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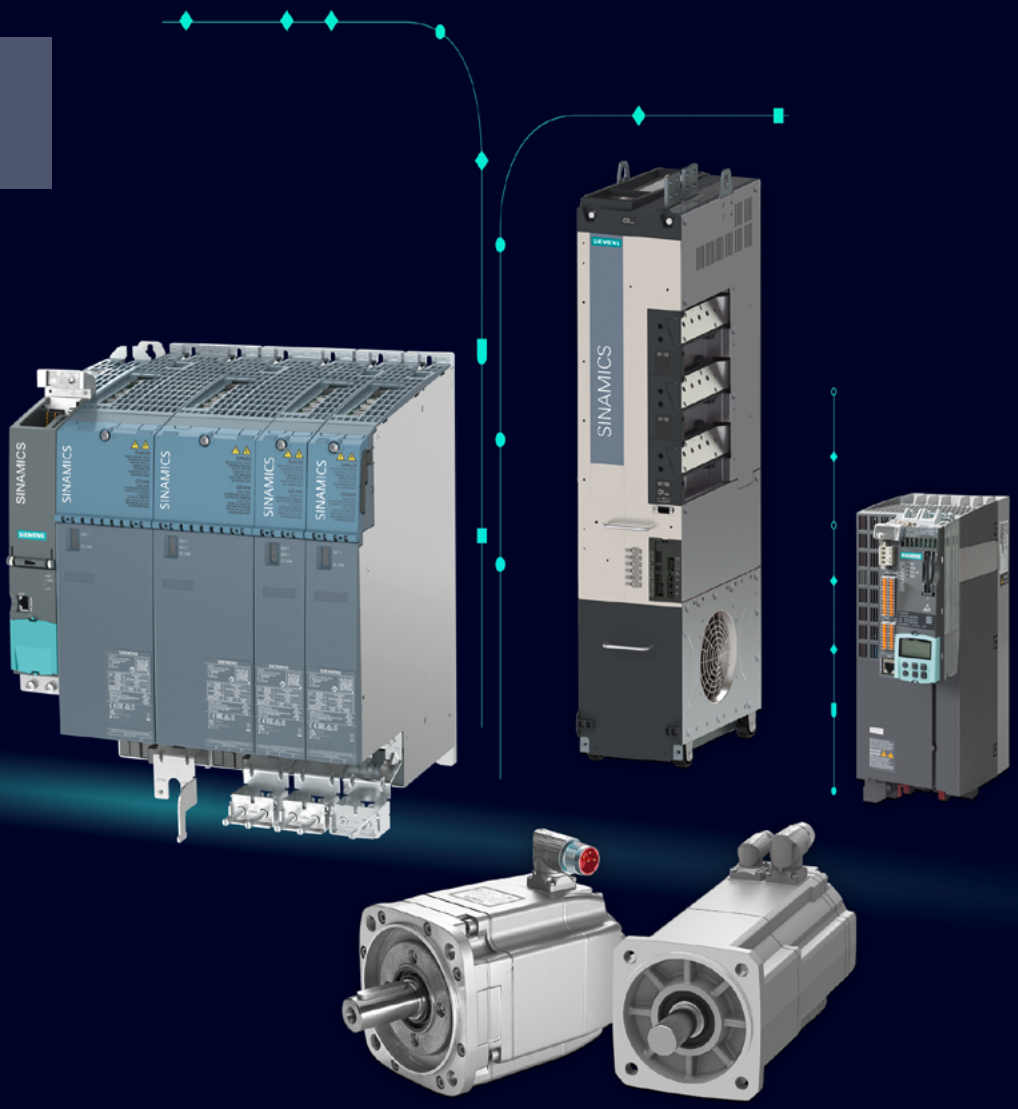
MOTION CONTROL DRIVES

SINAMICS S120, SINAMICS S220 and SIMOTICS

siemens.com/d21-4

Catalog
D 21.4

Edition
2026



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Related catalogs

Motion Control Drives D 31.1
SINAMICS Converters for Single-Axis Drives
Built-In Units

PDF (E86060-K5531-A111-A5-7600)



Motion Control Drives D 31.2
SINAMICS Converters for Single-Axis Drives
Distributed Converters

PDF (E86060-K5531-A121-A4-7600)



Motion Control Drives D 31.5
SINAMICS Converters for Single-Axis Drives
SINAMICS G120X infrastructure converters
for HVAC/Water/Wastewater

PDF (E86060-K5531-A151-A5-7600)



Motion Control Drives D 32
SINAMICS S210 Servo Drive System

PDF (E86060-K5532-A101-B2-7600)



Motion Control Drives D 36.1
SINAMICS Converters for Single-Axis Drives
SINAMICS G220 built-in and wall-mounted units

PDF (E86060-K5536-A111-A6-7600)



Motion Control Drives D 37.1
SINAMICS S200 Servo drive system

PDF (E86060-K5537-A111-A3-7600)



SINAMICS S120 D 21.3
Chassis Format Converter Units
Chassis-2 Format Converter Units
Cabinet Modules, Cabinet Modules-2
SINAMICS S150
Converter Cabinet Units
PDF (E86060-K5521-A131-B1-7600)



Motion Control Drives D 21.4
SINAMICS S120, SINAMICS S220 and
SIMOTICS

PDF (E86060-K5521-A141-A2-7600)



Motion Control Drives D 23.1
SINAMICS DCM
series of converters
DC Converter, Control Module

PDF (E86060-K5523-A111-A4-7600)



SIMOTICS S-1FG1 D 41
Servo geared motors
Helical, Parallel shaft, Bevel and
Helical worm geared motors

PDF (E86060-K5541-A101-A6-7600)



Motion Control Drives D 60
SIMOTICS E
Drive system for extra low voltage

PDF (E86060-K5560-A101-A3-7600)



Motion Control System PM 21
SIMOTION
Equipment for Production Machines

PDF (E86060-K4921-A101-A4-7600)



Industrial Controls IC 10
SIRIUS

PDF (E86060-K1010-A101-B7-7600)



Low-Voltage Power Distribution and Electrical Installation Technology LV 10
SENTRON • SIVACON • ALPHA

PDF (E86060-K8280-A101-C1-7600)



SIMATIC ST 70
Products for
Totally Integrated Automation

PDF (E86060-K4670-A101-C1-7600)



SIMATIC HMI / ST 80/ST PC
PC-based Automation
Human Machine Interface Systems
PC-based Automation

PDF (E86060-K4680-A101-D3-7600)



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Digital Industry Academy

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Catalog
D 21.4

Edition
2026

Combining the real and digital worlds ...
Transformation

MOTION CONTROL DRIVES

SINAMICS S120, SINAMICS S220 and SIMOTICS

siemens.com/d21-4

Dear Customer,

We are pleased to present you with the new Catalog D 21.4 · 2026. The catalog provides a comprehensive overview of the SINAMICS S120 drive system including the SINAMICS S220 Smart Line Modules in booksize format, the associated SIMOTICS motors, the MOTION-CONNECT connection systems and other components. The new edition of the catalog mainly contains updates and technical adjustments.

The products listed in this catalog are also included in SiePortal.

Please contact your local Siemens office for additional information.

Up-to-date information about SINAMICS S120 and SINAMICS S220 is available on the internet at
www.siemens.com/sinamics-s120

www.siemens.com/sinamics-s220

You can access SiePortal on the internet at
https://sieportal.siemens.com

Your personal contact will be happy to receive your suggestions and recommendations for improvement.
You can find your representative in our Personal Contact database at
www.siemens.com/automation-contact

We hope that you will often enjoy using Catalog D 21.4 · 2026 as a selection and ordering reference document and wish you every success with our products and solutions.

With kind regards,



Frank Golüke
Vice President
General Motion Control
Siemens AG, Digital Industries, Motion Control

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SINAMICS S120, SINAMICS S220 and SIMOTICS

MOTION CONTROL DRIVES



Catalog D 21.4 · 2026

Supersedes:
Catalog D 21.4 · 2023

Refer to SiePortal for current updates of this catalog:
https://sieportal.siemens.com

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Appendix 15

The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with EN ISO 9001 (Certified Registration No. 001258). The certificate is recognized by all IQNet countries.

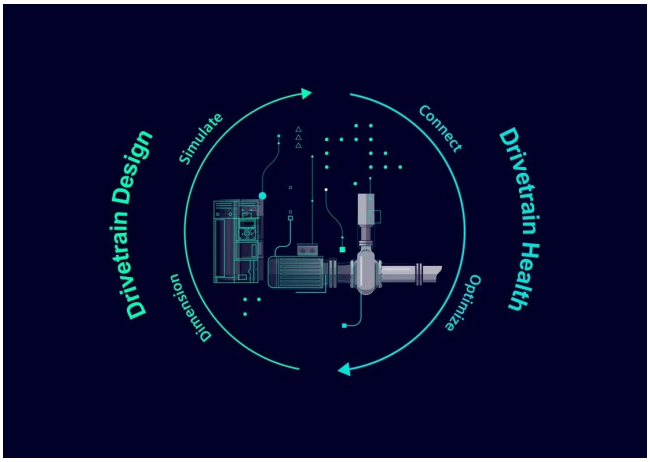
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Motion beyond expectations

Drives move the industries. But how can they make them more efficient, more reliable and more sustainable – and exceed all expectations while they are doing it? Our answer: Siemens Xcelerator for Digital Drivetrain.

Digital solutions for Drivetrain Design and Drivetrain Health

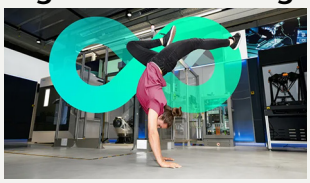
With digitalization solutions for Drivetrain Design and Drivetrain Health, you can optimize your drivetrain processes and use data to improve efficiency.
Drivetrain Design:
Simplify and shorten the engineering steps to get faster and more efficiently from concept to the commissioned drive-train.
Drivetrain Health:
Reduce total cost of ownership for your equipment and machine park – energy, maintenance, downtime.



siemens.com/digital-drivetrain

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Digitalization along the drivetrain value chain



Dimension

Accurate in motion: Dimension your motors, gearboxes, and complete drivetrains digitally with greater precision – for greater reliability and energy efficiency.



Simulate

Faster in motion: Add the digital twin of the drivetrain to your machine simulation to speed up your design and engineering phases and to accelerate your time-to-market!



Connect

Data in motion: Acquire high-quality raw data and connect your entire drive-trains or machines to cloud or on-premise platforms – for a consistent and secure data flow.



Optimize

Better in motion: Analyze and visualize drivetrain and machine data in digital solutions and apps to identify optimization potentials and concrete actionable measures how to tap it.

Use cases for digital drivetrain technology



Condition monitoring for drivetrains

Keep your operations moving: Gain valuable insights into your drivetrain to optimize maintenance, equipment availability, and cost efficiency. Discover intelligent digital condition monitoring for your drives!

Are your drivetrains fit enough for tough times?

Industry must optimize its production processes and reduce costs to remain competitive. Leverage digitalization and the data from your motors and drives to enhance your competitiveness – and keep your production moving.



What if you consume too much electricity?

With digital solutions and digital drive technology, you can significantly reduce your share of this!



What if you waste too much energy?

Digitalization enables you to detect energy waste and impending system down-times at an early stage so that you can take counter-measures in due time!



What if your motors are incorrectly designed?

Digital tools make it quicker and easier to correctly design your drive components!



What if your drives fail unexpectedly?

With digital solutions, you can identify risks in your drivetrain at an early stage and react before a failure occurs.

"Our digital solutions transform your drivetrain value chain to the next level of efficiency."

siemens.com/digital-drivetrain

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Next Generation

SINAMICS VARIABLE FREQUENCY DRIVES

Driving **next generation applications**


SINAMICS
SINAMICS
SINAMICS

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Low voltage converters

Low voltage frequency converters are suitable for a huge range of applications. For example, if materials must be moved, processed, positioned, pumped or compressed. Variable-speed operation saves energy and also increases process quality and process availability.



Servo converters

These servo converters meet the highest dynamic requirements for single and multi-axis applications. The perfect solution for machine tools, packaging machines, continuous material handling, cranes, rolling mills, test stands, material handling, robotics and many other applications requiring high-precision, dynamic motion control.



DC converters

The dynamic performance, ruggedness, and cost-effectiveness of DC technology continue to make it the most cost-effective and proven drive solution for many applications today – with numerous advantages in terms of reliability, ease of use, and operational performance.



Our variable frequency drives meet your requirements and enable flexible drive applications through digital functionality and versatility

How can you make production more efficient? Accelerate your digital transformation? And become more sustainable?

The answer is our SINAMICS frequency converters. They offer the versatility you need for a wide range of applications and advance your digital transformation by providing data to optimize your production processes. Our converters offer you integrated safety and security features, efficient engineering and software tools as well as comprehensive lifecycle services. In other words: Everything you need to address the next generation of applications – today and tomorrow.

EFFICIENT

Implement energy-efficient applications easily, quickly, and safely with efficient motion control.

- Sustainable drive systems
- Efficient Motion Control solutions
- Drive System Services

VERSATILE

Drives equipped with tailored safety features to ensure optimal machine safety in a wide range of industrial applications.

- Safety and Security Integrated
- Drive applications
- Drives for any industry

FUTURE-PROOF

Efficient engineering, powerful software tools, and cloud and edge connectivity for greater transparency.

- Digitalization in drive technology
- Efficient drive engineering
- Drive Software for all applications

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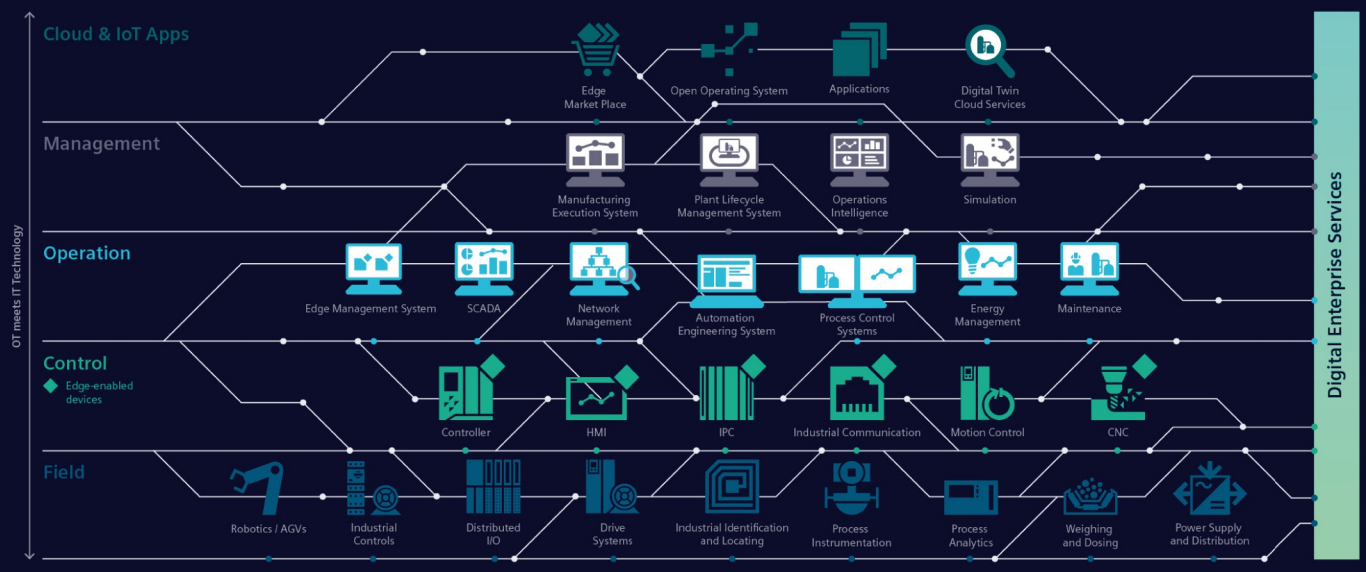
Totally Integrated Automation



Totally Integrated Automation (TIA) offers smart automation development, flexible machine concepts, transparent operation, and sustainable solutions that enable access to data to calculate and optimize the product carbon footprint. We are constantly improving and expanding TIA to be future-proof and adaptive to existing and upcoming challenges.

A comprehensive portfolio for the challenges of today and tomorrow

The TIA offering is integrated seamlessly and it's so comprehensive that it provides the right automation solutions for every industry. We will continue to improve and expand our proven automation portfolio and are constantly including innovative technologies and solutions that pave the way towards the factory of the future.



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Real added value for the automation of your production

From the development of innovative machine concepts to engineering and optimized production:
TIA offers real added value along the entire value chain.

Smart Automation Development

Innovative machine concepts made easy: When you use standardized library concepts and preconfigured expertise, you can count on efficient engineering. Thanks to the integration of safety features, diagnostic functions, and cybersecurity, you also save valuable time.

Flexible Machine Concepts

No matter what new requirements emerge in the market, TIA supports modular machine concepts and the simple integration of new machines into existing lines – thanks to standardized hardware interfaces and engineering libraries. As a machine builder, this enables you to meet any challenge quickly and reliably.

Transparent Operation

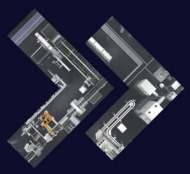
Integrated interfaces let you achieve a new level of transparency for the essential performance indicators in your processes and plants. The connection between IT and OT along with efficient data management lay the foundation for new service models such as predictive maintenance.

Future-proof Automation

Our TIA portfolio is constantly being refined with a view to integrating automation technologies more and more efficiently. The components can then interact with modern IT capabilities, which are becoming increasingly important for specific applications in automation. TIA provides a solid foundation, whether for working with our Industrial Operations X portfolio or for everything the future has in store.

Sustainable Solutions

Sustainability starts with the acquisition of data. With the TIA portfolio, you can measure energy and resource data and make it transparent, providing a solid foundation for calculating the Product Carbon Footprint. This is crucial for drawing the right conclusions and responding to sudden changes in order to lastingly reduce CO_2 emissions and save more resources in production.



www.siemens.com/tia

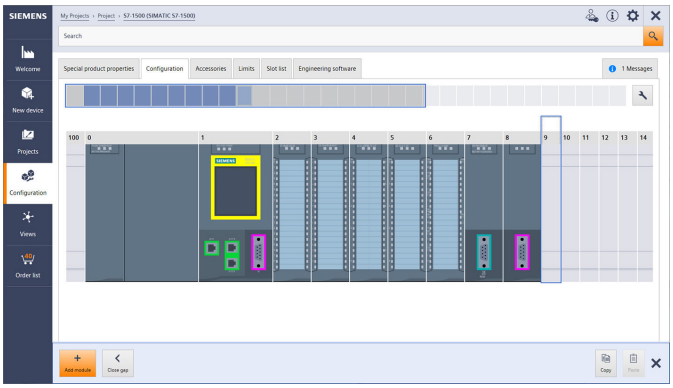
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TIA Selection Tool – quick, easy, smart configuration

For you to get the most out of our portfolio quickly and easily.

Do you always need the optimum configuration for planning your project?
For your application we offer the TIA Selection Tool to support all project planners, beginners and experts alike.
No detailed portfolio knowledge is necessary.
TIA Selection Tool is available for download as a free desktop version or a cloud variant.



Your Advantages

Quick

- Configure a complete project with just a few entries – without a manual, without special knowledge
- Import and export of hardware configuration to TIA Portal or other systems
- Ideal visualization of the projects to be configured

Easy

- Tool download either as desktop version or web-based cloud version
- Technically always up-to-date about product portfolio and innovative approaches
- Highly flexible, secure, cross-team work in the cloud
- Direct ordering in SiePortal

Smart

- Smart selection wizard for error-free configuration and ordering
- Configuration options can be tested and simulated in advance
- Library for archiving sample configurations

The TIA Selection Tool is a completely paperless solution.
Download it now:
www.siemens.com/tst

For more information, scan the QR code

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Sustainability @Siemens

Transforming the everyday to create a better tomorrow.



For more information, see www.siemens.com/sustainability

As a company, Siemens considers environmental, social and governance (ESG) criteria from all angles with its DEGREE framework (decarbonization, ethics, governance, resource efficiency, equity and employability). We are not only committed to reducing the carbon footprint in our own operations to net zero by 2030, but also helping our customers achieve their decarbonization and sustainability goals.

Mission & strategy

As a focused technology company, Siemens is committed to addressing the world's most profound challenges by leveraging the synergies between digitalization and sustainability.

Technology with aim and purpose

We develop technologies that connect the real and digital worlds and enable our customers to positively transform the industries that form the backbone of our economy: industry, infrastructure, transportation and healthcare.

Our contribution

Siemens makes an impact every day by providing innovative solutions in response to challenges relating to environmental protection, decarbonization, health and safety. Innovative solutions that have a clear goal: to make the world more sustainable, more integrative and a better place to live.

Sustainability facts

For almost 175 years, Siemens has been driven by the desire to improve the lives of people around the world with our technologies.

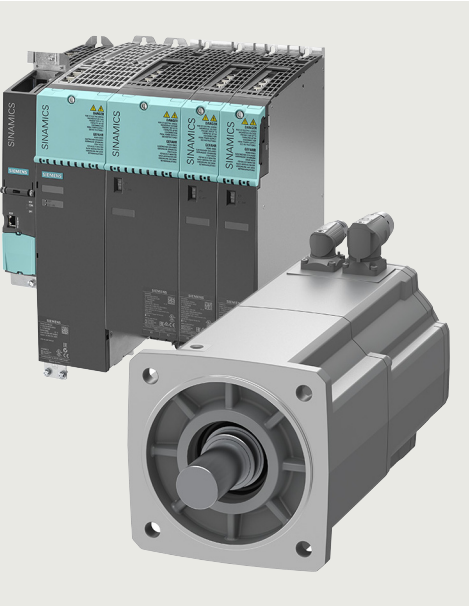
Siemens EcoTech

Siemens EcoTech is a framework for products that promotes the sustainable transformation of industry and infrastructure. The framework offers you transparency regarding the performance of our evaluated products in terms of environmental criteria, so that you can make informed decisions in order to achieve your sustainability goals, see www.siemens.com/SiemensEcoTech.

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System overview



1/2	Excellence in Motion Control
1/3	The SINAMICS converter family
1/4	Drive selection
1/5	SINAMICS S120 drive system
1/10	SIMOTICS motors
1/11	SIMOTICS motors for motion control applications
1/13	Motion Control Encoder measuring system
1/14	MOTION-CONNECT connection systems

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Overview

Motion Control Solutions "Made by Siemens"

Thanks to our strong innovation capacity, sector know-how and outstanding customer benefits of our automation solutions for machine tools and production machines, Siemens is one of the leading suppliers of Motion Control Systems worldwide. For this reason, we can supply many references in different areas.



Innovative products, systems, solutions and services for each sector

Siemens Motion Control Systems satisfy very high requirements: All products stand out through the use of the latest technologies, high functionality and quality. In addition, the individual systems and products are optimally matched to one another so that they can be easily and consistently combined into an economic machine solution.

Examples of this are the SINAMICS drive system and the SIMOTICS motors. These products constitute an innovative system platform with which you can optimize the design of your machine to meet your own requirements. They provide you with optimized, economic and future-oriented motion control solutions for different sectors such as the packaging, plastics and glass, wood and metalworking, textile and printing industries, which can be easily expanded for increased requirements.



By offering you Mechatronic Support, Siemens is providing you with an intelligent alternative to developing expensive prototypes. Using virtual prototyping, it is possible to model and optimize all the mechanical, electronic and information technology systems for their functionality while they are still at the design stage. You don't then need to implement a prototype for real, but can immediately build the finished machine.

Application consulting: The safe path to top solutions

Our technical and application consultants accompany the projects on site from planning to commissioning, from the idea to the functioning machine. You will receive support from a number of different application centers, some of which are sited in Germany, Italy, the USA and China.

Application consulting includes:

- Planning and implementation of projects
- Technical verification with test configuration and simulation
- Development of requirements and functional specifications
- Application workshops and customer-specific training courses

Partnership for joint success

During this cooperation Siemens not only supports its customers, but also includes them as technology partners in the development process of systems and components which results in practical and future-oriented automation solutions.

In this way Siemens helps its customers increase their productivity, competitiveness and profitability over the long term.

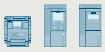
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Overview

SINAMICS frequency converters

SINAMICS frequency converters are the ultimate solution for all drive applications. From low voltage to direct current (DC), our frequency converters meet your needs.

Thanks to their high energy efficiency and versatile applications, they support demand-based drive control in industrial applications. The digital functions of SINAMICS frequency converters enable flexible integration into modern automation and drive concepts.
www.siemens.com/sinamics

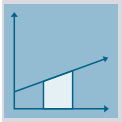
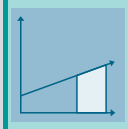
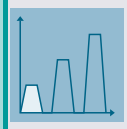
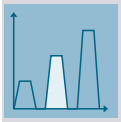
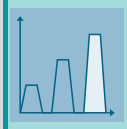
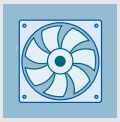
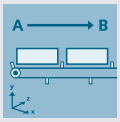
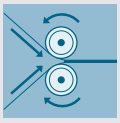
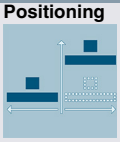
Low voltage									Direct voltage
Standard performance frequency converters		Distributed frequency converters	Industry-specific frequency converters	Servo converters		High performance frequency converters			DC converters
									
SINAMICS V20 G120C G120 G200 G210	SINAMICS G130 G150	SINAMICS G115D G120D SIMATIC ET 200pro FC-2	SINAMICS G120X G210X	SINAMICS V90 S200	SINAMICS S210 (6SL5...)	SINAMICS G220	SINAMICS S120 S120M S220	SINAMICS S150 S220	SINAMICS DCM DCP [1]
0.12 kW to 250 kW	75 kW to 2700 kW	0.37 kW to 7.5 kW	0.75 kW to 630 kW	0.05 kW to 7 kW	0.05 kW to 7 kW	0.55 kW to 160 kW	0.55 kW to 5700 kW	75 kW to 1200 kW	6 kW to 30 MW
Pumps, fans, compressors, conveyor belts, mixers, mills, spinning machines, textile machines, refrigerated display counters, fitness equipment, ventilation systems, single-axis positioning applications in machine and plant engineering	Pumps, fans, compressors, conveyor belts, mixers, mills, extruders	Conveyor technology, single-axis positioning applications (G120D)	Pumps, fans, compressors, building management systems, process industry, HVAC, water/waste water industries	Handling machines, packaging machines, automatic assembly machines, metal forming machines, printing machines, winding and unwinding units	Packaging machines, handling equipment, feed and withdrawal devices, stacking units, automatic assembly machines, laboratory automation, wood, glass and ceramics industry, digital printing machines	Pumps, fans, compressors, conveyor belts, mixers, mills, spinning machines, textile machines, refrigerated display counters, fitness equipment, ventilation systems, single-axis positioning applications in machine and plant engineering	Production machines (packaging, textile and printing machines, paper machines, plastic processing machines), machine tools, plants, process lines and rolling mills, marine drives, test bays	Test bays, cross cutters, centrifuges	Rolling mill drives, wire-drawing machines, extruders and kneaders, cableways and lifts, test bay drives
Catalog D 31.1 D 36.3 D 36.4	Catalog D 11	Catalog D 31.2	Catalog D 31.5 D 36.5	Catalog D 33 D 37.1	Catalog D 32	Catalog D 36.1	Catalogs D 21.3, D 21.4 D 38	Catalog D 21.3 D 38	Catalog D 23.1, SiePortal
Engineering tools (e.g. Siemens Product Configurator, TIA Selection Tool, DriveSim Engineer, STARTER and SINAMICS Startdrive)									

[1] DC/DC controllers, see SiePortal.

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Overview

Use	Requirements for torque accuracy/speed accuracy/position accuracy/coordination of axes/functionality					
	Continuous motion			Non-continuous motion		
	Basic	Medium	High	Basic	Medium	High
						
Pumping, ventilating, compressing	Centrifugal pumps Radial / axial fans Compressors	Centrifugal pumps Radial / axial fans Compressors	Eccentric screw pumps	Hydraulic pumps Metering pumps	Hydraulic pumps Metering pumps	Descaling pumps Hydraulic pumps
	V20 G200 G120X/G210X	G120X/G210X G130/G150 DCM	G220 G210X **S120/S220**	G120 G220	S210 S220	**S120/S220**
Moving	Conveyor belts Roller conveyors Chain conveyors	Conveyor belts Roller conveyors Chain conveyors Lifting/lowering devices Elevators Escalators/moving walkways Indoor cranes Marine drives Cable railways	Elevators Container cranes Mining hoists Excavators for open-cast mining Test bays	Acceleration conveyors Storage and retrieval machines	Acceleration conveyors Storage and retrieval machines Cross cutters Reel changers	Storage and retrieval machines Robotics Pick & place Rotary indexing tables Cross cutters Roll feeds Engagers/ disengagers
	V20 G115D G120C/G200 ET 200pro FC-2 [1]	G120/G210 G120D G130/G150	G220 **S120/S220** S150 DCM	S200 G120 G220 G120D	S210 DCM	**S120/S220** S210 DCM
Processing	Mills Mixers Kneaders Crushers Agitators Centrifuges	Mills Mixers Kneaders Crushers Agitators Centrifuges Extruders Rotary furnaces	Extruders Winders/unwinders Lead/follower drives Calenders Main press drives Printing machines	Tubular bagging machines Single-axis motion control such as • Position profiles • Path profiles	Tubular bagging machines Single-axis motion control such as • Position profiles • Path profiles	Servo presses Rolling mill drives Multi-axis motion control such as • Multi-axis positioning • Cams • Interpolations
	V20 G120C/G200	G120/G210 G130/G150	G220 **S120/S220** S150 DCM	S200 G120 G220	S210	**S120/S220** S210 DCM
Positioning	Positioning	Dynamic Positioning	Coordinated Motion	Indexing	Dynamic Indexing	Synchronized Motion & Camming
	G120 G210	G120 G120D G210	G220	S200	S210	**S120** S150 DCP S210 **S220**
Machining	Main drives for • Turning • Milling • Drilling	Main drives for • Drilling • Sawing	Main drives for • Turning • Milling • Drilling • Gear cutting • Grinding	Axis drives for • Turning • Milling • Drilling	Axis drives for • Drilling • Sawing	Axis drives for • Turning • Milling • Drilling • Lasering • Gear cutting • Grinding • Nibbling and punching
	S200	**S120/S220**	**S120/S220**	S200	**S120/S220**	**S120/S220**

Using the SINAMICS selection guide

The varying range of demands on modern variable frequency drives requires a large number of different types. Selecting the optimum drive has become a significantly more complex process. The application matrix shown simplifies this selection process considerably, by suggesting the ideal SINAMICS drive for examples of typical applications and requirements.

- The application type is selected from the vertical column
  - Pumping, ventilating, compressing
  - Moving
  - Processing
  - Positioning
  - Machining
- The quality of the motion type is selected from the horizontal row
  - Basic
  - Medium
  - High

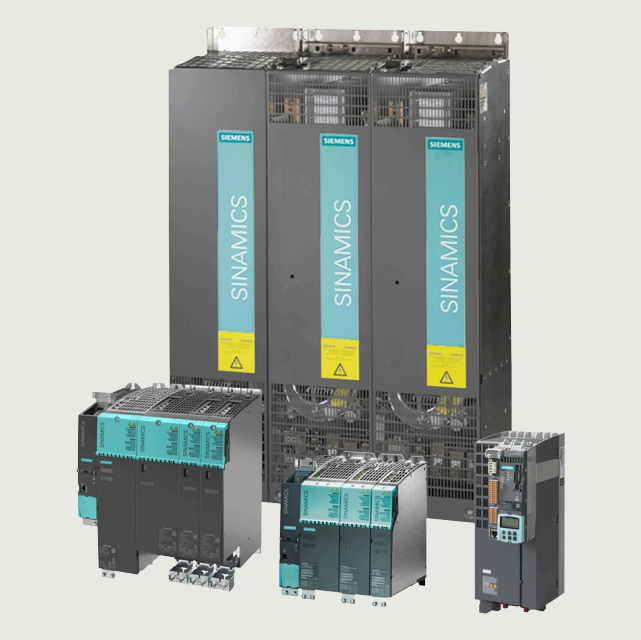
More information

Further information about SINAMICS is available on the internet at
www.siemens.com/sinamics
Practical application examples and descriptions are available on the internet at
www.siemens.com/sinamics-applications

[1] Information on the SIMATIC ET 200pro FC-2 frequency converter is available in Catalog D 31.2 and at: www.siemens.com/et200pro-fc

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Overview



Flexibility for successful machine concepts

As part of the SINAMICS converter family, the SINAMICS S120 drive is a modular system for high-performance applications in machine and plant engineering. SINAMICS S120 offers high-performance single-axis and multi-axis drives for a very broad range of industrial applications. By virtue of its scalability and flexibility, SINAMICS S120 is the ideal system for satisfying the ever increasing demand for more axes and better performance. SINAMICS S120 supports flexible machine designs and speedy implementation of customized drive solutions.

The response to ever increasing demands

Modern machines must be built at ever lower cost, but deliver ever greater productivity. The SINAMICS S120 drive concept meets both these challenges! It is easy to configure and thus helps reduce project completion times. Its excellent dynamic response and accuracy permit higher cycle rates for maximum productivity.

Applications in machine and plant engineering

Regardless of whether the application involves continuous material webs or cyclic, highly dynamic processes – SINAMICS S120 means increased machine performance in many industries:

- Packaging machines
- Plastics processing machines
- Textile machines
- Printing machines
- Paper machines
- Woodworking machines
- Hoists and cranes
- Handling and assembly systems
- Machine tools
- Rolling mills
- Test stands
- Machinery associated with renewable energy applications

Modularity for mechanical engineering

SINAMICS S120 is designed to allow free combination of power and control performance. Multi-axis drives with higher-level motion control can be implemented with the SINAMICS S120 modular system as easily as single-drive solutions.

Greater flexibility with central control intelligence

On the SINAMICS S120, the drive intelligence is combined with closed-loop control functions into Control Units.

These units are capable of controlling drives in Vector, Servo and *V/f* modes. They also perform the speed and torque control functions plus other intelligent drive functions for all axes on the drive.

Free performance selection for Vector and Servo control modes

The use of a SINAMICS S120 Vector control is recommended for drive solutions with continuous material webs, for example, wire-drawing machines, film and paper machines, as well as for hoisting gear, centrifuges and marine drives with harmonic, circular motion.

Servo control with SINAMICS S120 is employed for cyclic processes with precise, highly dynamic position control and servo motors, e.g. in textile, packaging, printing machines and machine tools.

SINAMICS S120 – functions for better efficiency

- Basic functions: Speed control, torque control, positioning functions
- Intelligent starting functions for independent restart after power supply interruption
- BICO technology with interconnection of drive-related I/Os for easy adaptation of the drive system to its operating environment
- Integrated safety functions for rational implementation of safety concepts
- Regulated infeed/regenerative feedback functions for preventing undesirable reactions on the supply, allowing recovery of braking energy and ensuring greater stability against line fluctuations.

DRIVE-CLiQ – the digital interface between all components

All SINAMICS S120 components, including the motors and encoders, are interconnected by a shared serial interface called DRIVE-CLiQ. The standardized cables and connectors reduce the variety of different parts and cut storage costs. Converter boards (Sensor Modules) for converting standard encoder signals to DRIVE-CLiQ are available for third-party motors or retrofit applications.

Swift and automatic: The electronic rating plate

An important digital linkage element of the SINAMICS S120 drive system are the electronic type plates integrated in every component. They allow all drive components to be detected automatically via a DRIVE-CLiQ link. As a result, data do not need to be entered manually during commissioning or component replacement – helping to ensure that drives are commissioned successfully! The electronic rating plates of the motors contain, for example, the parameters of the electrical equivalent circuit diagram and the characteristic data of the built-in motor encoder in addition to information such as order and identification numbers.

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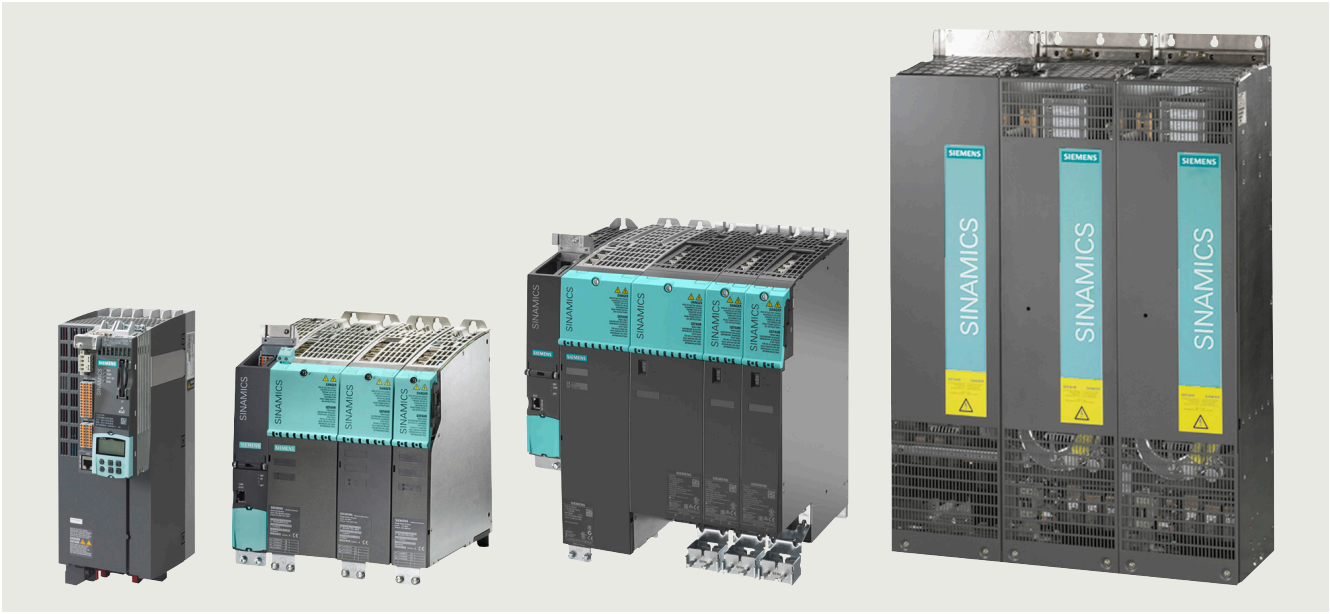
Overview

Modular design ensures flexibility and scalability

DC/AC units (Motor Modules) – available in compact booksize, booksize and chassis formats – are characterized by their modular design. All the drive intelligence is organized into Control Units. The Control Units perform all the closed-loop control functions for the drive line-up. They also handle all other drive functions such as the interconnection of drive-related I/Os, positioning functions, and feature PROFIBUS DP or PROFINET as the central interface for linking to higher-level automation systems.

Line Modules function as the central energy supply to the voltage-source DC link. Line Modules are optionally available with regulated infeed/regenerative feedback to provide a constant DC link voltage and high level of supply compatibility. Motor Modules supply the motors with energy from the DC link.

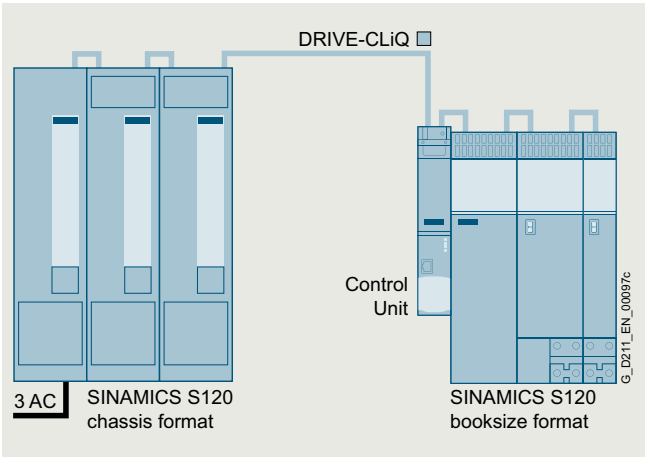
On AC/AC units, the infeed and motor power supply functions are combined in one device, the Power Module – available in blocksize and chassis formats. For single-axis applications, drive control functions are performed by a special Control Unit (CU310-2) mounted on the Power Module and for multi-axis applications, by a Control Unit (e.g. CU320-2) connected by a DRIVE-CLiQ link. In this case, a Control Unit Adapter is mounted on the Power Module in place of the Control Unit.



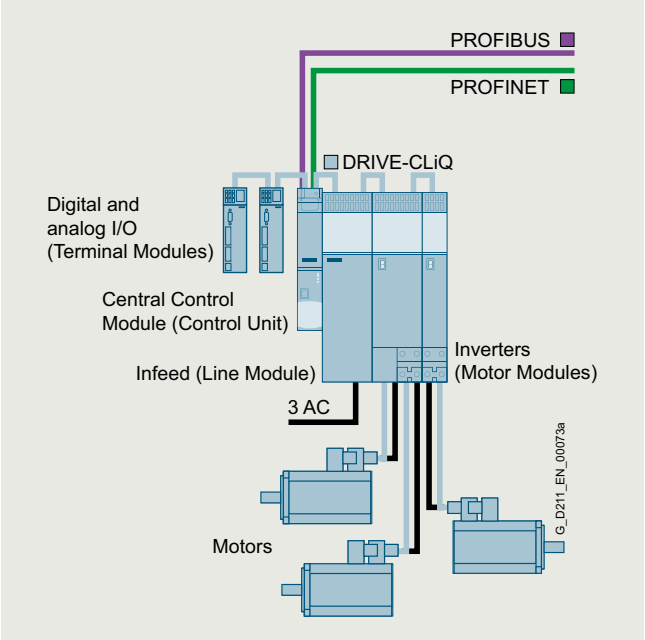
SINAMICS S120 blocksize, booksize compact, booksize and chassis formats

All formats can be combined as required

The different SINAMICS S120 formats can be combined freely thanks to their DRIVE-CLiQ interfaces, e.g. Line Modules in chassis format can be freely combined with Motor Modules in booksize format for multi-axis applications with high total output.



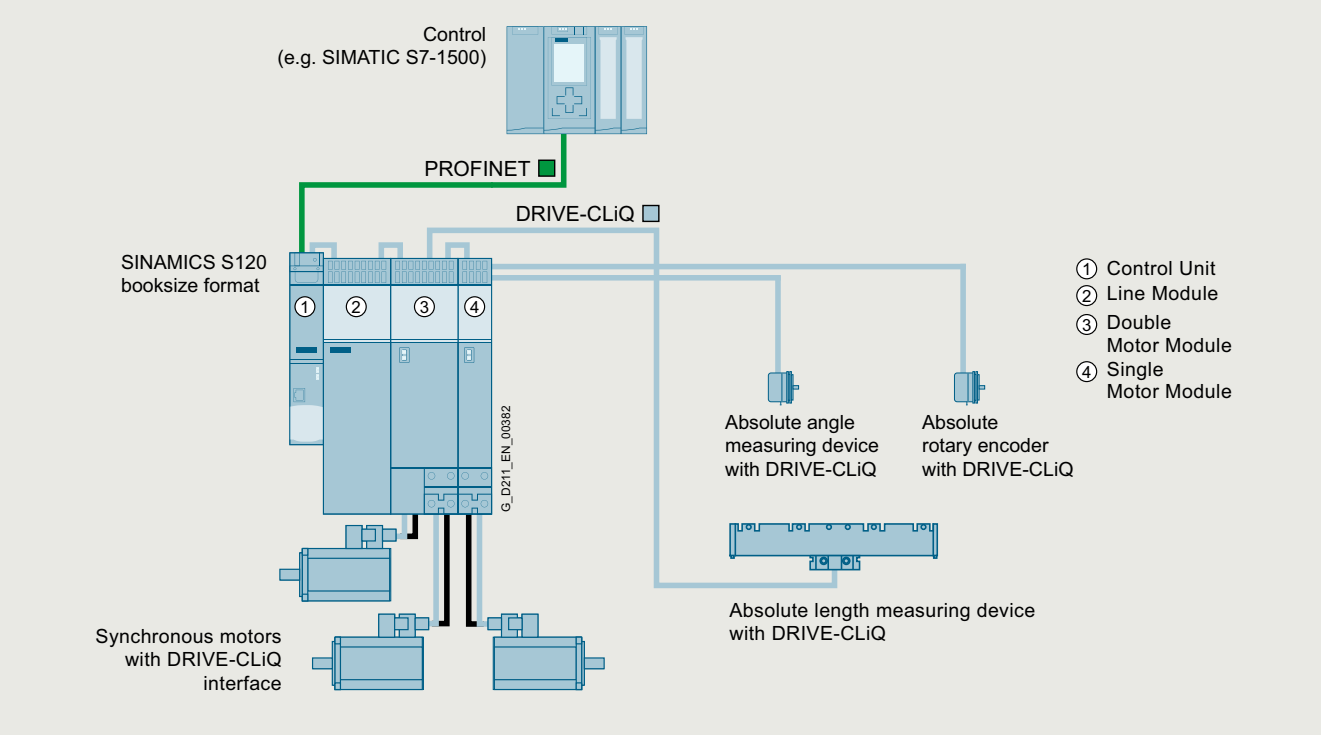
SINAMICS S120 Control Units in booksize and chassis formats



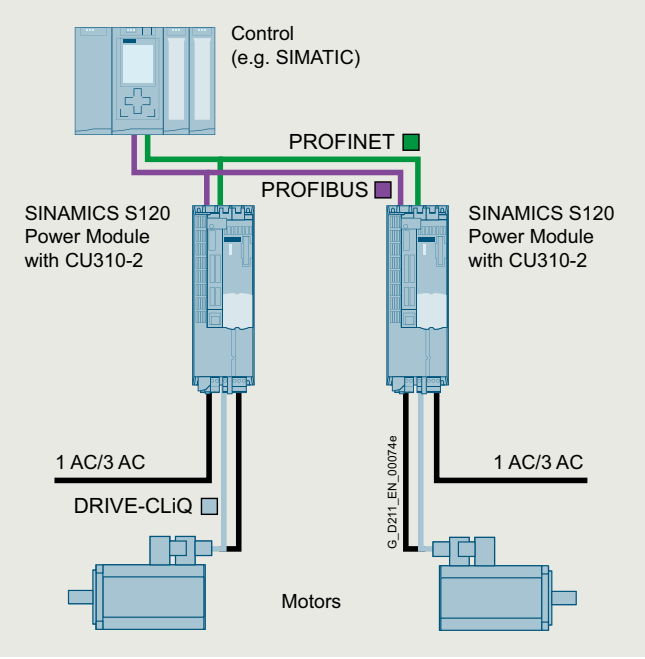
Example configuration of SINAMICS S120 booksize format

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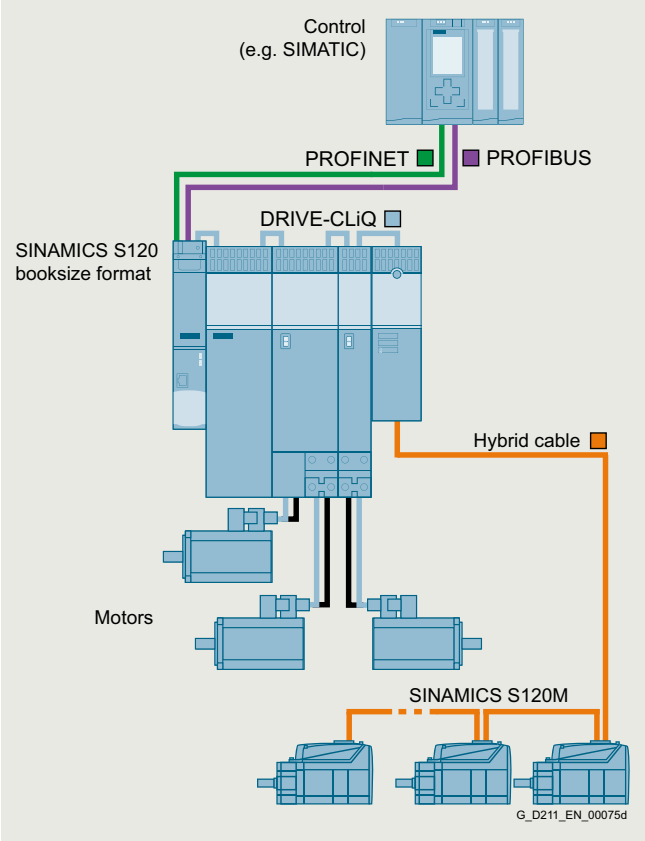
Overview



Configuration scheme SINAMICS S120 booksize format



Example configuration of SINAMICS S120 blocksize format

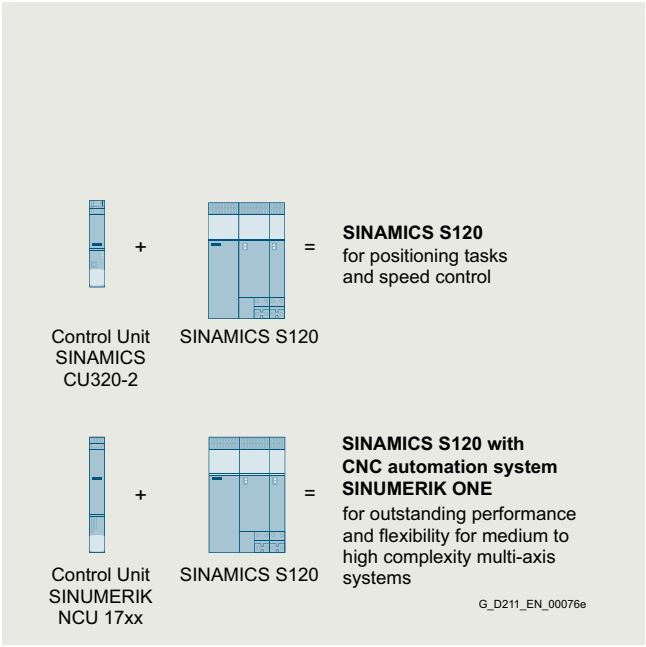


Example configuration of SINAMICS S120, integrated in control cabinet and distributed

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Overview

SINAMICS S120 can be scaled with respect to performance and technology. In the case of more exacting technological requirements, for example, the SINAMICS S120 Control Unit can be replaced by a drive-based controller for motion control. This is the SINUMERIK for machine tools. It is also easy to couple the SINAMICS S120 to a higher-level SIMATIC S7 with integral technology functions.



Scalable motion control functions

Totally Integrated Automation – the unique automation platform

With Totally Integrated Automation (TIA), Siemens is the only single-source provider to offer an integrated spectrum of products and systems for all industries. Tailored to meet individual customer requirements, industry-specific automation solutions can be implemented efficiently on the basis of TIA. Lower life-cycle costs for plant operation and a significant reduction in time to market result in a marked improvement in productivity and greater investment security.

Easy – Totally Integrated Automation with SINAMICS S120

Apart from SIMATIC and SINUMERIK, SINAMICS is also one of the core components of TIA. The STARTER commissioning tool is therefore an integral element of the TIA platform. It is thus possible to parameterize, program and commission all components in the automation system using a standardized engineering platform and without any gaps. The system-wide data management functions ensure consistent data and simplify archiving of the entire plant project.

PROFINET – for enhanced performance and open IT communication

PROFINET, the standard fieldbus of the TIA system, is supported by all SINAMICS S120 variants. This Ethernet-based bus enables control data to be exchanged at high speed via PROFINET IO with IRT or RT and makes SINAMICS S120 a suitable choice for integration in top-performance multi-axis applications.

At the same time, PROFINET also uses standard IT mechanisms (TCP/IP) to transport information, e.g. operating and diagnostic data, to higher-level systems. A SINAMICS S120 with this interface can thus easily be integrated into factory IT networks.

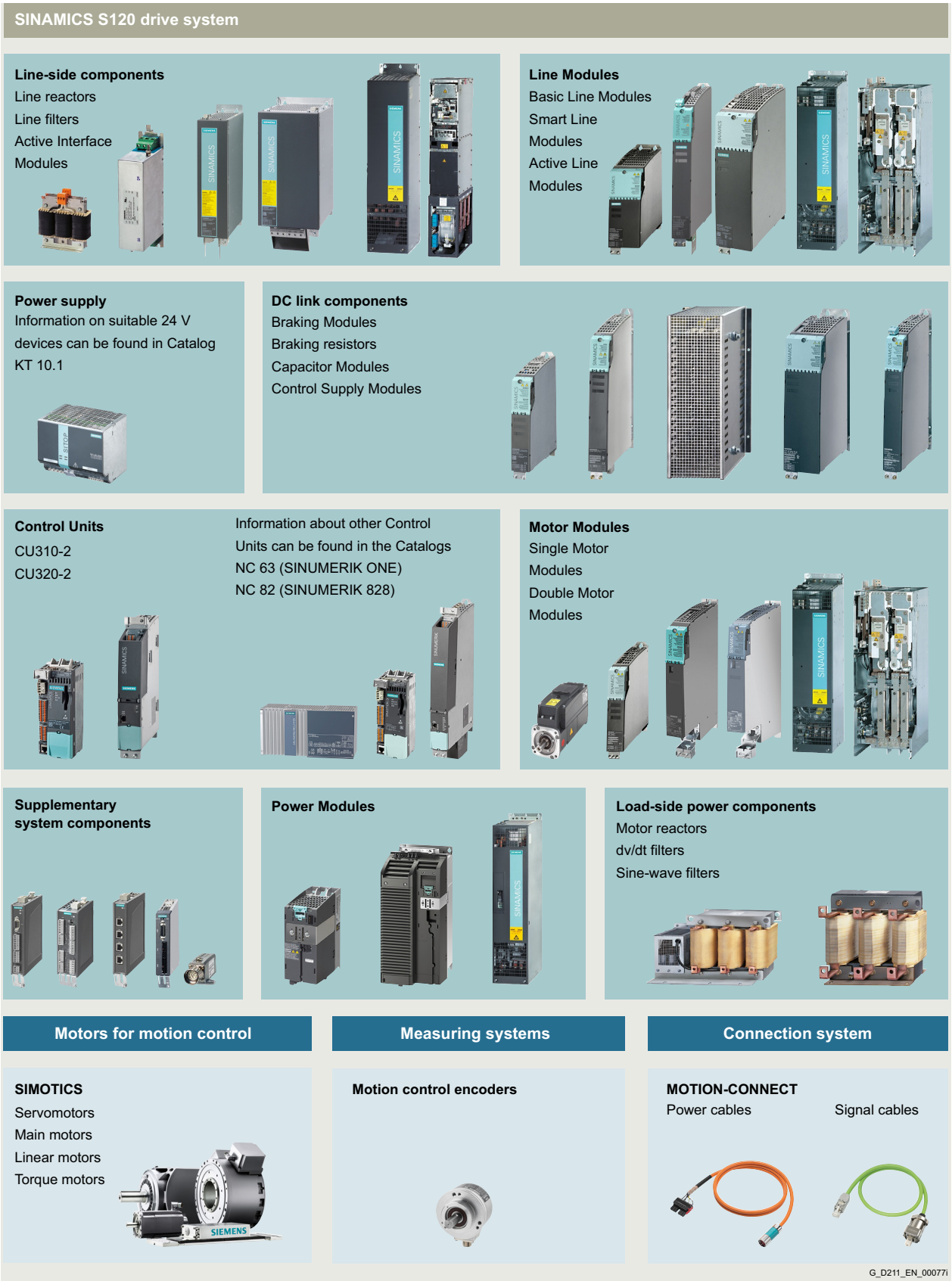
PROFIBUS

SINAMICS S120 supports PROFIBUS DP. It provides a high-performance, system-wide communication network which links all automation components: HMI, controls, drives and I/O devices.

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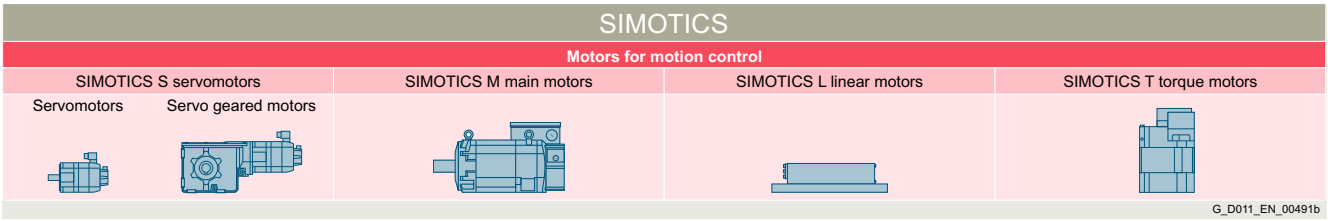
Overview

The components of the SINAMICS S120 drive system



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Overview



SIMOTICS stands for

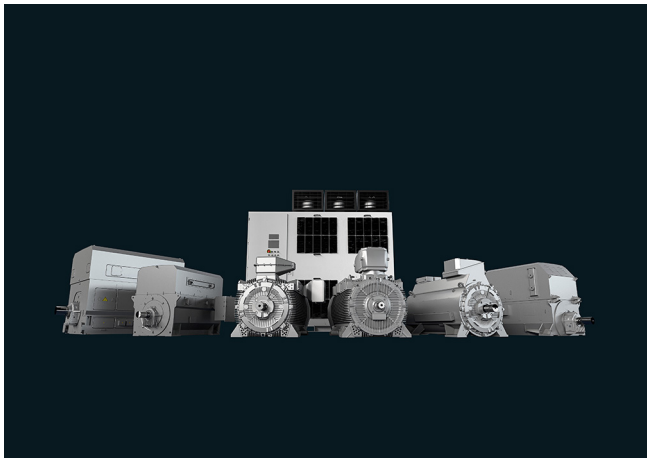
- 150 years of experience in building electric motors
- The most comprehensive range of motors for motion control applications
- Optimum solutions in all industries, regions and power/ performance classes
- Innovative motor technologies of the highest quality and reliability
- Highest dynamic performance, precision and efficiency together with the optimum degree of compactness
- Our motors can be integrated into the drive train as part of the overall system
- A global network of skill sets and worldwide service around the clock

A clearly structured portfolio

The entire SIMOTICS product portfolio is transparently organized according to application-specific criteria in order to help users select the optimum motor for their application.

Whatever it is that you want to move – we can supply the right motor for the task.
www.siemens.com/simotics

Motors from Innomotics



You can also find suitable motors from our product partner Innomotics
www.siemens.com/simotics

An outstanding performance for any job

A key characteristic of all SIMOTICS motors is their quality. They are robust, reliable, dynamic and precise to assure the requisite performance level for any process and deliver exactly the capabilities demanded by the application in hand. Thanks to their compact design, they can be integrated as space-saving units into installations. Furthermore, their impressive energy efficiency makes them effective as a means of reducing operating costs and protecting the environment.

A dense network of skill sets and servicing expertise around the world

SIMOTICS offers not only a wealth of sound experience gleaned from a development history which stretches back over around 150 years, but also the know-how of hundreds of engineers. This knowledge and our worldwide presence form the basis for a unique proximity to industries which feeds through in tangible terms to the specific motor configuration which is tailored to suit your application.

Our specialists are available to answer all your queries regarding any aspect of motor technology. At any time – wherever you are in the world. When you choose SIMOTICS, therefore, you reap the benefits of a global service network which is continuously accessible, thereby helping to optimize response times and minimize downtimes.

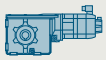
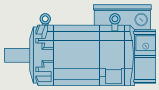
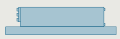
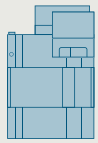
An end-to-end automation concept that sets new standards in efficiency and cost-effectiveness

Our portfolio includes perfectly matched components: SIMOTICS motors work precisely with the SINAMICS frequency converter family and are seamlessly integrated into the SIMATIC control landscape.
The combination of SIMATIC industrial automation and SINUMERIK CNC systems as well as the MOTION-CONNECT system cabling and cabinet integration enables a holistic solution. The system is supplemented by HMI devices, peripherals, power supplies and measuring systems.
Benefit from a complete system from a single source that meets your requirements in any industry.

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Overview

Overview of motors for motion control applications

Motion control motors				
SIMOTICS S servomotors		SIMOTICS M main motors	SIMOTICS L linear motors	SIMOTICS T torque motors
Servomotors	Servo-geared motors			
				
1FT2 1FK2 1FT7	1FG1	1PH8 1FE1 1FE2	1FN3	1FW3 1FW6
0.05 ... 45.5 kW	0.5 ... 7 kW	2.8 ... 1340 kW	1.7 ... 81.9 kW	1.7 ... 380 kW
0.08 ... 250 Nm	14 ... 8100 Nm	13 ... 12435 Nm	150 ... 10375 N	10 ... 7000 Nm
up to 10000 r/min	up to 1300 r/min	up to 40000 r/min	up to 836 r/min	up to 1200 r/min
Applications with high to very high demands regarding dynamic performance and precision, e.g. robots and handling systems, wood, glass, ceramics and stone working, packaging, plastics and textile machines and the machine tool area	In applications such as palletizers, storage and retrieval units with lifting, traversing and fork drives, dosing pumps and actuators	Precise turning, highly dynamic rotary axes, e.g. main drives in presses, printing machines, roller drives and winders in foil machines and other converting applications, main spindle drives in machine tools	Applications with stringent dynamic response and precision requirements for linear movements, e.g. machining centers, turning, grinding, laser machining, handling and machine tool applications	Rotary axis applications with stringent precision and force requirements, e.g. extruders, winders, roller drives, rotary axes in machine tools, rotary index tables, tool magazines
D 21.4 NC 82	D 41	D 21.4 NC 82	D 21.4	D 21.4

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Whether it is a servomotor, a main motor, a torque motor or a linear motor – no other manufacturer anywhere in the world offers such an extensive portfolio of motors for motion control applications. Perfectly coordinated for operation with SINAMICS drives, all products in the portfolio impress with their compact dimensions, precision and dynamic response.

SIMOTICS S servomotors
Highly dynamic and extremely compact

Whether they are used for positioning in pick and place applications, as cyclic drives in packaging machines or for path control in handling systems and machine tools: Our permanent-magnet, highly energy efficient SIMOTICS servomotors are the first choice for any application which demands highly dynamic and precise motional sequences. Depending on the application, they are available with various different built-in encoders – from the simple resolver to the high-resolution absolute encoder. The SIMOTICS S product range is rounded off by the SIMOTICS servo geared motors.

SIMOTICS M main motors
Exact rotation at up to 40000 r/min

For applications where continuous, precise rotation of the axes is the primary concern. Thus they are ideally suited for the main drives for presses, as roller drives in printing and paper-making machines, textiles and plastics-processing machines. They can also be deployed as winder drives and in machine tool spindles and hoisting gear. With a power spectrum ranging from 2.8 kW to 1340 kW (3.75 to 1797 hp), they cover virtually every application.

SIMOTICS L linear motors
Improved dynamic response all along the line

The ideal solution for any application which requires linear movements to be performed with maximum dynamic response and precision. The reason: The effects of elasticity, backlash and friction as well as natural oscillation in the drive train are largely eliminated because no mechanical transmission elements such as ball screw, coupling and belt are needed when linear motors are used. This simplifies the machine design and reduces wear.

SIMOTICS T torque motors
Outstanding precision for rotary axes

Optimized for high torques at low rated speeds. With their excellent precision, dynamic response and low wear (they have no mechanical transmission elements), these motors have all the right credentials for use as built-in motors in rotary indexing machines, rotary tables or swivel and rotary axes, e.g. on machine tools. The same also applies to complete torque motors which are typically used as a roller and winder drive in converting applications.

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Overview

Individual solutions for special applications

There is sometimes no other option but to develop an application-specific solution. Based on our many years of experience, we are able to work with our customers to develop and implement application-specific motor solutions – with a design and performance that are perfectly tailored to meet individual requirements. These have the additional useful benefit that they are highly integrated into our converter and control system environment.

Optimally coordinated system solutions

SIMOTICS motors are perfectly coordinated with the drive systems of the SINAMICS family. They provide you with precisely tailored, state-of-the-art motion control solutions in all performance classes created using globally available standard components. Electronic rating plates and the ability to integrate the motors via the DRIVE-CLiQ system interface ensure quick commissioning as well as problem-free operation. Thanks to the integral encoders with redundant encoder tracks and safety functions which are integrated in the drive, modern safety concepts are easy to implement. As a result, external safety components are completely unnecessary. All components can be interconnected simply and reliably by means of pre-assembled MOTION-CONNECT signal and power cables.

Powerful tools and competent support

Siemens offers expert advice and efficient tools to help users select the right motor solution. Experienced specialists are always ready to lend a hand in designing mechanically integrated motor solutions.

Focused motor selection and dimensioning: SIZER for Siemens Drives engineering tool (integrated in the TIA Selection Tool)

The SIZER for Siemens Drives (integrated in the TIA Selection Tool) engineering tool is designed to help you configure a complete drive system including options, accessories and connection systems. The engineering tool allows you to handle any kind of drive – from single drives to complex multi-axis drives. Starting from the type of application in question, the software guides the user step by step through the motor dimensioning process. The advantage: SIZER for Siemens Drives not only provides a full list of components with their order data, but also offers an import function for easy transfer of the motor data into the CAD CREATOR.
www.siemens.com/sizer

Selection and configuring with the Siemens Product Configurator

The Siemens Product Configurator helps you select the optimum products for an application – from the motors to the converters and the associated options. You can also generate comprehensive documentation including data sheets, operating instructions, 2D and 3D dimension drawings, and certificates. You can order the products directly by transferring the selected components to the shopping cart of SiePortal.
www.siemens.com/spc

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Overview

Motion Control Encoder measuring systems								
Encoder type	Incremental encoders			Absolute encoders				
								
Interface	sin/cos 1 V_{pp}	RS422 (TTL)	HTL	DRIVE-CLiQ	SSI	EnDat 2.1	PROFIBUS DP-V2	PROFINET IO with RT/IRT
Resolution	1000 S/R 1024 S/R 2500 S/R	500 S/R 1000 S/R 1024 S/R 1250 S/R 1500 S/R 2000 S/R 2048 S/R 2500 S/R 3600 S/R 5000 S/R	100 S/R 500 S/R 1000 S/R 2500 S/R	Single-turn 24 bit Multi-turn 36 bit (24 bit Single-turn + 12 bit Multi-turn)	Single-turn 13 bit (8192 steps) Multi-turn 25 bit (8192 steps × 4096 revolutions)	Single-turn 13 bit (8192 steps) Multi-turn 25 bit (8192 steps × 4096 revolutions)	Single-turn 13 bit (8192 steps) Multi-turn 27 bit (8192 steps × 16384 revolutions)	Single-turn 13 bit/16 bit (8192/65536 steps) Multi-turn 27 bit/30 bit (8192/65536 steps × 16384 revolutions)
Catalog	D 21.4							

Motion control encoders are optoelectronic built-on encoders that detect the traversing distances, angles of rotation, speeds or positions of machine axes. Motion control encoders are direct measuring systems that are built-on to shafts, axes or motors. They can be used in conjunction with numerical and programmable logic controllers, drives and position displays. Motion control encoders are system-tested, certified components that have been harmonized for use with the following systems:

- SINUMERIK CNC controls
- SIMATIC programmable logic controllers
- SINAMICS drive systems

Motion control encoders are used with machine tools and production machines as additional external measuring systems. They are available as incremental or absolute encoders.

- In the case of incremental encoders, the machine must travel to a reference point after each power-off state, as the position is not usually stored in the controller, and movements of the machine while the power is off are not recorded.
- Absolute encoders, on the other hand, also record movements while the power is off and return the actual position after power on. Travel to a reference point is not necessary.

All motion control encoders are available as Synchro flange and clamp flange versions. The absolute encoders are also available with a hollow shaft and torque arm.

The motion control encoders are driven via a plug-in coupling or spring disk coupling. Alternatively, pulleys can also be used.

The motor control encoder supply voltage is 5 V DC or alternatively 10 V to 30 V DC. The 10 V to 30 V DC version supports longer cable lengths. Most control systems supply the voltage directly at the measuring circuit connector. With SINAMICS, the measuring systems are provided with power via the converters or the Sensor Modules.

For motion control encoders with cables, the cable length including the connector is 1 m.

The following bending radii must be observed for the cable to the built-on encoder:

- One-time bending: ≥ 20 mm
- Continuous bending: ≥ 75 mm

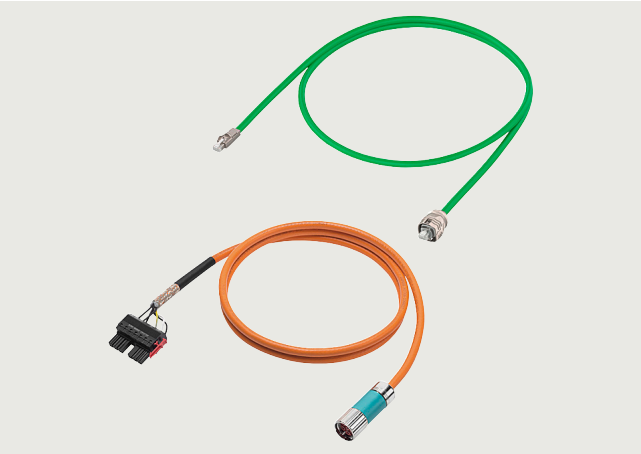
More information

- Internet:
  www.siemens.com/sensor-systems
  https://sieportal.siemens.com

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Overview

MOTION-CONNECT includes connection systems and components which are optimally tailored to individual areas of application. MOTION-CONNECT cables feature state-of-the-art connection systems to ensure fast, reliable connection of different components, and offer maximum quality as well as system-tested reliability.



MOTION-CONNECT power cable and signal cable

MOTION-CONNECT cables are available as fully-assembled power and signal cables or sold by the meter. The pre-assembled cables can be ordered in length units of 10 cm (3.94 in) and can be extended, if necessary.

Whatever your machine requirements, MOTION-CONNECT offers the solution.

- **Robust, high-performance and easy to use**
  thanks to pre-assembled cables with a rugged metal connector in degree of protection IP67 and reliable SPEED-CONNECT quick-release lock
- **Outstanding and proven quality**
  achieved by consistent quality management and system-tested cables

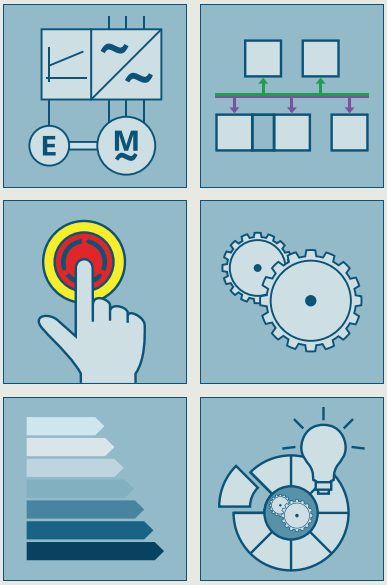
Cables are available in two different qualities – MOTION-CONNECT 500 and MOTION-CONNECT 800PLUS.

MOTION-CONNECT 500	MOTION-CONNECT 800PLUS
• Cost-effective solution for predominantly fixed installation • Tested for travel distances up to 5 m (16.4 ft)	• Meets requirements for use in cable carriers • Oil-resistant • Tested for travel distances of up to 50 m (164 ft)

More information

- Internet:
  www.siemens.com/motion-connect
  https://sieportal.siemens.com

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2/2 Firmware functionality
2/2 Introduction
2/2 Basic Drive Functions
2/4 Standard Technology Functions
2/5 Advanced Technology Functions
2/6 Common Engineering
2/6 Applications & Branch know-how

Further information about SINAMICS Drive Software for our SINAMICS next generation converters (from firmware V6.1) is available on the internet at:
www.siemens.com/sinamics-drive-software
For more information on ordering and configuration, see catalog D 99 and SiePortal at:
www.siemens.com/d99
www.siemens.com/sinamics-drive-software/sieportal

Further information about firmware functionality can be found on the internet at
www.siemens.com/sinamics-firmware

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Overview

The major part of the functionality of SINAMICS drives is implemented in software. This "embedded" **software** delivers the function of the product and is therefore a significant component of the overall product. The embedded software is also known as **firmware**, because it is firmly connected to specific hardware.

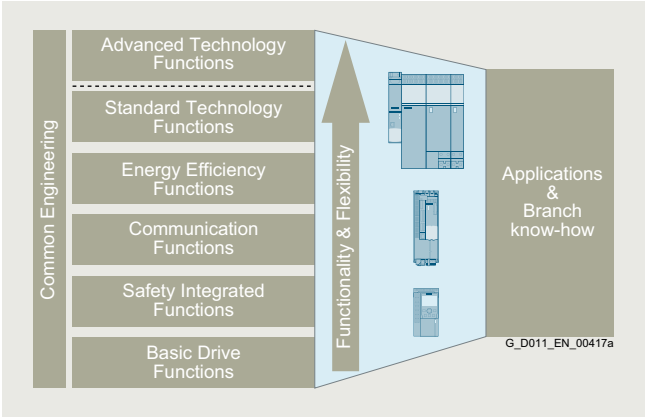
In the case of SINAMICS drives, the firmware is subdivided into the **operating system (OS)** with drivers for the hardware and the converter functions, which are also referred to as the **runtime (RT) functions**.

Introduction

The available firmware functions are so extensive that the overall functional scope has been structured into function groups corresponding to their main applications.

The 8 main groups are:

- Basic Drive Functions
- Standard Technology Functions
- Advanced Technology Functions
- Communication Functions
- Safety Integrated Functions
- Energy Efficiency Functions
- Common Engineering
- Applications & Branch know-how

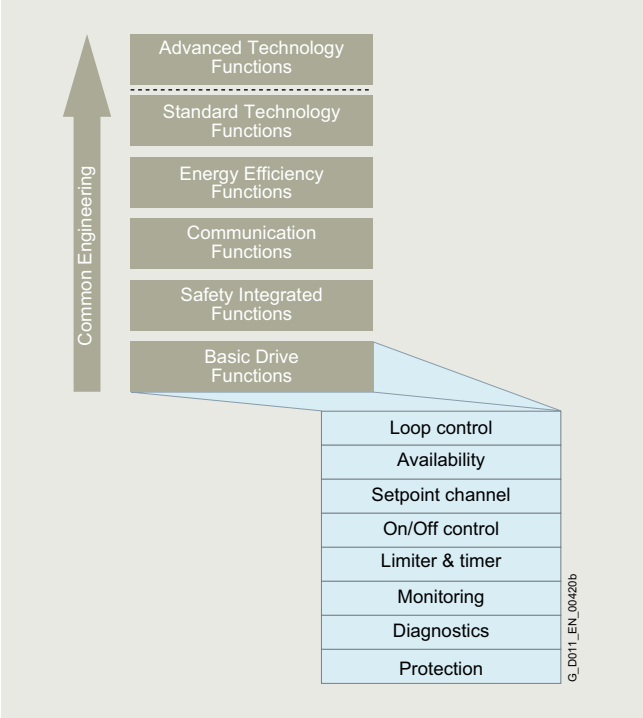


Functionality, including technology and configuration

Basic Drive Functions

The main groups, especially the "Basic Drive Functions", are divided up into further subgroups.

- Control modes
- Availability
- Setpoints and commands
- Limiters, timers and monitoring functions
- Diagnostics
- Protection



Basic Drive Functions - Control Functions

Control modes

The control methods are the core of the entire converter firmware. They are responsible for optimum movement of the connected motor and the attached machines. The better the control functions, the faster, better and more smoothly the machine operates, thereby significantly enhancing the quality of the production output.

A distinction is made between the following methods:

- V/f control (open-loop control)
- Vector control (closed-loop control)
- Servo control (closed-loop control)

Further classification refers to the control variables:

- Current control
- Speed control
- Torque control
- Position control
- Technological process control (pressure, flow rate, temperature, fill level, etc.)

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Overview

Availability

Availability refers to the frequency ratio, namely how often or seldom a single device restricts the entire production process due to a problem. That is why it is important in terms of availability that a drive enters the faulty state only when it is essential for self-protection. Moreover, it is important that the cause of the pending problem is identified and eliminated as quickly as possible.

Features and measures to increase availability:

- Parallel connections, for example, to maintain emergency operation (possibly also at a lower rating), if a power unit fails
- Automatic restart
- Flying restart
- V_{dc} control with kinetic buffering
- Redundancy (hardware, communication, etc.)

Setpoints and commands

The setpoint channel is the link between the setpoint source and the motor control. The converter has a special feature that supports simultaneous input of two setpoints. Generation and subsequent modification of the total setpoint (influencing the direction, skip frequency, up/down ramp) take place in the setpoint channel.

Different sources of command usually result from the requirements to operate a drive from different places (on-site/remote), in different situations (standard/emergency mode) and/or different operating. The BICO binector connector technology allows SINAMICS to configure and combine the command and setpoint sources completely individually.

The following can be used for switching:

- Dataset switchover
- Switching elements among the Free Function Blocks (FFB)
- Fixed values

Limiters and monitoring functions

Limiters or limits are used to constrain input and/or output variables as appropriate to the connected machine; this means that not all positioning variables are used over their full range but are limited judiciously to enhance the safety and quality of the production process.

Timers/runtime counters are used to obtain information or make statements about the temporal course of a process.

- Recording application information for manufacturers
- Recording operating times for users
- Configurable timers for monitoring intervals
- Configurable timers for triggering activities at certain intervals (e.g. maintenance work)

Monitoring is used for early detection of conditions that may be detrimental or even dangerous to the connected machine, so that they can be counteracted expediently. If an appropriate countermeasure is not initiated, a protective response of the converter with probable fault shutdown will ultimately result.

Diagnostics

The "Diagnostics" subgroup comprises all those functions that provide assistance with determining the possible causes of a problem.
If problems occur in a process, or in the driven machine, further interpretation of the measured variables in the converter is required. To this end, different signals should be correlated with respect to time and then observed.

This includes:

- Error and alarm buffer
- Diagnostic buffer
- List of missing signals that interrupt operation
- Tracing for temporal assignment of signal profiles
- I/O simulation
- Telegram content diagnoses
- Terminal status

Protection

All protection functions counteract any possible damage to the converter and/or motor. This is why the shutdown thresholds cannot be parameterized but are factory-tuned and permanently set to match the built-in components. Alarm thresholds may be parameterized as a relative variable for shutdown threshold of some monitoring processes. Thus, a countermeasure that is sensitive to the process may still be initiated upon occurrence of the alarm.

Apart from protection of the hardware, protection of the parameterization and therefore protection of the intellectual expertise of the customer from unauthorized access and copying is also an important part of the protection functions.

- Write protection
- Know-how protection
- Copy protection

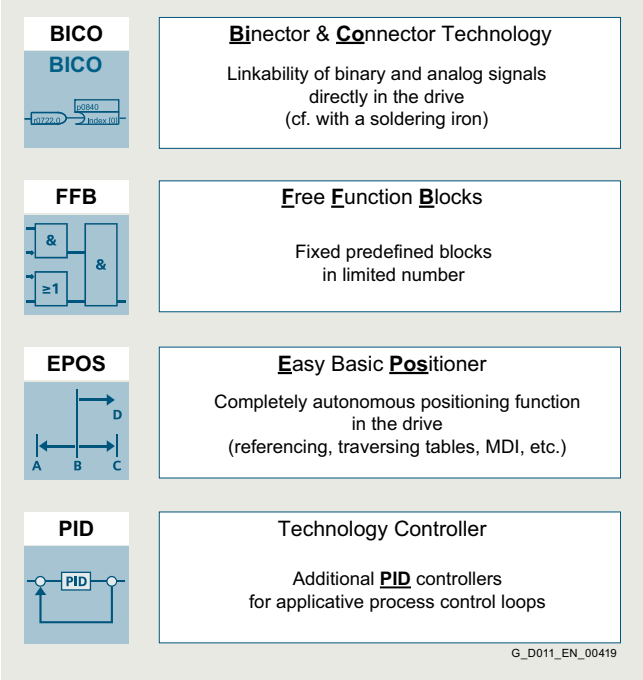
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Overview

Standard Technology Functions

The Standard Technology Functions are not restricted to a specific SINAMICS product family, but they are available in full or at least partially in SINAMICS S120 as well as in SINAMICS G120.

- BICO technology
- Free function blocks (FFB)
- Basic positioner (EPOS)
- Technology controller (PID)



Standard Technology Functions

The Standard Technology Functions significantly expand the application spectrum of the SINAMICS drives because the functions are not permanently and unalterably interconnected; rather, they are interrupted at defined access points and can be connected or wired differently. The BICO technology makes it possible.

The FFBs enable additional, freely interpretable adaptations of the binary and analog signal flow to the given machine application. However, the FFBs are limited in terms of the absolute quantity and the computing intervals (sampling times) that can be selected. These blocks are NOT multi-instance capable.

With EPOS, comprehensive positioning tasks are autonomous in SINAMICS (i.e. their solution does not need a higher-level control). And moreover, this integrated functionality is also extremely flexible: It can be used for highly dynamic servo control as well as for simple applications with vector-controlled asynchronous motors. Up to 64 target positions, as well as the respective traversing speeds, can be permanently stored in the drive during commissioning. Axes can be positioned either absolutely or relatively.
It is, however, also possible to transfer these parameters as required from a higher-level controller. This means that target positions and velocities can even be changed on-the-fly during a positioning run.

The technology controller (PID controller) permits all types of simple process controls to be implemented. It can be used, for example, to control the line pressure, fill level, temperature, flow or also tension control or load balancing.

For more information, see section Technology functions.

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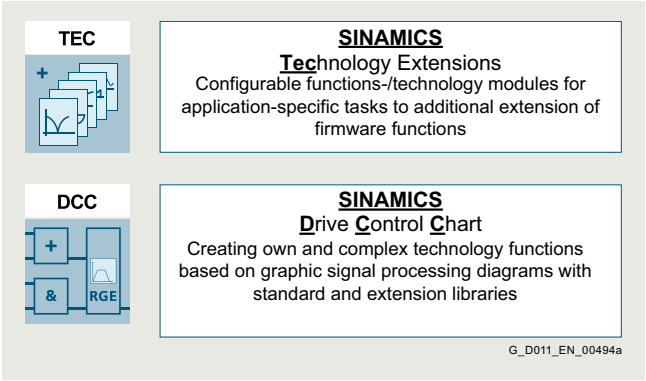
Overview

Advanced Technology Functions

The Advanced Technology Functions are the clear differentiating feature between the SINAMICS product families of SINAMICS G120 with the CU2xx-2 Control Units and SINAMICS S120 with the CU3x0-2 Control Units. The Advanced Technology Functions are only available for SINAMICS S120:

- SINAMICS Drive Control Chart (DCC)
- SINAMICS Technology Extensions (TEC)

The Advanced Technology Functions are characterized by maximum flexibility and performance whereby extremely individual and, at the same time, efficient solutions can be achieved.



Advanced Technology Functions

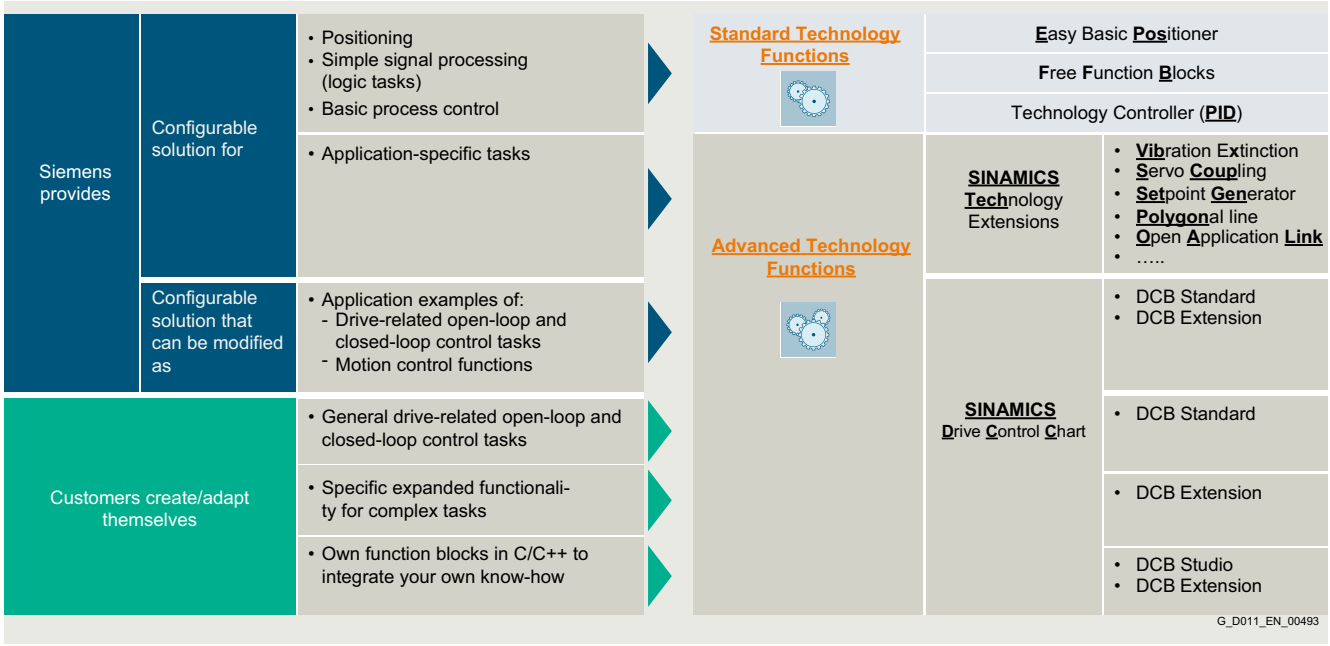
SINAMICS DCC comprises the block library, so-called DCB Drive Control Blocks and the DCC Editor for graphical interconnection of blocks. SINAMICS DCC is primarily employed to solve arithmetic and control-related tasks or logic functions associated with complex applications.

In addition to the DCB Standard library, the DCB Extension library can also be used to create applications.
The DCB Extension library is comprised of freely programmable blocks which are created for specific applications using DCB Studio and are then graphically interconnected with the DCC Editor in a similar fashion to standard blocks.

SINAMICS Technology Extensions (TECs) are configurable firmware expansions that are specifically created for use in a customized application with special requirements. This functionality can therefore be subsequently installed as an add-on to the standard scope of firmware functions. One example of a SINAMICS TEC is the VIBX vibration extinction for storage and retrieval systems.

For more information, see section Technology functions.

The functional scope of Advanced Technology Functions is scalable and flexible. Depending on the task, you can choose between configurable solutions provided by Siemens or freely created proprietary solutions in the drive.



Depending on the technology function, a license may be required for the application.

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Firmware functionality

Overview

Safety Integrated Functions

See section Safety Integrated

Communication Functions

See section Communication

Energy Efficiency Functions

See section Energy efficiency

Common Engineering

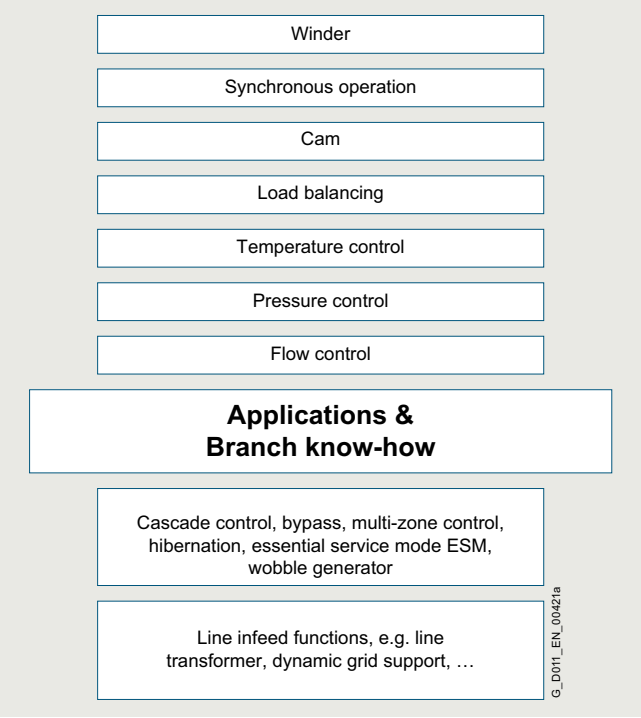
All functions of the converters are implemented to enable a common engineering approach to their handling no matter which type of drive is selected; i.e. if a function is used in drive x, it can be configured intuitively and commissioned in the same way in drive y. Knowledge gained can therefore be reused easily and efficiently. The configuration and commissioning tools in particular (such as SIZER for Siemens Drives (integrated in TIA Selection Tool), STARTER and SINAMICS Startdrive) reflect this approach..

For more information, see section Engineering tools.

Applications & Branch know-how

Siemens has applied these technology functions (standard and/or advanced) to generate numerous application solutions. These applications can be downloaded from the Siemens application support website at
www.siemens.com/sinamics-applications

The STARTER and SINAMICS Startdrive commissioning tools can then be used to activate and configure the applications and download them to the Control Units.



Applications & Branch know-how

Depending on the technology function, a license may be required for the application.

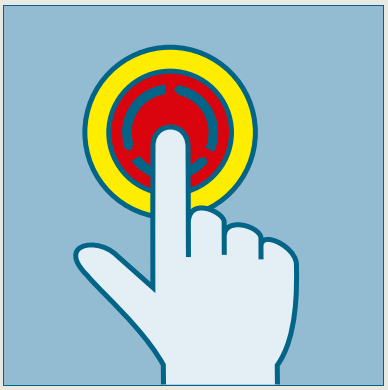
In some branch-specific Control Units (e.g. CU230P-2) branch-specific functions are also an integral part of the firmware.

For more information, see section Drive applications.

More information

Further information about firmware functionality can be found on the internet at
www.siemens.com/sinamics-firmware

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3/14 **Safety Integrated for SINAMICS S120 built-in units**
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Further information about SINAMICS Drive Software for our SINAMICS next generation converters (from firmware V6.1) is available on the internet at:
www.siemens.com/sinamics-drive-software
For more information on ordering and configuration, see catalog D 99 and SiePortal at:
www.siemens.com/d99
www.siemens.com/sinamics-drive-software/sieportal

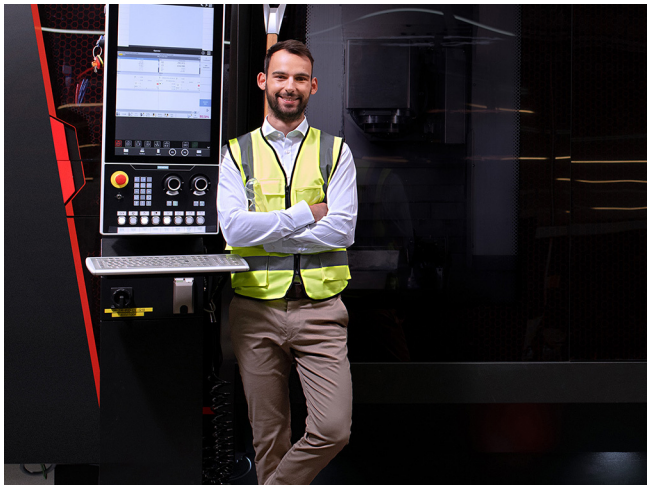
The Safety Integrated Function Manual contains detailed information about the safety functions.
https://support.industry.siemens.com/cs/document/109781722

Further manuals pertaining to Safety Integrated in drive systems can be found on the internet at
https://support.industry.siemens.com/cs/ww/en/ps/13206/man

Further information about Safety Integrated in SINAMICS can be found on the internet at
www.siemens.com/safety-drives

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Overview



Legal framework

Machine manufacturers and plant construction companies must ensure that their machines or plants cannot cause danger due to malfunctions in addition to the general risks of electric shock, heat or radiation.

In Europe, for example, compliance with the Machinery Directive 2006/42/EC is legally stipulated by the EU framework directive for occupational safety. In order to ensure compliance with this directive, it is recommended that the corresponding harmonized European standards are applied. This triggers the "assumption of conformity" and gives manufacturers and operators the legal security in terms of compliance with both national regulations and EU directives. The machine manufacturer uses the CE marking to document compliance with all relevant directives and regulations in the free movement of goods.

Safety-related standards

Functional safety is specified in various standards. For example, ISO 12100 specifies standards pertaining to machine safety (risk assessment and risk reduction). IEC 61508 specifies basic requirements for electronic and programmable safety-related systems. IEC 62061 (only applicable for electrical and electronic control systems) and ISO 13849-1 define the functional and safety-related requirements of safety-oriented control systems.

The above-mentioned standards define different safety requirements that the machine has to satisfy in accordance with the risk, frequency of a dangerous situation, probability of occurrence and the opportunities for recognizing impending danger.

- ISO 13849-1:
  Performance Level PL a ... e;
  Category B, 1 ... 4
- IEC 62061:
  Safety Integrity Level SIL 1 ... 3

Trend toward integrated safety systems

The trend toward greater complexity and higher modularity of machines has seen a shift in safety functions away from the classical central safety functions (for example, shutdown of the complete machine using a main disconnecting means) and into the machine control system and the drives. This is often accompanied by a significant increase in productivity because the setup times are shortened. Depending on the type of machine, it may even be possible to continue manufacturing other parts while the setup is in progress.

Safety Integrated Functions act much faster than those of a conventional design. The safety of a machine is increased further with Safety Integrated. Furthermore, thanks to the faster method of operation, safety measures controlled by integrated safety systems are perceived as less of a hindrance by the machine operator, therefore significantly reducing the motivation to consciously bypass safety functions.

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Function

Safety functions integrated in SINAMICS drives

SINAMICS drives are characterized by a large number of Safety Integrated Functions. In combination with the sensors and safety control required for the safety functionality, they ensure that highly-effective protection for persons and machines is implemented in a practice-oriented manner.

They comply with the requirements of the following safety categories:

- PL d and Category 3 according to ISO 13849-1
- SIL 2 according to IEC 61508 and IEC 61800-5-2

Note:

The Safe Brake Test (SBT) diagnostic function meets the requirements for Category 2 according to ISO 13849-1.

The PM240-2 Power Modules, frame sizes FSD to FSG additionally offer STO acc. to IEC 61508 SIL 3 and ISO 13849-1 PL e and Category 3.

The Safety Integrated functions are generally certified by independent institutes. You can obtain the corresponding test certificates and manufacturer's declarations from your Siemens contacts.

The Safety Integrated Functions that are currently available are described below. Their functional safety satisfies the requirements defined in the international standard IEC 61800-5-2 for variable-speed drive systems.

The safety functions integrated into the SINAMICS drive system can be roughly divided into four categories:

- **Functions for safely stopping a drive**
  - Safe Torque Off (STO)
  - Safe Stop 1 (SS1)
  - Safe Stop 2 (SS2)
  - Safe Operating Stop (SOS)
- **Functions for safe brake management**
  - Safe Brake Control (SBC)
  - Safe Brake Test (SBT) (this diagnostic function exceeds the scope of IEC 61800-5-2)
- **Functions for safely monitoring the motion of a drive**
  - Safely-Limited Speed (SLS)
  - Safe Speed Monitor (SSM)
  - Safe Direction (SDI)
  - Safely-Limited Acceleration (SLA)
- **Functions for safely monitoring the position of a drive**
  - Safely-Limited Position (SLP)
  - Safe Position (SP) (this function exceeds the scope of IEC 61800-5-2)
  - Safe Cam (SCA)

Safe Torque Off (STO)

The STO function is the most common and basic drive-integrated safety function. It ensures that no torque-generating energy can continue to affect a motor and prevents unintentional start-ups.

Effect

This function is a mechanism that prevents the drive from restarting unexpectedly, in accordance with EN 60204-1, Section 5.4. The STO function suppresses the drive pulses (corresponds to Stop Category 0 according to EN 60204-1). The drive is reliably torque-free. This state is monitored internally in the drive.

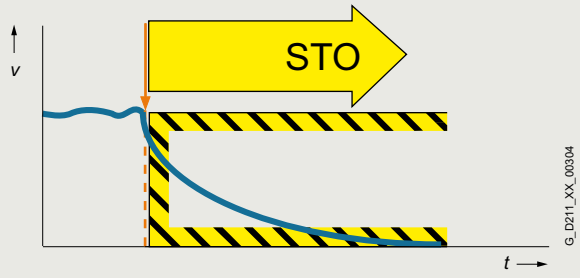
Application

STO has the immediate effect that the drive cannot supply any torque-generating energy. STO can be used wherever the drive will naturally reach a standstill due to load torque or friction in a sufficiently short time or when "coasting down" of the drive will not have any relevance for safety.

STO makes it possible for persons to work safely when the protective door is open (restart interlock) and is used on machines/installations with moving axes, e.g. on handling or conveyor systems.

Customer benefits

Some of the advantages of the Safety Integrated Function STO over conventional safety technology with electromechanical switchgear include the elimination of separate components as well as of the work that would be required to wire and service them, i.e. no wearing parts as a result of the electronic shutdown. Because of the fast electronic switching times, the function provides a shorter reaction time than the conventional solution comprising electromechanical components. When STO is triggered, the converter remains connected to the network and can be fully diagnosed.



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3

Function

Safe Stop 1 (SS1)

The SS1 function causes a motor to stop rapidly and safely and switches the motor to torque-free mode after coming to a standstill by activating STO.

Effect

The SS1 function can safely stop the drive in accordance with EN 60204-1, Stop Category 1. When the SS1 function is selected, the drive brakes autonomously along a quick-stop ramp and automatically activates the Safe Torque Off and Safe Brake Control functions (if configured) when the parameterized safety delay time expires.

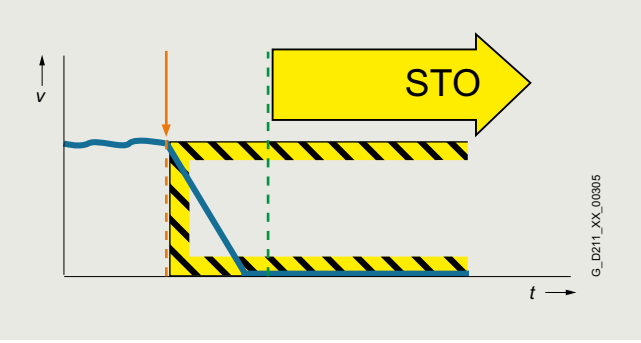
If the variant "SS1 with external stop (SS1E)" is parameterized, the drive does not brake autonomously when the function is selected. In this case, the higher-level control must bring the drive to a standstill within a parameterized STO transition time. The SBR (Safe Brake Ramp) and SAM (Safe Acceleration Monitor) functions are not active. SS1E is a useful function for drives that need to be stopped as a group by the Motion Control system in order to prevent potential damage to the machine or product.

Application

The SS1 function is used when, in the event of a safety-relevant incident, the drive must stop as quickly as possible with a subsequent transition into the STO state (e.g. EMERGENCY STOP). It is thus used to bring large centrifugal masses to a stop as quickly as possible for the safety of the operating personnel, or to brake motors at high speeds as quickly as possible. Examples of typical applications are saws, grinding machine spindles, centrifuges, winders and storage and retrieval machines.

Customer benefits

The targeted stopping of a drive by means of SS1 reduces the risk of danger, increases the productivity of a machine, and allows the safety clearances in a machine to be reduced. The principle is to bring the drive actively to a standstill, compared with just using the STO function. Complex mechanical brakes that are susceptible to wear are normally not required to brake the motor.



Safe Stop 2 (SS2)

The SS2 function brings the motor to a standstill quickly and safely and then activates the SOS function once the motor has stopped.

Effect

The Safe Stop 2 function can safely stop the drive in accordance with EN 60204-1, Stop Category 2. When the SS2 function is selected, the drive brakes autonomously along a quick stop ramp. In contrast to SS1, the drive control remains operational afterwards, i.e. the motor can supply the full torque required to maintain zero speed. Standstill is safely monitored (Safe Operating Stop function).

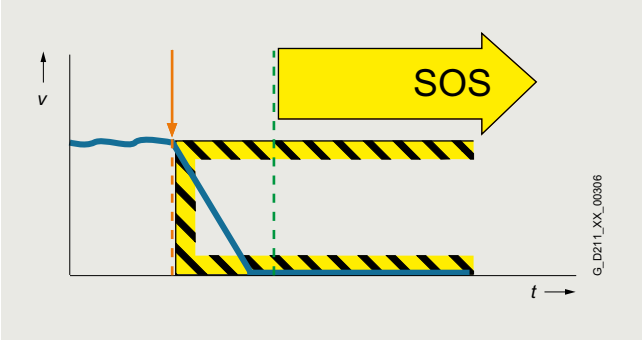
If the variant "SS2 with external stop (SS2E)" is parameterized, the drive does not brake autonomously when the function is selected. In this case, the higher-level control must bring the drive to a standstill within a parameterized Safe Operating Stop transition time. The SBR (Safe Brake Ramp) and SAM (Safe Acceleration Monitor) functions are not active. SS2E is a useful function for drives that need to be stopped as a group by the Motion Control system in order to prevent potential damage to the machine or product.

Application

As with SS1, the SS2 function ensures the quickest possible deceleration of the motor. However, the motor power is not switched off. Instead, a control system prevents it from leaving the standstill position – even if it is affected by external forces. Typical applications for SS2 include machine tools, for example.

Customer benefits

The SS2 function ensures a rapid axis stop. Because the control remains active, after the safety function is deselected, productive operation can continue without referencing. This ensures short setup and standstill times and high productivity.



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Function

Safe Operating Stop (SOS)

With the SOS function, the stopped motor is held in position by the drive control system and its position is monitored.

Effect

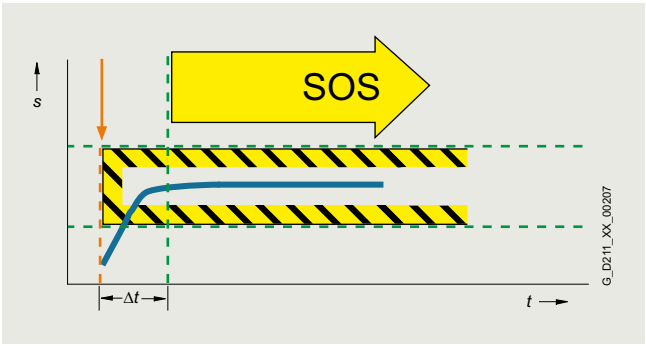
The SOS function constitutes safe standstill monitoring. The drive control remains in operation. The motor can therefore deliver the full torque to hold the current position. The actual position is reliably monitored. In contrast to safety functions SS1 and SS2, the speed setpoint is not influenced autonomously. After SOS has been activated, the higher-level control must bring the drive to a standstill within a parameterized time and then hold the position setpoint.

Application

SOS is an ideal solution for all those applications for which the machine or parts of the machine must be at a safe standstill for certain steps, but the drive must also supply a holding torque. It is ensured that despite counter torque the drive remains in its current position. In contrast to SS1 and SS2, the drive does not brake autonomously in this case. It expects the higher-level controller to ramp down the relevant axes as a coordinated group within an adjustable delay time. This can be used to prevent any damage to the machine or product. Typical applications for SOS include winders, converting and packaging machines and machine tools.

Customer benefits

No mechanical components are necessary to keep the axis in position despite any counterforce that may occur. Due to the short switching times and the fact that the drive control always remains active, setup and downtimes are reduced. Recalibration of the axis after exiting the SOS function is not necessary. The axis can immediately be moved again after deactivation of the SOS function.



Safe Brake Control (SBC)

The SBC function permits the safe control of a holding brake. SBC is always activated in parallel with STO.

Effect

A holding brake which is active in a de-energized state is controlled and monitored using safe two-channel technology. Due to the two-channel control, the brake may still be activated in the event of an insulation fault in the control cable. Errors of this kind are detected early by means of test pulses.

Note:

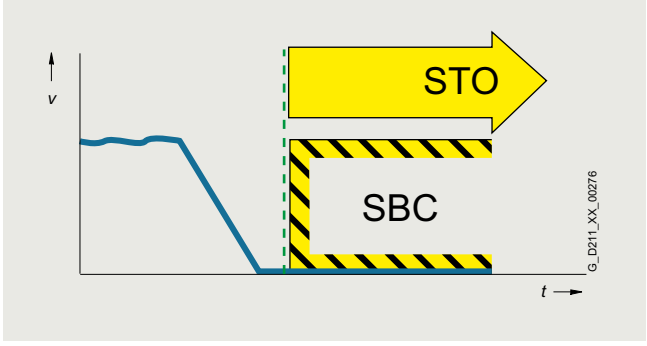
Safe Brake Control does not detect mechanical faults in the brake itself, such as worn brake linings. For Motor Modules in booksize format, the terminals for the motor brake are integrated. An additional Safe Brake Relay is required for Power Modules in blocksize format. An additional Safe Brake Adapter is necessary for Power Modules in chassis format.

Application

The SBC function is used in conjunction with the functions STO or SS1 to prevent the movement of an axis in the torque-free state, e.g. because of gravity.

Customer benefits

Again, the function saves the use of external hardware and the associated wiring.



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3

Function

Safe Brake Test (SBT)

The SBT diagnostic function carries out a brake function test at regular intervals or before personnel enter the danger zone.

Effect

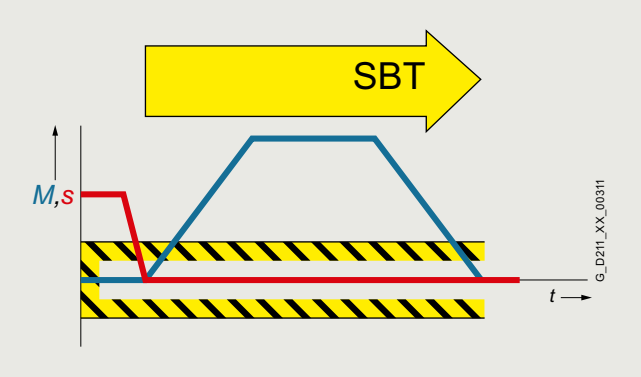
A good way to check the proper functioning of brakes that have become worn is to apply a torque to the closed brake. Drive systems that have two brakes, e.g. motor brake and external brake, can be tested with different torque values.

Application

The SBT diagnostic function is suitable for implementing a safe brake in combination with the SBC function.

Customer benefits

The function detects faults or wear in the brake mechanics. Automatically testing the effectiveness of brakes reduces maintenance costs and increases the safety and availability of the machine or plant.



Safely-Limited Speed (SLS)

The SLS function monitors the drive to ensure that it does not exceed a preset speed or velocity limit.

Effect

The SLS function monitors the drive against a parameterized speed limit. Four different limit values can be selected. As in the case of SOS, the speed setpoint is not influenced independently. After SLS has been selected, the higher-level control must bring the drive down below the selected speed limit within a parameterizable time. If the speed limit is exceeded, a customizable drive-integrated fault reaction occurs.

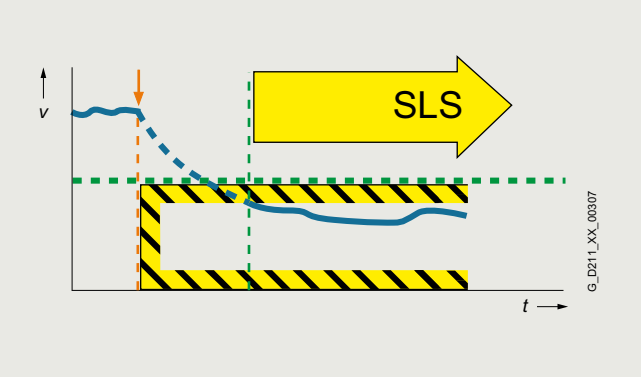
The SLS limit stage 1 can be multiplied by a factor that is transferred in 16-bit resolution via PROFIsafe. This allows an almost unlimited number of limits to be specified.

Application

The SLS function is used if people are in the danger zone of a machine and their safety can only be guaranteed by reduced speed. Typical application cases include those in which an operator must enter the danger zone of the machine for the purposes of maintenance or setting up, such as a winder in which the material is manually threaded by the operator.
To prevent injury to the operator, the roller may only spin at a safely reduced speed. SLS is often also used as part of a two-stage safety concept. While a person is in a less critical zone, the SLS function is activated, and the drives are only stopped safely in a smaller area with higher potential risk. SLS can be used not only for operator protection, but also for machinery protection, e.g. if a maximum speed must not be exceeded.

Customer benefits

The SLS function can contribute to a significant reduction in downtime, or greatly simplify or even accelerate setup.
The overall effect achieved is a higher availability of the machine. Moreover, external components such as speed monitors can be omitted.



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Function

Safe Speed Monitor (SSM)

The SSM function warns when a drive is working below an adjustable speed limit. As long as it remains below the threshold, the function issues a safety-related signal.

Effect

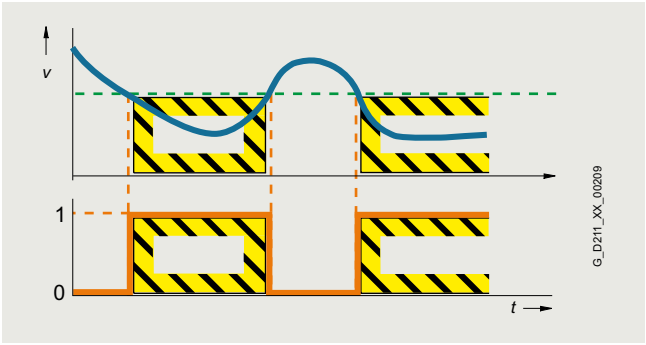
If a speed value drops below a parameterized limit, a safety-related signal is generated. This can, for example, be processed in a safety control unit to respond to the event by programming, depending on the situation.

Application

With the SSM function, in the simplest case, a safety door can be unlocked if the speed drops below a non-critical level. Another typical example is that of a centrifuge that may be filled only when it is operating below a configured speed limit.

Customer benefits

Unlike SLS, there is no drive-integrated fault reaction when the speed limit is exceeded. The safe feedback can be evaluated in a safety control unit, allowing the user to respond appropriately to the situation.



Safe Direction (SDI)

The SDI function ensures that the drive can only move in the selected direction.

Effect

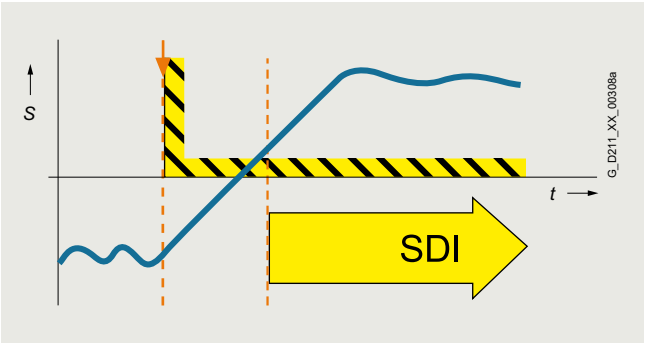
Deviation from the direction of motion currently being monitored is detected reliably and the configured drive-integrated fault reaction is initiated. It is possible to select which direction of rotation is to be monitored.

Application

The SDI function is used when the drive may only move in one direction. A typical application is to permit the operator access to a danger zone, as long as the machine is rotating in the safe direction, i.e. away from the operator. In this state, the operator can feed material into the work zone or remove material from the work zone without danger.

Customer benefits

The function saves the use of external components such as speed monitors and the associated wiring. The release of a danger zone while the machine is moving away from the operator increases productivity. Without the SDI function, the machine must be safely stopped during material loading and removal.



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3

Function

Safely-Limited Acceleration (SLA)

The SLA function monitors that the drive does not exceed a preset acceleration limit value.

Effect

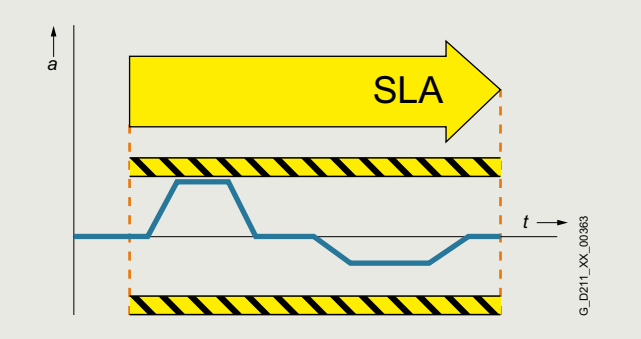
The SLA function monitors that the motor does not violate the defined acceleration limit (e.g. in setup mode). SLA detects early on whether the speed is increasing at an inadmissible rate (the drive accelerates uncontrollably) and initiates the stop response.

Application

The SLA function is used, e.g., for SIMATIC Safe Kinematics.

Customer benefits

The function monitors for maximum permissible acceleration in setup mode and safe monitoring of the tool center point with different kinematics.



Safely-Limited Position (SLP)

The SLP function monitors the axis to ensure that it remains within the permissible traversing range.

Effect

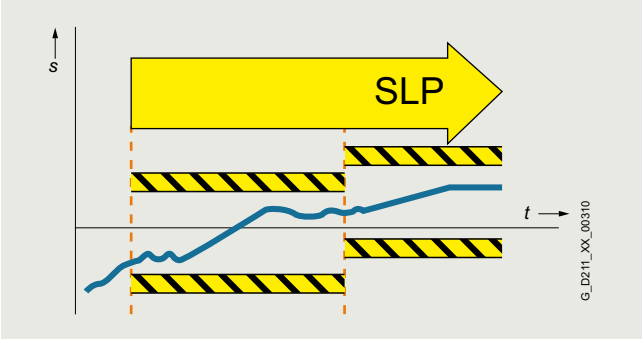
When SLP is activated, the traversing range limited by the configured software limit switches is safely monitored. If the permitted traversing range is exited, a configurable fault reaction occurs. It is possible to toggle between two traversing ranges, even when the machine is in operation.

Application

SLP is used for applications in which machine operators have to enter a protection area, e.g. for feeding in and removing material. Safe monitoring of the axis position ensures that the axis cannot move into the protection area released for operators and so place them in danger, for example, on storage and retrieval machines, gantry cranes or machining centers.

Customer benefits

SLP can be used for highly-effective protection area monitoring. The function does away with the use of external components such as hardware limit switches and the associated wiring expense. Due to the short reaction time following a limit overshoot, safety clearances can be reduced.



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Function

Safe Position (SP)

The SP function transfers the actual position values determined safely in the drive over safe PROFIsafe communication to a safety control.

Effect

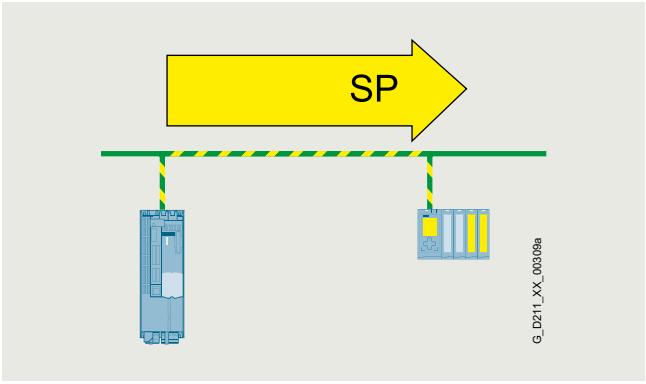
In contrast to the SLP function that monitors the current actual position value against a limit and, in the case of an overshoot, activates a drive-integrated fault reaction, SP transfers the current actual position values to the safety control. Position monitoring is implemented in the safety program of the control. Extended PROFIsafe telegrams are available for transferring the position values. The position values can be transferred in 16-bit or 32-bit resolution, as required. A time stamp is also transferred with the position values.

Application

Tailor-made safety concepts can be created using the SP function. It is ideal for use on machines that require flexible safety functions. It is extremely versatile and can be used, for example, to implement safe, axis-specific range detection by means of safe cams. The SP function can also be used to implement multi-axis safety concepts, multi-dimensional protection areas and zone concepts.

Customer benefits

Position monitoring or speed monitoring is implemented in the safety program of the control, so the user has the flexibility for implementing tailor-made safety functions. The reaction to a limit overshoot must also be specified in the safety program. This means a higher initial programming outlay, but it does offer the opportunity for initiating different fault reactions depending on the situation.



Safe Cam (SCA)

The SCA function enables safety-related monitoring of the position.

Effect

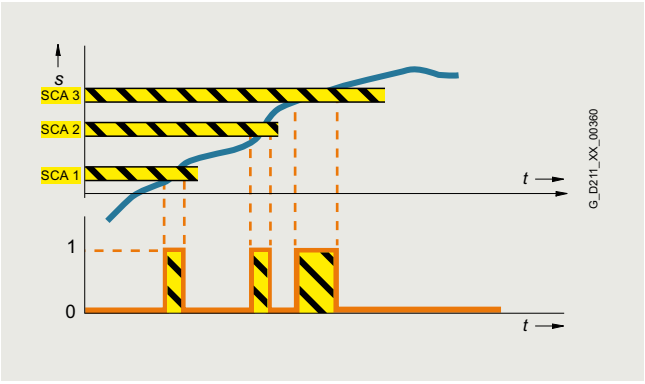
The SCA function outputs a safe signal if the drive is within a specified position range. It facilitates the realization of safe axis-specific range detection. Up to 30 safe cams can be parameterized per axis.

Application

It is only permissible that a protective door is opened if a drive is in a certain position range. The drive may only be traversed with reduced speed when it is located in a certain position range.

Customer benefits

The function enables safety-related switchover of safety functions. With SCA, safe electronic cam controllers can be implemented without additional hardware. With SCA, work and protection zone delimitations are reliably detected.



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Function

Basic Functions, Extended Functions, and Advanced Functions

With SINAMICS G converters, the safety functions are basically implemented without encoders.

With SINAMICS S drives, the safety functions are implemented with encoders – individual safety functions can also be operated without encoders.

The Safety Integrated Functions are grouped into Basic Functions, Extended Functions, and Advanced Functions.

The Basic Functions are included in the standard scope of supply.
The Extended Functions must be activated by a license [1]. The Advanced Functions for SINAMICS S120 must also be activated via a license.

The electronic Certificate of License is the paperless delivery form for runtime options for SINAMICS and contains information about the type of rights of use purchased for the software.

- Basic Functions
  - Safe Torque Off (STO)
  - Safe Brake Control (SBC)
  - Safe Stop 1 (SS1)
- Extended Functions
  - Safe Stop 1 (SS1) with SBR or SAM
  - Safe Stop 2 with external stop (SS2E)
  - Safe Stop 2 (SS2) with SBR or SAM
  - Safe Operating Stop (SOS)
  - Safely-Limited Speed (SLS)
  - Safe Speed Monitor (SSM)
  - Safe Direction (SDI)
  - Safely-Limited Acceleration (SLA)
  - Safe Brake Test (SBT) diagnostic function
- Advanced Functions
  - Safely-Limited Position (SLP)
  - Safe Position (SP)
  - Safe Cam (SCA)

The license for Safety Integrated Advanced Functions also includes the license for Safety Integrated Extended Functions.

For the Extended Functions SS1 and SS2 with SAM, Safe Acceleration Monitor (SAM) is performed during braking to identify any faults already during the braking phase.

With SS1 and SS2, a Safe Brake Ramp (SBR) can be configured as an alternative. SS1 can also be parameterized with an external stop (SS1E).

The Basic Functions – activated via on-board terminals on the device, TM54F Terminal Module (only for SINAMICS S) or via PROFIsafe – do not require an encoder.

Activation of the Safety Integrated Functions

The safety functions for SINAMICS drives can be activated via terminals, e.g. for use of a conventional safety circuit.

For standalone safety solutions for small to medium-sized applications, it is frequently sufficient that the various sensing components are directly hardwired to the drive.

For integrated safety solutions, the safety-relevant sequences are generally processed and coordinated in the fail-safe SIMATIC controller. Here, the system components communicate via the PROFINET or PROFIBUS fieldbus. The safety functions are controlled via the safe PROFIsafe communication protocol.

SINAMICS drives can be easily integrated into the plant or system topology.

PROFIsafe

SINAMICS drives support the PROFIsafe profile based on PROFINET as well as on PROFIBUS.

PROFIsafe is an open communications standard that supports standard and safety-related communication over the same communication path (wired or wireless). A second, separate bus system is therefore not necessary. The telegrams that are sent are continually monitored to ensure safety-relevant communication.

Possible errors such as telegrams that have been lost, repeated or received in the incorrect sequence are avoided. This is done by consecutively numbering the telegrams in a safety-relevant fashion, monitoring their reception within a defined time and transferring an ID for transmitter and receiver of a telegram. A CRC (cyclic redundancy check) data security mechanism is also used.

The operating principle of Safety Integrated

Two independent switch-off signal paths

Two independent switch-off signal paths are available. All switch-off signal paths are low active. This ensures that the system is always switched to a safe state if a component fails or in the event of cable breakage. If a fault is discovered in the switch-off signal paths, the STO or SS1 function (depending on parameter settings) is activated and a system restart inhibited.

Two-channel monitoring structure

All the main hardware and software functions for Safety Integrated are implemented in two independent monitoring channels (e.g. switch-off signal paths, data management, data comparison). A cyclic crosswise comparison of the safety-relevant data in the two monitoring channels is carried out.

The monitoring functions in each monitoring channel work on the principle that a defined state must prevail before each action is carried out and a specific acknowledgement must be made after each action. If these expectations of a monitoring channel are not fulfilled, the drive coasts to a standstill (two channel) and an appropriate message is output.

Forced dormant error detection using test stop

The functions and switch-off signal paths must be tested at least once within a defined time in order to meet requirements as per ISO 13849-1 and IEC 61508 in terms of timely fault detection. This must be implemented either in cyclic manual mode or the test stop must be automatically initiated as part of the process. The test stop cycle is monitored, and after a specific time has been exceeded, an alarm is output. A test stop does not require a POWER ON. The acknowledgment is set by canceling the test stop request.

Examples of when forced dormant error detection must be performed:

- When the drives are at a standstill after the system has been switched on
- Before the protective door is opened
- At defined intervals (e.g. every 8 hours)
- In automatic mode, time and event-driven

[1] Only applies to SINAMICS G Control Unit CU250S-2 and SINAMICS S. Available for SINAMICS G via hardware versions "-F".

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Function

Safe speed/position sensing without/with encoder

Safe actual value sensing without encoder

A drive monitor with encoder is necessary for operation of a series of safety functions.

For applications with encoderless mode or with encoders that have no safety capability, the safety functions can also be implemented without encoder. It is not possible to use all safety functions in this case.

In operation without encoder, the actual speed values are calculated from the measured electrical actual values. This means that speed monitoring is also possible during operation without an encoder.

Safe actual value sensing with encoder

Incremental encoders or absolute encoders can be used for safe sensing of the position values on a drive.

Safe actual value sensing relies on redundant evaluation of the incremental tracks A/B that supply sin/cos signals of 1 V_{pp}. Only encoders of the type whose A/B track signals are created and processed using purely analog techniques can be used.

HTL/TTL incremental encoders may also be used. In this case, safe actual value sensing is achieved by using two independent encoders. The minimum possible speed resolution must also be taken into account.

The encoder signals are input via Sensor Modules.

As an alternative, motors with an integrated DRIVE-CLiQ interface can be used. The speed or position actual values are generated directly in the motor as safe values and are transferred to the Control Unit over safe communication via DRIVE-CLiQ.

Certified built-on rotary encoders with DRIVE-CLiQ interface may also be used (see https://support.industry.siemens.com/cs/document/65402168).

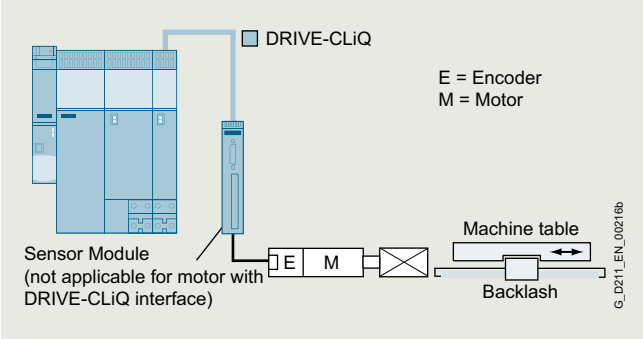
The encoder must be mechanically attached in such a manner that the encoder shaft is unable to unplug or slide off. For notes on this, see IEC 61800-5-2: 2016, Table D.16.

A list of Siemens motors that fulfill the electrical and mechanical requirements is available at:
https://support.industry.siemens.com/cs/document/33512621

The following can be used for safe speed/position sensing:

- Single-encoder systems or
- Dual-encoder systems

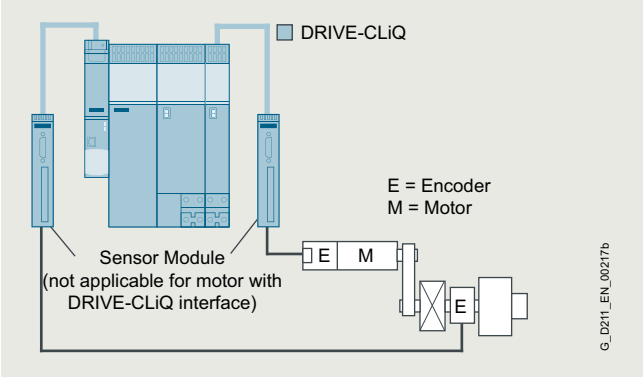
Single-encoder system



Example: Single-encoder system

In a single-encoder system, the motor encoder is used exclusively for safe actual value sensing.

Dual-encoder system



Example: Dual-encoder system

In the case of the dual-encoder system, the safe actual values for a drive are provided by two separate encoders. The actual values are transferred to the Control Unit over DRIVE-CLiQ. When motors without a DRIVE-CLiQ connection are used, a Sensor Module must be provided.

HTL/TTL incremental encoders can be used as an alternative with a dual-encoder system. Either two HTL/TTL encoders, one dual-HTL/TTL encoder or one HTL/TTL encoder and one sin/cos encoder can be used.

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Function

The safety functions are listed below with criteria for actual value sensing:

	Functions	Abbreviation	With encoder	Without encoder	Description
Basic Functions	Safe Torque Off	STO	Yes	Yes	Safe Torque Off
	Safe Stop 1	SS1	Yes	Yes [1]	Safe stopping process in accordance with stop category 1
	Safe Brake Control	SBC	Yes	Yes	Safe Brake Control
Extended Functions	Safe Torque Off	STO	Yes	Yes	Safe Torque Off
	Safe Stop 1	SS1	Yes	Yes [1]	Safe stopping process in accordance with stop category 1
	Safe Brake Control	SBC	Yes	Yes	Safe Brake Control
	Safe Operating Stop	SOS	Yes	No	Safe monitoring of the standstill position
	Safe Stop 2	SS2	Yes	No	Safe stopping process in accordance with stop category 2
	Safely-Limited Speed	SLS	Yes	Yes [1]	Safe monitoring of the maximum speed
	Safe Speed Monitor	SSM	Yes	Yes [1]	Safe monitoring of the minimum speed
	Safe Direction	SDI	Yes	Yes [1]	Safe monitoring of the direction of motion
	Safely-Limited Acceleration	SLA	Yes	No	Safely-Limited Acceleration
	Safe Brake Test	SBT	Yes	No	Diagnostic function for safe testing of the required holding torque of a brake
Advanced Functions	Safely-Limited Position	SLP	Yes	No	Safely-Limited Position
	Safe Position	SP	Yes	Yes [2]	Safe transfer of position values
	Safe Cam	SCA	Yes	No	Safe cams

[1] The use of this safety function without encoder is permitted with asynchronous (induction) motors or with reluctance motors.

[2] Only for the transmission of relative position values. An encoder is required to transmit absolute position values.

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Integration

The safety functions integrated in SINAMICS drives, including SIMATIC ET 200pro FC-2 frequency converters, are listed below.

Safety Integrated	Low voltage									
	Standard Performance frequency converters						Distributed frequency converters			
	SINAMICS						SINAMICS			SIMATIC
	V20	G120C	G120			G130 G150	G115D	G120D		ET 200pro FC-2 [6]
			CU230P-2	CU240E-2	CU250S-2	CU320-2		CU240D-2	CU250D-2	
Functions										
STO	–	✓	–	✓	✓	✓	✓	✓	✓	✓
SS1	–	–	–	✓ [1]	✓ [2] [8]	✓ [2] [8]	–	✓ [1]	✓ [1]	–
SS2	–	–	–	–	–	✓ [1]	–	–	–	–
SOS	–	–	–	–	–	✓ [1]	–	–	–	–
SBC	–	–	–	–	✓	✓	–	–	–	–
SBT	–	–	–	–	–	✓ [1]	–	–	–	–
SLS	–	–	–	✓ [1]	✓ [2]	✓ [1]	✓ [2]	✓ [1]	✓ [1]	–
SSM	–	–	–	✓ [1]	✓ [2]	✓ [1]	–	✓ [1]	✓ [1]	–
SDI	–	–	–	✓ [1]	✓ [2]	✓ [1]	–	✓ [1]	✓ [1]	–
SLA	–	–	–	–	–	✓ [1]	–	–	–	–
SLP	–	–	–	–	–	✓ [3]	–	–	–	–
SP	–	–	–	–	–	✓ [3]	–	–	–	–
SCA	–	–	–	–	–	✓ [3]	–	–	–	–
Control										
PROFIsafe	–	✓	–	✓	✓	✓	✓	✓	✓	–
F-DI	–	✓	–	✓	✓	✓	✓	✓	✓	–

Safety Integrated	Low voltage						
	Industry-specific frequency converters	Servo converters			High performance frequency converters		
	SINAMICS						
	G120X	V90	S210	S210 (New)	S120 S120M		S150
					CU310-2	CU320-2	CU320-2
Functions							
STO	✓ [7]	✓	✓	✓	✓	✓	✓
SS1	–	–	✓ [2] [8]	✓ [8] [9]	✓ [2] [8]	✓ [2] [8]	✓ [2] [8]
SS2	–	–	✓ [2]	✓ [9]	✓ [2]	✓ [2]	✓ [2]
SOS	–	–	✓ [2]	✓ [9]	✓ [2]	✓ [2]	✓ [2]
SBC	–	–	✓	✓	✓	✓	✓
SBT	–	–	✓ [2]	✓ [9]	✓ [2]	✓ [2]	✓ [2]
SLS	–	–	✓ [2]	✓ [9]	✓ [2]	✓ [2]	✓ [2]
SSM	–	–	✓ [2]	✓ [9]	✓ [2]	✓ [2]	✓ [2]
SDI	–	–	✓ [2]	✓ [9]	✓ [2]	✓ [2]	✓ [2]
SLA	–	–	✓ [2]	✓ [9]	✓ [2]	✓ [2]	✓ [2]
SLP	–	–	–	–	✓ [3]	✓ [3] [4]	✓ [5]
SP	–	–	–	–	✓ [3]	✓ [3] [4]	✓ [5]
SCA	–	–	–	–	✓ [3]	✓ [3] [4]	✓ [5]
Control							
PROFIsafe	–	–	✓	✓	✓	✓	✓
F-DI	✓	✓	✓	✓	✓	✓	✓

More information

The Safety Integrated Function Manual contains detailed information about the safety functions
https://support.industry.siemens.com/cs/document/109781722

Further manuals pertaining to Safety Integrated in drive systems can be found on the internet at
https://support.industry.siemens.com/cs/ww/en/ps/13206/man

More information about Safety Integrated in SINAMICS can be found on the internet at
www.siemens.com/safety-drives

1) With fail-safe Control Unit.
2) With Safety Extended license.
3) With Safety Advanced license.
4) Safety Advanced license for cabinet modules on request.
5) Safety Advanced license on request.
6) Information on the SIMATIC ET 200pro FC-2 frequency converter – depending on the SIMATIC ET 200pro station – is available at: www.siemens.com/et200pro-fc
7) With external safety relay.
8) Safe Stop 1 time controlled (SS1-t) is also included in the Safety Integrated Basic functions.
9) The Extended Functions require a Safety license. The functions SS1, SLS, SDI and SSM are available with firmware V6.1. Further functions will be added in a subsequent version.

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Overview



The Safety Integrated functions of SINAMICS S120 provide highly effective application-oriented protection for personnel and machinery. They are suitable for machines and systems that require flexible safety functions and support the setup of tailored safety concepts.

SINAMICS S120 offers Extended Functions (SS1 with SBR/SAM, SS1E, SS2 with SBR/SAM, SS2E, SOS, SLS, SDI, SSM, SLA, SBT) as well as Advanced Functions (SLP, SP, SCA) in addition to Basic Functions (STO, SS1, SBC).

The SP function and the SBT diagnostic function go beyond the functional scope according to IEC 61800-5-2.

The Safety Integrated functions are completely integrated into the drive system. They can be activated as follows:

- Via safety-related inputs on the CU310-2 Control Unit
- Via safety-related inputs on the TM54F Terminal Module
- Via PROFIBUS or PROFINET with PROFIsafe

The Safety Integrated functions are implemented electronically and therefore offer short response times in comparison to solutions with externally implemented monitoring functions.

As an alternative to controlling via terminals and/or PROFIsafe, there is also the option to parameterize several Safety Integrated functions without selection. In this mode, after parameterization and a POWER ON, these functions are permanently selected.

Example:

"SLS without selection" can be used, for example, to monitor the maximum velocity to prevent the drive from exceeding a mechanical speed limit. For this purpose, using the "without selection" function, an F-DI does not have to be used; an F-CPU is also not required.

Safe speed/position sensing

Incremental encoders or absolute encoders can be used for safe sensing of the position values on a drive. Safe actual value sensing relies on redundant evaluation of the incremental tracks A/B that supply sin/cos signals of 1 V_{pp}. Only encoders of the type whose A/B track signals are created and processed using purely analog techniques can be used. The encoder signals can be input via the Sensor Modules.

HTL/TTL encoders can be used in a dual-encoder system to achieve safe actual value sensing. The minimum possible speed resolution must also be taken into account. The encoder signals are input via the SMC30 Sensor Module.

As an alternative, motors with an integrated DRIVE-CLiQ interface can be used. The speed or position actual values are generated directly in the motor as safe values and are transferred to the Control Unit over safe communication via DRIVE-CLiQ.

The encoder must be mechanically attached in such a manner that the encoder shaft is unable to unplug or slide off. For notes on this, see IEC 61800-5-2: 2017, Table D.8..

A list of Siemens motors that fulfill the electrical and mechanical requirements is available at:

https://support.industry.siemens.com/cs/document/33512621

The following can be used for safe speed/position sensing:

- Single-encoder systems or
- Dual-encoder systems

Single-encoder systems

In a single-encoder system, the motor encoder is used exclusively for safe actual value sensing.

Dual-encoder systems

The safe actual values for a drive are provided by two separate encoders. The actual values are transferred to the Control Unit over DRIVE-CLiQ. When motors without a DRIVE-CLiQ connection are used, a Sensor Module must be provided.

Safe actual value sensing without encoder

The Extended Functions Safe Stop 1 (SS1) with SAM/SBR, Safely-Limited Speed (SLS), Safe Speed Monitor (SSM) and Safe Direction (SDI) are also available for use without encoders (in combination with asynchronous motors or with reluctance motors). An encoder that is used for the purposes of motor control has no significance for the safety function here.

The Safety Integrated Function Manual contains additional information about the encoderless safety functions.

https://support.industry.siemens.com/cs/document/109781722

The Extended Functions Safe Stop 2 (SS2), Safe Operating Stop (SOS) and Safe Brake Test (SBT) and the Advanced Functions Safely-Limited Position (SLP), Safe Position (SP) always require a safe encoder system.

Licensing

No license is required for the Basic Functions.

The Extended Functions and Advanced Functions each require a license. The Extended Functions are included in the Advanced Functions license. It is of no consequence here which Safety Integrated functions are used and how many. The license can be ordered as an option with the memory card. Alternatively, a single-user license can also be purchased.

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Overview

Safe Brake Control

The Safe Brake Control is integrated in power units in booksize format.

For the Safe Brake Control (SBC) function, a Safe Brake Relay is required for power units in blocksize format, and a Safe Brake Adapter for power units in chassis format.

The Safe Brake Relay/Safe Brake Adapter and the brake control that is integrated in the booksize/chassis format allows safe control of electro-mechanical motor brakes.

The Safe Brake Relay controls a 24 V DC brake; the Safe Brake Adapter controls a 230 V AC brake. When the STO function is active, the Safe Brake Relay/Safe Brake Adapter safely closes the connected brake. The SBC function monitors the control of the brake, however, not its mechanical functioning.

The converter controls the connected brake using the motor holding brake function.

External surge suppressors are not required. The cable harnesses for connection to the Power Module are supplied as standard with the Safe Brake Relay. A connecting cable is required to connect the Safe Brake Adapter.

With the Safe Brake Relay/Safe Brake Adapter functions, the brake is controlled in accordance with IEC 61508 SIL 2 and ISO 13849-1 PL d and Category 3.



Safe Brake Relay



Safe Brake Adapter

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Function

Function	Control	Underlying function	Reaction to limit overshoot	External setpoint input effective	Encoder required	License required
Basic Functions						
STO	• EP terminals on the power unit or CUA31/CUA32 and a DI on the Control Unit • F-DI on TM54F • F-DI on CU310-2 • PROFIsafe	SBC (if activated)	–	No	No	No
SBC	• With STO (immediately or following expiry of the delay time with SS1)	–	–	–	No	No
SS1/SS1E time-controlled	• EP terminals on the power unit or CUA31/CUA32 and a DI on the Control Unit • F-DI on TM54F • F-DI on CU310-2 • PROFIsafe	STO following expiry of the parameterized delay time, SBC (if activated)	STO	Parameterizable	No	No
Extended Functions						
SS1 with SBR/SAM	• F-DI on TM54F • F-DI on CU310-2 • PROFIsafe	Safe Acceleration Monitor (SAM) or Safe Brake Ramp (SBR) during braking. STO and SBC (if activated) following expiry of the parameterized delay time or if the speed falls below the minimum speed limit	STO	Parameterizable	No	Yes
SS2 with SBR/SAM	• F-DI on TM54F • F-DI on CU310-2 • PROFIsafe	Safe Acceleration Monitor (SAM) or Safe Brake Ramp (SBR) during braking. Following expiry of the parameterized delay time SOS	SS1 → STO	No	Yes	Yes
SOS	• F-DI on TM54F • F-DI on CU310-2 • PROFIsafe	–	SS1 → STO	Yes	Yes	Yes
SLS encoderless	• F-DI on TM54F • F-DI on CU310-2 • PROFIsafe • Continuously activated	–	STO, SS1 (can be parameterized)	Yes	No	Yes
SLS	• F-DI on TM54F • F-DI on CU310-2 • PROFIsafe • Continuously activated	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	Yes	Yes
SDI	• F-DI on TM54F • F-DI on CU310-2 • PROFIsafe • Continuously activated	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	No	Yes
SSM	• Always active, if configured	–	Signals that the speed has fallen below a specified value (safe checkback signal switches to high)	Yes	No	Yes
SLA	• PROFIsafe	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	Yes	Yes
SBT	• Safety Control Channel • BICO signals • for test stop selection	–	Signals test result. Warning if test fails	Yes	Yes	Yes
Advanced Functions						
SLP	• F-DI on TM54F • F-DI on CU310-2 • PROFIsafe	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	Yes	Yes
SP	• Always active, if configured	–	–	Yes	Yes	Yes
SCA	• PROFIsafe	–	–	Yes	Yes	Yes

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4/2 **Energy efficiency**
4/2 Success factor Energy Efficiency

4/3 **SIMATIC Energy Suite – integrated energy management**

4/4 **Energy-efficient drives**
4/5 Overview of the energy-saving functions for SINAMICS drives

4/7 **Energy efficiency classes in accordance with IEC 61800-9-2**

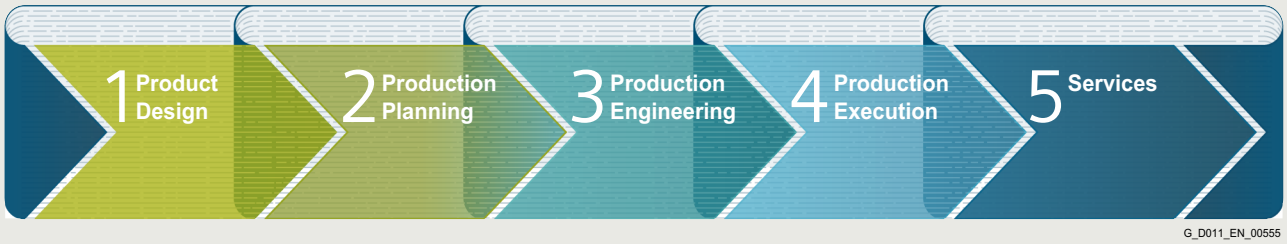
Further information about SINAMICS Drive Software for our SINAMICS next generation converters (from firmware V6.1) is available on the internet at:
www.siemens.com/sinamics-drive-software
For more information on ordering and configuration, see catalog D 99 and SiePortal at:
www.siemens.com/d99
www.siemens.com/sinamics-drive-software/sieportal

Further information about energy efficiency including references from industrial production can be found at
www.siemens.com/energy-efficiency
www.siemens.com/energysaving

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Energy efficiency

Overview



Success factor Energy Efficiency

Siemens helps you to optimize your energy demand, reduce your energy costs and increase your competitive advantage

Industry is facing enormous challenges:
Production processes need to be highly productive, energy-efficient, and resource-saving. Siemens is offering an energy efficiency concept that continually and systematically reduces the power consumption of machines and equipment and thereby boosts the competitive advantage of industrial producers. When implementing energy-efficient solutions, Siemens not only assesses the production process as a whole, but also evaluates each individual production step.

1 Produkt Design

Improve your confidence in planning outcomes! It is important to know the costs associated with the operation of a production machine so that these can be taken into account in the machine design. For example, the SinaSave software application can help you to calculate how soon you will recoup your investment if you purchase an energy-efficient drive. The Mechatronic Support simulation package will also provide you with the means to test and optimize your machine concept, Helping you to save time, energy and operating expenses. See also the SIZER for Siemens Drives engineering tool (integrated in the TIA Selection Tool).
SinaSave: www.siemens.com/sinasave
SIZER for Siemens Drives (integrated in the TIA Selection Tool): www.siemens.com/sizer

2 Production Planning

Make your plant more profitable! It is possible to carry out an on-screen simulation of individual machines and even the entire production process. By doing this, you can optimize the efficiency and productivity of production processes. For example, you can use the digital models and analysis functions provided by the Plant Simulation tool in order to optimize the motion sequences of your machines, prevent load peak overlaps, recover energy and optimize speeds.
Plant Simulation: www.siemens.com/tecnomatix

3 Production Engineering

Optimize the workflow! The SIMATIC Energy Manager PRO management tool helps you to achieve efficient control of energy and costs. But this requires perfectly coordinated communication and operation between hardware and software. Using the TIA Portal engineering framework, for example, it is easy to set up and optimize every single engineering process. You can then see at a glance the areas in your plant that can be made more productive and environmentally friendly. See also the STARTER commissioning tool and the SINAMICS Startdrive commissioning tool.
SIMATIC Energy Manager PRO:
www.siemens.com/energymanagerpro
TIA Portal: www.siemens.com/tia-portal
STARTER: www.siemens.com/starter
SINAMICS Startdrive: www.siemens.com/startdrive

4 Production Execution

Use innovative drive technology to reduce your energy consumption! The energy-efficient components and systems developed by Siemens can cut the energy consumption of a plant. Important components in an energy-efficient plant are, for example, frequency converters with regenerative feedback functions for applications with variable speeds or soft starters for fixed-speed drives. With its PROFIenergy system, Siemens is also offering solutions that permit centralized shutdown of loads or entire production units during production breaks – a vendor- and device-neutral interface for flexible use over short or long production breaks.

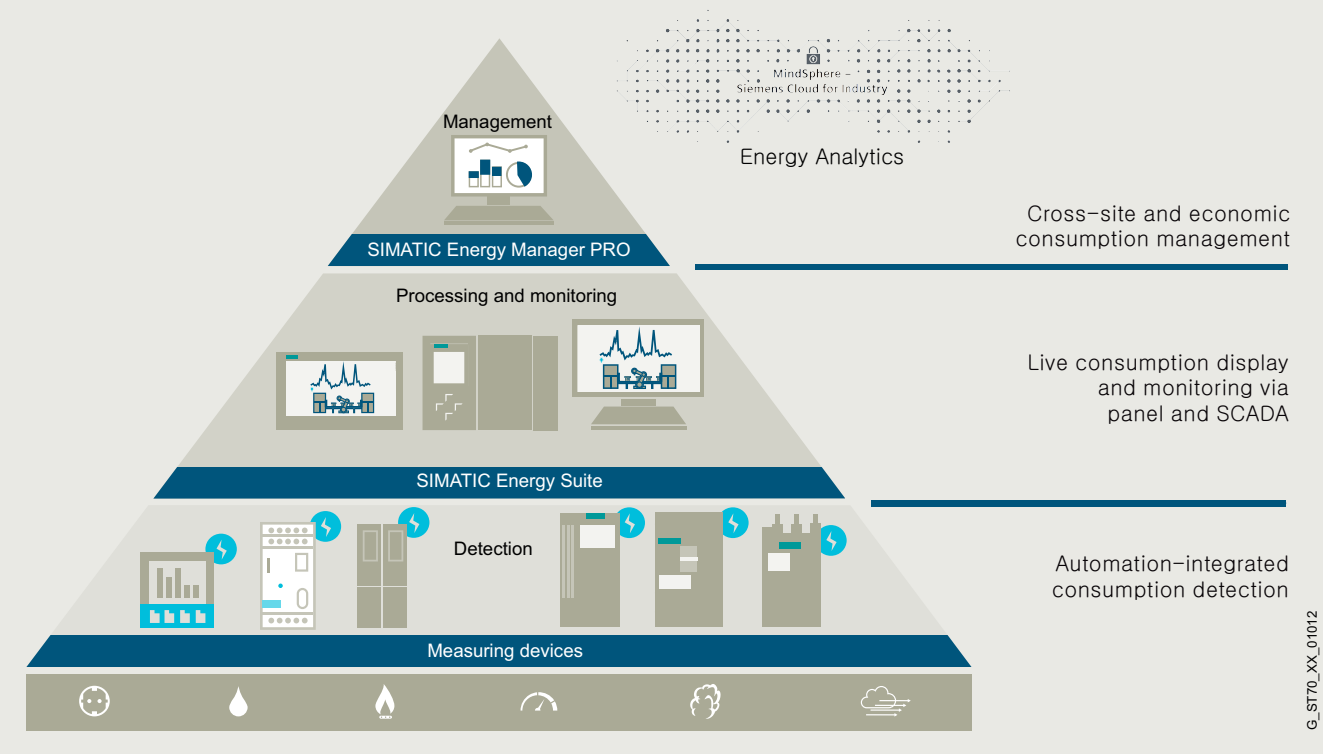
5 Services

Improve your productivity and efficiency while reducing total costs! With its Energy & Environmental Services, Siemens is offering a tailored consultancy that will provide you with the necessary support in designing and implementing systematic energy and environmental management solutions. It will give you the satisfaction of achieving maximum energy efficiency throughout your company.

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More information

Further information about energy efficiency including references from industrial production can be found at
www.siemens.com/energy-efficiency
www.siemens.com/energysaving



A high energy consumption and automated production are typical for many industries.

If you want to keep your energy costs under control in the long term and you are already focusing on the digital future, you will equip your plant with integrated energy measuring technology, thus anchoring your energy management in the automation of your production processes – which is where most energy is consumed. SIMATIC Energy Suite as an integrated option for the TIA Portal efficiently links energy management with automation, thus creating energy transparency in production. The considerably simplified configuration of energy measuring components from the product families[2] SIMATIC, SENTRON, SINAMICS, SIRIUS and SIMOCODE significantly reduces the configuration costs. Thanks to the end-to-end connection to SIMATIC Energy Manager PRO[1] or cloud-based Service Energy Analytics, you can seamlessly expand the recorded energy data to create a cross-site energy management system.

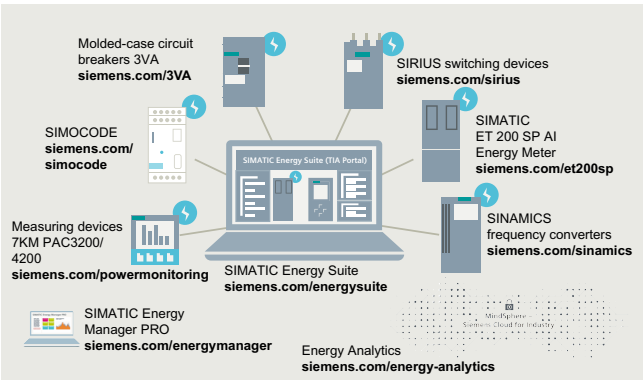
This additionally enables companies to satisfy all the required economic and energy management aspects – from the purchasing of energy and planning all the way to energy controlling.

The advantages at a glance:

- Automatic generation of energy management data
- Integration into TIA Portal and into automation
- Simple configuration

Highlights

- Simple and intuitive configuration instead of programming
- Automatic generation of the PLC energy program
- Convenient integration of measuring components from the Siemens portfolio and from the portfolio of other vendors
- Integrated into the TIA Portal and automation
- Archiving on WinCC Professional or PLC
- Seamless connection to Energy Manager PRO and Energy Analytics



Ready for SIMATIC Energy Suite

Further information on SIMATIC Energy Suite:
www.siemens.com/energysuite

[1] SIMATIC Energy Manager PRO is the innovative successor to SIMATIC B.Data

[2] Products of the SIMATIC, SENTRON, SINAMICS, SIRIUS and SIMOCODE product families. You can find details on the currently supported devices here:
www.siemens.com/energysuite-hardware

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4

Overview

Energy-efficient SINAMICS drives save energy in an intelligent way

Exploit energy-saving potential and optimize energy consumption: You can - with intelligent SINAMICS drives. Depending on the application in question, energy consumption can be controlled by motor speed adjustment to suit the individual process and achieve the greatest possible energy savings. Regenerative feedback is also an option for many applications. Our portfolio of frequency converters is the most comprehensive and standardized range on the market and the first choice for anyone seeking an energy-efficient drive – at low-voltage or medium-voltage level.

Energy-efficient drives with intelligent functions

Depending on the application and load profile, the intelligent energy-saving functions of SINAMICS drives can cut energy consumption.

PROFIenergy



Provides energy-related status data for the system components to create transparency for the energy management; energy savings by selective shut-down of plants or plant sections.

ECO-Modus



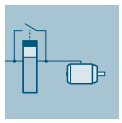
In ECO mode, the operating point of the motor in the partial-load range is automatically adjusted and optimized. This reduces motor losses, for example, in machines that do not need a high torque over the entire operating range.

Hibernation mode



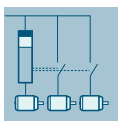
Variable-speed drives that are not required to operate continuously are switched to standby or "Hibernation mode". The drive is restarted again as soon as it is needed.

Bypass mode



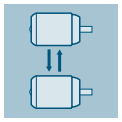
In bypass mode it is possible to "bypass" the converter electrically as soon as the motor is frequently operating close to its rated speed. This solution helps reduce converter losses and so increase overall efficiency.

Cascading



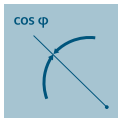
In pump, fan and compressor applications involving high outputs, the entire power demand is distributed among several motors. Phased connection and disconnection by means of partially or fully controlled cascades in combination with converters make a drive system more energy-efficient.

Energy balancing



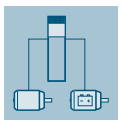
Through the use of converters with coupled drives, energy is exchanged through the common DC link. Through the direct energy exchange from one converter to the next, it is possible to minimize power losses in the system.

Reactive power compensation



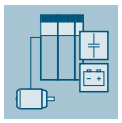
The use of SINAMICS converters with Active Line Modules reduces the capacitive and/or inductive reactive power in the machine. It is then possible to dispense with costly reactive power compensation systems.

Kinetic energy buffering



With dynamic reversing operations in single-axis and multi-axis systems, the kinetic energy available in the system is reused. A motor connected to the common DC link is used to buffer kinetic energy.

Electrical energy buffering



With dynamic reversing operations in single-axis and multi-axis systems, the kinetic energy available in the system is reused. A capacitor module connected to the common DC link is used to buffer electrical energy.

Optimized pulse patterns



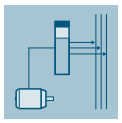
Thanks to optimized clock frequency and pulse pattern, SINAMICS G and SINAMICS S are perfectly suited to SIMOTICS motors and SIMOGEAR geared motors. The benefits: Optimization of performance and system efficiency, reduced system losses as well as lower temperature and noise levels.

Energy usage counter/Energy saving counter



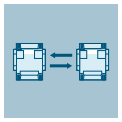
Actual energy usage can be displayed during operation. Furthermore, an energy saving counter can be installed to indicate the cumulative energy savings during machine operation as compared to a fixed-speed application.

Regenerative feedback



In conventional drive systems, the energy produced during braking is converted to heat using braking resistors. SINAMICS G and SINAMICSS converters with regenerative feedback capability need no braking resistor, and supply the resulting braking energy back into the line.

DC link coupling with SINAMICS V20



Applications with two SINAMICS V20 converters with the same power rating can share a common DC link in order to reuse regenerated energy.

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Integration

Overview of the energy-saving functions for SINAMICS drives including SIMATIC ET 200pro FC-2 frequency converters

Energy-saving function	Low voltage									
	Standard performance frequency converters						Distributed frequency converters			
	SINAMICS						SINAMICS			SIMATIC
	V20	G120C	G120			G130 G150	G115D	G120D		ET 200pro FC-2 1)
			CU230P-2	CU240E-2	CU250S-2	CU320-2		CU240D-2	CU250D-2	
Functions										
ECO mode	✓	✓	✓	✓	✓	–	✓	✓	✓	✓
Hibernation mode	✓	–	✓	–	–	–	–	–	–	–
Bypass mode	–	–	✓	–	–	✓	–	–	–	–
Cascading	✓	–	✓	–	–	–	–	–	–	–
Energy balancing	✓	–	–	–	–	–	–	–	–	–
Reactive power compensation	–	–	–	–	–	–	–	–	–	–
Kinetic energy buffering	–	–	–	–	–	–	–	–	–	–
Electrical energy buffering	–	–	–	–	–	–	–	–	–	–
Optimized pulse patterns	–	–	–	–	–	✓	–	–	–	–
Energy usage counter/Energy saving counter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Regenerative feedback	–	–	✓ with PM250 Power Module	✓ with PM250 Power Module	✓ with PM250 Power Module	–	–	✓	✓	✓
Communication protocol and profile										
PROFINET	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
• PROFIenergy	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ready for SIMATIC Energy Suite										
Integrated energy management	–	✓	✓	✓	✓	–	✓	✓	✓	–

1) Information on the SIMATIC ET 200pro FC-2 frequency converter – depending on the SIMATIC ET 200pro station – is available at: www.siemens.com/et200pro-fc

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Integration

Energy-saving function	Low voltage					
	Industry-specific frequency converters	Servo converters		High performance frequency converters		
	SINAMICS					
	G120X	V90	S210	S120 S120M		S150
				CU310-2	CU320-2	CU320-2
Functions						
ECO mode	✓	–	–	✓	✓	–
Hibernation mode	✓	–	–	–	–	–
Bypass mode	✓	–	–	✓	✓	✓
Cascading	✓	–	–	–	–	–
Energy balancing	–	–	–	✓ for multi-axis drives only	✓ for multi-axis drives only	–
Reactive power compensation	–	–	–	✓ with Active Line Module	✓ with Active Line Module	✓
Kinetic energy buffering	–	–	–	✓ for multi-axis drives only	✓ for multi-axis drives only	–
Electrical energy buffering	–	–	–	✓ for multi-axis drives only	✓ for multi-axis drives only	–
Optimized pulse patterns	–	–	–	✓	✓	✓
Energy usage counter/ Energy saving counter	✓	–	–	✓	✓	✓
Regenerative feedback	–	–	–	✓ with Smart Line Module or Active Line Module	✓ with Smart Line Module or Active Line Module	✓
Communication protocol and profile						
PROFINET	✓	–	–	✓	✓	✓
• PROFIenergy	✓	–	–	✓	✓	✓
Ready for SIMATIC Energy Suite						
Integrated energy management	✓	–	–	✓	–	–

More information

Information on the SIMATIC ET 200pro FC-2 frequency converter with PROFINET or PROFIBUS DP - depending on the SIMATIC ET 200pro station - is available at www.siemens.com/et200pro-fc

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Overview

Step by step to more efficiency

One of the core objectives of the European Union is a sustainable power industry. In industrial plants today, around 70 % of the power demand is from electrically driven systems. This high percentage contains huge potential for saving energy in electrical drives. For that reason, the European Union introduced minimum requirements for the energy efficiency of electric motors in the form of a statutory motor regulation as early as 2011.

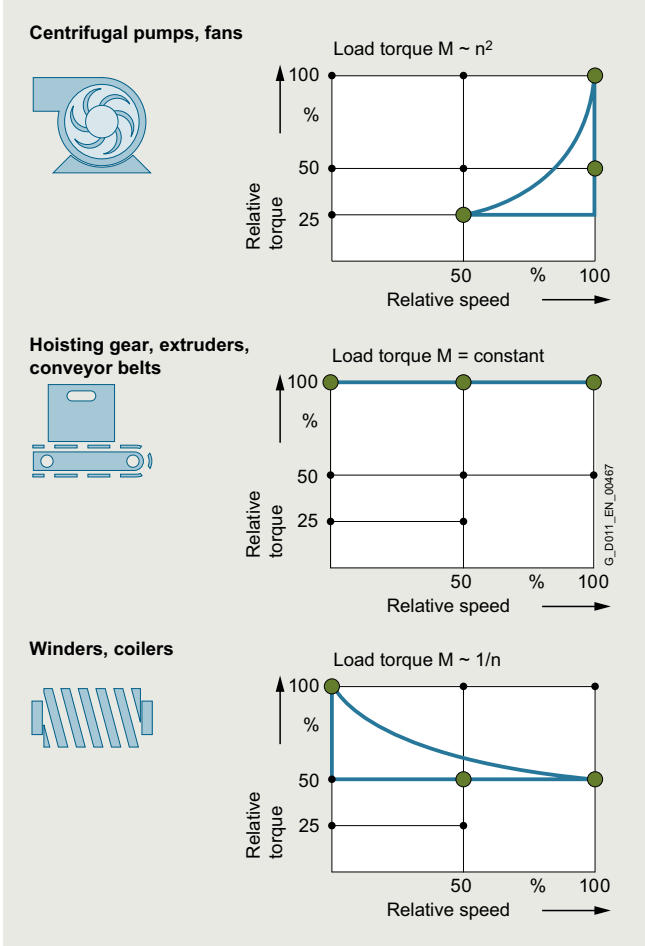
These activities are extended by the 2019/1781 EU regulation dealing with stricter requirements for DOL (Direct On Line) motors and defining efficiency limits for frequency converters. The regulation provides a legal basis for technical content regarding the efficiency of specific products and services. Standardization, however, has played a leading role in determining the field and the available market technology.

Energy efficiency improvement is supported through a systematic selection of the most efficient converter and drive system technology via the IEC 61800-9 series of standards. Part 1 specifies the methodology to determine the energy efficiency index of an application based on the extended product approach (EPA) and semi analytical models (SAMs), while Part 2 provides indicators for assessing the energy efficiency performance and the classification of converters and drive systems. To take account of the different use cases, consideration of eight application-relevant operating points has been introduced as mandatory for the first time. Determination of loss values at these eight points and definition of efficiency classes are laid down by the standard in a uniform way. This enables data relevant to operation, such as application-specific load profiles, to now be taken into account more easily in the energy efficiency analysis.

The standard is especially important for variable-speed drives of the following types:

- for AC/AC converters without energy recovery functionality
- for motors with integrated converters
- for supply voltages of 100 V to 1000 V
- for power ratings of 0.12 kW to 1000 kW

To cover all applications of driven machines, the IEC 61800-9-2 standard defines operating points in full-load and partial-load operation, at which the losses of the motor and drive systems have to be determined. Based on the loss data at the operating points in partial-load operation, variable-speed drives can be explicitly considered in more detail. This makes their advantages especially clear.



Duty cycles for different driven machines

Moreover, frequency converters and motor systems are classified in efficiency classes, which permit an initial rough estimate of the potential saving. Definition of reference systems is a key aspect of this because they provide standard reference values. The positioning of these reference systems defines the efficiency class. The relative distance from the reference system can be used as an absolute measure of the efficiency at the operating point in question.

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4

Overview

Advantages of the detailed loss consideration of IEC 61800-9-2 over the previous consideration of efficiencies and maximum loss values

For motors, the efficiency consideration was previously only defined for operation without a converter at 50/60 Hz. It provides a good way of comparing the energy efficiency of motors from different manufacturers for this use case.

The more detailed loss analysis of IEC 61800-9-2, on the other hand, is aimed at speed-controlled operation and therefore now also includes motors especially designed for converter operation in the energy analysis. These were previously not covered by the applicable standards.
Moreover, a loss analysis over the entire setting and load range of the motor is possible. This is done in accordance with the standard IEC 61800-9-2 with typical values.

For holistic consideration, it is essential to include all the relevant components of a drive system. The IEC 61800-9-2 standard defines this in detail. The standardized expression of power loss data as a percentage makes comparison considerably easier and more transparent.

The method also makes it possible to consider a motor that produces a holding torque at speed zero, for example. In this case, the efficiency is zero, but a power loss from current producing magnetization and holding torque does occur. In summary, the key advantage of standard IEC 61800-9-2 is the ability to perform the energy analysis of an electrical drive system based on standardized load profiles in all operating ranges due to uniform general conditions. This provides the user with complete transparency irrespective of the manufacturer.

Establishing efficiency classes of frequency converters (Complete Drive Modules CDM)

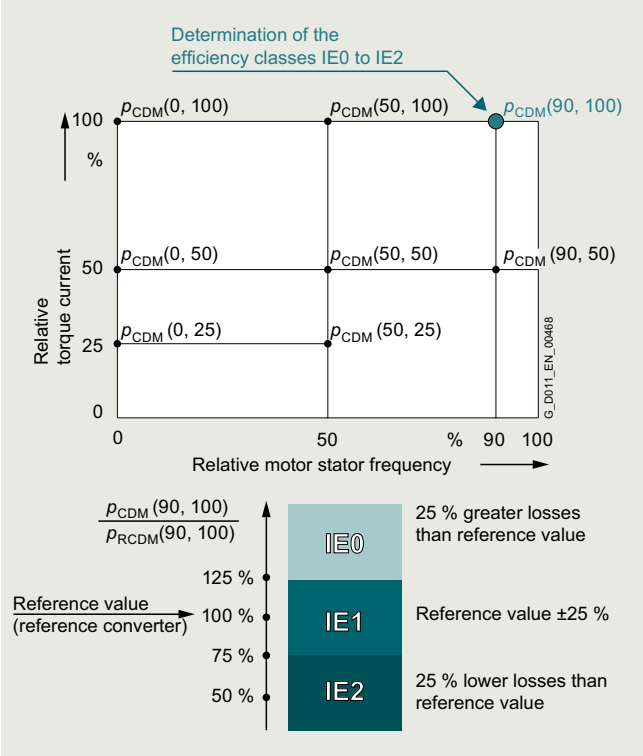
To avoid overmodulation and to ensure comparability between makes, which cannot be achieved otherwise, the efficiency classes of CDMs refer to the 90/100 operating point (90 % motor stator frequency, 100 % torque current).

Standard IEC 61800-9-2 defines the relative losses of a CDM in efficiency classes IE0 to IE2. With reference to the value of a CDM of efficiency class IE1 (reference converter), a CDM of efficiency class IE2 has 25 % lower losses and a CDM of efficiency class IE0 has 25 % higher losses.

The publication of the 2019/1781 EU regulation has made mandatory the fulfillment of the ecodesign requirements for the declaration of product conformity.

AC/AC converters belonging to the aforementioned categories (specific voltage and power level without regenerative capability) have to fulfill efficiency class IE2 in order to be approved for installation/utilization within EU.

Operating points for CDMs



Complete Drive Module (CDM) – determining the efficiency class

Establishing the efficiency classes of drive systems (Power Drive Systems PDS)

What is possible for the individual systems, of course, also applies to the entire electrical PDS (frequency converter plus motor). Detailed comparisons are now possible at this level, too. The reference values for the reference system provide clear indications of the energy performance of the PDS.

Because targeted matching of the motor and CDM provides additional potential for optimization in electrical drive systems, it is especially important for the user to consider the entire drive system.

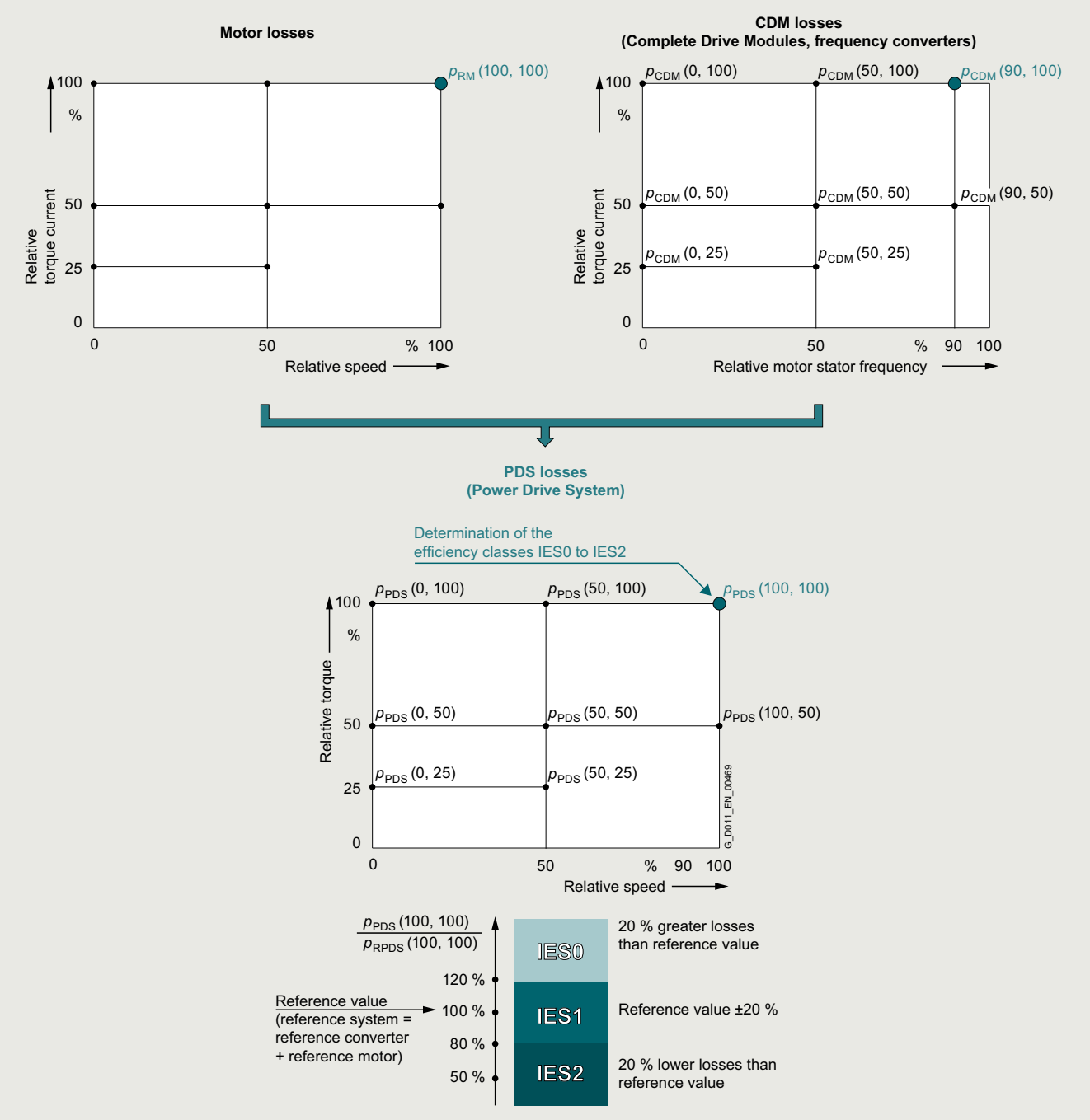
For the efficiency class of a PDS, too, a specific load point is defined. In this case, the reference point used is the 100/100 operating point (100 % motor stator frequency, 100 % torque).

Standard IEC 61800-9-2 defines the relative losses of a PDS in efficiency classes IES0 to IES2. With reference to the value of a PDS of efficiency class IES1 (reference drive), a PDS of efficiency class IES2 has 20 % lower losses and a PDS of efficiency class IES0 has 20 % higher losses.

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Overview

Operating points for PDS



Power Drive System (PDS) – determining the efficiency class

More information

Power loss data of SINAMICS converters for single-axis drives are available

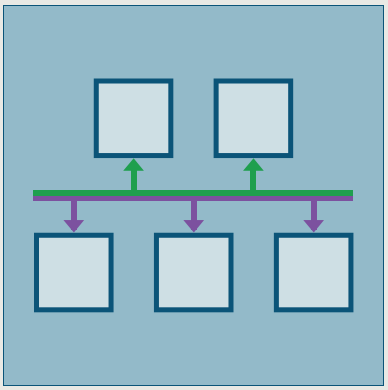
- for SINAMICS V20, SINAMICS G115D/G120/G120C/G120D/G120X/G130/G150 and SINAMICS S120/S150 on the internet at https://support.industry.siemens.com/cs/document/94059311
- for SINAMICS frequency converters of the next generation (from firmware V6.1) via ID-Link or Siemens Product Configurator in SiePortal at www.siemens.com/spc

More information on current laws and standards, new standards, and mandatory guidelines is available on the internet at www.siemens.com/legislation-and-standards

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Notes

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Further information about SINAMICS Drive Software for our SINAMICS next generation converters (from firmware V6.1) is available on the internet at:
www.siemens.com/sinamics-drive-software
For more information on ordering and configuration, see catalog D 99 and SiePortal at:
www.siemens.com/d99
www.siemens.com/sinamics-drive-software/sieportal

Further information regarding PROFINET and PROFIBUS can be found at
www.profibus.com

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Overview

Communication overview

Digital bus systems are commonly used in industrial automation today. These handle communication between the control level, the machine control, the sensors and actuators. The SINAMICS product family offers integrated communication interfaces in all product groups – which can be used to connect the most important fieldbus systems in the simplest possible way.

The properties and special application areas of the various bus systems for SINAMICS converters incl. SIMATIC ET 200pro FC-2 frequency converters are briefly described in the following.

Protocol	Low voltage									
	Standard performance frequency converters						Distributed frequency converters			
	SINAMICS						SINAMICS			SIMATIC
	V20	G120C	G120			G130 G150	G115D	G120D		ET 200pro FC-2 [1]
			CU230P-2	CU240E-2	CU250S-2	CU320-2		CU240D-2	CU250D-2	
PROFINET	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
- PROFINET RT	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
- PROFINET IRT isochronous	–	–	–	–	–	–	–	–	–	–
- PROFINET IRT not isochronous	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
- PROFINET Shared Device	–	✓	✓	✓	✓	✓	–	✓	✓	✓
- PROFINET media redundancy MRP (step-change)	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
- PROFINET media redundancy MRPD (bumpless)	–	✓	✓	✓	✓	✓	✓	✓	✓	–
- System redundancy S2	–	–	–	–	–	✓	–	–	–	–
- PROFIsafe	–	✓	–	✓	✓	✓	✓	✓	✓	✓
- PROFIenergy	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
- PROFIdrive application class 1	–	✓	✓	✓	✓	✓	✓	✓	–	✓
- PROFIdrive application class 3	–	–	–	–	✓	–	–	–	✓	–
- PROFIdrive application class 4	–	–	–	–	–	–	–	–	–	–
PROFIBUS DP	–	✓	✓	✓	✓	✓	–	–	–	✓
- PROFIBUS DP equidistance and isochronous mode	–	–	–	–	–	–	–	–	–	–
- PROFIBUS DP peer-to-peer communication	–	✓	✓	✓	✓	✓	–	–	–	–
EtherNet/IP	–	✓	✓	✓	✓	✓	✓	✓	✓	–
Modbus TCP	–	–	–	–	–	✓	–	–	–	–
Modbus RTU	✓	✓	✓	✓	✓	–	–	–	–	–
AS-Interface	–	–	–	–	–	–	✓	–	–	–
BACnet MS/TP	–	–	✓	–	–	–	–	–	–	–
CANopen	–	–	–	–	–	–	–	–	–	–
USS	✓	✓	✓	✓	✓	✓	–	–	–	–
FLN P1	–	–	✓	–	–	–	–	–	–	–
Web server	✓ [2]	✓ [2]	✓ [2]	✓ [2]	✓ [2]	✓	✓ [2]	–	–	–

[1] Information on the SIMATIC ET 200pro FC-2 frequency converter with PROFINET, PROFIBUS DP or EtherNet/IP – depending on the SIMATIC ET 200pro station – is available at www.siemens.com/et200pro-fc

[2] Function possible with optional SINAMICS G120 Smart Access web server module.

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Overview

Protocol	Low voltage					
	Industry-specific frequency converters	Servo converters		High performance frequency converters		
	SINAMICS					
	G120X	V90	S210	S120 S120M		S150
				CU310-2	CU320-2	CU320-2
PROFINET	✓	✓	✓	✓	✓	✓
- PROFINET RT	✓	✓	✓	✓	✓	✓
- PROFINET IRT isochronous	–	✓	✓	✓	✓	✓
- PROFINET IRT not isochronous	✓	✓	✓	✓	✓	✓
- PROFINET Shared Device	✓	–	✓	✓	✓	✓
- PROFINET media redundancy MRP (step-change)	✓	–	✓	✓	✓	✓
- PROFINET media redundancy MRPD (bumpless)	✓	–	✓	✓	✓	✓
- System redundancy S2	–	–	–	✓	✓	✓
- PROFIsafe	–	–	✓	✓	✓	✓
- PROFIenergy	✓	–	✓	✓	✓	✓
- PROFIdrive application class 1	✓	✓	–	✓	✓	✓
- PROFIdrive application class 3	–	✓	–	✓	✓	✓
- PROFIdrive application class 4	–	✓	✓	✓	✓	✓
PROFIBUS DP	✓	–	–	✓	✓	✓
- PROFIBUS DP equidistance and isochronous mode	–	–	–	✓	✓	✓
- PROFIBUS DP peer-to-peer communication	✓	–	–	✓	✓	✓
EtherNet/IP	✓	–	–	–	✓	✓
Modbus TCP	–	–	–	✓	✓	✓
Modbus RTU	✓	✓	–	–	–	–
AS-Interface	–	–	–	–	–	–
BACnet MS/TP	✓	–	–	–	–	–
CANopen	–	–	–	–	–	–
USS	✓	✓	–	✓	✓	✓
FLN P1	–	–	–	–	–	–
Web server	✓ [1)]	–	✓	✓	✓	✓

[1)] Function possible with optional SINAMICS G120 Smart Access web server module.

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Overview



PROFINET – the Ethernet standard for automation

PROFINET is the world's leading Industrial Ethernet standard for automation with more than 40 million nodes installed worldwide.

PROFINET makes companies more successful, because it speeds up processes and raises both productivity and plant availability.

Your advantages at a glance

Flexibility	Efficiency	Performance
Tailor-made plant concepts	Optimal use of resources	Increased productivity
Industrial Wireless LAN	One cable for everything	Speed
Safety	Device/network diagnostics	High precision
Flexible topologies	Energy efficiency	Large quantity structures
Open standard	Simple wiring	High transmission rate
Web tools	Fast device replacement	Redundancy
Expandability	Ruggedness/stability	Fast start-up

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Overview

Flexibility

Short response times and optimized processes are the basic requirements for competitiveness in global markets because the product lifecycles are becoming shorter and shorter.

PROFINET ensures maximum flexibility in plant structures and production processes, and it enables you to implement innovative machine and plant concepts. For example, mobile devices can also be integrated at locations that are difficult to access.

Flexible topologies

In addition to the linear structure characterized by the established fieldbuses, PROFINET also enables the use of star, tree and ring structures. This is made possible by switching technology via active network components, such as Industrial Ethernet switches and media converters, or by integrating switch functionality into the field devices. This results in increased flexibility in the planning of machines and plants, as well as savings in cabling.

The PROFINET network can be installed without any specialist knowledge at all and meets all requirements that are relevant to the industrial environment. The "PROFINET Installations Guidelines" assist manufacturers and users with network planning, installation and commissioning. Symmetrical copper cables or RFI-resistant fiber-optic cables are used, depending on the application. Devices from different manufacturers are easily connected via standardized and rugged plug-in connectors (up to IP65/IP67 degree of protection).

By integrating switch functionality into the devices, linear topologies can be created that are directly oriented toward an existing machine or plant structure. This reduces cabling overhead and cuts down on components such as external switches.

IWLAN

PROFINET also supports wireless communication with Industrial Wireless LAN, thus opening up new fields of application. For example, technologies subject to wear, such as trailing cables, can be replaced and automated guided vehicle systems and mobile operator panels can be used.

Safety

The PROFIsafe safety profile, which has been tried and tested with PROFIBUS and which permits the transmission of standard and safety-related data on a single bus cable, can also be used with PROFINET. No special network components are necessary for fail-safe communication, which means that standard switches and standard network transitions can continue to be used without any restrictions. In addition, fail-safe communication is equally possible via Industrial Wireless LAN (IWLAN).

Open standard

PROFINET, the open multi-vendor standard (IEC 61158/IEC 61784), is supported by PROFIBUS and PROFINET International (PI). It stands for maximum transparency, open IT communication, network security and simultaneous real-time communication.

Thanks to its openness, PROFINET provides the basis for a standardized automation network in the plant, to which all other machines and devices can be connected. Even the integration of existing plant components, for example using PROFIBUS, presents no problems due to the use of network transitions.

Use of web tools

Thanks to the unrestricted support of TCP/IP, PROFINET permits the use of standard web services such as web servers. Irrespective of the tool used, information from the automation level can be accessed from virtually any location using a commercially available internet browser. This considerably simplifies commissioning and diagnostics. Users can then decide for themselves how much openness to the IT world they want to allow for their machine or plant. This means that PROFINET can be used simply as an isolated plant network or connected via appropriate Security Modules, such as the SCALANCE S modules, to the office network or the internet. In this way, new remote maintenance concepts or the high-speed exchange of production data become possible.

Expandability

On the one hand, PROFINET facilitates the integration of existing systems and networks without any great effort. In this way, PROFINET safeguards investments in existing plant components that communicate via PROFIBUS and other fieldbuses such as AS-Interface. On the other hand, additional PROFINET nodes can be added at any time. By using additional network components, network infrastructures can be expanded using cabling or wireless methods – even while the plant is operating.

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Overview

Efficiency

Greater global competition means that companies must use their resources economically and efficiently. This applies in particular to production. This is where PROFINET ensures greater efficiency. Simple engineering guarantees fast commissioning, while reliable devices ensure a high level of plant availability. Comprehensive diagnostic and maintenance concepts help to reduce plant downtimes and keep maintenance costs to a minimum.

One cable for everything

PROFINET permits simultaneous fieldbus communication with isochronous mode and standard IT communication (TCP/IP) on one cable. This real-time communication for the transmission of user/process data and diagnostic data takes place on a single cable. Specific profile communication (PROFIsafe, PROFIdrive and PROFIenergy) can be integrated without any additional cabling. This solution offers a wide scope of functions at a low level of complexity.

Device and network diagnostics

By retaining the tried and tested PROFIBUS device model, the same diagnostics information is available with PROFINET. In addition, module-specific and channel-specific data can also be read out from the devices during device diagnostics, enabling faults to be located quickly and easily. Apart from the availability of device information, the reliability of network operation has top priority in the network management.

In existing networks the Simple Network Management Protocol (SNMP) has established itself as the de facto standard for the maintenance and monitoring of the network components and their functions. PROFINET uses this standard and gives users the opportunity to maintain their networks with tools that are familiar to them, such as the SINEMA Server network management software.

For easier maintenance of PROFINET devices, both on-site and remotely via a secure VPN connection, application-specific websites can be set up on the web server of the field devices using the familiar HTML standard.

Energy efficiency

Increasing energy efficiency in production: PROFIenergy is a profile that provides functions and mechanisms for PROFINET field devices to specifically reduce energy consumption during production breaks and thus significantly lower energy costs.

The profile, which is defined by the PNO and is independent of any manufacturers or devices, enables energy demand and costs to be significantly reduced: Using PROFIenergy, any specific loads that are not currently being used can be switched off. This achieves a noticeable reduction in energy costs during breaks in production. PROFIenergy permits the simple, automated activation and deactivation of technologically related plant components. It is coordinated centrally by means of a higher-level controller and is networked via PROFINET. This ensures that as much energy as possible is saved during long breaks. Temporarily switching off plant components contributes to the even distribution and most efficient use of energy.

The use of PROFIenergy is made easy for the machine builder by its integration into familiar series of products. In addition, PROFIenergy is defined in such a way that the necessary function blocks can easily be integrated into existing automation systems at a later stage.

Simple wiring

Particularly stringent demands are made on the installation of cables in the industrial environment. In addition, there is a requirement to set up industry-standard networks in the shortest possible time without any special knowledge.

With FastConnect, Siemens offers a high-speed installation system that meets all of these requirements. FastConnect is the standard-compliant, industry-standard cabling system consisting of cables, connectors and assembly tools for PROFINET networks. The time required for connecting terminals is minimized by the simple installation method using just a single tool, while installation errors are prevented by the practical color-coding. Both copper cables and glass fiber optic cables can be easily assembled on site in this way.

Fast device replacement

PROFINET devices are identified by means of a name assigned during configuration. When replacing a defective device, a new device can be recognized from its topology information by the IO controller and a new name can be assigned to it automatically. This means that no engineering tool is necessary for the replacement of equipment.

This mechanism can even be used for the initial commissioning of a complete system. This speeds up commissioning, particularly in the case of series machines.

Ruggedness

An automation network must be able to withstand most external sources of interference. The use of Switched Ethernet prevents faults in one section of the network from affecting the entire plant network. For areas that are particularly prone to radio frequency interference (RFI), PROFINET allows the use of fiber optic cables.

Performance

Productivity and product quality determine the level of success in the market. Precise motion control, dynamic drives, high-speed controllers and the deterministic synchronization of devices are therefore key factors in achieving superior production. They facilitate high production rates and optimum product quality at the same time.

Speed and precision

Fast motion control applications demand precise and deterministic exchange of data. This is implemented by means of drive controllers using isochronous real time (IRT).

With IRT and isochronous mode, PROFINET permits fast and deterministic communication. This synchronizes the various cycles of a system (input, network, CPU processing and output), even in the case of parallel TCP/IP traffic. The short cycle times of PROFINET make it possible to raise the productivity of machines and plants and to guarantee the product quality and high level of precision.

The standardized PROFIdrive profile permits vendor-independent communication between CPUs and drives.

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Overview

Large quantity structures

The use of PROFINET makes it possible to overcome the existing restrictions regarding the scope of machines and systems that can be implemented. In one network, several different controllers can interact with their assigned field devices. The number of field devices per PROFINET network is virtually unlimited – the entire range of IP addresses is available.

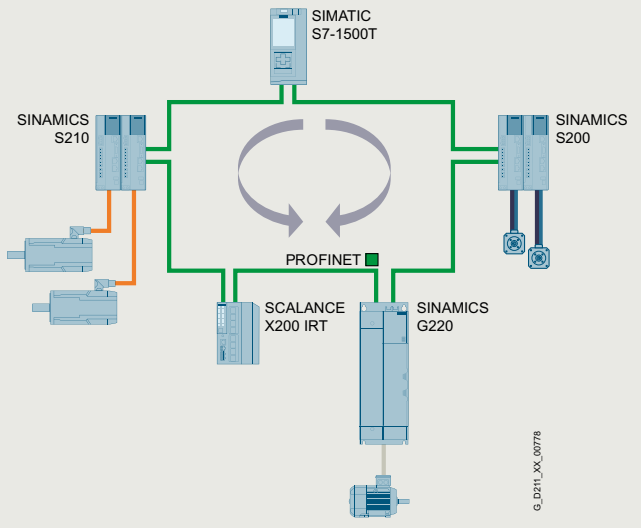
High data rate

By using 100 Mbit/s in full duplex mode, PROFINET achieves a significantly higher data rate than previous fieldbuses. This means that other plant data can be transmitted over TCP/IP without any problems, in addition to the process data. PROFINET therefore meets the combined industrial demands for simultaneously transmitting high-speed IO data and large volumes of data for additional sections of the application. Even the transmission of large volumes of data, such as that from cameras, has no adverse effect on the speed and precision of the IO data transmission, thanks to PROFINET mechanisms.

Media redundancy

A higher plant availability can be achieved with a redundant installation (ring topology). The media redundancy can be implemented not only with the aid of external switches, but also by means of integrated PROFINET interfaces. Using the media redundancy protocol (MRP), reconfiguration times of 200 ms can be achieved. If the communication is interrupted in just one part of the ring installation this means that a plant standstill is prevented and any necessary maintenance or repair work can be performed without any time pressure.

For motion control applications, PROFINET with IRT in ring topologies offers extended media redundancy for planned duplication (MRPD) which operates in a bumpless mode without any reconfiguration time. If communication is interrupted (e.g. a cable break) the process can continue operating without interruption.



Bumpless media redundancy illustrated by example of SINAMICS G220, S200, S210 and SCALANCE X200IRT

Benefits

- PROFINET is the open Industrial Ethernet standard for automation
- PROFINET is based on Industrial Ethernet
- PROFINET uses TCP/IP and IT standards
- PROFINET is real-time Ethernet
- PROFINET enables seamless integration of fieldbus systems
- PROFINET supports fail-safe communication via PROFIsafe and also via IWLAN

Integration

PROFINET – Functions of the SINAMICS S120

SINAMICS S120	CU320-2 PN	CU320-2 DP (CBE20)	CU310-2 PN
PROFINET with IRT (isochronous mode)	✓	✓	✓
Number of ports	2	4	2
Min. send clock in ms	0.25	0.5	0.25
Shared Device	✓	✓	✓
Bumpless media redundancy (MRPD)	✓	✓	✓
Step-change media redundancy (MRP)	✓	✓	✓
System redundancy S2	✓	–	✓
PROFIsafe	✓	✓	✓
PROFIenergy	✓	✓	✓
PROFIdrive	✓	✓	✓

System redundancy

SINAMICS S120 supports the PROFINET function "system redundancy":

SINAMICS S120 can now be connected to high-availability systems such as SIMATIC S7-400H with two controllers. No additional hardware is required to make the connection. Complex automation tasks in the process industry, in particular, where plant availability and redundancy of the control system are essential, require reliable communication with a high-availability system. Both controllers of the high-availability system always have access to the SINAMICS S120.

In the event of a cable break or failure of a CPU, the other controller takes over, thus ensuring uninterrupted communication.

More information

More information is available on the internet at:
www.siemens.com/profinet

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5

Overview



PROFIdrive – the standardized drive interface for PROFINET and PROFIBUS

PROFIdrive defines the device behavior and technique to access internal device data for electric drives connected to PROFINET and PROFIBUS – from basic frequency converters up to high-performance servo controllers.

It describes in detail the practical use of communication functions – device-to-device communication, equidistance and clock cycle synchronization (isochronous mode) in drive applications. In addition, it specifies all device characteristics which influence interfaces connected to a controller over PROFINET or PROFIBUS. This also includes the state machine (sequence control), the encoder interface, scaling of values, definition of standard telegrams, access to drive parameters, etc.

The PROFIdrive profile supports both central as well as distributed motion control concepts.

What are profiles?

For devices and systems used in automation technology, profiles define properties and modes of behavior. This allows manufacturers and users to define common standards. Devices and systems that comply with such a cross-manufacturer profile, are interoperable on a fieldbus and, to a certain degree, can be interchanged.

Are there different types of profiles?

A distinction is made between what are known as application profiles (general or specific) and system profiles:

- Application profiles (also device profiles) predominantly refer to devices (e.g. drives) and include an agreed selection regarding bus communication as well as specific device applications.
- System profiles describe classes of systems, including master functionality, program interfaces and integration resources.

Is PROFIdrive fit for the future?

PROFIdrive has been specified by the PROFIBUS and PROFINET International (PI) user organization, and is specified as a standard that is fit for the future through standard IEC 61800-7.

The basic philosophy: Keep it simple

The PROFIdrive profile tries to keep the drive interface as simple as possible and free from technology functions. As a result, referencing models as well as the functionality and performance of the PROFINET/PROFIBUS master have either no or only little influence on the drive interface.

One drive profile – different application classes

The integration of drives into automation solutions depends very strongly on the particular drive application. In order to be able to address the complete, huge bandwidth of drive applications – from basic frequency converters up to synchronized multi-axis systems with a high dynamic performance – using just one profile, PROFIdrive defines six application classes, to which most drive applications can be assigned:

- Class 1 – standard drives (pumps, fans, agitators, etc.)
- Class 2 – standard drives with technological functions
- Class 3 – positioning drives
- Class 4 – motion control drives with central, higher-level motion control intelligence and the patented "Dynamic Servo Control" positioning concept
- Class 5 – motion control drives with central, higher-level motion control intelligence and position setpoint interface
- Class 6 – motion control drives with distributed motion control intelligence integrated in the drives

Design

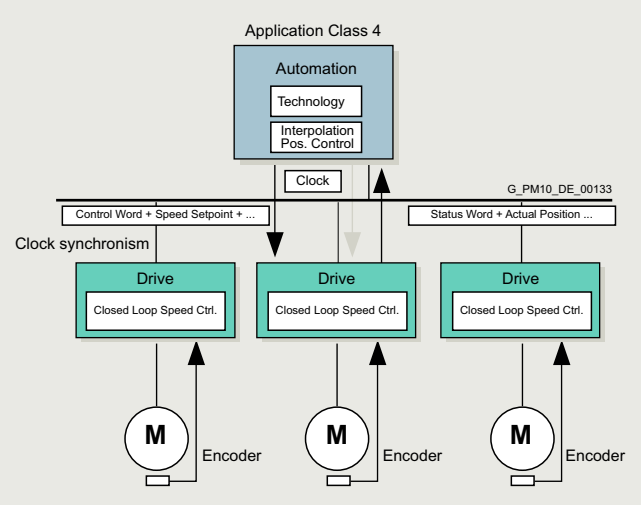
The device model of PROFIdrive

PROFIdrive defines a device model comprising function modules, which interoperate inside the device and which reflect the intelligence of the drive system. These modules have objects assigned to them which are described in the profile and are defined with respect to their functions. The overall functionality of a drive is therefore described through the sum of its parameters.

In contrast to other drive profiles, PROFIdrive defines only the access mechanisms to the parameters as well as a subset of profile parameters (approx. 30) such as the fault buffer, drive control and device identification.

All other parameters are vendor-specific which gives drive manufacturers great flexibility with respect to implementing control functions. The elements of a parameter are accessed acyclically over data records.

As a communication protocol, PROFIdrive uses DP-V0, DP-V1, and the DP-V2 expansions for PROFIBUS including the functions "Device-to-Device Communication" and "Isochronous Operation", or PROFINET IO with real-time classes RT and IRT.



More information

More information on PROFINET and PROFIBUS is available at: www.profibus.com

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Overview



PROFIBUS – the proven, rugged bus system for automation engineering applications

The requirements of users for an open, non-proprietary communication system have resulted in the specification and standardization of the PROFIBUS protocol.

PROFIBUS defines the technical and functional features of a serial fieldbus system, with which the distributed field automation devices in the lower area (sensor/actuator level) can be networked up to the mid performance range (cell level).

Standardization according to IEC 61158/EN 50170 secures your investments for the future.

Using the conformity and interoperability test performed by the test laboratories authorized by PROFIBUS & PROFINET International (PI) and the certification of the devices by PI, users have the security of knowing that the quality and functionality is guaranteed, even in multi-vendor installations.

PROFIBUS versions

Two different PROFIBUS versions have been defined in order to comply with the widely varying requirements at field level:

- PROFIBUS PA (Process Automation) – the version for applications in process automation. PROFIBUS PA uses the intrinsically safe transmission technology specified in IEC 61158-2.
- PROFIBUS DP (Distributed Periphery) – this version, which is optimized for speed, is specifically tailored to the communication of automation systems with distributed I/O stations and drives. PROFIBUS DP sets itself apart as a result of very short response times and high noise immunity, and replaces cost-intensive, parallel signal transfer with 24 V and measured value transfer utilizing 0/4 … 20 mA technology.

Design

Bus participants on PROFIBUS DP

PROFIBUS DP makes a distinction between two different master classes and one device class:

DP master class 1

For PROFIBUS DP, DP master class 1 is the central component. In a defined and continually repeating message cycle the central master station exchanges information with distributed stations (DP devices).

DP master class 2

Devices of this type (programming, configuring or operator control devices) are used during commissioning, for configuring the DP system, for diagnostics or for operating the active plant or system. A DP master class 2 can, for example, read input, output, diagnostic and configuration data of the devices.

DP device

A DP device is an I/O device which receives output information or setpoints from the DP master, and as response, returns input information, measured values and actual values to the DP master. A DP device never sends data automatically, but only when requested by the DP master.

The quantity of input and output information depends on the device, and for each DP device in each send direction can be a maximum of 244 bytes.

Function

Functional scope in DP masters and DP devices

The functional scope can differ between DP masters and DP devices. The different functional scopes are classified as DP-V0, DP-V1 and DP-V2.

DP-V0 communication functions

The DP-V0 master functions consist of "Configuration", "Parameter Assignment" and "Reading Diagnostics Data", as well as cyclic reading of input data/actual values and writing output data/setpoints.

DP-V1 communication functions

The DP-V1 function expansions make it possible to perform acyclic read and write functions as well as processing cyclic data communication. This type of device must be supplied with extensive parameterization data during start-up and during normal operation. These acyclically transferred parameterization data are only rarely changed in comparison to the cyclic setpoints, actual values, and measured values, and are transferred at lower priority in parallel with the cyclic high-speed user data transfer. Detailed diagnostic information can be transferred in the same way.

DP-V2 communication functions

The extended DP-V2 master functions mainly comprise functions for isochronous operation and device-to-device communication between DP devices.

- Isochronous mode:
  Isochronous mode is implemented by means of an equidistant signal in the bus system. This cyclic, equidistant cycle is sent by the DP master to all bus nodes in the form of a Global Control Telegram. Master and devices can then synchronize their applications with this signal. The signal jitter between cycles is less than 1 µs.
- Device-to-device communication:
  The "publisher/subscriber" model is used to implement device-to-device communication. Devices declared as publishers make their input data/actual values and measured values available to other devices, the subscribers, for reading. This is performed by sending the response frame to the master as a broadcast. Device-to-device communication is therefore a cyclic process.

Integration

PROFIBUS with SINAMICS

SINAMICS uses the PROFIBUS DP protocol. SINAMICS drives can only be used as DP devices.

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Overview



Ethernet is the basic internet technology for worldwide networking. The many possibilities of intranet and internet, which have been available for office applications for a long time, are now utilized for production automation with Industrial Ethernet.

Apart from the use of information technology, the deployment of distributed automation systems is also on the increase. This entails breaking up complex control tasks into smaller, manageable and drive-based control systems. This increases the demand for communication and consequently a comprehensive and powerful communication system.

Industrial Ethernet provides a powerful area and cell network for the industrial field, compliant with the IEEE 802.3 (ETHERNET) standard.

Benefits

Ethernet enables a very fast data transfer (10/100 Mbit/s, 1/10 Gbit/s) and at the same time has full-duplex capability. It therefore provides an ideal basis for communication tasks in the industrial field. With a share of over 90 %, Ethernet is the number one network worldwide and offers important features which have essential advantages:

- Fast commissioning thanks to the simplest connection method
- High availability since existing networks can be extended without any adverse effects
- Almost unlimited communication performance because scalable performance is available through switching technology and high data rates when required
- Networking of different application areas such as office and production areas
- Company-wide communication based on WAN (Wide Area Network) technology or the internet
- Investment protection due to continuous compatibility with further developments
- Wireless communication using Industrial Wireless LAN

In order to make Ethernet suitable for industrial applications, considerable expansions with respect to functionality and design are required:

- Network components for use in harsh industrial environments
- Fast assembly of the RJ45 connectors
- Fail-safety through redundancy
- Expanded diagnostics and message concept
- Use of future-oriented network components (e.g. switches)

SIMATIC NET offers corresponding network components and products.

Integration

Industrial Ethernet with SINAMICS

SINAMICS provides Control Units and Communication Boards with PROFINET interface based on 100 Mbit/s Ethernet. This means that process communication in real-time, as well as engineering and HMI via standard TCP/IP are simultaneously possible.

It is also possible to access the web server in SINAMICS at the same time that process communication is in progress.

The CU310-2 and CU320-2 Control Units have an additional Ethernet interface at the front so that service and engineering tasks can be performed very easily.

Communication with SINAMICS over Industrial Ethernet

PG/PC/HMI communication

PG/PC/HMI communication is performed using protocols which are based on the basic TCP/IP protocol.

- Engineering and diagnostics with STARTER and SINAMICS Startdrive

IT communication

IT communication is performed using protocols which are based on the basic TCP/IP protocol. The most important IT protocols are:

- HTTP/HTTPS: Hypertext Transfer Protocol (Secure)
  Using a standard internet browser, it is possible to retrieve predefined web pages containing diagnostic information from the device. Furthermore, user-defined web pages containing information defined by the user can be stored in the device.
- SNMP: Simple Network Management Protocol

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EtherNet/IP

Overview

Ethernet Industrial Protocol (EtherNet/IP) is an open standard for industrial networks. EtherNet/IP is used to transmit cyclic I/O data and acyclic parameter data. EtherNet/IP was developed by the ODVA (Open DeviceNet Vendor Association) and belongs to the international standard series IEC 61158.

Modbus TCP

Overview

The Ethernet protocol Modbus TCP is an open standard for industrial networks. Modbus TCP is used to transmit acyclic register data. Modbus TCP has been standardized in the international series of standards IEC 61158 since 2007.

USS

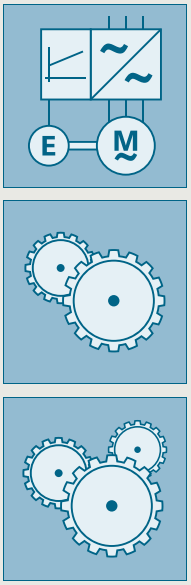
Overview

As a simple fieldbus protocol, USS (**U**niversal **S**erial **I**nterface protocol of Siemens AG, 1992) can be used both cyclically and acyclically. Based on RS485 physical bus characteristics, up to 32 nodes can be networked to one bus segment and connected to a higher-level controller. This protocol is generally used when there are limited demands on data throughput.

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Notes

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6/2 **Basic positioner EPOS**
6/2 Function module basic positioner EPOS
6/3 Functionality of the EPOS basic positioner

6/4 **SINAMICS Technology Extensions (SINAMICS TEC)**

Further information about SINAMICS Drive Software for our SINAMICS next generation converters (from firmware V6.1) is available on the internet at:
www.siemens.com/sinamics-drive-software
For more information on ordering and configuration, see catalog D 99 and SiePortal at:
www.siemens.com/d99
www.siemens.com/sinamics-drive-software/sieportal

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Overview

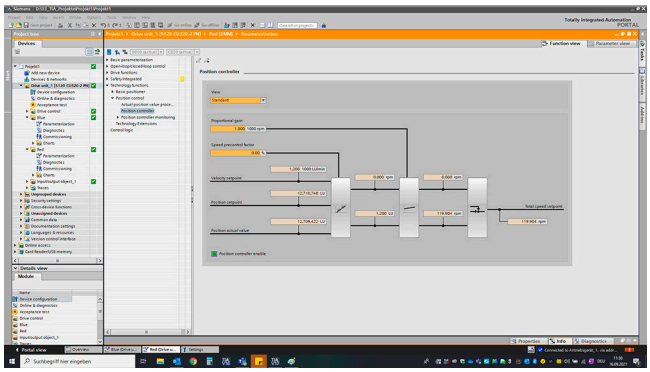
Function module basic positioner EPOS

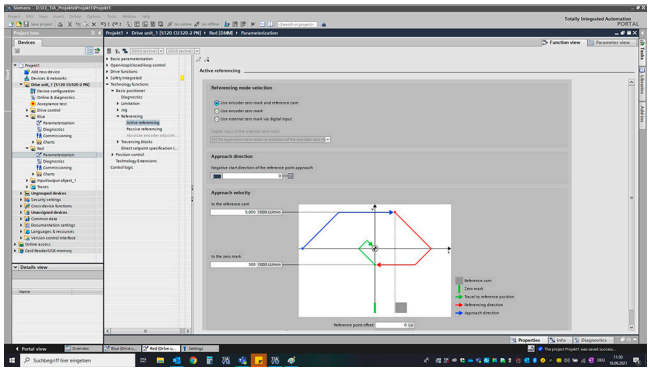
The basic positioner EPOS is available as a standard technology function for the following SINAMICS Control Units and can be called as a function module that can be activated additionally.

- SINAMICS S120 CU310-2 and CU320-2 Control Units
- SINAMICS G120 CU250S-2 Control Units
- SINAMICS G120D CU250D-2 Control Units

The basic positioner can be used to resolve basic motion control tasks without additional external technological outlay from the drive itself.

Integrated functionality for absolute and relative positioning of linear and rotary axes with motor encoders or machine encoders.





The EPOS basic positioner in the SINAMICS drive system provides powerful and precise positioning functions. Due to its flexibility and adaptability, the basic positioner can be used for a wide range of positioning tasks.

The functions are easy to handle both during commissioning and during operation, and the comprehensive monitoring functions are outstanding.

Many applications can be carried out without external position controllers.

The EPOS basic positioner is used to position linear and rotary axes (modulo) in absolute/relative terms with rotary as well as linear motor encoder or machine encoder (indirect or direct measuring system).

EPOS is a function module that can be activated additionally in Servo Control and in Vector Control.

User-friendly configuring and commissioning, including control panel (operation using PC) and diagnostics, are possible with the STARTER and SINAMICS Startdrive commissioning tools.

In addition to extremely flexible positioning functions, EPOS offers a high degree of user-friendliness and reliability thanks to integral monitoring and compensation functions.

Different operating modes and their functionality increase flexibility and plant productivity, for example, by means of "on-the-fly" and bumpless correction of the motion control.

Preconfigured PROFIdrive positioning frames are available which, when selected, automatically establish the internal "connection" to the basic positioner.

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Overview

Functionality of the EPOS basic positioner

Lower-level closed-loop position control with the following essential components

- Position actual value sensing (including the lower-level measuring probe evaluation and reference mark search)
- Position controller (including limits, adaptation and pre-control calculation)
- Monitoring functions (standstill, positioning and dynamic following error monitoring, cam signals)

Mechanical system

- Backlash compensation
- Modulo offset

Limitations

- Speed/acceleration/delay/jerk limitation
- Software limit switches (traversing range limitation by means of position setpoint evaluation)
- Stop cams (traversing range limitation using hardware limit switch evaluation)

Referencing or adjustment

- Set reference point (for an axis at standstill)
- Search for reference (separate mode including reversing cam functionality, automatic reversal of direction, homing to "output cam and encoder zero mark" or only "encoder zero mark" or "external zero mark (BERO)")
- Flying referencing (seamless referencing possible during "normal" traversing with the aid of the measuring input evaluation; generally evaluation, e.g. of a BERO. Subordinate function for the modes "jog", "direct setpoint input/MDI" and "traversing blocks")
- Absolute encoder alignment

Traversing block mode

- 64 traversing blocks for
  - SINAMICS S120 CU310-2 and CU320-2 Control Units
- 16 traversing blocks for
  - SINAMICS G120 CU250S-2 Control Units
  - SINAMICS G120D CU250D-2 Control Units
- Positioning using traversing blocks that can be stored in the drive unit including continuation conditions and specific jobs for a previously homed axis.
- Configuring traversing blocks using the traversing block editor in the relevant commissioning tool of the SINAMICS converter family
- A traversing block contains the following information:
  - Job number and job (e.g. positioning, waiting, GOTO block jump, setting of binary outputs, travel to fixed stop)
  - Motion parameters (target position, velocity, override for acceleration and deceleration)
  - Mode (e.g.: hide block, continuation conditions such as "Continue_with_stop", "Continue_flying" and "Continue_externally using high-speed measuring inputs")
  - Job parameters (e.g. wait time, block step conditions)

Direct setpoint specification (MDI) mode

- Positioning (absolute, relative) and setting-up (endless closed-loop position control) using direct setpoint inputs (e.g. via the PLC using process data)
- It is always possible to influence the motion parameters during traversing (on-the-fly setpoint acceptance) as well as for on-the-fly changes between the setup and positioning modes.
- The direct setpoint specification mode (MDI) can also be used in the relative positioning or setup mode if the axis is not referenced. This means that on-the-fly synchronization and re-referencing can be carried out using "flying referencing".

Jog mode

- Closed-loop position controlled traversing of the axis with "endless position controlled" or "jog incremental" modes (traverse through a "step width"), which can be toggled between

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Overview

The SINAMICS Technology Extensions are configurable functions or Siemens technologies that can be added onto firmware functions. The extensions are designed to allow implementation of highly complex, targeted application-specific tasks for various sectors such as test stands, storage and retrieval machines, transportation systems based on linear motors or multi-winding motors in machine manufacture.

The SINAMICS Technology Extensions are part of the Advanced Technology Function and are added to the existing firmware as self-contained software packages. They are easy to install using the SINAMICS Startdrive and STARTER commissioning tools and expand the existing device functionality by the application-specific functions contained in the software. The software is parameterized and diagnosed using SINAMICS Startdrive and STARTER.

Installing these extended functions customizes the functionality of the SINAMICS S120 converter so that it meets the specific requirements of the user.

SINAMICS Technology Extensions can be used for the following drive systems (the way in which they are used depends on the individual Technology Extension):

- SINAMICS G130
- SINAMICS G150
- SINAMICS S120
- SINAMICS S150
- SINAMICS DCM
- SINAMICS DCP
- SINAMICS GM150
- SINAMICS SM150
- SINAMICS SM120CM
- SINAMICS GL150
- SINAMICS SL150
- SINAMICS GH150
- SIMATIC Drive Controller (SINAMICS Integrated)
- SINUMERIK 840D sl (SINAMICS Integrated)
- SINUMERIK 828D (SINAMICS Integrated)
- SINUMERIK ONE (SINAMICS Integrated)

The following SINAMICS Technology Extensions are available to download
https://support.industry.siemens.com

Simply enter your Article No. in "Search for product information".

Coupling of SERVO Motor Modules with SINAMICS Technology Extension SERVCOUP (Servo Coupling)

The Technology Extension SERVCOUP (Servo Coupling) is an extension for the SERVO drive object of SINAMICS.
In the SERVO control mode, SERVCOUP allows motors to be operated, which as a result of their size and/or design format, cannot be operated from a single SINAMICS S120 power unit.
These motors are subdivided into several drive objects, each of which can be operated on a Motor Module, and can be coupled with one another. As a consequence, the individual drive objects can be considered as partial motors with their own winding and terminals.

Irrespective of the number of coupled drive objects, only one encoder is required for the operation of the motor because Technology Extension SERVCOUP implements a digital encoder splitter in the Control Unit. In this way, the actual encoder values together with the setpoint specifications are passed on to all encoderless drive objects.

SERVCOUP is generally released for the following SIMOTICS motors:

- 1FE2 (built-in spindle motor) as a built-in spindle drive for machine tools
- 1FN3 (linear motor) as milling centers with large rotary tables for machine tools or portal applications with linear motors
- 1FW4 (torque motor) for servo presses and test stands for high performances with superior dynamics
- 1FW6 (torque motor) for servo presses
- 1FW68 (segment motor) in milling centers with large rotary tables for machine tools

Fundamentally, operation is possible with the following motors:

- Segment motors (axial and radial)
- Direct drives (linear and rotary)
- Double and multi-winding motors (induction and synchronous)

Peak load management of the spindle for overload protection of the infeed of machine tools with SINAMICS Technology Extension DYNEGMA (Dynamic Energy Management)

The SINAMICS Technology Extension DYNEGMA (Dynamic Energy Management) from the Advanced Technology Functions is an extension for the infeed and SERVO drive objects of SINAMICS. The SINAMICS Technology Extensions are also known by the name SINAMICS Open Architecture.
The Technology Extension DYNEGMA is a peak load management and overload protection function for machine tool infeeds. The task of DYNEGMA is to protect the infeed unit during power peaks; these can occur when several drives/spindles simultaneously accelerate or brake, e.g. during tool change. DYNEGMA only intervenes when actually required in order to guarantee not only safe and reliable operation, but also maximum dynamic performance. To protect the infeed unit against overload, and in turn resulting machine downtimes or tool, material, or machine damage, when required DYNEGMA also limits the torque of individual spindles/drives.

For example, the following applications can be used with DYNEGMA:

- Overload protection of the infeed and peak load management of spindles for milling and turning machines, even during a forced EMERGENCY STOP
- Dynamic tool change for optimal utilization of the maximum infeed power of machine tools

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Overview

Vibration extinction for storage and retrieval machines with SINAMICS Technology Extension VIBX (Vibration Extinction)

The Technology Extension VIBX (Vibration Extinction) is an extension of the SINAMICS drive objects SERVO and VECTOR. A setpoint filter is implemented in VIBX. The objective of the setpoint filter is to change the setpoint of an axis so that there is as little vibration as possible caused in the natural frequency range of the moving mechanical components. This function is primarily deployed on storage and retrieval machines to significantly reduce mast vibrations caused by acceleration and braking. It has been demonstrated that reducing the mast vibrations will allow the mast to come to a standstill more quickly and so enable it to handle goods faster.

The SINAMICS Technology Extension Vibration Extinction implemented as setpoint filter can be used both in basic positioners (EPOS) and Dynamic Servo Controls (DSC) together with a controller in the drive. For this purpose, two modes of application are supported by the Technology Extension:

- EPOS and LR application mode
- DSC application mode
- Speed application mode

The filter characteristics can be set using frequency and damping (attenuation). The filter frequency can be linearly changed between two limit values via an input during operation. This means that the filter frequency can be tracked to follow the changing natural frequency of a mechanical system (e.g. as a result of different load states) (online frequency change).

The following applications can be implemented with VIBX:

- Sway control for storage and retrieval unit
- Vibration extinction of positioning applications with mechanical natural oscillations

Engineered DC-DC Converters with Standard Motor Modules with SINAMICS Technology Extension DCDCCONV (DC-DC Converter)

The SINAMICS Technology Extension DCDCCONV (DC-DC Converter) is an extension for the booksize and chassis formats of SINAMICS S120.
Using Technology Extension DCDCCONV, you can use the booksize or chassis design formats of the Motor Module - which normally control a 3-phase motor - as an engineered DC/DC converter. Additional components (e.g. energy storage reactor or smoothing capacitor) must be connected downstream from the Motor Module.

The following applications can be implemented with DCDCCONV:

- Integration of capacitors (Ultracapacitor Modules or electrolytic capacitors) as energy storage devices for the following applications:
  - Reduction of electrical connected power
  - Mains buffering
  - Storage for regenerated energy
- Integration of battery modules as energy storage devices for the following applications:
  - Reduction of electrical connected power
  - Mains buffering
  - Storage for regenerated energy
  - Provision of an island grid
  - Loading of connected battery modules with defined test cycles
- Supply of an electrolyzer for hydrogen production
  - Here, the DC-DC converter serves as the energy source for an electrolyzer to produce hydrogen.
- Supply of inverters:
  - Supply of a connected inverter with defined voltage level
  - Test stand for the complete vehicle drive system

In addition to the Function Manual for the SINAMICS Technology Extension DCDCCONV software, there are also application descriptions for the released applications available. The application descriptions include information on configuring a **SINAMICS S120 DC-DC Converter** with the core element SINAMICS S120 Motor Module in conjunction with the DCDCCONV software in the respective applications. This application description should be observed in order to be able to reliably and safely configure the application.

The application description for DCDCCONV

- with capacitors is available at:
  https://support.industry.siemens.com/cs/document/109748701
- with battery modules is available at:
  https://support.industry.siemens.com/cs/document/109751796
- to supply an electrolyzer is available at:
  https://support.industry.siemens.com/cs/document/109813658
- to supply inverters is available at:
  https://support.industry.siemens.com/cs/document/109771893

Signal generation based on three signal generators with Technology Extension SETPGEN (Setpoint Generator)

The SINAMICS Technology Extension SETPGEN (Setpoint Generator) is a software extension for the SINAMICS software.

The setpoint generator comprises three individual signal generators that can be simultaneously operated. The required signal waveform and its characteristics can be set for each signal generator.

The following applications can be implemented with SETPGEN, for example:

- Generation of specific, frequency-dependent position, speed and torque profiles
- Generation of special signal waveforms together with the SINAMICS Technology Extension POLYGON

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Overview

Signal generation based on a parameterizable characteristic curve with SINAMICS Technology Extension POLYGON (Polygonal Line)

The Technology Extension POLYGON (Polygonal Line) is an extension of the SINAMICS drive objects SERVO, VECTOR and HLA.
The polygonal line application makes it possible to create a master-value-dependent output signal based on a parameterized characteristic in the current controller sampling time (or an integer multiple of the current controller sampling time). The characteristic is defined by up to 10000 equidistantly distributed interpolation points between which linear interpolation is performed. The y values of the interpolation points can be taken from an Excel sheet using a script. By interconnecting the output signals to different connector inputs, it is possible to create various relationships via the characteristic functionality, e.g.:

- Position-position reference
- Position-speed reference
- Position-torque reference

The following applications can be implemented with POLYGON, for example:

- Generation of special signal waveforms together with the SINAMICS Technology Extension SETPGEN
- Compensation for dead times and transfer behavior of speed setpoint oscillation
- Actual encoder position value as the master value for operating on a user-defined torque profile
- Cyclic cam integrated in the drive

Fast signal evaluation and processing with Technology Extension SIVALU (Signal Evaluation)

The SIVALU Technology Extension allows signals to be evaluated in the current controller sampling time of a drive object. Minimum value, maximum value, and mean value can be obtained, as well as arithmetic and logical evaluations executed. Evaluations are calculated in ascending order of indexes and can therefore be cascaded. In addition, additional fixed values for BICO interconnections are freely available.

The following applications can be implemented with SIVALU, for example:

- Applications with fast signal processing of logical and arithmetic functions, as well as conversions of signals up to the current controller cycle
- Logical and arithmetic functions for SINUMERIK ONE and SINUMERIK 840D sl in the drive
- Calculation of process torque using an arithmetic function

Additional setpoint or actual value filters with SINAMICS Technology Extension ADDFIL (Additional Filter)

The SINAMICS Technology Extension ADDFIL (Additional Filter) is a software extension for the SINAMICS software and can be activated on the SERVO and VECTOR drive objects. The filters available in the basic system are not sufficient for special applications, such as gear machining. The SINAMICS Technology Extension ADDFIL provides additional filters for such applications. Several filter types are available for the additional filters. The filters can be assigned to filter groups that can be switched via the drive data set.

The following applications can be implemented with ADDFIL, for example:

- Damping of mechanical resonant frequencies
- Freely configurable actual value filtering of analog signals or encoder actual values
- Amplifier compensation in the torque feedforward path

Control of the Heat Exchanger Module for the dissipation of power loss of the converter with HEM Technology Extension (Heat Exchanger Module)

The HEM Technology Extension enables the control of the Heat Exchanger Module hardware and handles the following tasks:

- The Heat Exchanger Module is set up for the specific system using parameters
- Controlling the pumps
- Monitoring the motor circuit breaker, the pressure actual values and the temperature actual values
- Detecting leaks
- Controlling the intake temperature in the de-ionized water circuit using a control valve
- Displaying all system parameters
- Functionalities to avoid condensation

Quick recording of drive data together with Drive Connector SINAMICS and the Technology Extension TRCDATA (Trace Data)

The Technology Extension TRCDATA is necessary for the use of the Drive Connector SINAMICS with the High Speed adapter function (HS Adapter).
Together with the High Speed adapter (HS Adapter) in the Drive Connector SINAMICS, it is possible to continuously record drive data up to 8 kHz and provide the data to the Industrial Edge data bus.
The maximum sampling frequency of 8 kHz is dependent on the network and drive configuration.

Other properties of the Technology Extension TRCDATA in connection with the Drive Connector SINAMICS are available at:
https://sieportal.siemens.com/su/bjTFD

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Overview

Fast collection of drive data together with SINUMERIK Connector and the TRCBUF Technology Extension (Trace Buffer)

The SINAMICS Technology Extension TRCBUF (Trace Buffer) is a software extension in SINAMICS and enables the isochronous recording of drive signals in chronological order. Together with the SINUMERIK Connector and a special manufacturer-specific telegram, continuous drive data of up to 8 kHz can be collected and made available to the Industrial Edge.

The following applications can be implemented with TRCBUF:

- Evaluating High-frequency drive data in the control system
- In the context of the Industrial Edge platform, e.g. SINUMERIK Connector. You can find more information on SINUMERIK Connector in the Operating Manual.

Point-to-point connection between two CUs with SINAMICS Technology Extension OALINK (Open Application Link)

The Technology Extension OALINK (Open Application Link) is a SINAMICS extension for the CU320-2 Control Unit.
The OALINK enables bidirectional communication between two Control Units based on DRIVE-CLiQ to facilitate the simple exchange of data. In this way, an additional Control Unit can be integrated as a technology extension for extensive drive-based technology with SINAMICS Drive Control Chart (DCC).

The following applications can be implemented with OALINK:

- Technology extension for the SINAMICS S120 (CU320-2 as replacement for the SIMATIC T400 technology module).
- Technology extension for the SINAMICS DCM (CU320-2 as replacement for the SIMATIC T400 technology module).
- Load distribution of physically coupled drives (leading/follower drive).
- General couplings between SINAMICS DCM and SINAMICS S120.
- General couplings between SINAMICS DCP and SINAMICS S120.
- General couplings between SINAMICS DCM and SINAMICS MV

Fast fault reaction of coupled axes with SINAMICS Technology Extension FASTBRK (Fast Brake Reaction for Coupled Axes)

The SINAMICS Technology Extension FASTBRK (Fast Brake Reaction for Coupled Axes) is a SINAMICS extension for SERVO drive objects.

Technology Extension FASTBRK is used on machines with coupled axes, such as gantry axes.
Previously, in cases of a drive-autonomous fault, braking was only applied to the affected axis. The coupled axes were only braked after the set gantry switch-off limit of the synchronism difference was exceeded, for example.
The FASTBRK Technology Extension on the other hand propagates the original fault reaction to the coupled axes. This means that in the event of a fault such as an encoder failure on a drive axis, the same fault reaction (e.g. encoderless braking) is initiated as quickly as possible on all mechanically coupled axes. In this way, the Technology Extension FASTBRK enables coupled drive objects to simultaneously and evenly brake to a standstill, thus minimizing the risk of damage to the machine.

The following applications can be implemented with FASTBRK:

- Fast fault reaction in the drive for SINUMERIK axis couplings, such as gantry and master/device axes.
- Propagation of the axis fault possible with a minimum reaction time from the current controller cycle (e.g. 125 µs)
- Grouping of up to three groups per Control Unit / NCU / NX

Reactive power compensation with SINAMICS Technology Extension REACTPWR (Reactive Power Compensation)

In industrial plants, most loads connected to the power supply require both active and reactive power. The resulting apparent power must be made available by the grid operator and the energy generator. The reactive power increases the apparent power requirement.
If the reactive power required can already be compensated at the line connection point, then the apparent power requirement can often be reduced significantly, and costs for providing reactive power can be reduced.

With the software extension SINAMICS Technology Extension REACTPWR (Reactive Power Compensation), the occurring inductive or capacitive reactive power can be compensated together with the SINAMICS Active Line Module.

Typical fields of application for REACTPWR are applications in industrial plants, machine tools, production plants, production lines, etc.

Monitoring of the opening and closing processes of the motor holding brake with SINAMICS Technology Extension BRAKEMON (Brake Condition Monitoring)

The SINAMICS Technology Extension BRAKEMON (Brake Condition Monitoring) is a software extension for SINAMICS software and can be activated on "SERVO" and "VECTOR" drive objects.

Technology Extension BRAKEMON continually monitors and analyzes the opening and closing operations of the motor holding brake:

- The brake opening time is estimated for the brake opening operation.
- The braking energy, speed at the start of braking, the braking time and the braking distance are calculated for the brake closing operation.

Typical fields of application for BRAKEMON are applications in crane and lifting equipment industry.

In the crane and lifting equipment industry, the motor holding brake is used to prevent unwanted rotation of the motor by tension forces. To ensure operational safety, it is therefore important to monitor the technical data of the motor holding brake during the process. The BRAKEMON Technology Extension responds to this requirement by monitoring the opening and closing operations of the brake.

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Selection and ordering data

Description	Article No.
SINAMICS Technology Extensions	
Runtime license per performance unit (of a Control Unit)	
All software products can be downloaded free of charge	
SINAMICS Technology Extension SERVCOUP	
Usable from SINAMICS firmware V4.5 HF21	
• CoL in electronic form	**6SL3077-0AA00-8AH0**
SINAMICS Technology Extension DYNEGMA	
Usable from SINAMICS firmware V4.7	
• CoL in electronic form	**6SL3077-0AA03-0AH0**
SINAMICS Technology Extension VIBX	
Usable from SINAMICS firmware V4.4	
• CoL in electronic form	**6SL3077-0AA00-5AH0**
SINAMICS Technology Extension HEM	
Usable from SINAMICS firmware V5.1	
Included in SINAMICS S120 Cabinet Modules, Heat Exchanger Modules.	
• CoL in electronic form	**6SL3077-0AA05-2AH0**
SINAMICS Technology Extension POLYGON	
Usable from SINAMICS firmware V4.5	
• CoL in electronic form	**6SL3077-0AA00-7AH0**
SINAMICS Technology Extension OALINK	
Usable from SINAMICS firmware V4.6 HF5	
• CoL in electronic form	**6SL3077-0AA01-0AH0**
SINAMICS Technology Extension SIVALU	
Usable from SINAMICS firmware V5.2	
• CoL in electronic form	**6SL3077-0AA01-4AH0**
SINAMICS Technology Extension FASTBRK	
Usable from SINAMICS firmware V4.5	
• CoL in electronic form	**6SL3077-0AA01-7AH0**
SINAMICS Technology Extension DCDCCONV	
Usable from SINAMICS firmware V5.2 SP3 with DCDCCONV V2.1 or from SINAMICS firmware V4.8 HF4 with DCDCCONV V1.3 SP1	
• CoL in electronic form	**6SL3077-0AA02-0AH0**
SINAMICS Technology Extension TRCDATA	
Usable from SINAMICS firmware V4.6	
• CoL in electronic form	**6SL3077-0AA02-1AH0**
SINAMICS Technology Extension SETPGEN	
Usable from SINAMICS firmware V4.7	
• CoL in electronic form	**6SL3077-0AA00-3AH0**
SINAMICS Technology Extension ADDFIL	
Usable from SINAMICS firmware V4.5	
• CoL in electronic form	**6SL3077-0AA01-3AH0**
SINAMICS Technology Extension TRCBUF	
Usable from SINAMICS firmware V4.7	
• CoL in electronic form	**6SL3077-0AA00-6AH0**
SINAMICS Technology Extension REACTPWR	
Usable from SINAMICS firmware V4.8	
• CoL in electronic form	**6SL3077-0AA03-6AH0**
SINAMICS Technology Extension BRAKEMON	
Usable from SINAMICS firmware V5.1 SP1	
• CoL in electronic form	**6SL3077-0AA03-7AH0**

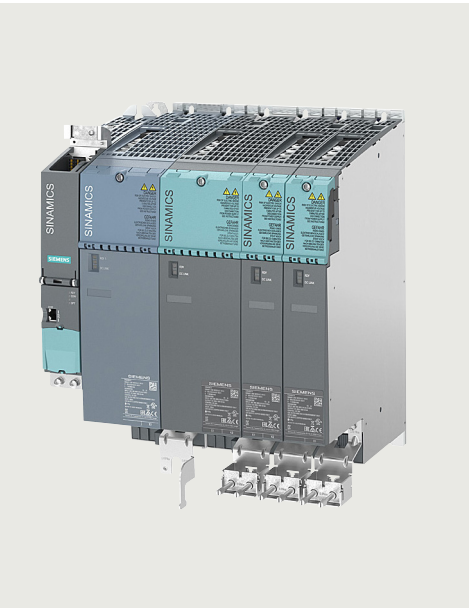
More information

Further SINAMICS Technology Extensions are available for the following applications:

- Specification of current setpoint and transformation angle with Technology Extension **EXLOOP** (External Loop Controller)
- Rotation detection to determine the speed with Technology Extension **ROTDTEC** (Rotation Detection)
- Detection of chatter during the machining process with Technology Extension **CHATDTEC** (Chatter Detection)
- Condensation avoidance and engine heating with Technology Extension **DEWAVOID** (Dew Avoidance)
- Coupling of linear motors for transportation systems with Technology Extension **RAILCTRL** (Rail Control), see Multi-Carrier-System at: https://support.industry.siemens.com/cs/document/109784038

More information about SINAMICS Technology Extensions is available on the internet at www.siemens.com/sinamics-firmware (Section: Advanced Technology Functions)

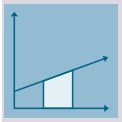
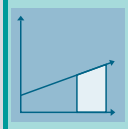
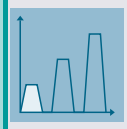
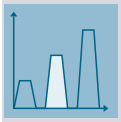
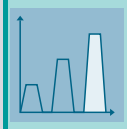
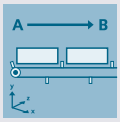
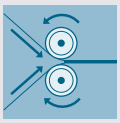
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7/2 **SINAMICS drive system**
7/2 Drive selection
7/3 Suitable
SINAMICS S120/SINAMICS S220
Motor Modules in booksize format
7.1/1 SINAMICS S120 drive system
7.2/1 SINAMICS S220 drive system

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Overview

Use	Requirements for torque accuracy/speed accuracy/position accuracy/coordination of axes/functionality					
	Continuous motion			Non-continuous motion		
	Basic	Medium	High	Basic	Medium	High
						
Pumping, ventilating, compressing	Centrifugal pumps Radial / axial fans Compressors	Centrifugal pumps Radial / axial fans Compressors	Eccentric screw pumps	Hydraulic pumps Metering pumps	Hydraulic pumps Metering pumps	Descaling pumps Hydraulic pumps
	V20 G200 G120X/G210X	G120X/G210X G130/G150 DCM	G220 G210X **S120/S220**	G120 G220	S210 S220	**S120/S220**
Moving 	Conveyor belts Roller conveyors Chain conveyors	Conveyor belts Roller conveyors Chain conveyors Lifting/lowering devices Elevators Escalators/moving walkways Indoor cranes Marine drives Cable railways	Elevators Container cranes Mining hoists Excavators for open-cast mining Test bays	Acceleration conveyors Storage and retrieval machines	Acceleration conveyors Storage and retrieval machines Cross cutters Reel changers	Storage and retrieval machines Robotics Pick & place Rotary indexing tables Cross cutters Roll feeds Engagers/ disengagers
	V20 G115D G120C/G200 ET 200pro FC-2 [1]	G120/G210 G120D G130/G150	G220 **S120/S220** S150 DCM	S200 G120 G220 G120D	S210 DCM	**S120/S220** S210 DCM
Processing 	Mills Mixers Kneaders Crushers Agitators Centrifuges	Mills Mixers Kneaders Crushers Agitators Centrifuges Extruders Rotary furnaces	Extruders Winders/unwinders Lead/follower drives Calenders Main press drives Printing machines	Tubular bagging machines Single-axis motion control such as • Position profiles • Path profiles	Tubular bagging machines Single-axis motion control such as • Position profiles • Path profiles	Servo presses Rolling mill drives Multi-axis motion control such as • Multi-axis positioning • Cams • Interpolations
	V20 G120C/G200	G120/G210 G130/G150	G220 **S120/S220** S150 DCM	S200 G120 G220	S210	**S120/S220** S210 DCM
Positioning 	Positioning	Dynamic Positioning	Coordinated Motion	Indexing	Dynamic Indexing	Synchronized Motion & Camming
	G120 G210	G120 G120D G210	G220	S200	S210	**S120** S150 DCP S210 **S220**
Machining 	Main drives for • Turning • Milling • Drilling	Main drives for • Drilling • Sawing	Main drives for • Turning • Milling • Drilling • Gear cutting • Grinding	Axis drives for • Turning • Milling • Drilling	Axis drives for • Drilling • Sawing	Axis drives for • Turning • Milling • Drilling • Lasering • Gear cutting • Grinding • Nibbling and punching
	S200	**S120/S220**	**S120/S220**	S200	**S120/S220**	**S120/S220**

Using the SINAMICS selection guide

The varying range of demands on modern variable frequency drives requires a large number of different types. Selecting the optimum drive has become a significantly more complex process. The application matrix shown simplifies this selection process considerably, by suggesting the ideal SINAMICS drive for examples of typical applications and requirements.

- The application type is selected from the vertical column
  - Pumping, ventilating, compressing
  - Moving
  - Processing
  - Positioning
  - Machining
- The quality of the motion type is selected from the horizontal row
  - Basic
  - Medium
  - High

More information

Further information about SINAMICS is available on the internet at
www.siemens.com/sinamics
Practical application examples and descriptions are available on the internet at
www.siemens.com/sinamics-applications

[1] Information on the SIMATIC ET 200pro FC-2 frequency converter is available in Catalog D 31.2 and at: www.siemens.com/et200pro-fc

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Overview

SINAMICS S220 Booksize Motor Modules can replace the previously used SINAMICS S120 Booksize Motor Modules. Mixed operation of SINAMICS S120 and SINAMICS S220 Booksize components is supported.

The table below provides a comparison of SINAMICS S120 Motor Modules and their corresponding SINAMICS S220 Motor Modules to support the selection of a suitable replacement module.

Integration

Mixed operation for SINAMICS S220 and SINAMICS S120 Motor Modules is possible with:

- One Control Unit CU320-2 (from SINAMICS firmware V5.2 SP3 HF10)
- One SINUMERIK 828D (from SINUMERIK firmware V4.95 SP1)
- One SINUMERIK ONE (from SINUMERIK firmware V6.15 SP1)
- One SIMOTION (from SIMOTION firmware V5.5)
- One SIMATIC Drive Controller (from firmware V2.9).

SINAMICS S120 Motor Module Booksize format				SINAMICS S220 Motor Module Booksize format			
Article No.	Type	Rated current/ Rated power	Width mm (in)	**Article No.**	Type	Rated current/ Rated power	Width mm (in)
Double Motor Modules							
6SL3120-2TE13-0AD0	D type	2 × 3 A / 2 × 1.6 kW	50 (1.97)	**6SL5120-2UE13-0AD1**	D type	2 × 3 A / 2 × 1,1 kW	50 (1.97)
6SL3120-2TE15-0AD0	D type	2 × 5 A / 2 × 2.7 kW	50 (1.97)	**6SL5120-2UE15-0AD1**	D type	2 × 5 A / 2 × 2,2 kW	50 (1.97)
6SL3120-2TE21-0AD0	D type	2 × 9 A / 2 × 4.8 kW	50 (1.97)	**6SL5120-2UE21-0AD1**	D type	2 × 9 A / 2 × 4 kW	50 (1.97)
6SL3120-2TE21-8AC0	C type	2 × 18 A / 2 × 9.7 kW	100 (3.94)	**6SL5120-2UE21-8SC1**	C type (slim)	2 × 18 A / 2 × 7.5 kW	50 (1.97)
				6SL5120-2UE21-8AC1 *)	C type	2 × 18 A / 2 × 7.5 kW	100 (3.94)
6SL3120-2TE21-8AD0	D type	2 × 18 A / 2 × 9.7 kW	100 (3.94)	**6SL5120-2UE21-8SD1**	D type (slim)	2 × 18 A / 2 × 7.5 kW	50 (1.97)
				6SL5120-2UE21-8AD1 *)	D type	2 × 18 A / 2 × 7.5 kW	100 (3.94)
Single Motor Modules							
6SL3120-1TE13-0AD0	D type	3 A / 1.6 kW	50 (1.97)	**6SL5120-1UE13-0AD1**	D type	3 A / 1.1 kW	50 (1.97)
6SL3120-1TE15-0AD0	D type	5 A / 2.7 kW	50 (1.97)	**6SL5120-1UE15-0AD1**	D type	5 A / 2.2 kW	50 (1.97)
6SL3120-1TE21-0AD0	D type	9 A / 4.8 kW	50 (1.97)	**6SL5120-1UE21-0AD1**	D type	9 A / 4 kW	50 (1.97)
6SL3120-1TE21-8AC0	C type	18 A / 9.7 kW	50 (1.97)	**6SL5120-1UE21-8AC1**	C type	18 A / 7.5 kW	50 (1.97)
6SL3120-1TE21-8AD0	D type	18 A / 9.7 kW	50 (1.97)	**6SL5120-1UE21-8AD1**	D type	18 A / 7.5 kW	50 (1.97)
6SL3120-1TE22-4AC0	C type	24 A / 12.9 kW	50 (1.97)	**6SL5120-1UE22-4AC1**	C type	24 A / 11 kW	50 (1.97)
6SL3120-1TE22-4AD0	D type	24 A / 12.9 kW	50 (1.97)	**6SL5120-1UE22-4AD1**	D type	24 A / 11 kW	50 (1.97)
–				**6SL5120-1UE23-0SC1**	C type (slim)	30 A / 15 kW	50 (1.97)
–				**6SL5120-1UE23-0SD1**	D type (slim)	30 A / 15 kW	50 (1.97)
6SL3120-1TE23-0AC0	C type	30 A / 16 kW	100 (3.94)	**6SL5120-1UE23-0AC1**	C type	30 A / 15 kW	100 (3.94)
6SL3120-1TE23-0AD0	D type	30 A / 16 kW	100 (3.94)	**6SL5120-1UE23-0AD1**	D type	30 A / 15 kW	100 (3.94)
6SL3120-1TE24-5AC0	C type	45 A / 24 kW	100 (3.94)	**6SL5120-1UE24-5AC1**	C type	45 A / 22 kW	100 (3.94)
6SL3120-1TE26-0AC0	C type	60 A / 32 kW	100 (3.94)	**6SL5120-1UE26-0AC1**	C type	60 A / 30 kW	100 (3.94)
6SL3120-1TE28-5AA3	–	85 A / 46 kW	200 (7.87)	**6SL5120-1UE28-5AC1**	C type	85 A / 45 kW	150 (5.91)
–				**6SL5120-1UE28-5AD1**	D type	85 A / 45 kW	150 (5.91)
6SL3120-1TE31-3AA3	–	132 A / 71 kW	300 (11.81)	**6SL5120-1UE31-3AC1**	C type	132 A / 75 kW	150 (5.91)
–				**6SL5120-1UE31-3AD1**	D type	132 A / 75 kW	150 (5.91)
6SL3120-1TE32-0AA4	–	200 A / 107 kW	300 (11.81)	**6SL5120-1UE32-0AC1**	C type	200 A / 110 kW	200 (7.87)
–				**6SL5120-1UE32-0AD1**	D type	200 A / 110 kW	200 (7.87)

More information

When using SINAMICS S220 Motor Modules in booksize format, please refer to the corresponding manuals:
sieportal.siemens.com/su/bkxtq

The compatibility list, including further technical details and notes for SINAMICS S120/S220 modules in booksize format is available at:
support.industry.siemens.com/cs/document/109806050

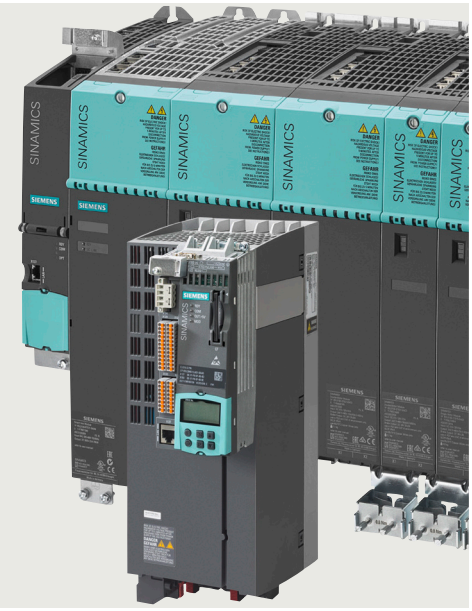
The Equipment Manual for SINAMICS S220 booksize power units with the Motor Modules is available at:
support.industry.siemens.com/cs/document/109803552

*) Available soon.

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Notes

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Information on Chassis and Chassis-2 format is provided in catalog D 21.3 at: www.siemens.com/d21-3

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Overview

With its separate power unit and Control Unit, the SINAMICS S120 drive system can be perfectly adapted to a wide variety of different drive tasks.

The Control Unit is selected according to the number of drives to be controlled and the required performance level, while the power unit must be rated to meet the energy requirements of the system. The connection between the Control Unit and power unit is made very simply using the digital system interface DRIVE-CLiQ.

Control Units



CU310-2 PN Control Unit with BOP20 Basic Operator Panel



CU320-2 PN Control Unit with BOP20 Basic Operator Panel

CU310-2 DP and CU310-2 PN Control Units

The CU310-2 Control Unit is used to control a single drive. A PROFIBUS interface (CU310-2 DP) or a PROFINET interface (CU310-2 PN) and a TTL/HTL encoder evaluation circuit are standard features.

CU320-2 Control Unit

The CU320-2 Control Unit is designed to control several drives. In this case, the following can be operated on a CU320-2 Control Unit:

- Up to 12 drives in V/f control mode, or
- Up to 6 drives in Servo or Vector control mode.

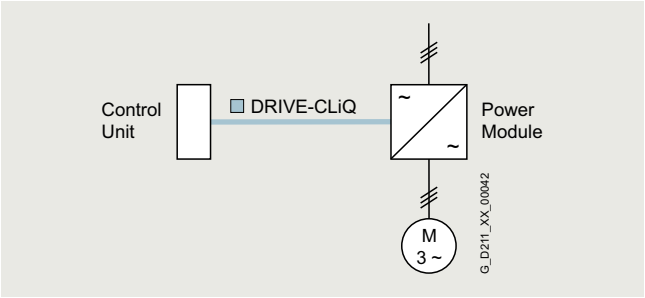
The CU320-2 Control Unit can be used to establish links between individual drives and to implement simple technological functions.

Power Modules

The simplest version of a SINAMICS S120 drive system comprises a CU310-2 Control Unit and a Power Module. A line rectifier, a DC link and an inverter for supplying a motor are integrated in the Power Module.



Power Module in blocksize format with CU310-2 Control Unit and BOP20 Basic Operator Panel



Power Modules are designed for single drives which are not capable of regenerating energy to the supply. Generated energy produced during braking is converted to heat via braking resistors.

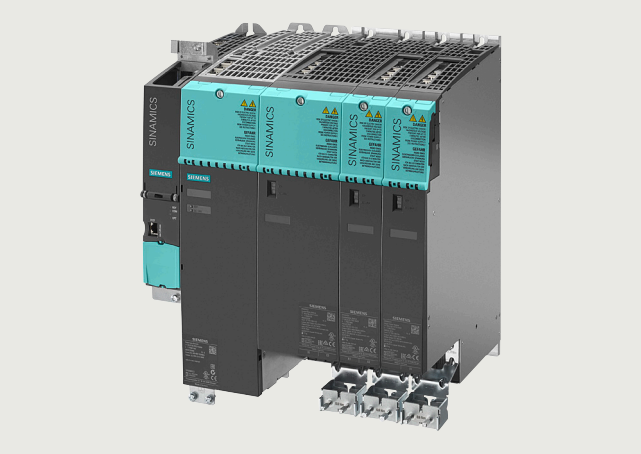
Power Modules can also be operated via a CU320-2 Control Unit, for example, if a single drive is added to a multi-axis grouping. In this case, the Power Modules in blocksize format must be equipped with the CUA31/CUA32 Control Unit Adapter. This is connected via DRIVE-CLiQ to the CU320-2 Control Unit. Power Modules in chassis format can be directly connected to the Control Unit using a DRIVE-CLiQ cable.

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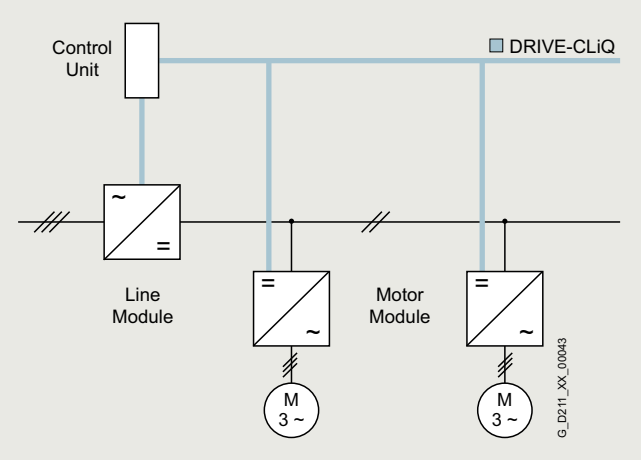
Overview

Motor Modules

A DC link and an inverter for supplying a motor are integrated in the Motor Module.



CU320-2 Control Unit, Line Module and three Motor Modules in booksize format



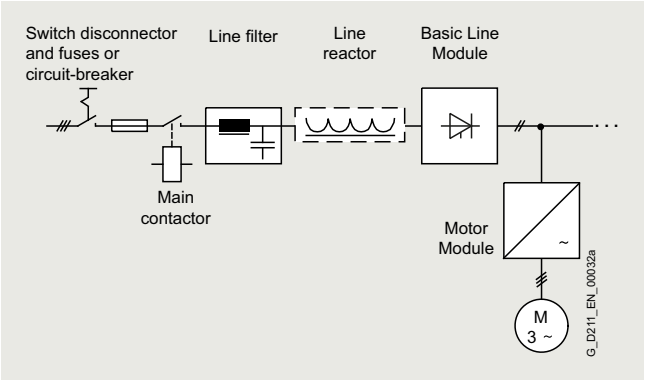
Motor Modules have been designed for multi-axis drives. Motor Modules are interconnected by means of a shared DC busbar. Since the Motor Modules share the same DC link, they can exchange energy with one another, i.e. if one Motor Module operating in the generator mode produces energy, the energy can be used by another Motor Module operating in the motor mode. The voltage-source DC link is supplied with mains voltage by a Line Module.

Line Modules

Line Modules generate a DC voltage from the line voltage and supply Motor Modules with energy via the voltage-source DC link.

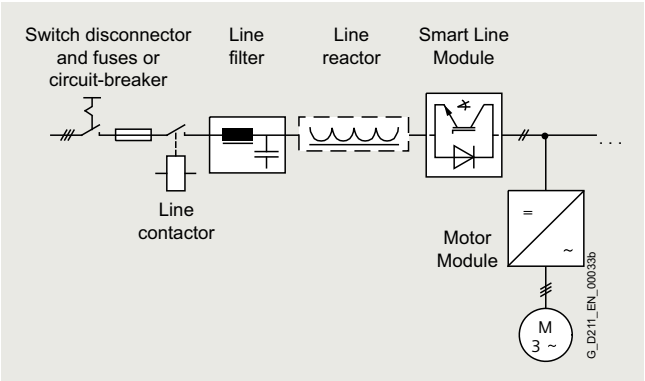
Basic Line Modules

Basic Line Modules are designed only for infeed operation, i.e. they are not capable of recovering energy to the line supply. If regenerative energy is produced, e.g. when drives brake, it must be converted to heat by means of a Braking Module and a braking resistor. When a Basic Line Module is used as the infeed, the matching line reactor must be installed. A line filter can be optionally installed in order to ensure compliance with the limits stipulated for Category C2 in EN 61800-3.



Smart Line Modules

Smart Line Modules can supply energy and return regenerative energy to the supply system. A Braking Module and braking resistor are required only if the drives need to be decelerated in a controlled manner after a power failure (i.e. when energy cannot be recovered to the supply). When a Smart Line Module is used as the infeed, the matching line reactor must be installed. A line filter can be optionally installed in order to ensure compliance with the limits stipulated for Category C2 in EN 61800-3.



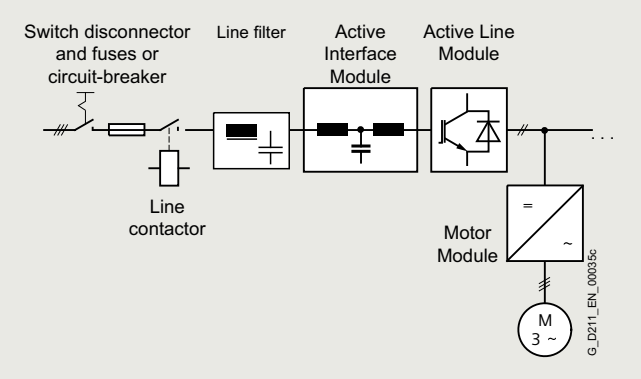
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Overview

Active Line Modules

Active Line Modules can supply energy and return regenerative energy to the supply system. A Braking Module and braking resistor are required only if the drives need to be decelerated in a controlled manner after a power failure (i.e. when energy cannot be recovered to the supply). In contrast to Basic Line Modules and Smart Line Modules, however, Active Line Modules generate a regulated DC voltage which remains constant despite fluctuations in the line voltage. In this case, the line voltage must remain within the permissible tolerance range. Active Line Modules draw a virtually sinusoidal current from the supply which limits any harmful harmonics.

In order to operate an Active Line Module, an Active Interface Module with the appropriate rating must be used. A line filter can be optionally installed in order to ensure compliance with the limits stipulated for Category C2 in EN 61800-3.



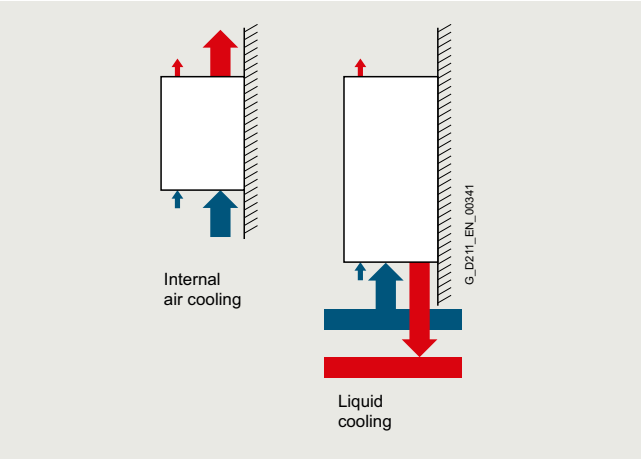
For further information about configuring a drive system with SINAMICS S120, refer to section Configuration notes.

Power Modules, Motor Modules and Line Modules are available in booksize, booksize compact, blocksize and chassis format:

- Power Modules in blocksize and chassis formats,
- Motor Modules and Line Modules in booksize, booksize compact and chassis formats.

Cooling methods

There are two cooling options available for Chassis format:



Internal air cooling

In this standard solution, the power loss from the electronics and power units of the drive components is removed by natural cooling or by a forced-ventilation system and routed to the interior of the control cabinet.

Liquid cooling

For liquid-cooled devices in chassis format, the power semiconductors are mounted on a heat sink through which the cooling medium flows. Most of the heat produced by the unit is absorbed by the cooling medium and can be dissipated outside the control cabinet.

Customized application

The devices can be purchased in the different formats as a complete system solution. Users profit from the know-how of the drive experts and need not spend valuable time calculating the thermal design requirements of the application. Especially in applications involving devices with liquid cooling in chassis format, users are provided with a technically sound solution and can reduce their engineering costs. The system solution extends up to complete control cabinets with cooling system and temperature/condensation control.

Further information is available on request.

Energy efficiency

The SINAMICS S120 drive system saves energy by recovering energy from the axes and using it within the DC link group of a multi-axis configuration and by feeding it back into the supply system. Even at full infeed capacity, no unnecessary heat is generated in the control cabinet. Because the Active Line Modules prevent capacitive and inductive reactive currents, SINAMICS S120 also ensures that no unnecessary power losses occur in the power supply and that no current harmonics occur. This not only prevents detrimental effects on other loads, but it also reduces the heat generated in the control cabinet.

System components

System components are divided into the following categories:

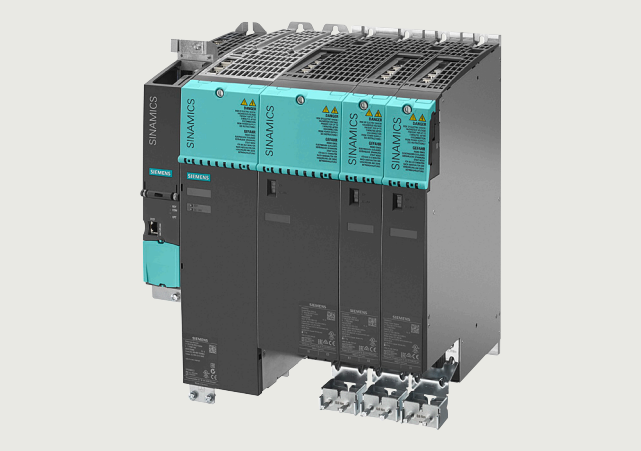
- **DC link components**
  e.g. Braking Modules and braking resistors
- **Load-side power components**
  e.g. motor reactors
- **Supplementary system components**
  e.g. Terminal Modules, Operator Panel and Communication Boards
- **Encoder system interface**
  for connecting various encoder types to SINAMICS S120

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Overview

Booksize format

Booksize format units are optimized for multi-axis applications and are mounted adjacent to one another. The connection for the common DC link is an integral feature. The units are cooled by an internal air cooling circuit.



Booksize compact format

Derived from the booksize format we developed the booksize compact format for machines with particularly high requirements for the compactness of their drives. The booksize compact format offers virtually all of the advantages of the booksize format but with a reduced overall height and greater overload capability. The units are cooled by an internal air cooling circuit.



Blocksize format

Blocksize format units are optimized for single-axis applications and are available only as Power Modules.

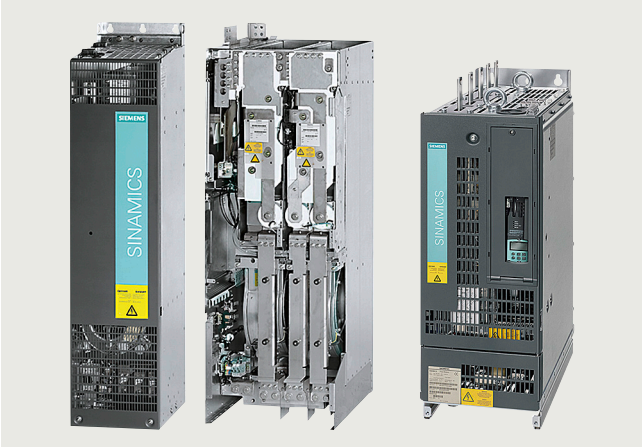
The CU310-2 can be directly snap-mounted. The units are cooled by an internal air cooling circuit.



Chassis format

Higher-output units (approximately 100 kW and above) are constructed in chassis format. These are available as Line Modules, Power Modules and Motor Modules. Chassis format units are cooled by an internal air cooling circuit. Liquid-cooled devices can be ordered for special applications such as extrusion processes, forming technology or marine engineering. The CU310-2 Control Unit can be integrated in the Power Modules.

Additional information on Chassis format is provided in Catalog D 21.3 at:
www.siemens.com/d21-3



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Overview

Cabinet Modules

In addition to the converter chassis units listed in this catalog, SINAMICS S120 Cabinet Modules are available which are a modular cabinet system for multi-motor drives with a central supply infeed and a common DC busbar, for example, as used in paper machines, rolling mills, test bays, and hoisting gear. Cabinet Modules are available with a total power rating of up to 4500 kW in the air-cooled version and up to 5700 kW in the liquid-cooled version.

The main components of the system are as follows:

- Line Connection Modules
- Basic Line Modules
- Smart Line Modules
- Active Line Modules including Active Interface Modules
- Central Braking Modules
- Motor Modules
- Auxiliary Power Supply Modules



For additional information see Catalog D 21.3 at:
www.siemens.com/d21-3

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Technical specifications

The most important directives and standards are listed below. These are used as the basis for the SINAMICS S120 built-in units and they must be carefully observed to achieve an EMC-compliant configuration that is safe both functionally and in operation.

European standards	
EN 61508-1	Functional safety of electrical/electronic/ programmable electronic safety-related systems Part 1: General requirements
EN 60204-1	Electrical equipment of machines Part 1: General definitions
EN 61800-3	Adjustable speed electrical power drive systems Part 3: EMC product standard including specific test methods
IEC/EN 61800-5-1	Adjustable-speed electrical power drive systems Part 5: Safety requirements Main section 1: Electrical and thermal requirements
North American standards	
UL 508C	Power Conversion Equipment
UL 61800-5-1	Adjustable Speed Electrical Power Drive Systems
CSA C22.2 No. 14	Industrial Control Equipment
Certificates of suitability	
cULus	Testing by UL (Underwriters Laboratories, www.ul.com) according to UL and CSA standards

More information

For reliable operation of the drive system, original components of the SINAMICS drive system and the original Siemens accessories as described in this Catalog and the Configuration Manuals, in the functional descriptions or user manuals must be used.

The user must observe the configuring instructions.

Combinations that differ from the configuring instructions (also in conjunction with non-Siemens products) require a special agreement.

If no original components are used, for example, for repairs, approvals such as UL, EN and Safety Integrated can become invalid. This may also result in the operating authorization for the machine in which the non-Siemens components are installed becoming invalid.

All of the certificates of suitability, approvals, certificates, declarations of conformity, test certificates, e.g. CE, UL, Safety Integrated, have been performed with the associated system components as they are described in the Catalogs and Configuration Manuals. The certificates are only valid if the products are used with the described system components, are installed according to the Installation Guidelines and are used for their intended purpose. In other cases, the vendor of these products is responsible for arranging that new certificates are issued.

For further information about configuring a drive system with SINAMICS S120, refer to section Configuration notes.

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Overview

System architecture with a central Control Unit

Electronically coordinated individual drives work together to perform your drive tasks. In multi-axis drives, the individual drives are controlled from the higher-level control systems in such a way as to achieve the desired coordinated movement. This requires cyclic data exchange between the controller and the drives. A central Control Unit controls the drives for all connected axes and also establishes the technological links between the drives and/or axes. Since all the required data is stored in the central Control Unit, it does not need to be transferred. Inter-axis connections can be established within a Control Unit and easily configured in the SINAMICS Startdrive or STARTER commissioning tool using a mouse.

- The SINAMICS Control Unit can handle simple technological tasks by itself
- The **CU310-2 DP** or **CU310-2 PN** Control Units are used in conjunction with Power Modules and single-motor drives.
- The **CU320-2 DP** or **CU320-2 PN** Control Units are used in conjunction with all Motor Modules or Line Modules for single or multi-motor drives.

Each of these Control Units is based on an object-oriented SINAMICS standard firmware, which contains all common control modes and can be scaled to meet even the most advanced performance requirements.

The drive controls are supplied as ready-to-configure drive objects:

- Infeed Control for mains infeed
- Vector control
  - Speed-controlled drives with high speed and torque stability in general machine and plant construction
  - Particularly suitable for asynchronous motors
  - Optimized pulse patterns for efficient motor/converter systems
- Servo control
  - Drives with highly dynamic motion control
  - Angular-locked synchronism with isochronous PROFIBUS/PROFINET
  - For use in machine tools and clocked production machines

The most commonly used v/f control modes are stored in the "Vector control" drive object and are ideal for implementing even simple applications such as group drives with synchronous motors.

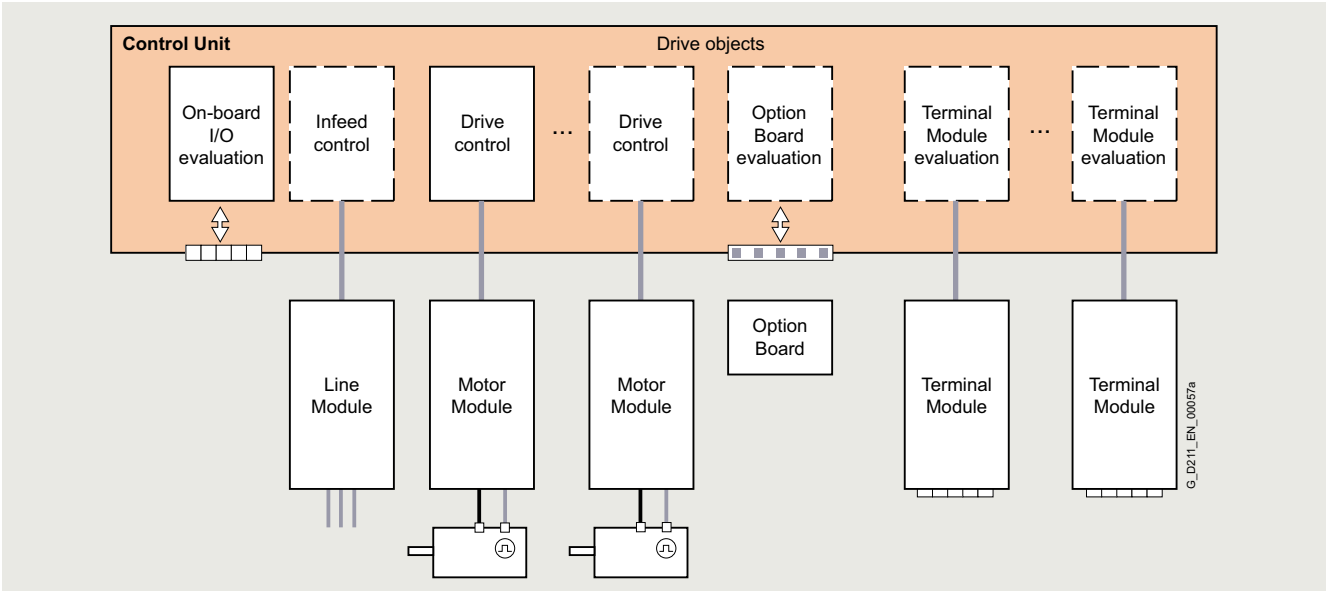
CompactFlash card

The functions of the drives are stored on a CompactFlash card. This card contains the firmware and parameter settings for all drives in the form of a project. The CompactFlash card can also hold additional projects, which means that the correct project can be accessed immediately when series machines of different types are commissioned. When the Control Unit has booted, the data on the CompactFlash card is read and loaded to the work memory.

The firmware is organized in objects. Drive objects are used to implement open-loop and closed-loop control functions for Line Modules, Motor Modules, Power Modules and other system components connected by DRIVE-CLiQ.

Drive objects

A drive object is a self-contained software function with its own parameters and, where appropriate, its own fault messages and alarms.



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Overview

Comprehensive package of open-loop and closed-loop control functions

A wide variety of standard functions such as setpoint input, data set changeover, controller optimization, kinetic buffering, etc. ensure a high degree of functional reliability and excellent flexibility when addressing the application.

Overview of key open-loop and closed-loop control functions

	Closed-loop control types S120	Open-loop control types S120	Main functions S120 for booksize/chassis	Comment, note
Infeed Control	• Booksize - Current control with/without mains sensor - V_{DC} control without/with mains sensor • Chassis - Current control with VSM10 - V_{DC} control with VSM10 - Network functionalities (island grids)	• Booksize/chassis - Basic Mode Rectification only - Smart Mode Rectification and regenerative feedback	• Mains identification • Controller optimization • Harmonics filter • Automatic restart	The mains sensor is the VSM10 Voltage Sensing Module; "Current" is the line current; 3-phase with line frequency
Vector control	• Asynchronous motor - Torque control with/without encoder - Speed control with/without encoder • Torque motor - Torque control with encoder - Speed control with/without encoder • Asynchronous motor, torque motor - Position control with encoder • Reluctance motor - Torque control with/without encoder - Speed control with/without encoder	• Linear/parabolic V/f characteristic • Constant-frequency V/f characteristic (textile) • Independent voltage setpoint input	• Data set changeover • Extended setpoint input • Motor identification • Current/speed controller optimization • Technology controller • Basic positioner • Automatic restart • Flying restart with/without encoder • Kinetic buffering • Synchronization • Droop • Brake control	Mixed operation with V/f control modes is possible; it is for this reason that the V/f control modes are stored only once in the "Vector control" drive object V/f is not possible with reluctance motors. More information on reluctance motors can be found in catalog D 81.1. Position control can be selected as a function module from both Servo and Vector mode Synchronous motors (1FK and 1FT) and linear motors can be operated only in Servo mode. Permanent-magnet 1FW4 synchronous motors can be operated over the complete operating range in Vector control.
Servo control	• Asynchronous motor - Torque control with/without encoder - Speed control with/without encoder • Synchronous motor, linear motor and torque motor - Torque control with encoder - Speed control with encoder • All motor types - Position control with encoder	• Linear/parabolic V/f characteristic • Constant-frequency V/f characteristic (textile) • Independent voltage setpoint input	• Data set changeover • Setpoint input • Motor identification • Damping application • Technology controller • Basic positioner • Brake control	Mixed operation with V/f control modes is possible; it is for this reason that the V/f control modes are stored only once in the "Vector control" drive object Position control can be selected as a function module from both Servo and Vector mode.

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Overview

BICO technology

Every drive object contains a large number of input and output variables which can be freely and independently interconnected using Binector Connector Technology (BICO). A binector is a logic signal which can assume the value 0 or 1. A connector is a numerical value, e.g. the actual speed or current setpoint.

Basic positioner (EPOS)

The EPOS basic positioner provides powerful and precise positioning functions. Due to its flexibility and adaptability, the EPOS basic positioner can be used for a wide range of positioning tasks. The functions are easy to use during both commissioning and operation, and the comprehensive monitoring functions are very powerful. Many applications can be implemented without external position control systems.

More information about the basic positioner (EPOS) is provided in the section Technology functions.

EPOS is only available for SINAMICS S120 booksize and booksize compact.

SINAMICS Drive Control Chart (SINAMICS DCC)

SINAMICS DCC expands the scope of device functions by means of freely available closed-loop control, arithmetic and logic blocks and offers a means by which proprietary technological functions can be graphically configured in the SINAMICS drive system. In addition, local data processing in the drive supports the implementation of modular machine concepts and results in an increase in the overall machine performance.

More information about the Drive Control Chart (DCC) is provided in section Engineering tools.

SINAMICS Technology Extensions (SINAMICS TEC)

The SINAMICS TEC are configurable functions or Siemens technologies that can be added to extend firmware functions. The extensions implement high-performance and targeted application-specific tasks for different areas, e.g. storage and retrieval machines.

More information about Technology Extensions (TEC) is provided in section Technology functions.

Integral safety functions (Safety Integrated)

The Control Units support comprehensive safety functions.

The integrated safety functions are the Safety Integrated Basic Functions

- STO = Safe Torque Off
- SBC = Safe Brake Control
- SS1 = Safe Stop 1 (Time controlled)

and the Safety Integrated Extended Functions that require a license

- STO = Safe Torque Off
- SS1 with SBR/SAM = Safe Stop 1 with Safe Brake Ramp/Safe Acceleration Monitor
- SS2 = Safe Stop 2
- SBC = Safe Brake Control
- SOS = Safe Operating Stop
- SLS = Safely-Limited Speed
- SSM = Safe Speed Monitor
- SDI = Safe Direction
- SLA = Safely-Limited Acceleration
- SBT = Safe Brake Test

and Safety Integrated Advanced Functions

- SLP = Safely-Limited Position
- SP = Safe Position transmission
- SCA = Safe Cam

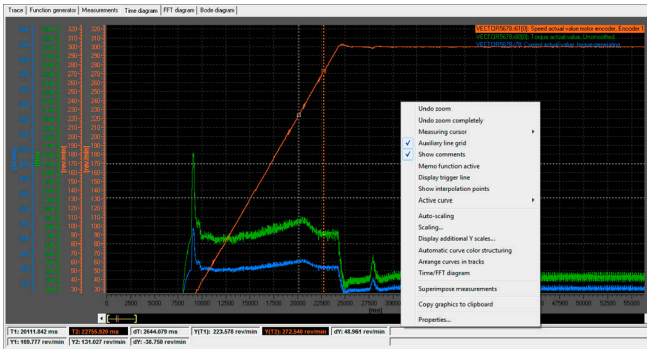
(Abbreviations in accordance with IEC 61800-5-2)

If the integrated safety functions are used, licenses, supplementary system components such as TM54F Terminal Modules, or suitable safety controls will be necessary.

More information about the integrated safety functions is provided in section Safety Integrated.

Diagnostics optimally supported by trace function

The time characteristics of input and output variables associated with drive objects can be measured by the integrated trace function and displayed using the STARTER commissioning tool. Several signals can be simultaneously traced. A recording can be triggered dependent on freely selectable boundary conditions, e.g. the value of an input or output variable.



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Overview



CU320-2 PN Control Unit with BOP20 Basic Operator Panel



CU320-2 DP Control Unit

The communication, open-loop and closed-loop control functions for one or more Line Modules and/or Motor Modules are executed in a CU320-2 Control Unit. The CU320-2 Control Unit is essentially designed for multi-axis operation. Communication with the higher-level control system is performed either via PROFINET (PN) or PROFIBUS (DP).

Design

CU320-2 Control Units feature the following interfaces as standard:

- Fieldbus interface:
  - CU320-2 PN: 1 PROFINET interface with 2 ports (RJ45 sockets) with PROFIdrive V4 profile
  - CU320-2 DP: 1 PROFIBUS interface with PROFIdrive V4 profile
- 4 x DRIVE-CLiQ sockets for communication with other DRIVE-CLiQ nodes, e.g. Motor Modules, Active Line Modules, Sensor Modules, Terminal Modules
- 12 parameterizable digital inputs (isolated)
- 8 parameterizable bidirectional digital inputs/digital output (not isolated)
- 1 serial RS232 interface (e.g. to connect the AOP30 Advanced Operator Panel)
- 1 interface for the BOP20 Basic Operator Panel
- 1 slot for the CompactFlash card on which firmware and parameters are stored
- 1 slot for mounting an option module (e.g. TB30 Terminal Board)
- CU320-2 DP: 2 rotary coding switches for manually setting the PROFIBUS address
- 1 Ethernet interface for commissioning and diagnostics
- 3 measuring sockets and one reference ground for commissioning support
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE/protective conductor connector
- 1 ground connection

A shield connection for the signal cable shield of the option module is located on the CU320-2 Control Unit.

The available option slot is used to expand the interfaces, for example, to include additional terminals or for communication purposes.

The status of the CU320-2 Control Unit is indicated via multi-color LEDs.

As the firmware and parameter settings are stored on a plug-in CompactFlash card, the Control Unit can be changed without the need for software tools.

The CU320-2 Control Unit can be mounted on the side of the Line Module via brackets integrated in a Line Module. The CU320-2 Control Unit can also be fixed to the wall of the control cabinet using the integrated fixing lugs. As the CU320-2 Control Unit is not as deep as the booksize Line Modules, suitable spacers are available to increase the depth of the CU320-2 Control Unit to 270 mm.

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Selection and ordering data

Description	Article No.
CU320-2 PN Control Unit Without CompactFlash card	**6SL3040-1MA01-0AA0**
CU320-2 DP Control Unit Without CompactFlash card	**6SL3040-1MA00-0AA0**
Accessories	
For CU320-2 PN: **Industrial Ethernet FC**	
• RJ45 Plug 145 (1 units)	**6GK1901-1BB30-0AA0**
• RJ45 Plug 145 (10 units)	**6GK1901-1BB30-0AB0**
• Stripping tool	**6GK1901-1GA00**
• Standard cable GP 2x2	**6XV1840-2AH10**
• Flexible cable GP 2x2	**6XV1870-2B**
• Trailing cable GP 2x2	**6XV1870-2D**
• Trailing cable 2x2	**6XV1840-3AH10**
• Marine cable 2x2	**6XV1840-4AH10**
For CU320-2 DP: **PROFIBUS connector**	
• Without PG/PC connection	**6ES7972-0BA42-0XA0**
• With PG/PC connection	**6ES7972-0BB42-0XA0**
Spacers (2 units) Increases the depth of the CU320-2 DP Control Unit to 270 mm (if the integrated brackets are not to be used, but the depth still has to be 270 mm)	**6SL3064-1BB00-0AA0**
STARTER commissioning tool [1]	
• On DVD-ROM	**6SL3072-0AA00-0AG0**
• Software download	**6SL3072-0AA00-0AK0**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

For information on connectors and cables refer to the section MOTION-CONNECT connection system and in the internet at:
www.siemens.com/motion-connect
https://sieportal.siemens.com

Integration

DRIVE-CLiQ components, for example, Motor Modules and Active Line Modules, can be connected to a CU320-2 Control Unit. The number of modules depends on the performance required, including duty type and additional functions.

The BOP20 Basic Operator Panel can also be snapped onto the CU320-2 Control Unit during operation for diagnostic purposes.

The CU320-2 Control Unit and other connected components are commissioned and diagnosed with the SINAMICS Startdrive or STARTER commissioning tool with the installed SINAMICS Support Package or the AOP30 Advanced Operator Panel.

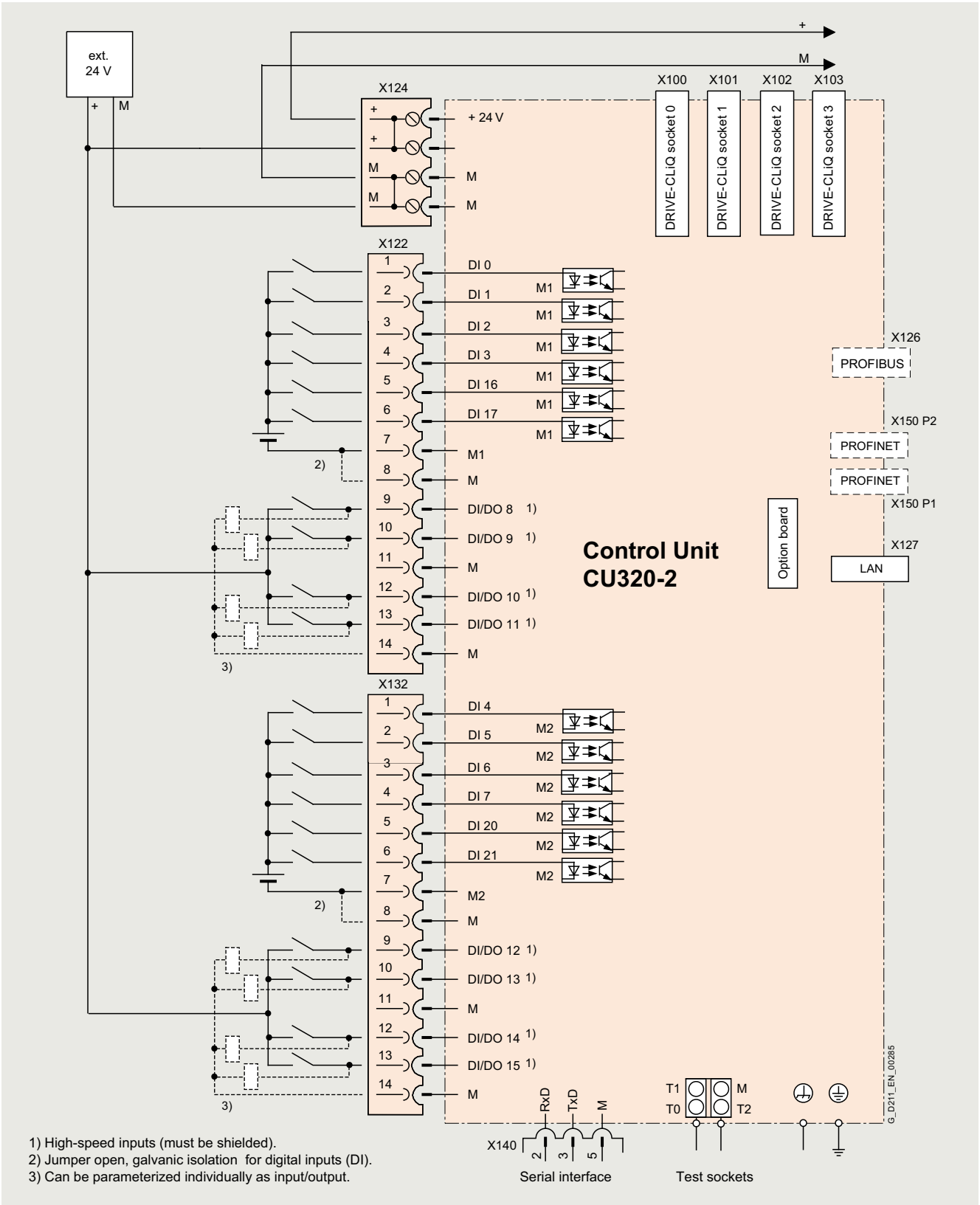
To operate the CU320-2 PN Control Unit, a CompactFlash card with firmware V4.4 or higher is required.

To operate the CU320-2 DP Control Unit, a CompactFlash card with firmware V4.3 or higher is required.

[1] STARTER commissioning tool also available at:
www.siemens.com/starter

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Integration



1) High-speed inputs (must be shielded).
2) Jumper open, galvanic isolation for digital inputs (DI).
3) Can be parameterized individually as input/output.

Connection example of a CU320-2 Control Unit

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Technical specifications

	CU320-2 Control Unit
PROFINET **PROFIBUS**	6SL3040-1MA01-0AA0 6SL3040-1MA00-0AA0
Power requirement, max. At 24 V DC, without taking account of digital outputs, expansion option slot and DRIVE-CLiQ supply	1 A
Conductor cross-section, max.	2.5 mm^2
Fuse protection, max.	20 A
Digital inputs	In accordance with IEC 61131-2 type 1 12 isolated digital inputs 8 bidirectional non-isolated digital inputs/digital outputs
• Voltage	-3 ... +30 V
• Low level (an open digital input is interpreted as "low")	-3 ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC, typ.	3.5 mA
• Delay time of digital inputs [1], approx.	
- L → H	50 µs
- H → L	100 µs
• Delay time of high-speed digital inputs [1], approx.	
- L → H	5 µs
- H → L	50 µs
• Conductor cross-section, max.	1.5 mm^2
Digital outputs (continuously short-circuit proof)	8 bidirectional non-isolated digital outputs/inputs
• Voltage	24 V DC
• Load current per digital output, max.	500 mA
• Delay time [1], typ./max.	
- L → H	150 µs/400 µs
- H → L	75 µs/100 µs
• Conductor cross-section, max.	1.5 mm^2
Power loss	24 W
PE connection	M5 screw
Ground connection	M5 screw
Dimensions	
• Width	50 mm (1.97 in)
• Height	300 mm (11.81 in)
• Depth	226 mm (8.90 in)
Weight, approx.	2.3 kg (5.07 lb)
Certificate of suitability	cULus

[1] The specified delay times refer to the hardware. The actual reaction time depends on the time slice in which the digital input or output is processed.

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Overview



The CompactFlash card contains the firmware and set parameters. The CompactFlash card is inserted into the appropriate slot of the CU320-2 Control Unit.

Design

A CU320-2 Control Unit can perform the communication, open-loop and closed-loop control functions for several power units. The computing capacity requirement increases in proportion to the number of power units and system components and in relation to the dynamic response required. The computing capacity requirement and utilization of the CU320-2 Control Unit can be calculated with the SIZER for Siemens Drives engineering tool (integrated in the TIA Selection Tool). The full computing capacity of the CU320-2 Control Unit is only available on systems with performance enhancement. For the CU320-2 Control Unit, the performance enhancement is necessary from the 4th axis.

In addition to the firmware, the CompactFlash card also contains licensing codes which are required to enable firmware options.

In addition to the Article No., the following firmware options can currently be ordered with or without performance enhancement:

- Safety Integrated Extended Functions, order code per axis **F01** to **F06**
- Safety Integrated Advanced Functions, order code per axis **A01** to **A06**
- High output frequency, order code **J01**
- DCB Extension, order code **U01**
- Technology Extension VIBX, order code **U03**
- Technology Extension OALINK, order code **U04**
- Technology Extension HEM, order code **U05**

Converter cabinets with a Control Unit already contain the CompactFlash card with the current firmware. The firmware options can be added as cabinet options.

The firmware options can also be enabled subsequently. You require the serial number of the CompactFlash card and the article number of the firmware option to be enabled. With this information, you can purchase the associated license code from a license database and enable the firmware option. The license code is only valid for the CompactFlash card declared and cannot be transferred to other CompactFlash cards.

Subsequent licensing is possible in the internet via the web license manager by generating a license key:
www.siemens.com/automation/license

Selection and ordering data

Description	Article No.
CompactFlash card for CU320-2 Control Unit without safety license	
• Without performance enhancement	**6SL3054-0 ■ ■ ■ 0-1BA0**
• With performance enhancement firmware option	**6SL3054-0 ■ ■ ■ 1-1BA0**
CompactFlash card for CU320-2 Control Unit with safety license for Extended Functions	
• For 1 axis	**6SL3054-0 ■ ■ ■ ■-1BA0-Z F01**
• For 2 axes	**6SL3054-0 ■ ■ ■ ■-1BA0-Z F02**
• For 3 axes	**6SL3054-0 ■ ■ ■ ■-1BA0-Z F03**
• For 4 axes	**6SL3054-0 ■ ■ ■ 1-1BA0-Z F04**
• For 5 axes	**6SL3054-0 ■ ■ ■ 1-1BA0-Z F05**
• For 6 axes	**6SL3054-0 ■ ■ ■ 1-1BA0-Z F06**
CompactFlash card for CU320-2 Control Unit with/without safety license	
• With high output frequency [1]	**6SL3054-0 ■ ■ ■ ■-1BA0-Z J01**
• With DCB Extension license (firmware V4.6 and higher) (more information about DCB Extension and license upgrades can be found under Drive Control Chart (DCC) in the Engineering Tools section)	**6SL3054-0 ■ ■ ■ ■-1BA0-Z U01**
• With Technology Extension VIBX	**6SL3054-0 ■ ■ ■ ■-1BA0-Z U03**
• With Technology Extension OALINK	**6SL3054-0 ■ ■ ■ ■-1BA0-Z U04**
• With Technology Extension HEM (more information about Technology Extension can ben found under SINAMICS Technology Extension (SINAMICS TEC))	**6SL3054-0 ■ ■ ■ ■-1BA0-Z U05**
Firmware version	↑ ↑
V4.8	**E J**
V5.1	**F B**
V5.2	**F C**
	↑
Service Pack SP1 [2]	**1**
Service Pack SP3 [3]	**3**
	↑
Without performance enhancement	**0**
With performance enhancement firmware option	**1**

[1] For more information, see https://support.industry.siemens.com/cs/document/104020669

[2] Applies only to firmware version V5.1.

[3] Applies only to firmware version V5.2.

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CompactFlash card for CU320-2

Selection and ordering data

Description	Article No.
License upgrades	
Electronic Certificate of License (eCoL)	
• **Performance extension** for upgrading the license on a CompactFlash card	**6SL3074-0AA01-0AH0**
• **Safety Integrated Extended Function** License upgrade for one axis on a CompactFlash card. This option must be ordered once for each axis, e.g. a maximum of 6 for one CompactFlash card (**F01** - **F06**)	**6SL3074-0AA10-0AH0**
• **Safety Integrated Advanced Function** License upgrade for one axis on a CompactFlash card. This option must be ordered once for each axis, e.g. a maximum of 6 for one CompactFlash card (**A01 - A06**)	**6SL3074-0AA20-0AH0**
• **High output frequency** [1] Upgrading license to enable high output frequencies above 550 Hz for all axes on a CompactFlash card (**J01**)	**6SL3074-0AA02-0AH0**
• **SINAMICS DCB extension** Runtime license as of firmware V4.6 for upgrading the license on a CompactFlash card (**U01**) (see Engineering Tools section, SINAMICS Drive Control Chart engineering software)	**6SL3077-0AA00-0AH0**
• **Cogging torque compensation** Option to compensate motor cogging torques at low speeds License for one axis is provided on a CompactFlash card.	**6SL3074-0AA15-0AH0**
• **Enhanced Vibration Suppression Support** (incl. Advanced Position Control (APC) and Active Vibration Suppression (AVS)) Option to dampen load oscillations by taking into account motor- and load-side state variables License for one axis is provided on a CompactFlash card.	**6SL3074-0AA05-0AH0**
• **SINAMICS Technology Extension VIBX** (**U03**)	**6SL3077-0AA00-5AH0**
• **SINAMICS Technology Extension OALINK** (**U04**)	**6SL3077-0AA01-0AH0**
• **SINAMICS Technology Extension HEM (Heat Exchanger Module)** Included in SINAMICS S120 Cabinet Modules, Heat Exchanger Modules (**U05**). (more information about Technology Extensions can be found under SINAMICS Technology Extension (SINAMICS TEC))	**6SL3077-0AA05-2AH0**
Fault ride-through as a function of the Active Line Module format [2]	
- Booksize Active Line Module: 6SL3130-7TE..	**6SL3074-0AA07-1AH0**
- Chassis Active Line Module: with the hardware version for line formation	**6SL3074-0AA07-0AH0**

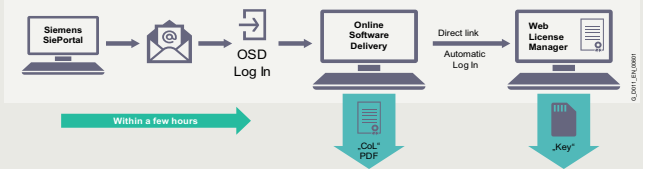
Description	Article No.
Line droop control dependent on the power of the Active Line Module [2]	
- 0 ... 50 kW Active Line Modules: 6SL3130-7TE21-6AA4, 6SL3130-7TE23-6AA3	**6SL3074-0AA08-8AH0**
- 51 ... 100 kW Active Line Modules: 6SL3130-7TE25-5AA3, 6SL3130-7TE28-0AA3	**6SL3074-0AA08-7AH0**
- 101 ... 200 kW Active Line Modules: 6SL3130-7TE31-2AA3, 2 x 6SL3130-7TE28-0AA3 (parallel connection)	**6SL3074-0AA08-6AH0**
- 201 ... 350 kW Active Line Modules: 2 × 6SL3130-7TE31-2AA3 (parallel connection), 6SL3330-7TE35-0AA4	**6SL3074-0AA08-5AH0**
- 351 ... 650 kW Active Line Modules: 6SL3330-7TE41-0AA4, 6SL3335-7TG35-8AA4, 6SL3335-7TG35-8AA8	**6SL3074-0AA08-4AH0**
- 651 ... 950 kW Active Line Module: 6SL3330-7TE41-4AA4	**6SL3074-0AA08-3AH0**
- 951 ... 1250 kW Active Line Module: 6SL3330-7TG41-0AA4	**6SL3074-0AA08-2AH0**
- 1251 ... 1600 kW Active Line Modules: 6SL3330-7TG41-3AA4, 6SL3335-7TG41-3AA4, 6SL3335-7TG41-3AA8	**6SL3074-0AA08-1AH0**
- 1601 ... 2000 kW Active Line Modules: 6SL3335-7TG41-6AA4, 6SL3335-7TG41-6AA8	**6SL3074-0AA08-0AH0**

More information

A firmware version as of V4.3 is required for the CU320-2 Control Unit.

The current firmware version at the time of publication of this catalog is Firmware V5.2 SP3.

The electronic Certificate of License is the paperless delivery form for runtime options for SINAMICS and contains information about the type of rights of use purchased for the software.
The electronic Certificate of License is supplied as a PDF file via the Online Software Delivery Portal (OSD).
This enables quick notification with a download link to the email address to be stated in the order.
The Web License Manager can also be called from the OSD to assign the runtime license to a memory card.
In this case, the data of the electronic Certificate of License are automatically transferred to the Web License Manager and do not have to be entered manually.
This ensures quick availability of the license key and simple and secure handling and management of the license certificates.
You will find information on the OSD at:
https://support.industry.siemens.com/cs/ww/en/view/109759444



The Certificates of License are stored in directory "KEYS".

[1] For more information, see https://support.industry.siemens.com/cs/document/104020669

[2] For more information, see https://support.industry.siemens.com/cs/document/109781647

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Overview



CU310-2 PN and CU310-2 DP Control Units



CU310-2 PN Control Unit with BOP20 Basic Operator Panel

The CU310-2 Control Unit for the communication and open-loop/closed-loop control functions of a Power Module is combined with the Power Module [1] to create a powerful single drive. A PROFINET (PN) variant and a PROFIBUS (DP) variant are available for fieldbus communication.

Design

CU310-2 Control Units feature the following interfaces as standard:

- Fieldbus interface
  - CU310-2 PN: 1 PROFINET interface with 2 ports (RJ45 sockets) with PROFIdrive V4 profile
  - CU310-2 DP: 1 PROFIBUS interface with PROFIdrive V4 profile
- 1 DRIVE-CLiQ socket to allow communication with other DRIVE-CLiQ nodes
- 1 encoder evaluation for evaluating the following encoder signals
  - Incremental encoder TTL/HTL
  - SSI encoders without incremental signals
- 6 parameterizable digital inputs (isolated) or alternatively 3 parameterizable, fail-safe digital inputs (isolated, can be used with firmware V4.5 and higher).
  The fail-safe digital inputs can be routed, i.e. they can be routed via PROFIsafe to a higher-level controller.
- 5 parameterizable digital inputs (isolated)
- 1 digital output (isolated) or alternatively 1 parameterizable, fail-safe digital output (isolated, can be used with firmware V4.5 or higher)
- 8 parameterizable bidirectional digital inputs/digital outputs (non-isolated) [2]
- 1 analog input, either ± 10 V (resolution 12 bits + sign) or ± 20 mA (11 bits + sign)
- 1 Ethernet interface (RJ45 socket) for commissioning and diagnostics
- 1 serial RS232 interface
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 temperature sensor input for KTY84-130, Pt1000 or PTC (Pt1000 can be used from firmware V4.7 HF17 and higher)
- 3 measuring sockets and one reference ground for commissioning support
- 1 slot for the CompactFlash card on which firmware and parameters are stored
- 1 PM-IF interface for communication with Power Modules in blocksize format
- 1 interface to the BOP20 Basic Operator Panel
- 1 PE/protective conductor connection

The status of the CU310-2 Control Unit is indicated via multi-color LEDs.

A BOP20 Basic Operator Panel can also be snapped directly onto the CU310-2 Control Unit for diagnostic procedures.

As the firmware and parameter settings are stored on a plug-in CompactFlash card, the Control Unit can be changed without the need for software tools.

[1] for PM240-2 Power Modules, usable with firmware V4.8 or later

[2] A 24-V supply voltage must be connected to terminal X124 for the digital outputs to be used.

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Selection and ordering data

Description	Article No.
CU310-2 PN Control Unit Without CompactFlash card	**6SL3040-1LA01-0AA0**
CU310-2 DP Control Unit Without CompactFlash card	**6SL3040-1LA00-0AA0**
Accessories	
For CU310-2 PN:	
Industrial Ethernet FC	
• RJ45 plug 180 (1 unit)	**6GK1901-1BB10-2AA0**
• RJ45 plug 180 (10 units)	**6GK1901-1BB10-2AB0**
• Stripping tool	**6GK1901-1GA00**
• Standard cable GP 2x2	**6XV1840-2AH10**
• Flexible cable GP 2x2	**6XV1870-2B**
• Trailing cable GP 2x2	**6XV1870-2D**
• Trailing cable 2x2	**6XV1840-3AH10**
• Marine cable 2x2	**6XV1840-4AH10**
For CU310-2 DP:	
PROFIBUS connector	
• Without PG/PC connection	**6ES7972-0BA42-0XA0**
• With PG/PC connection	**6ES7972-0BB42-0XA0**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

For information on connectors and cables refer to the section MOTION-CONNECT connection system and in the internet at:
www.siemens.com/motion-connect
https://sieportal.siemens.com

Integration

The CU310-2 Control Unit drives Power Modules in blocksize format via the PM-IF interface. DRIVE-CLiQ motors or Sensor Modules (SMC) can also be connected to the integrated DRIVE-CLiQ socket to permit the operation of motors without a DRIVE-CLiQ interface.

Power Modules in chassis format are controlled by the CU310-2 Control Unit directly via the DRIVE-CLiQ interface. Sensor Modules and Terminal Modules must be connected to the free DRIVE-CLiQ sockets of the Chassis Power Module.

With the BOP20 Basic Operator Panel, parameters can be changed directly on the device. The BOP20 Basic Operator Panel can also be snapped onto the CU310-2 Control Unit during operation to perform diagnostics.

The CU310-2 Control Unit and other connected components are commissioned and diagnosed with the SINAMICS Startdrive or STARTER commissioning tool.

A CU310-2 DP Control Unit communicates with the higher-level control system using PROFIBUS and the PROFIdrive V4 profile.

A CU310-2 PN Control Unit communicates with the higher-level control system using PROFINET IO and the PROFIdrive V4 profile.

The SINAMICS S120 drive system with the CU310-2 PN Control Unit then assumes the function of a PROFINET IO device and can perform the following functions:

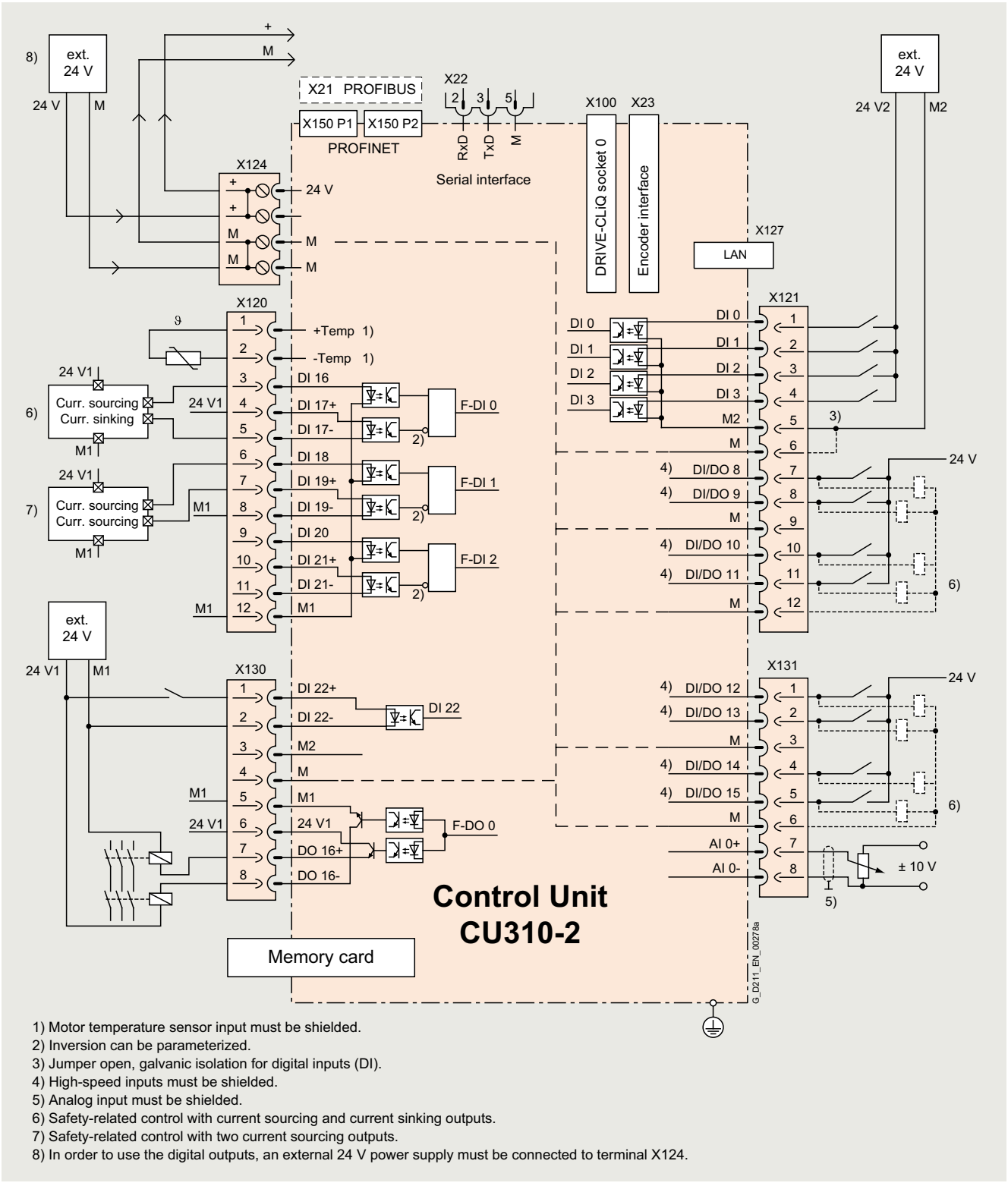
- PROFINET IO device
- 100 Mbps full duplex
- Supports real-time classes of PROFINET IO:
  - RT (Real-Time)
  - IRT (isochronous real-time), minimum send clock 250 µs
- Connects to controls as PROFINET IO devices using PROFIdrive compliant with Specification V4
- Standard TCP/IP communication for engineering with the SINAMICS Startdrive or STARTER commissioning tool
- Integrated 2-port switch with two RJ45 sockets based on the ERTEC ASIC. The optimum topology (line, star, tree) can therefore be configured without additional external switches.

A 24 V supply voltage must be connected to terminal X124 for the digital outputs to be used. To operate the CU310-2 Control Unit, a CompactFlash card with firmware V4.4 or higher is required.

[1] For more information, see
https://support.industry.siemens.com/cs/document/104020669

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Integration



1) Motor temperature sensor input must be shielded.
2) Inversion can be parameterized.
3) Jumper open, galvanic isolation for digital inputs (DI).
4) High-speed inputs must be shielded.
5) Analog input must be shielded.
6) Safety-related control with current sourcing and current sinking outputs.
7) Safety-related control with two current sourcing outputs.
8) In order to use the digital outputs, an external 24 V power supply must be connected to terminal X124.

Connection example of CU310-2 Control Unit

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Technical specifications

	CU310-2 Control Unit
PROFINET	6SL3040-1LA01-0AA0
PROFIBUS	6SL3040-1LA00-0AA0
Power requirement, max. At 24 V DC, without taking into account the digital outputs and DRIVE-CLiQ supply	0.35 A for CU310-2 Control Unit + 0.5 A for Power Module
Conductor cross-section, max.	2.5 mm^2
Fuse protection, max.	20 A
Digital inputs	in accordance with IEC 61131-2 type 1 5 isolated digital inputs 8 bidirectional non-isolated digital inputs/digital outputs 3 parameterizable, fail-safe digital inputs (isolated) or alternatively 6 parameterizable digital inputs (isolated)
• Voltage	-3 ... +30 V
• Low level (an open digital input is interpreted as "low")	-3 ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC, typ.	3.5 mA
• Delay time of digital inputs [1], approx.	
- L → H	50 µs
- H → L	150 µs
• Delay time of high-speed digital inputs [1], approx. (high-speed digital inputs can be used for position detection)	
- L → H	5 µs
- H → L	50 µs
• Conductor cross-section, max.	1.5 mm^2
Digital outputs (continuously short-circuit proof)	8 bidirectional non-isolated digital inputs/digital outputs
• Voltage	24 V DC
• Load current per digital output [2], max.	500 mA
• Delay time [1], typ./max.	
- L → H	150 µs/400 µs
- H → L	75 µs/100 µs
• Conductor cross-section, max.	1.5 mm^2
Analog input	1 analog input for current or voltage input, switchable
• Common mode range	±12 V
• As voltage input	-10 ... +10 V; R_i > 100 Ω Resolution: 12 bits + sign (referred to the maximum range that can be resolved -11 ... +11 V)
• As current input	-20 ... +20 mA; R_i > 250 Ω Resolution: 11 bits + sign (referred to -22 ... +22 mA) Max. range that can be resolved: -44 ... +44 mA
Encoder evaluation	• Incremental encoder TTL/HTL • SSI encoders without incremental signals
• Input current range TTL/HTL	2 ... 10 mA (typ. 5 mA)
• Encoder supply	24 V DC / 0.35 A or 5 V DC / 0.35 A
• Encoder frequency, max.	300 kHz
• SSI baud rate	100 ... 1000 kBaud
• Resolution absolute position SSI	30 bits
• Cable length, max.	
- TTL encoder	100 m / 328 ft (only bipolar signals permitted) [3]
- HTL encoder	100 m (328 ft) for unipolar signals 300 m (984 ft) for bipolar signals [3]
- SSI encoder	100 m (328 ft)
Power loss	<20 W
PE connection	M5 screw
Dimensions	
• Width	73 mm (2.87 in)
• Height	
- CU310-2 PN	191 mm (7.52 in)
- CU310-2 DP	187 mm (7.36 in)
• Depth	75 mm (2.95 in)
Weight, approx.	0.95 kg (2.09 lb)
Certificate of suitability	cULus

[1] The specified delay times refer to the hardware. The actual reaction time depends on the time slice in which the digital input or output is processed.

[2] In order to use the digital outputs, an external 24 V power supply must be connected to terminal X124.

[3] Signal cables twisted in pairs and shielded.

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Overview



The CompactFlash card contains the firmware and set parameters. The CompactFlash card is plugged into the appropriate slot on the CU310-2 Control Unit.

Design

A CU310-2 Control Unit can perform the communication, open-loop and closed-loop control functions for one Power Module. The performance enhancement is not required in this case.

In addition to the firmware, the CompactFlash card also contains licensing codes which are required to enable firmware options.

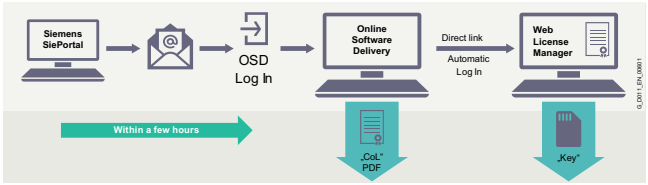
In addition to the Article No., the following firmware options can currently be ordered:

- Safety Integrated Extended Functions, order code **F01**
- Safety Integrated Advanced Functions, order code **A01**
- High output frequency, order code **J01**
- DCB Extension, order code **U01**

The firmware options can also be enabled subsequently. You will need the serial number of the CompactFlash card and the Article No. of the firmware option to be enabled. With this information, you can purchase the associated license code from a license database and enable the firmware option. The license code is only valid for the CompactFlash card declared and cannot be transferred to other CompactFlash cards.

Subsequent licensing is possible in the internet via the web license manager by generating a license key:
www.siemens.com/automation/license

The electronic Certificate of License is the paperless delivery form for runtime options for SINAMICS and contains information about the type of rights of use purchased for the software.
The electronic Certificate of License is supplied as a PDF file via the Online Software Delivery Portal (OSD).
This enables quick notification with a download link to the email address to be stated in the order.
The Web License Manager can also be called from the OSD to assign the runtime license to a memory card.
In this case, the data of the electronic Certificate of License are automatically transferred to the Web License Manager and do not have to be entered manually.
This ensures quick availability of the license key and simple and secure handling and management of the license certificates.
You will find information on the OSD at:
https://support.industry.siemens.com/cs/ww/en/view/109759444



The Certificates of License are stored in directory "KEYS".

Selection and ordering data

Description	Article No.
CompactFlash card for CU310-2 Control Units without safety license	**6SL3054-0 ■ ■ 00-1BA0**
CompactFlash card for CU310-2 Control Units with safety license • including Certificate of License	**6SL3054-0 ■ ■ 00-1BA0-Z F01**
CompactFlash card for CU310-2 Control Units with/without safety license	
• With high output frequency	**6SL3054-0 ■ ■ ■ 0-1BA0-Z J01**
• With DCB Extension license (firmware V4.6 and higher) (more information about DCB Extension and license upgrades can be found under Drive Control Chart (DCC) in the Engineering Tools section)	**6SL3054-0 ■ ■ ■ 0-1BA0-Z U01**
Firmware version	↑ ↑
V4.8	**E J**
V5.1	**F B**
V5.2	**F C**
	↑
Service Pack SP1 [1]	**1**
Service Pack SP3 [2]	**3**
License upgrades	
Electronic Certificate of License (eCoL)	
• **Safety Integrated Extended Functions** including Certificate of License Upgrading license for one axis on a CompactFlash card	**6SL3074-0AA10-0AH0**
• **Safety Integrated Advanced Functions** including Certificate of License Upgrading license for one axis on a CompactFlash card	**6SL3074-0AA20-0AH0**
• **High output frequency** Upgrading license to enable high output frequencies above 550 Hz for all axes on a CompactFlash card	**6SL3074-0AA02-0AH0**
• **Cogging torque compensation** Option to compensate motor cogging torques at low speeds Axis license is provided on a CompactFlash card.	**6SL3074-0AA15-0AH0**
• **Enhanced Vibration Suppression Support** (incl. Advanced Position Control (APC) and Active Vibration Suppression (AVS)) Option to dampen load oscillations by taking into account motor- and load-side state variables License is provided on a CompactFlash card	**6SL3074-0AA05-0AH0**
• **SINAMICS Technology Extension HEM (Heat Exchanger Module)** Included in SINAMICS S120 Cabinet Modules, Heat Exchanger Modules.	**6SL3077-0AA05-2AH0**

[1] Applies only to firmware version V5.1
[2] Applies only to firmware version V5.2

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CUA31 Control Unit Adapter

Overview



CUA31 Control Unit Adapter

The CUA31 Control Unit Adapter converts the PM-IF interface to a DRIVE-CLiQ interface. The CUA31 Control Unit Adapter allows Power Modules in blocksize format to operate on a Control Unit, e.g. as a single axis next to a multi-axis drive. In this case, the CUA31 Control Unit Adapter should be the last device in the DRIVE-CLiQ link from the viewpoint of the Control Unit.

Design

The CUA31 Control Unit Adapter features the following connections and interfaces:

- 1 temperature sensor input for KTY84-130, Pt1000 or PTC (Pt1000 can be used from firmware V4.7 HF17)
- 3 DRIVE-CLiQ sockets
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 Safe Stop input

The status of the CUA31 Control Unit Adapter is indicated via multi-color LEDs.

Selection and ordering data

Description	Article No.
CUA31 Control Unit Adapter Without DRIVE-CLiQ cable	**6SL3040-0PA00-0AA1**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

Technical specifications

	CUA31 Control Unit Adapter 6SL3040-0PA00-0AA1
Current requirement, max. at 24 V DC without DRIVE-CLiQ supply • Conductor cross-section, max.	0.15 A for CUA31 + max. 0.5 A for PM240-2 Power Module 2.5 mm^2
Power loss, max.	2.4 W
PE connection	M4 screw
Dimensions • Width • Height • Depth	 73 mm (2.87 in) 165.8 mm (6.53 in) 37.3 mm (1.47 in)
Weight, approx.	0.31 kg (0.68 lb)
Certificate of suitability	cULus

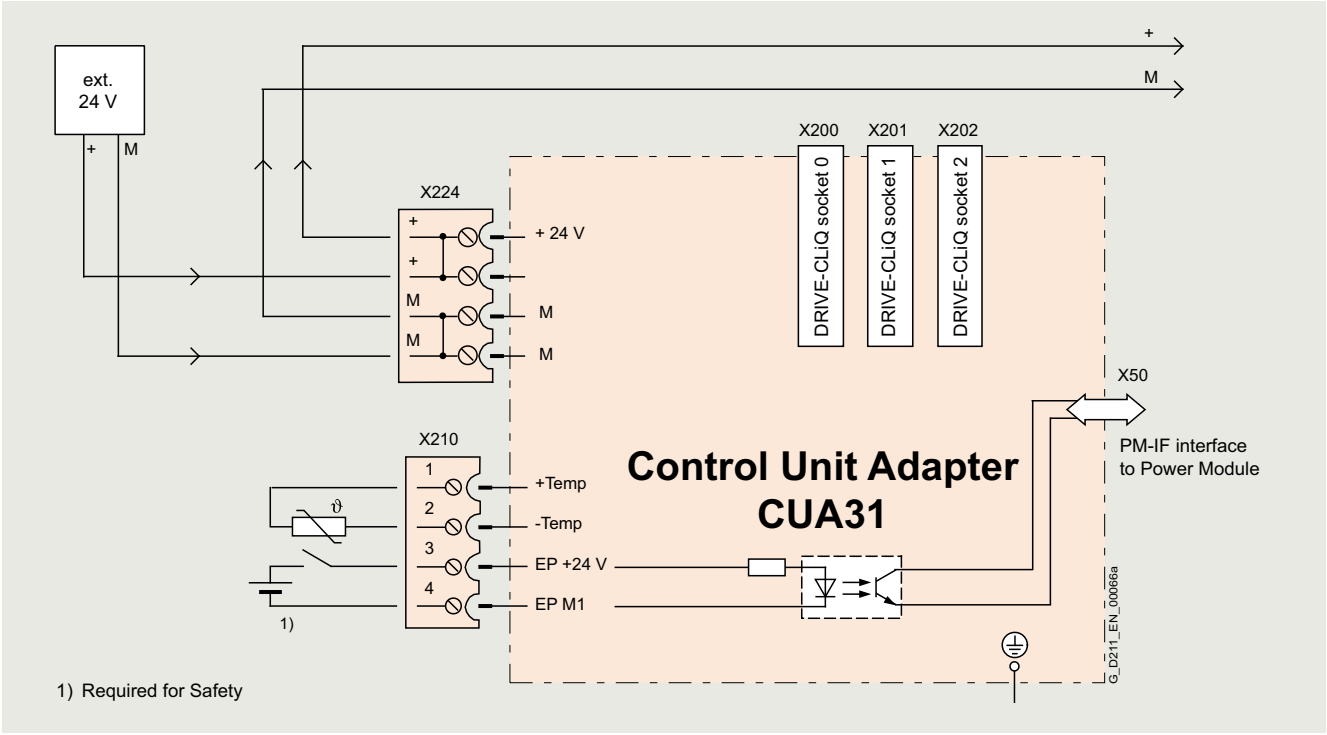
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Integration

The CUA31 Control Unit Adapter is snapped onto the Power Module in blocksize format and communicates with a CU320-2 Control Unit or a SINUMERIK Control Unit via a DRIVE-CLiQ connection.

The CUA31 Control Unit Adapter's power is supplied by the Power Module via the PM-IF interface. If the CUA31 Control Unit Adapter needs to communicate when the Power Module is switched off, it must be supplied with 24 V DC from an external source.

Other DRIVE-CLiQ devices such as Sensor Modules or Terminal Modules can be connected to the CUA31 Control Unit Adapter.



1) Required for Safety

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CUA32 Control Unit Adapter

Overview



CUA32 Control Unit Adapter

The CUA32 Control Unit Adapter converts the PM-IF interface to a DRIVE-CLiQ interface. The CUA32 Control Unit Adapter is also equipped with an integral encoder evaluation device which can be configured for an HTL/TTL or SSI encoder. The CUA32 Control Unit Adapter allows Power Modules in blocksize format to operate on a Control Unit, e.g. as a single axis next to a multi-axis drive. In this case, the CUA32 Control Unit Adapter should be the last device in the DRIVE-CLiQ link from the viewpoint of the Control Unit.

Design

The CUA32 Control Unit Adapter features the following connections and interfaces:

- 1 temperature sensor input for KTY84-130, Pt1000 or PTC (Pt1000 can be used from firmware V4.7 HF17)
- 3 DRIVE-CLiQ sockets
- 1 connection for the electronics power supply via the 24 V DC power supply connector
- 1 Safe Stop input
- 1 encoder evaluator for
  - Incremental encoder TTL/HTL
  - SSI encoder without incremental signals

The status of the CUA32 Control Unit Adapter is indicated via multi-color LEDs.

Selection and ordering data

Description	Article No.
CUA32 Control Unit Adapter Without DRIVE-CLiQ cable	**6SL3040-0PA01-0AA0**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

Technical specifications

	CUA32 Control Unit Adapter 6SL3040-0PA01-0AA0
Current requirement, max. at 24 V DC without DRIVE-CLiQ supply or encoder supply	0.15 A for CUA32 + max. 0.5 A for PM240-2 Power Module
• Conductor cross-section, max.	2.5 mm^2
Encoder evaluation	• Incremental encoder TTL/HTL (can be parameterized) • SSI encoder without incremental signals
• Input current range TTL/HTL	4 ... 20 mA (typ. 10 mA)
• Encoder supply	24 V DC/0.35 A or 5 V DC/0.35 A
• Encoder frequency, max.	500 kHz
• SSI baud rate	100 ... 250 kbaud
• Resolution absolute position SSI	30 bit
• Cable length, max.	
- TTL encoder	100 m (328 ft) (only bipolar signals permitted) [1]
- HTL encoder	100 m (328 ft) for unipolar signals 300 m (984 ft) for bipolar signals [1]
- SSI encoder	100 m (328 ft)
Power loss, max.	2.6 W
PE connection	M4 screw
Dimensions	
• Width	73 mm (2.87 in)
• Height	165.8 mm (6.53 in)
• Depth	37.3 mm (1.47 in)
Weight, approx.	0.32 kg (0.71 lb)
Certificate of suitability	cULus

[1] Signal cables twisted in pairs and shielded.

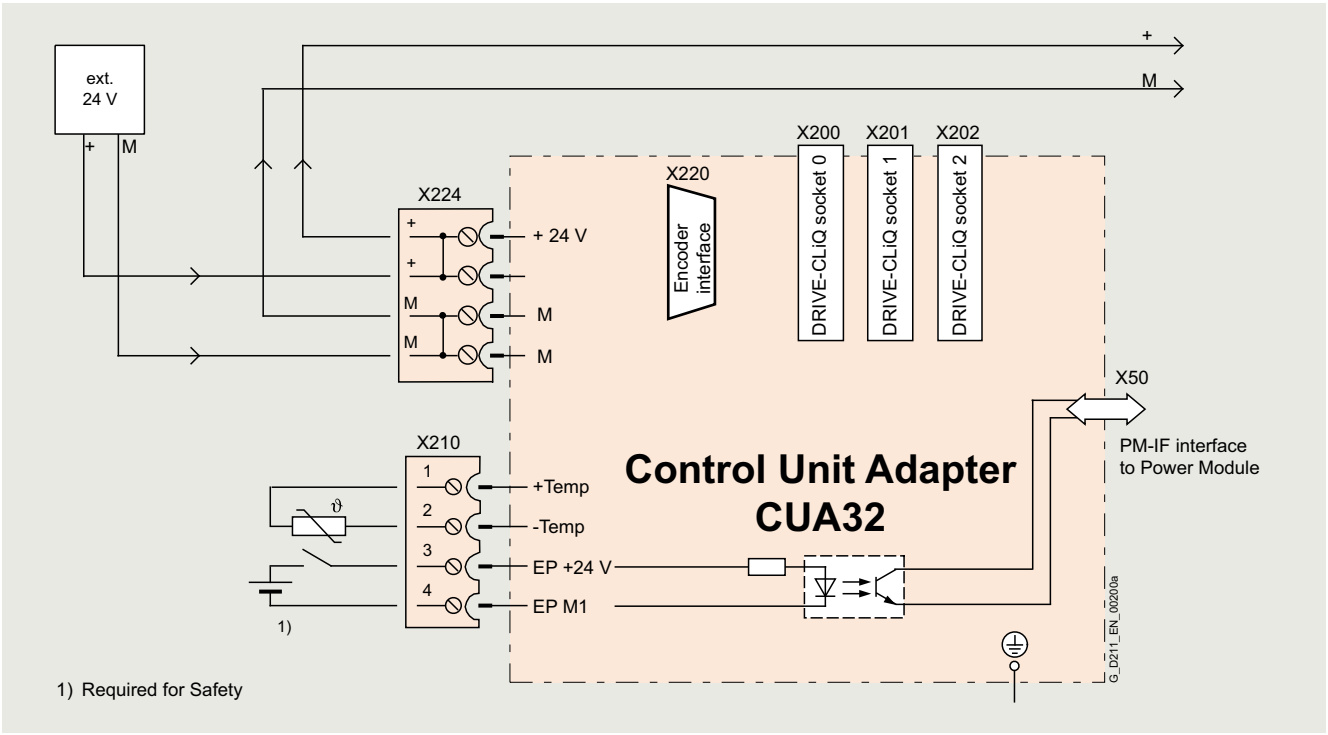
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Integration

The CUA32 Control Unit Adapter is snapped onto the Power Module in blocksize format and communicates with a CU320-2 Control Unit or a SINUMERIK Control Unit via a DRIVE-CLiQ connection.

The CUA32 Control Unit Adapter's power is supplied by the Power Module via the PM-IF interface. If the CUA32 Control Unit Adapter needs to communicate when the Power Module is switched off, it must be supplied with 24 V DC from an external source.

Other DRIVE-CLiQ devices such as Sensor Modules or Terminal Modules can be connected to the CUA32 Control Unit Adapter.



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Technical specifications

General technical specifications

Unless explicitly specified otherwise, the following technical specifications are valid for all components of the SINAMICS S120 booksize drive system.

Note:

When engineering the complete SINAMICS S120 drive, the system data of the associated Control Units, supplementary system components, DC link components and Sensor Modules must be taken into consideration.

Electrical specifications			
Line voltage	380 ... 480 V 3 AC ±10 % (-15 % <1 min)		
Line system configurations	Grounded TN/TT systems and non-grounded IT systems		
Line frequency	47 ... 63 Hz		
Electronics power supply	24 V DC -15 %/+20 %[1], safety extra low-voltage (PELV/SELV)		
Short-circuit current rating (SCCR) (Short Circuit Current Rating) acc. to UL 508C (up to 600 V)	1.1 ... 447 kW: 100 kA		
Electromagnetic compatibility acc. to EN 61800-3	Second environment, Category C2/C3 For more information, see section Engineering notes		
Overvoltage category acc. to IEC/EN 61800-5-1	III		
Mechanical specifications			
Degree of protection			
• According to EN 60529	IP20		
• According to UL 508C/UL 61800-5-1	Open type		
Protection class			
• Line circuits with protective conductor connection according to IEC 61800-5-1	I		
• Electronic circuits	Safety extra low-voltage PELV/SELV		
Ambient conditions			
	Storage In product packaging	**Transport** In transport packaging	**Operation**
Climatic conditions	Class 1K4 acc. to EN 60721-3-1: 1997 -25 ... +55 °C (-13 ... +131 °F)	Class 2K4 acc. to EN 60721-3-2: 1997 -40 ... +70 °C (-40 ... +158 °F)	Class 3K3 [3] acc. to EN 60721-3-3: 2002 In operation Without derating[4]: 0 ... +40 °C (32 ...104 °F) For operation with derating: >40 ... +55 °C (>104 ... 131 °F) Relative air humidity 5 ... 95 %
Environmental class/ harmful chemical substances	Class 1C2 acc. to EN 60721-3-1: 1997	Class 2C2 acc. to EN 60721-3-2: 1997	Class 3C2 Class 3C3 for H_2S and SO_2 acc. to EN 60721-3-3: 2002
Organic/biological influences	Class 1B1 acc. to EN 60721-3-1: 1997	Class 2B1 acc. to EN 60721-3-2: 1997	Class 3B1 acc. to EN 60721-3-3: 2002
Pollution degree [2] acc. to IEC/EN 61800-5-1	2		
Installation altitude			
• Up to 1000 m (3281 ft) above sea level	Without derating		
• From 1000 m (3281 ft) up to 2000 m (6562 ft) above sea level observe the derating characteristics	• Reduction of the output current by 10 % per 1000 m (3281 ft) or • Reduction of the ambient temperature by 5 K per 1000 m (3281 ft)		
• From 2000 m (6562 ft) up to 4000 m (13123 ft) above sea level observe the derating characteristics			
- Power components	• Reduction of the output current by 10 % per 1000 m (3281 ft) or • Reduction of the ambient temperature by 5 K per 1000 m (3281 ft) and additionally: • Operation on line supply systems with grounded neutral point, or • Operation with an isolating transformer with secondary grounded neutral point		
- Control Units	• Reduction of the ambient temperature by 5 K per 1000 m (3281 ft)		

[1] When using a motor holding brake, restricted voltage tolerances (24 V ±10 %) might need to be taken into account.

[2] The components must be protected against conductive pollution, e.g. by installing them in a control cabinet with degree of protection IP54 according to IEC 60529 or NEMA 12. If conductive pollution can be excluded at the installation site, a lower degree of cabinet protection is permissible.

[3] Better than 3K3 through increased ruggedness regarding the temperature range and air humidity. Oil mist, salt mist, ice formation, condensation, dripping water, spraying water, splashing water and water jets are not permitted.

[4] Also carefully observe the permissible temperatures for the Control Unit and operator panel.

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Technical specifications

Mechanical strength			
	Storage In product packaging	**Transport** In transport packaging	**Operation**
Vibratory load	Class 1M2 acc. to EN 60721-3-1: 1997	Class 2M3 acc. to EN 60721-3-2: 1997	Class 3M1 acc. to EN 60721-3-3: 2002 **Test values** acc. to EN 60068-2-6 : 10 oscillations per axis in the range: 10 ... 57 Hz constant deflection 0.075 mm 57 ... 150 Hz constant acceleration 9.81 m/s^2 (1 × *g*)
Shock load	Class 1M2 acc. to EN 60721-3-1: 1997	Class 2M3 acc. to EN 60721-3-2: 1997	Class 3M1 acc. to EN 60721-3-3: 2002 **Test values** acc. to EN 60068-2-27 : 3 shocks per axis in both directions Peak acceleration 49 m/s^2 (5 × *g*); duration 30 ms
Certificates			
Declarations of conformity	CE (Low Voltage, EMC and Machinery Directive)		
Certificates of suitability	cULus		

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Active Line Modules in booksize format

Overview



Active Line Module in booksize format

Active Line Modules are self-commutated infeed/regenerative feedback units (with IGBTs in the infeed and regenerative feedback directions) that generate a controlled DC link voltage. This means that the connected Motor Modules are decoupled from the line voltage. Line voltage fluctuations within the permissible supply tolerances have no effect on the motor voltage. Active Line Modules are designed for connection to grounded star (TN, TT) and non-grounded symmetrical (IT) supply systems.

The DC link is pre-charged via integrated precharging resistors.

In order to operate an Active Line Module, an associated Active Interface Module is required.

Design

The Active Line Modules in booksize format feature the following connections and interfaces as standard:

- 1 power connection via screw-type terminals
- 1 connection for the 24 V DC electronics power supply via the 24 V terminal adapter included in the scope of supply
- 1 DC link connection via integrated DC link busbars
- 3 DRIVE-CLiQ sockets
- 2 PE (protective earth) connections
- 1 temperature sensor input for KTY84-130, Pt1000 or PTC (Pt1000 can be used from firmware V4.7 HF17)

The status of the Active Line Modules is indicated via two multi-color LEDs.

For the Active Line Module with a width of 100 mm (3.94 in), the shield of the power connection cable can be connected to the integrated shield connection plate by means of a shield connection clamp or hose clip, e.g. Weidmüller type KLBÜ CO 4. The shield connection clamp must not be used as a strain relief mechanism. Shield connection sets are available for the 150 mm (5.91 in), 200 mm (7.87 in) and 300 mm (11.81 in) wide Active Line Modules.

The signal cable shield can be connected to the Active Line Module by means of a shield connection clamp, e.g. Weidmüller type KLBÜ 3-8 SC.

The scope of supply of the Active Line Modules includes:

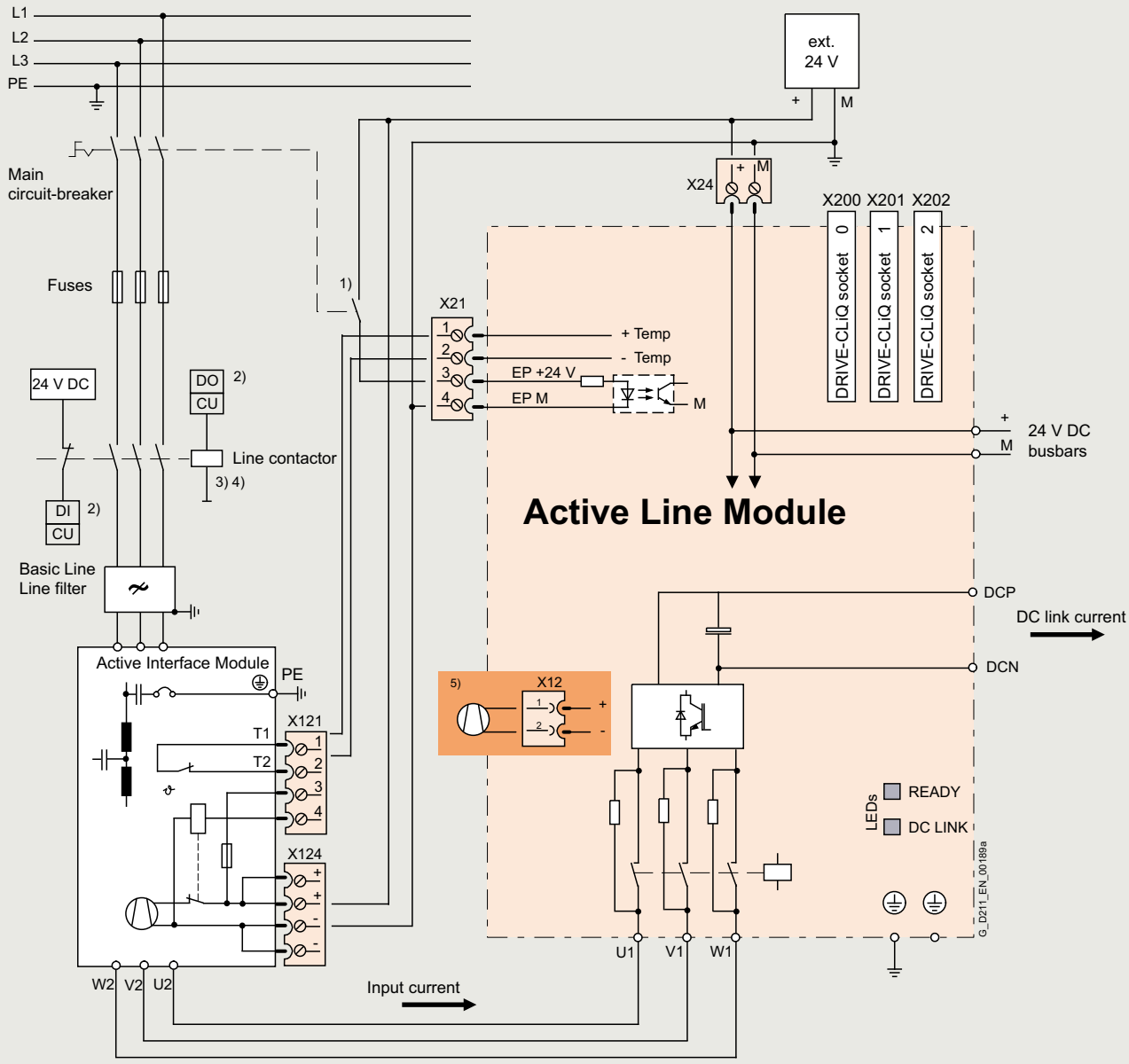
- DRIVE-CLiQ cable for connection to the adjacent Control Unit on the left for drive control, length 0.11 m (4.33 in)
- DRIVE-CLiQ cable (length depends on Active Line Module width) for connection to the adjacent Motor Module, length = width of Active Line Module + 0.11 m (4.33 in)
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- 24 V terminal adapter (X24)
- Connector X21 for digital inputs
- Fan insert for Active Line Modules of 80 kW (100 hp) and 120 kW (150 hp) (the voltage for the fan unit is supplied by the Active Line Module)
- 1 set of warning labels in 36 languages

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Integration

The Active Line Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit
- SINUMERIK 840D sl
- SINUMERIK ONE
- SINUMERIK MC



1) Leading NC contact t > 10 ms, 24 V DC and ground must be connected for operation.
2) Digital input (DI) or digital output (DO), controlled by the Control Unit.
3) No additional load permitted downstream of the line contactor.
4) The current carrying capacity of the digital output (DO) must be taken into account; an output interface element may have to be used.
5) Fan insert for Active Line Module of 80 kW (100 hp) and 120 kW (150 hp). The fan insert is supplied with the Active Line Module.

Connection example of Active Line Module in booksize format

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Active Line Modules in booksize format

Selection and ordering data

Rated power	Active Line Module in booksize format
kW (hp)	Article No.
Line voltage 380 ... 480 V 3 AC	
16 (18)	**6SL3130-7TE21-6AA4**
36 (40)	**6SL3130-7TE23-6AA3**
55 (60)	**6SL3130-7TE25-5AA3**
80 (100)	**6SL3130-7TE28-0AA3**
120 (150)	**6SL3130-7TE31-2AA3**

Description	Article No.
Accessories	
Shield connection plate For Line Modules and Motor Modules in booksize format with a width of	
• 150 mm (5.91 in)	**6SL3162-1AF00-0AA1**
• 200 mm (7.87 in)	**6SL3162-1AH01-0AA0**
• 300 mm (11.81 in)	**6SL3162-1AH00-0AA0**
DC link rectifier adapter For direct infeed of DC link voltage	
• Screw-type terminals 0.5 ... 10 mm^2 For Line Modules and Motor Modules in booksize format with a width of 50 mm (1.97 in), 75 mm (2.95 in) and 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
• Screw-type terminals 35 ... 120 mm^2 For Line Modules and Motor Modules in booksize format with a width of 150 mm (5.91 in), 200 mm (7.87 in) and 300 mm (11.81 in)	**6SL3162-2BM00-0AA0**
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 120 mm^2 For all Line Modules and Motor Modules in booksize format	**6SL3162-2BM01-0AA0**
Accessories for re-ordering	
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
24 V jumper For connection of the 24 V busbars (for booksize format)	**6SL3162-2AA01-0AA0**
Terminal Kit (Plug-in terminals, DRIVE-CLiQ jumper (length = module width + 60 mm (2.36 in)), dust protection blanking plugs) For DRIVE-CLiQ port For Active Line Modules with a width of	
• 100 mm (3.94 in)	**6SL3163-8FD00-0AA0**
• 150 mm (5.91 in)	**6SL3163-8GF00-0AA0**
• 200 mm (7.87 in)	**6SL3163-8HH00-0AA0**
• 300 mm (11.8 in)	**6SL3163-8JM00-0AA0**
Warning labels in 36 languages This label set can be glued over the standard German or English labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, CN, ID, IL, IR, JP, KR, SA, TH, TW	**6SL3166-3AB00-0AA0**
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

Technical specifications

	Active Line Module in booksize format
	6SL3130-7TE...
Line voltage (up to 2000 m (6562 ft) above sea level)	380 ... 480 V 3 AC ±10 % (in operation -15 % <1 min)
Line frequency	47 ... 63 Hz
SCCR (short-circuit current rating)	100 kA in conjunction with the recommended Class J fuse, or circuit breaker according to UL489 / CSA 22.2 No. 5-02 see recommended line-side components
Line power factor	
• Active mode	
- Fundamental power factor ($\cos \varphi_1$)	1 (factory setting), can be altered by inputting a reactive current setpoint
- Total (λ)	1 (factory setting)
• Smart Mode	
- Fundamental power factor	>0.96
- Overall	0.65 ... 0.9
Overvoltage category to EN 60664-1	Class III
DC link voltage V_d	In Active Mode, the DC link voltage is regulated and can be adjusted as a voltage decoupled from the line voltage. In Smart Mode, the DC link voltage is kept in proportion to the line voltage at the mean rectified line voltage value. Factory setting for DC link voltage: 380 ... 400 V 3 AC: 600 V (Active Mode) 400 ... 415 V 3 AC: 625 V (Active Mode) 416 ... 480 V 3 AC: 1.35 × line voltage (Smart Mode) [1]
Electronics power supply	24 V DC -15 %/+20 %
Radio interference suppression	
• Standard (Active Line Module + Active Interface Module)	Category C3 to EN 61800-3 up to 350 m (1148 ft) total cable length
• With line filter	Category C2 according to EN 61800-3 up to 350 m (1148 ft) total cable length Category C3 according to EN 61800-3 from 350 m to 1000 m (1148 ... 3281 ft) total cable length
Type of cooling	Internal air cooling (power units with increased air cooling by built-in fan)
Permissible ambient and coolant temperature (air) during operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 ... 55 °C (104 ... 131 °F), see derating characteristics
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, > 1000 ... 4000 m (3281 ... 13124 ft) above sea level, see derating characteristics
Declarations of conformity	CE (Low Voltage and EMC Directives)
Certificate of suitability	cULus

[1] Active Mode can also be selected if the connected motors are suitable for > 650 V DC.

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Technical specifications

Line voltage 380 ... 480 V 3 AC		Active Line Module in booksize format				
Internal air cooling		6SL3130-7TE21-6AA4	6SL3130-7TE23-6AA3	6SL3130-7TE25-5AA3	6SL3130-7TE28-0AA3	6SL3130-7TE31-2AA3
Infeed/regenerative feedback power						
• Rated power P_{rated}						
• At 380 V 3 AC	kW	**16**	**36**	**55**	**80**	**120**
• At 460 V 3 AC [5]	(hp)	(18)	(40)	(60)	(100)	(150)
• For S6 duty P_{S6} (40 %)	kW	21	47	71	106	145
• P_{max}	kW	35	70	91 (110 [1])	131	175
DC link current						
• At 600 V DC	A	27	60	92	134	200
• For S6 duty (40 %)	A	35	79	121	176	244
• Maximum	A	59	117	152 (176 [1])	218	292
Input current						
• Rated current at 380/400/480 V 3 AC	A	26/25/21	58/55/46	88/84/70	128/122/102	192/182/152
• For S6 duty (40 %) at 400 V	A	32	71	108	161	220
• At 400 V max.	A	54	107	139 (168 [1])	200	267
Current requirement 24 V DC electronics power supply, max.	A	1.1	1.5	1.9	2	2.5
Current carrying capacity						
• 24 V DC busbars	A	20	20	20	20	20
• DC link busbars	A	100	200	200	200	200
DC link capacitance						
• Active Line Module	µF	710	1410	1880	2820	3995
• Drive line-up, max.	µF	20000	20000	20000	20000	20000
Power loss [2]	kW	0.28	0.67	0.95	1.38	2.24
Cooling air requirement	m^3/s (ft^3/s)	0.016 (0.57)	0.031 (1.09)	0.044 (0.155)	0.144 (5.09)	0.144 (5.09)
Sound pressure level L_{pA} (1 m)	dB	<60	<65	<60	<73	<73
Line connection U1, V1, W1		Screw-type terminals (X1)	M6 screw studs (X1)	M8 screw studs (X1)	M8 screw studs (X1)	M8 screw studs (X1)
• Conductor cross-section, max.	mm^2	2.5 ... 10	2.5 ... 50	2.5 ... 95, 2 × 35	2.5 ... 120, 2 × 50	2.5 ... 120, 2 × 50
Shield connection		Integrated in the connector	See Accessories	See Accessories	See Accessories	See Accessories
PE connection		M5 screw	M6 screw	M6 screw	M8 screw	M8 screw
Cable length, max. Total of all motor cables and DC link						
• Shielded	m (ft)	630 (2067) [3]	630 (2067) [3]	1000 (3281)	1000 (3281)	1000 (3281)
• Unshielded	m (ft)	850 (2789)	850 (2789)	1500 (4922)	1500 (4922)	1500 (4922)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	100 (3.94)	150 (5.91)	200 (7.87)	300 (11.81)	300 (11.81)
• Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
- With fan [4]	mm (in)	–	–	–	629 (24.76)	629 (24.76)
• Depth	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
Weight, approx.	kg (lb)	7 (15.4)	10 (22.0)	16 (35.3)	23 (50.7)	23 (50.7)

[1] Higher peak output is possible in combination with the Active Interface Module 6SL3100-0BE25-5AB0 (for operating cycle constraints, see SINAMICS S120 Manual).

[2] Power loss of Active Line Module at rated power including losses of 24 V DC electronics power supply.

[3] Max. cable lengths in combination with Active Interface Module and Basic Line Filter (Category C3 according to EN 61800-3).

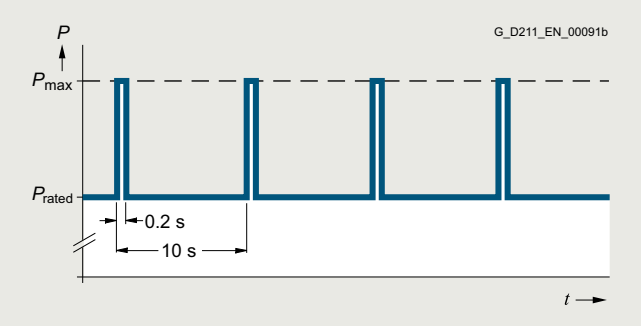
[4] The fan is supplied together with the Active Line Module and must be installed before the Active Line Module is commissioned.

[5] Nominal hp ratings are provided for ease of assigning components only. The Line Module outputs are dependent on the Motor Module loading and are to be dimensioned accordingly.

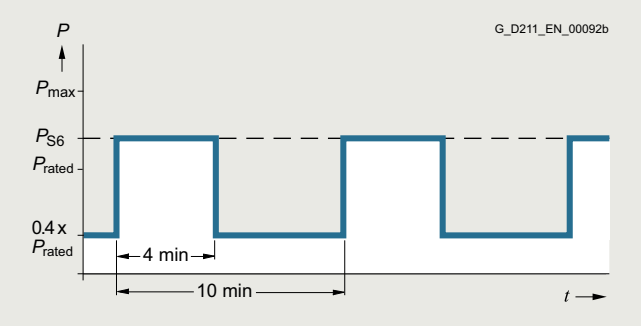
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Characteristic curves

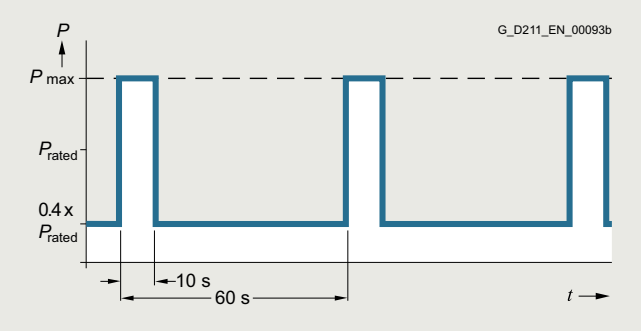
Overload capability



Duty cycle with previous load

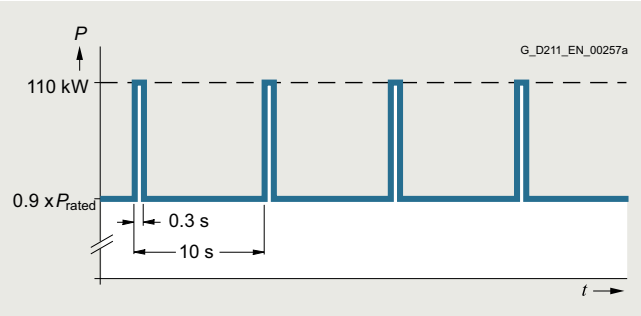


S6 duty cycle with previous load



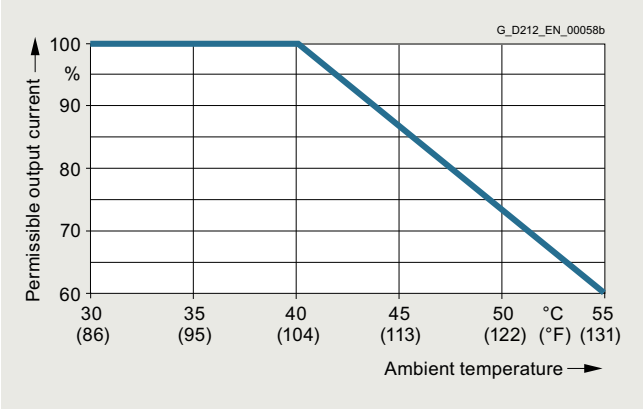
S6 duty cycle with previous load

55 kW Active Line Module only:



Peak power load duty cycle with previous load

Derating characteristics



Output power as a function of ambient temperature

Installation altitude

- >1000 ... 4000 m (3281 ... 13124 ft) above sea level
  - Reduction of the output current by 10 % per 1000 m (3281 ft), or
  - Reduction of the ambient temperature by 5 °C (9 °F) per 1000 m (3281 ft)
- >2000 ... 4000 m (6562 ... 13124 ft) above sea level
  - Operation on line supply systems with grounded neutral point, or
  - Operation with an isolating transformer with secondary grounded neutral point

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Overview



Active Interface Modules for 16 kW, 36 kW, 55 kW and 80 kW/120 kW

The Active Interface Modules combine with the Active Line Modules to form a functional unit and are required for operation of the associated Active Line Module. The Active Interface Modules contain a Clean Power Filter and basic interference suppression to ensure compliance with Category C3 in accordance with EN 61800-3 with respect to emitted interference.

The Clean Power Filter protects the mains connection from switching-frequency harmonics. The drive system therefore draws a sinusoidal current from the supply and causes almost no harmonics.

The Active Line Modules in combination with the Active Interface Module can also be operated with supply systems with an isolated star point (IT supply systems).

Design

The scope of supply of the Active Interface Modules includes:

- Connector X21 for temperature evaluation and fan control
- Connector X24 for connecting the 24 V supply for the integrated fan
- DRIVE-CLiQ cable for connecting the Control Unit to the Active Line Module; length of the DRIVE-CLiQ cable = width of the Active Interface Module + 0.11 m (4.33 in)
- Shield connection plate for Active Interface Module 16 kW
- 1 set of warning signs in 36 languages

Selection and ordering data

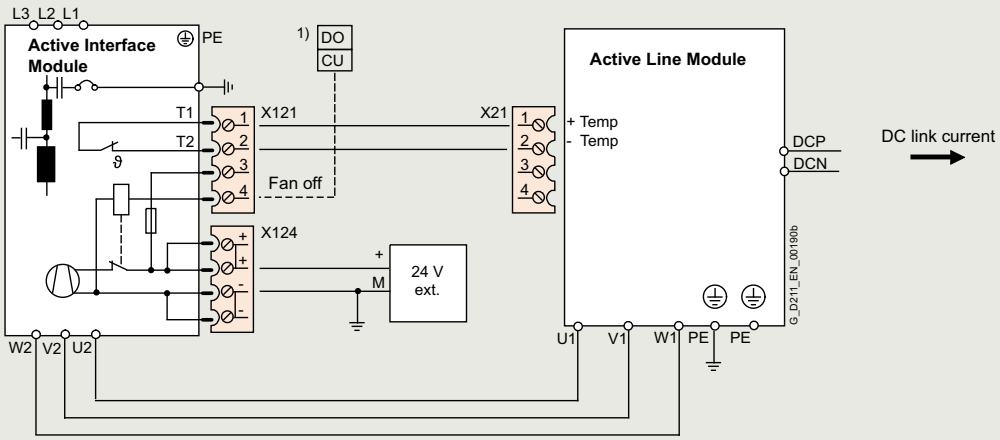
Rated power of the Active Line Module kW (hp)	Suitable for Active Line Module in booksize format	**Active Interface Module** Article No.
Line voltage 380 ... 480 V 3 AC		
16 (18)	6SL3130-7TE21-6AA4	**6SL3100-0BE21-6AB0**
36 (40)	6SL3130-7TE23-6AA3	**6SL3100-0BE23-6AB0**
55 (60)	6SL3130-7TE25-5AA3	**6SL3100-0BE25-5AB0**
80 (100)	6SL3130-7TE28-0AA3	**6SL3100-0BE28-0AB0**
120 (150)	6SL3130-7TE31-2AA3	**6SL3100-0BE31-2AB0**

Description	Article No.
Accessories	
Shield connection plate [1]	
• For Active Interface Module 36 kW (40 hp)	**6SL3163-1AF00-0AA0**
• For Active Interface Module 55 kW (60 hp)	**6SL3163-1AH00-0AA0**
• For Active Interface Module 80 kW (100 hp) and 120 kW (150 hp)	**6SL3163-1AM00-0AA0**
DRIVE-CLiQ cable, pre-assembled	
Degree of protection of connector IP20/IP20	
• For Active Interface Module 16 kW (18 hp), 0.31 m (1.02 ft) in length	**6SL3060-4AK00-0AA0**
• For Active Interface Module 36 kW (40 hp), 0.41 m (1.35 ft) in length	**6SL3060-4AP00-0AA0**
• For Active Interface Module 55 kW (60 hp), 0.6 m (1.97 ft) in length	**6SL3060-4AU00-0AA0**
• For Active Interface Module 80 kW (100 hp) and 120 kW (150 hp), 0.95 m (3.12 ft) in length	**6SL3060-4AA10-0AA0**
Accessories for re-ordering	
Terminal Kit (plug-in terminals, DRIVE-CLiQ jumper)	
• For Active Interface Module 16 kW (18 hp)	**6SL3160-8CD10-0AA0**
• For Active Interface Module 36 kW (40 hp)	**6SL3160-8DF10-0AA0**
• For Active Interface Module 55 kW (60 hp)	**6SL3160-8EH10-0AA0**
• For Active Interface Modules 80 kW (100 hp) and 120 kW (150 hp)	**6SL3160-8FM10-0AA0**
Warning labels in 36 languages This label set can be glued over the standard German or English labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, CN, ID, IL, IR, JP, KR, SA, TH, TW	**6SL3166-3AB00-0AA0**

[1] For Active Interface Module 16 kW, included in scope of supply.

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Integration



1) Digital input (DI) or digital output (DO), controlled by the Control Unit.
For Active Interface Modules 16 kW and 36 kW: The fan can be deactivated. The fan may only be switched off as long as the mains is disconnected via a main switch or a line contactor.
For Active Interface Modules 55 kW, 80 kW and 120 kW: The fan cannot be deactivated.

Connection example for Active Interface Module

7
1

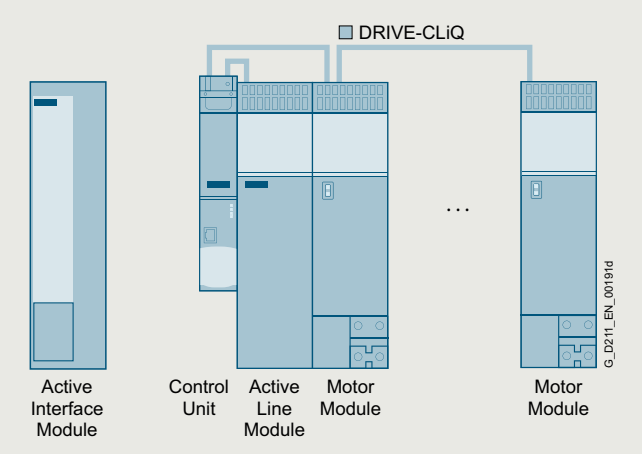
The Active Interface Module requires a 24 V DC supply for operation of the integral fan.

The thermostatic switch installed in the Active Interface Module is evaluated over the connected Active Line Module.

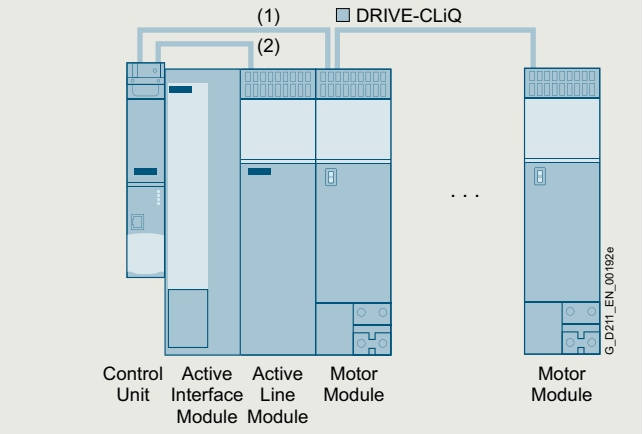
The power cables between the Active Interface Module and Active Line Module must be shielded if limit values for interference suppression are to be complied with. The cable shield can be routed over the shield connection plate (option) to the Active Interface Module or Active Line Module.

Depending on the position of the Active Interface Module in the drive system, additional DRIVE-CLiQ cables may be required. If it is separately installed next to the left side of the Control Unit and Active Line Module, no additional DRIVE-CLiQ cables are required. If the Active Interface Module is placed between the Control Unit and Active Line Module, the DRIVE-CLiQ cables supplied with the Active Line Modules are suitable for setting up a line topology, i.e. Active Line Module and all Motor Modules in series on one DRIVE-CLiQ line. If the Active Line Module is connected over a separate DRIVE-CLiQ line, the DRIVE-CLiQ cable marked with (1) must be ordered. A DRIVE-CLiQ cable suitable for connection (2) is included in the scope of supply of the Active Line Module.

For DRIVE-CLiQ cables for different configurations, see section MOTION-CONNECT connection systems.



Separate Active Interface Module



(1) DRIVE-CLiQ cable between Control Unit and Motor Module
Active Interface Module 16 kW: 0.31 m
Active Interface Module 36 kW: 0.41 m
Active Interface Module 55 kW: 0.60 m
Active Interface Module 80 kW and 120 kW: 0.95 m
(2) Included in scope of supply of Active Line Modules

Active Interface Module integrated in the drive line-up

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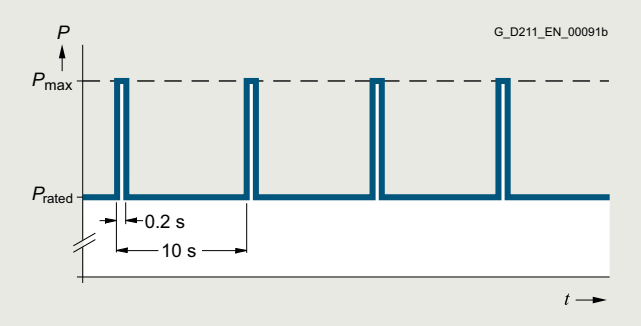
Technical specifications

Line voltage 380 ... 480 V 3 AC		**Active Interface Module**				
Internal air cooling		6SL3100-0BE21-6AB0	6SL3100-0BE23-6AB0	6SL3100-0BE25-5AB0	6SL3100-0BE28-0AB0	6SL3100-0BE31-2AB0
Rated current	A	26	58	88	128	192
Current requirement 24 V DC electronics power supply, max.	A	0.25	0.49	0.6	1.2	1.2
Internal resistance Digital input "Fan off" (X21/Pin 4)	Ω	1440 ±10 %	1440 ±10 %	1440 ±10 %	1440 ±10 %	1440 ±10 %
Power loss	kW	0.27	0.34	0.38	0.49	0.585
Cooling air requirement	m^3/s (ft^3/s)	0.03 (1.1)	0.04 (1.4)	0.083 (2.9)	0.167 (5.9)	0.167 (5.9)
Sound pressure level L_{pA} (1 m)	dB	57	60	66	68	68
Line supply/load connection L1, L2, L3/U2, V2, W2		Connector	Screw terminals	Screw terminals	M8 screw studs	M8 screw studs
• Conductor cross-section	mm^2	16	50	50	2.5 … 120 or 2 × 50	2.5 … 120 or 2 × 50
Thermostatic switch (NC contact)						
• Switching capacity		250 V AC/1.6 A 60 V DC/0.75 A	250 V AC/1.6 A 60 V DC/0.75 A	250 V AC/1.6 A 60 V DC/0.75 A	250 V AC/1.6 A 60 V DC/0.75 A	250 V AC/1.6 A 60 V DC/0.75 A
PE connection		M5 screw	M6 screw	M6 screw	M8 screw	M8 screw
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	100 (3.94)	150 (5.91)	200 (7.87)	300 (11.81)	300 (11.81)
• Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
• Depth	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
Weight, approx.	kg (lb)	11.6 (25.6)	19 (41.9)	23.2 (51.2)	31.9 (70.3)	36.6 (80.7)
Certificate of suitability		cURus	cURus	cURus	cURus	cURus
Suitable for Active Line Module in booksize format	Type	6SL3130-7TE21-6AA4	6SL3130-7TE23-6AA3	6SL3130-7TE25-5AA3	6SL3130-7TE28-0AA3	6SL3130-7TE31-2AA3
• Rated power of the Active Line Module	kW (hp)	16 (18)	36 (40)	55 (60)	80 (100)	120 (150)

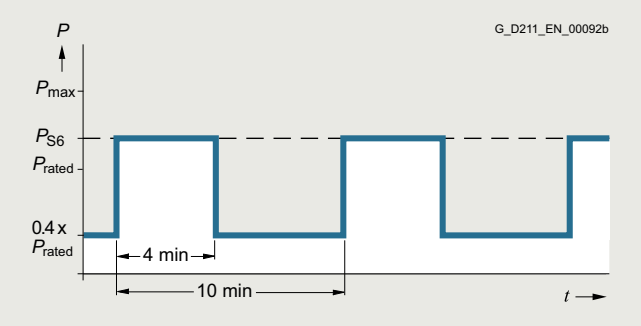
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Characteristic curves

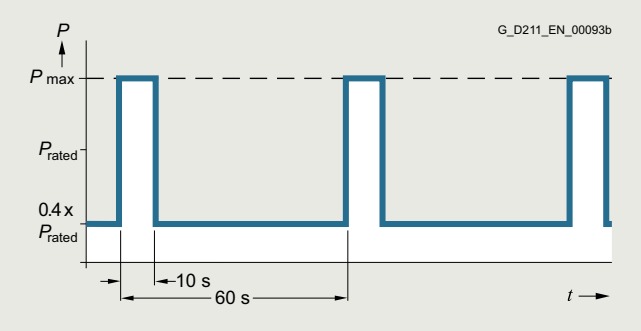
Overload capability



Duty cycle with previous load

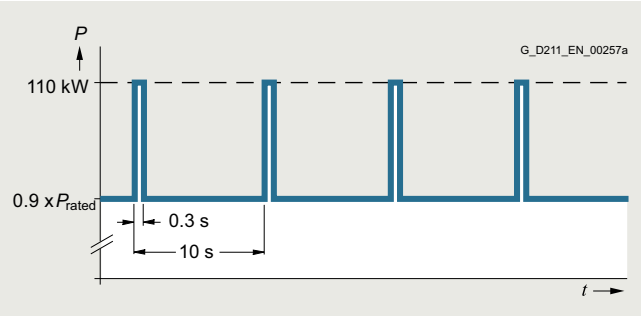


S6 duty cycle with previous load



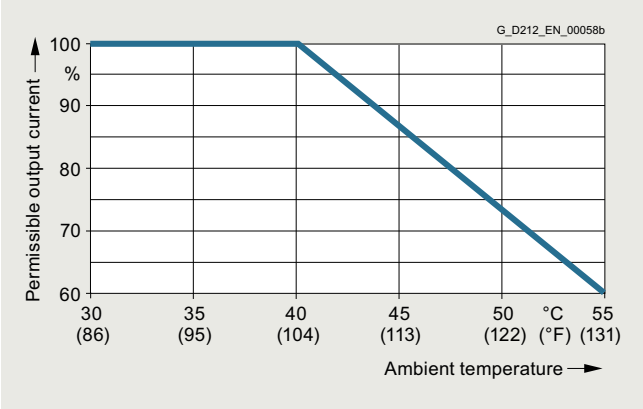
S6 duty cycle with previous load

55 kW Active Line Module only:



Peak power load duty cycle with previous load

Derating characteristics



Output power as a function of ambient temperature

Installation altitude

- >1000 ... 4000 m (3281 ... 13124 ft) above sea level
  - Reduction of the output current by 10 % per 1000 m (3281 ft), or
  - Reduction of the ambient temperature by 5 °C (9 °F) per 1000 m (3281 ft)
- >2000 ... 4000 m (6562 ... 13124 ft) above sea level
  - Operation on line supply systems with grounded neutral point, or
  - Operation with an isolating transformer with secondary grounded neutral point

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Overview

In conjunction with Active Interface Modules and a logically consistent configuration of the plant or system, line filters limit the interference conducted by the power modules to the limit values of Category C2 acc. to EN 61800-3. Line filters are only suitable for direct connection to TN line systems.

Note:

According to product standard EN 61800-3, RFI suppression commensurate with the relevant rated conditions must be provided and is a legal requirement in the EU (EMC Directive). Line filters and line reactors are required for this purpose. The use of line filters of other makes can lead to limit value violations, resonance, overvoltages and irreparable damage to motors or other equipment. The machine manufacturer must provide verification that the machinery to be operated with the drive products and the installed suppression elements, e.g. line filters, are CE-EMC-compliant.

Optional Basic Line Filters that are coordinated with the power ranges in booksize format are available for the SINAMICS S120 drive system.

Basic Line Filter



Basic Line Filter

With the Basic Line Filters in combination with the Active Interface Modules, the limits for the interference voltages can be extended to Category C2 (EN 61800-3) or, retaining Category C3, longer total cable lengths are possible for the configuration.

Basic Line Filters are used on machines on which conducted interference emissions in the frequency range between 150 kHz and 30 MHz need to be damped in accordance with the requirements of CE-EMC legislation.

Selection and ordering data

Rated power of the Active Line Module kW (hp)	Suitable for Active Line Module in booksize format	**Basic Line Filter** Article No.
16 (18)	6SL3130-7TE21-6AA4	**6SL3000-0BE21-6DA0**
36 (40)	6SL3130-7TE23-6AA3	**6SL3000-0BE23-6DA1**
55 (60)	6SL3130-7TE25-5AA3	**6SL3000-0BE25-5DA0**
80 (100)	6SL3130-7TE28-0AA3	**6SL3000-0BE28-0DA0**
120 (150)	6SL3130-7TE31-2AA3	**6SL3000-0BE31-2DA0**

Technical specifications

Line voltage 380 ... 480 V 3 AC		**Basic Line Filter**				
		6SL3000-0BE21-6DA0	6SL3000-0BE23-6DA1	6SL3000-0BE25-5DA0	6SL3000-0BE28-0DA0	6SL3000-0BE31-2DA0
Rated current	A	36	74	105	132	192
Power loss	kW	0.016	0.02	0.043	0.056	0.073
Line supply/load connection L1, L2, L3 / U, V, W		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	10	35	50	95	95
PE connection		M6 screw studs according to DIN 46234	M6 screw studs according to DIN 46234	M8 screw studs according to DIN 46234	M10 screw studs according to DIN 46234	M10 screw studs according to DIN 46234
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	50 (1.97)	75 (2.95)	100 (3.94)	150 (5.91)	150 (5.91)
• Height	mm (in)	429 (16.89)	433 (17.05)	466 (18.35)	479 (18.86)	479 (18.86)
• Depth	mm (in)	226 (8.90)	226 (8.90)	226 (8.90)	226 (8.90)	226 (8.90)
Weight, approx.	kg (lb)	5 (11.0)	7.5 (16.5)	11.5 (25.4)	17.5 (38.6)	18.5 (40.8)
Certificate of suitability		cURus	cURus	cURus	cURus	cURus
Suitable for Active Line Module in booksize format	Type	6SL3130-7TE21-6AA4	6SL3130-7TE23-6AA3	6SL3130-7TE25-5AA3	6SL3130-7TE28-0AA3	6SL3130-7TE31-2AA3
• Rated power of the Active Line Module	kW (hp)	16 (18)	36 (40)	55 (60)	80 (100)	120 (150)

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Recommended line-side components for Active Line Modules

Selection and ordering data

Suitable line-side power components are assigned depending on the power rating of the Active Line Modules.

The tables below list recommended components.

Additional information about the line-side power components can be found in Catalogs LV 10 and IC 10 as well as SiePortal.

Assignment of line-side power components to Active Line Modules in booksize format

Rated power	Suitable for Active Line Module in booksize format	**LV HRC fuse** (gL/gG)			**UL/CSA fuse, Class J** [1] Available from: Mersen www.ep.mersen.com		
kW (hp)	6SL3130-...	Rated current	Size	Article No.	Rated current	Size mm (in)	Reference No.
16 (18)	7TE21-6AA4	35 A	000	**3NA3814**	35 A	27 × 60 (1.06 x 2.36)	AJT35
36 (40)	7TE23-6AA3	80 A	000	**3NA3824**	80 A	29 × 117 (1.14 x 4.61)	AJT80
55 (60)	7TE25-5AA3	125 A	1	**3NA3132**	125 A	41 × 146 (1.61 x 5.75)	AJT125
80 (100)	7TE28-0AA3	160 A	1	**3NA3136**	175 A	41 × 146 (1.61 x 5.75)	AJT175
120 (150)	7TE31-2AA3	250 A	1	**3NA3144**	250 A	54 × 181 (2.13 x 7.13)	AJT250

Recommendations on further overcurrent protection devices are available at:
https://support.industry.siemens.com/cs/document/109749282

[1] Not suitable for 3NP and 3KL switch disconnectors.

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Overview



Smart Line Module in booksize compact format

Smart Line Modules are stall-protected, line-commutated infeed/regenerative feedback units (diode bridge for incoming supply; stall-protected, line-commutated regenerative feedback via IGBTs) with 100 % continuous regenerative feedback power. The regenerative capability of the modules can be deactivated by means of parameterization. Smart Line Modules are designed for connection to grounded TN/TT systems and non-grounded IT systems.

The DC link is pre-charged via integrated precharging resistors.

The associated line reactor is required for operating a Smart Line Module.

Design

The Smart Line Modules in booksize compact format feature the following connections and interfaces as standard:

- 1 power connection via screw-type terminals
- 1 connection for the 24 V DC electronics power supply via the 24 V terminal adapter included in the scope of supply
- 1 DC link connection via integrated DC link busbars
- 2 PE (protective earth) connections
- 3 DRIVE-CLiQ sockets

The status of the Smart Line Modules is indicated via two multi-color LEDs.

The signal cable shield can be connected to the Line Module by means of a shield connection clamp, e.g. Weidmüller type KLBÜ 3-8 SC.

The scope of supply of the Smart Line Modules includes:

- DRIVE-CLiQ cable for connection to the adjacent Control Unit on the left for drive control, length 0.11 m (4.33 in)
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- DRIVE-CLiQ cable for connecting to the adjacent Motor Module, length 0.21 m (8.3 in)
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- 24 V terminal adapter (X24)
- Connector X21 for digital inputs/outputs
- 1 set of warning signs in 36 languages
- 1 heat conducting foil

Selection and ordering data

Rated power kW (hp)	**Smart Line Module in booksize compact format** Article No.
Line voltage 380 ... 480 V 3 AC	
16 (18)	**6SL3430-6TE21-6AA1**

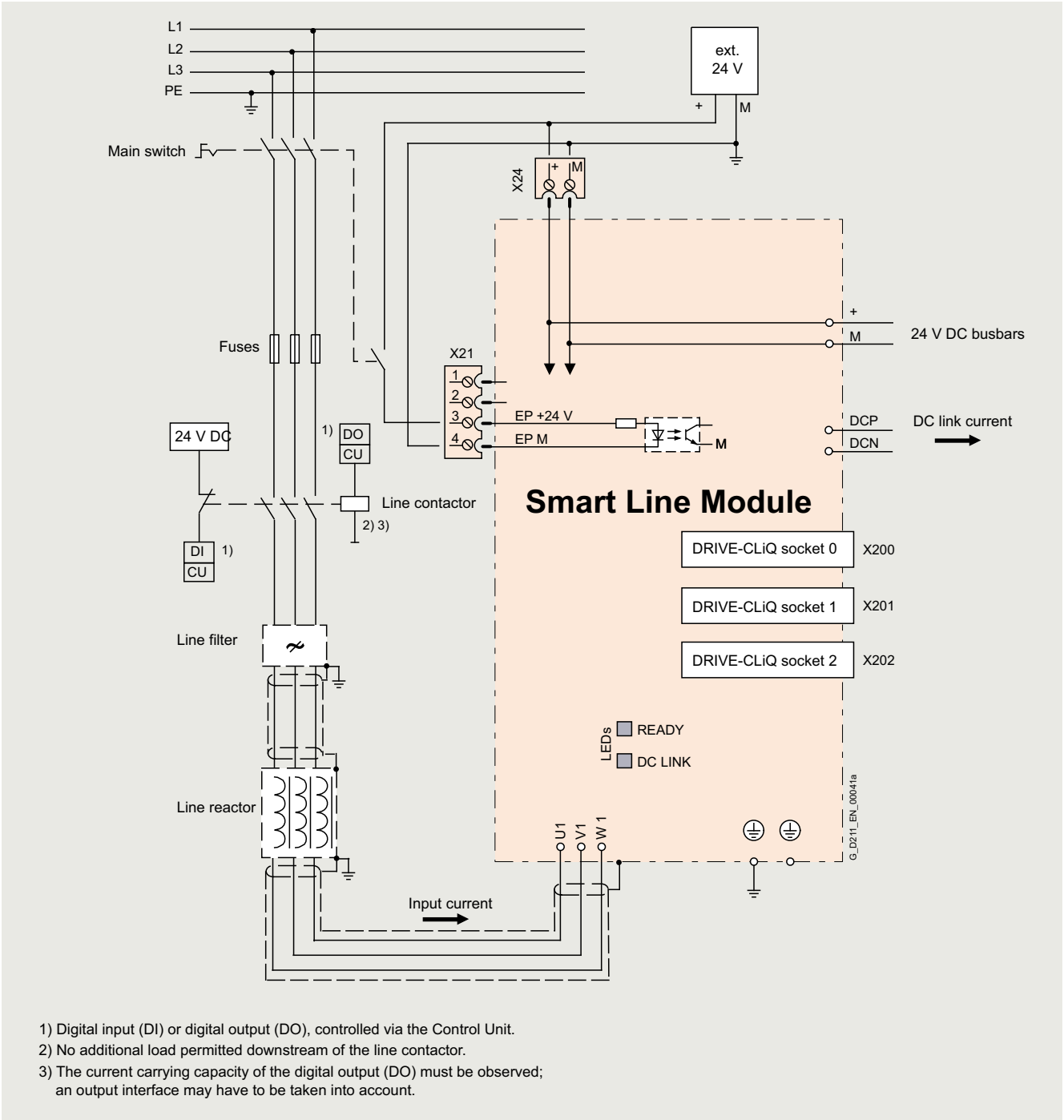
Description	Article No.
Accessories	
DC link rectifier adapter For direct infeed of DC link voltage Screw-type terminals 0.5 ... 10 mm^2 For Line Modules and Motor Modules in booksize format with a width of 50 mm (1.97 in), 75 mm (2.95 in) and 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 120 mm^2 For all Line Modules and Motor Modules in booksize format	**6SL3162-2BM01-0AA0**
Accessories for re-ordering	
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
24 V jumper For connection of the 24 V busbars (for booksize format)	**6SL3162-2AA01-0AA0**
Warning labels in 36 languages This label set can be glued over the standard German or English labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, CN, ID, IL, IR, JP, KR, SA, TH, TW	**6SL3166-3AB00-0AA0**
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

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Integration

The Smart Line Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit



1) Digital input (DI) or digital output (DO), controlled via the Control Unit.
2) No additional load permitted downstream of the line contactor.
3) The current carrying capacity of the digital output (DO) must be observed; an output interface may have to be taken into account.

Connection example of Smart Line Module in booksize compact format

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Technical specifications

	Smart Line Module in booksize compact format
	6SL3430-6TE21-6AA1
Line voltage (up to 2000 m (6562 ft) above sea level)	380 ... 480 V 3 AC ±10 % (in operation -15 % <1 min)
Line frequency	47 ... 63 Hz
SCCR (short-circuit current rating)	100 kA in conjunction with the recommended Class J fuse, or circuit breaker according to UL489 / CSA 22.2 No. 5-02 see recommended line-side components
Line power factor at rated power	
• Fundamental (cos φ_1)	>0.96
• Total (λ)	0.65 ... 0.9
Overvoltage category according to EN 60664-1	Class III
DC link voltage, approx.	1.35 × line voltage [1]
Electronics power supply	24 V DC, -15 %/+20 %
Radio interference suppression	
• Standard	No radio interference suppression
• With line filter	Category C2 to EN 61800-3 Total cable length up to 350 m (1148 ft) (shielded)
Type of cooling	Internal air cooling (power units with increased air cooling by built-in fan)
Permissible ambient and coolant temperature (air) during operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 ... 55 °C (104 ... 131 °F), see derating characteristics
Installation altitude	Up to 1000 m (3281 ft) a bove sea level without derating, > 1000 ... 4000 m (3281 ... 13124 ft) above sea level, see derating characteristics
Declarations of conformity	CE (Low Voltage and EMC Directives)
Certificate of suitability	UL recognized

Line voltage 380 ... 480 V 3 AC	**Smart Line Module in booksize compact format**
Internal air cooling	6SL3430-6TE21-6AA1
Infeed/regenerative feedback power	
• Rated power P_{rated}	**16 kW**
- at 380 V 3 AC	**16 kW**
- at 460 V 3 AC [2]	(18 hp)
• For S6 duty (40 %) P_{S6}	21 kW
• P_{max}	35 kW
DC link current	
• At 600 V DC	27 A
• For S6 duty (40 %)	35 A
• Maximum	59 A
Input current	
• Rated current at 380 V 3 AC	29 A
• For S6 duty (40 %)	35 A
• Maximum	57.5 A
Current requirement 24 V DC electronics power supply, max.	1.1 A
Current carrying capacity	
• 24 V DC busbars	20 A
• DC link busbars	100 A
DC link capacitance	
• Smart Line Module	705 µF
• Drive line-up, max.	6000 µF
Power loss [2]	0.19 kW
Cooling air requirement	0.016 m^3/s (0.57 ft^3/s)
Sound pressure level L_{pA} (1 m)	<60 dB
Line connection U1, V1, W1	Screw-type terminals (X1)
• Conductor cross-section, max.	2.5 ... 10 mm^2
Shield connection	Cable shield connection plate integrated into the connector
PE connection	M5 screw
Cable length, max. (total of all motor cables and DC link)	
• Shielded	630 m (2067 ft)
• Unshielded	850 m (2788 ft)
Degree of protection	IP20
Dimensions	
• Width	100 mm (3.94 in)
• Height	270 mm (10.6 in)
• Depth	226 mm (8.90 in)
Weight, approx.	5.3 kg (12 lb)

[1] The DC link voltage is regulated to the mean value of the rectified line voltage. For further information, see section Configuration notes.

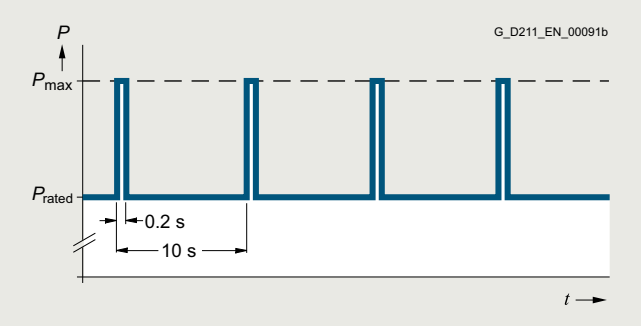
[2] Power loss of Smart Line Module at rated output including losses of 24 V DC electronics power supply.

[3] Nominal hp ratings are provided for ease of assigning components only. The Line Module outputs are dependent on the Motor Module loading and are to be dimensioned accordingly.

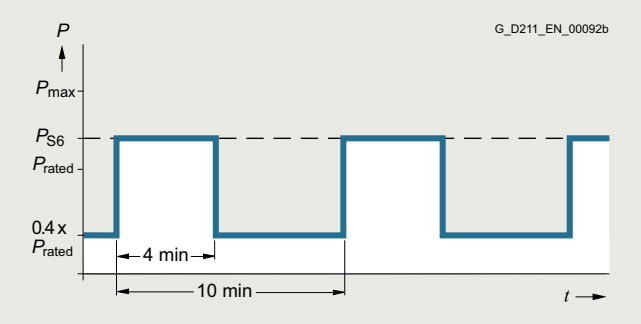
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Characteristic curves

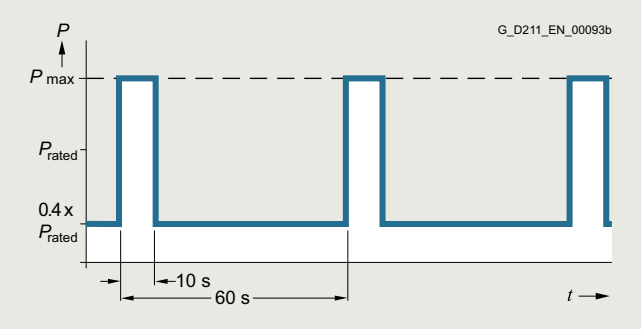
Overload capability



Duty cycle with previous load

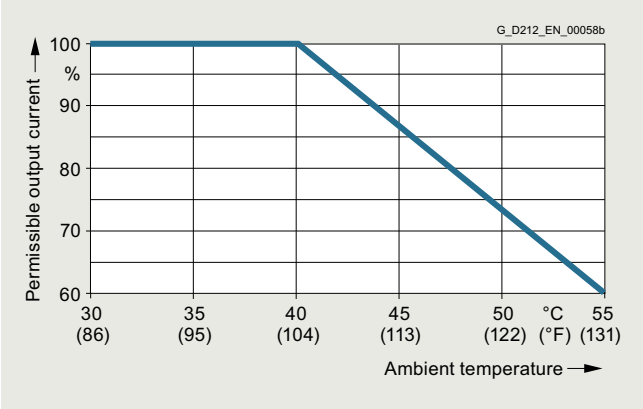


S6 duty cycle with previous load



S6 duty cycle with previous load

Derating characteristics



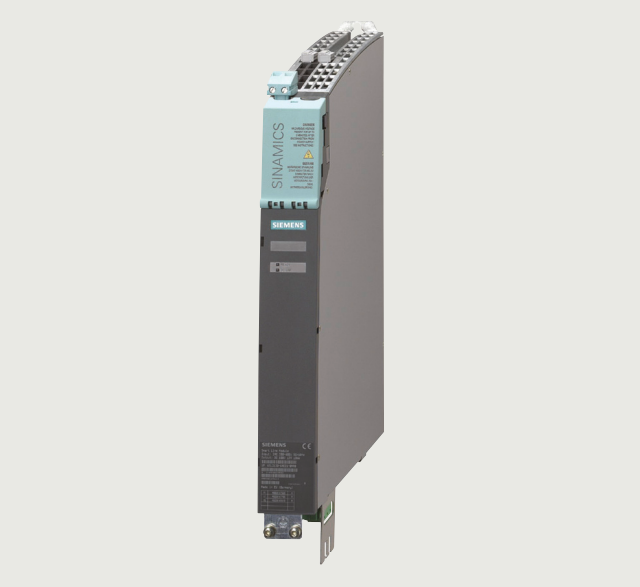
Output power as a function of ambient temperature

Installation altitude

- >1000 ... 4000 m (3281 ... 13124 ft) above sea level
  - Reduction of the output current by 10 % per 1000 m (3281 ft), or
  - Reduction of the ambient temperature by 5 °C (9 °F) per 1000 m (3281 ft)
- >2000 ... 4000 m (6562 ... 13124 ft) above sea level
  - Operation on line supply systems with grounded neutral point, or
  - Operation with an isolating transformer with secondary grounded neutral point

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Overview



Smart Line Modules are stall-protected, line-commutated infeed/regenerative feedback units (diode bridge for incoming supply; stall-protected, line-commutated regenerative feedback via IGBTs) with 100 % continuous regenerative feedback power. The regenerative feedback capability of the modules can be deactivated by means of a digital input (Smart Line Modules 5 kW and 10 kW) or by means of parameterization (Smart Line Modules 16 kW to 55 kW). Smart Line Modules are designed for connection to grounded TN/TT systems and non-grounded IT systems.

The DC link is pre-charged via integrated precharging resistors.

The associated line reactor is required for operating a Smart Line Module.

Design

The Smart Line Modules in booksize format feature the following connections and interfaces as standard:

- 1 power connection via screw-type terminals
- 1 connection for the 24 V DC electronics power supply via the 24 V terminal adapter included in the scope of supply
- 1 DC link connection via integrated DC link busbars
- 2 PE (protective earth) connections
- 2 digital inputs
  (only for Smart Line Modules 5 kW and 10 kW)
- 1 digital output
  (only for Smart Line Modules 5 kW and 10 kW)
- 3 DRIVE-CLiQ sockets
  (only for Smart Line Modules 16 kW to 55 kW)
- 1 temperature sensor input for KTY84-130, Pt1000 or PTC
  (only for Smart Line Modules 16 kW to 55 kW, Pt1000 can be used from firmware V4.7 HF17)

The status of the Smart Line Modules is indicated via two multi-color LEDs.

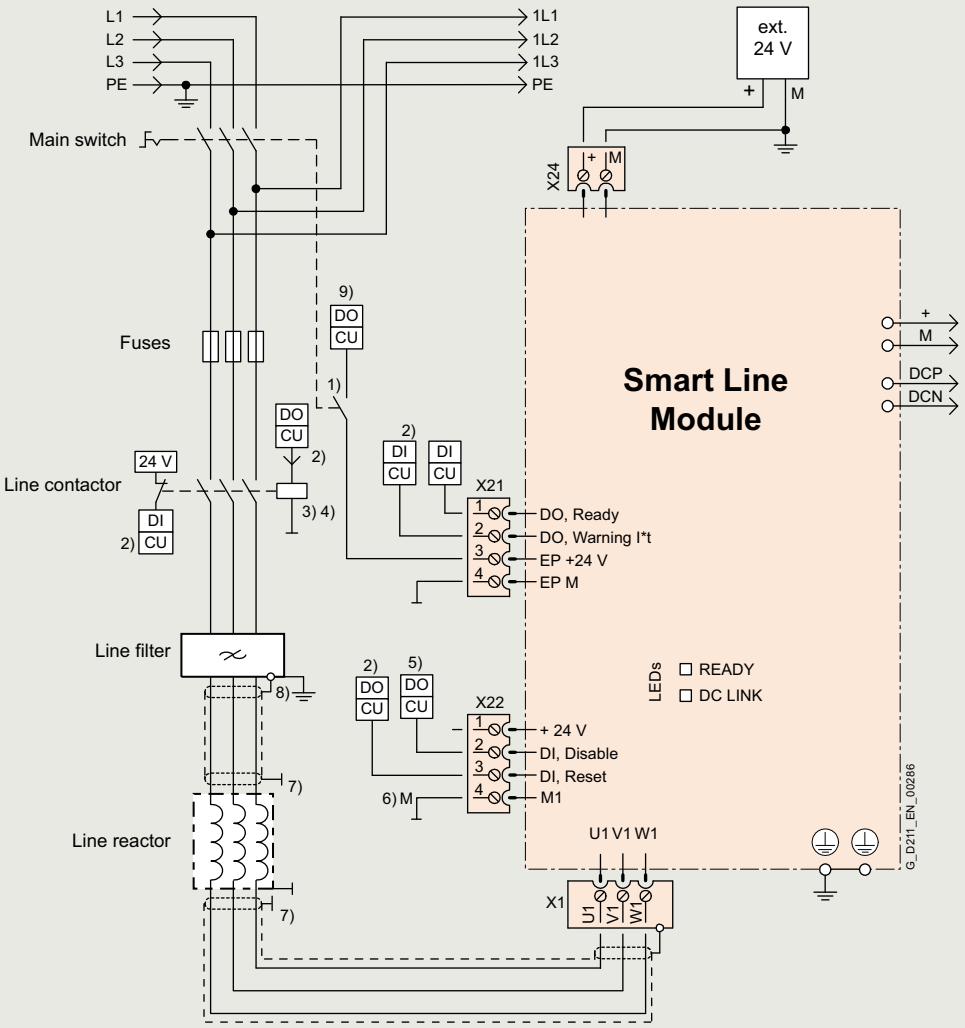
The signal cable shield can be connected to the Line Module by means of a shield connection terminal, e.g. Weidmüller type KLBÜ 3-8 SC.

The scope of supply of the Smart Line Modules includes:

- DRIVE-CLiQ cable for connecting the module to the adjacent Control Unit on the left with the drive control, length 0.11 m (4.33 in)
  (only for Smart Line Modules 16 kW to 55 kW)
- 2 blanking plugs for closing unused DRIVE-CLiQ sockets
  (only for Smart Line Modules 16 kW to 55 kW)
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- 24 V terminal adapter (X24)
- Connector X21 for digital inputs and outputs
- Connector X22 for digital inputs and outputs
  (only for Smart Line Modules 5 kW and 10 kW)
- Connector X1 for line connection
  (only for Smart Line Modules 5 kW and 10 kW)
- 1 set of warning labels in 36 languages

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Integration



1) Leading NC contact t >10 ms, 24 V DC and ground must be connected for operation.
2) DI/DO, controlled by the Control Unit.
3) No additional load permitted downstream of the line contactor.
4) The current carrying capacity of the digital output (DO) must be taken into account; an output interface element may have to be used.
5) Digital output (DO) = High means: feedback deactivated (a jumper can be inserted between X22 pins 1 and 2 for permanent deactivation).
6) X22 pin 4 must be connected to ground (ext. 24 V).
7) Contacting via mounting back panel or shield panels according to EMC Installation Guidelines.
8) 5 kW and 10 kW line filters via shield connection
9) Signal output to prevent backlash of the DC 24 V supply on the EP terminal.

Connection example of 5 kW and 10 kW Smart Line Modules in booksize format

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Selection and ordering data

Rated power	Smart Line Module in booksize format	SINAMICS S220 Smart Line Module in booksize format	
kW (hp)	Article No.	C/D type	Article No.
Line voltage 380 ... 480 V 3 AC			
5 (5)	**6SL3130-6AE15-0AB1**		
10 (10)	**6SL3130-6AE21-0AB1**		
16 (18)	–	C type	**6SL5130-6UE21-6AC1**
		D type	**6SL5130-6UE21-6AD1**
24 (27)	–	C type	**6SL5130-6UE22-4AC1**
	–	D type	**6SL5130-6UE22-4AD1**
36 (40)	–	C type	**6SL5130-6UE23-6AC1**
	–	D type	**6SL5130-6UE23-6AD1**
55 (60)	–	C type	**6SL5130-6UE25-5AC1**
	–	D type	**6SL5130-6UE25-5AD1**

Further information (technical data, accessories, etc.) about SINAMICS S220 Smart Line Modules in booksize format can be found in the section SINAMICS S220 built-in units in booksize format.

Description	Article No.
Accessories	
DC link rectifier adapter For direct infeed of DC link voltage • Screw-type terminals 0.5 ... 10 mm^2 For Line Modules and Motor Modules in booksize format with a width of 50 mm (1.97 in), 75 mm (2.95 in) and 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
• Screw-type terminals 35 ... 120 mm^2 For Line Modules and Motor Modules in booksize format with a width of 150 mm (5.91 in), 200 mm (7.87 in) and 300 mm (11.81 in)	**6SL3162-2BM00-0AA0**
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 120 mm^2 For all Line Modules and Motor Modules in booksize format	**6SL3162-2BM01-0AA0**
DRIVE-CLiQ cable, pre-assembled For Smart Line Modules 5 kW (5 hp) and 10 kW (10 hp) Degree of protection of connector IP20/IP20, 0.16 m (0.53 ft) in length	
• For connection to SINAMICS S120 Control Unit CU320-2	**6SL3060-4AD00-0AA0**
• For connection to SINAMICS S220 Control Unit CU320-3	**6SL5060-4AD00-0AA0**
Accessories for re-ordering	
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
24 V jumper For connection of the 24 V busbars (for booksize format)	**6SL3162-2AA01-0AA0**
Terminal Kit (Plug-in terminals, dust protection blanking plugs) For DRIVE-CLiQ port For Smart Line Modules with a width of	
• 50 mm (1.97 in)	**6SL3163-8KB00-0AA1**
Warning labels in 36 languages This label set can be glued over the standard German or English labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, CN, ID, IL, IR, JP, KR, SA, TH, TW	**6SL3166-3AB00-0AA0**
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

Technical specifications

	Smart Line Module in booksize format 6SL313...
Line voltage (up to 2000 m (6562 ft) above sea level)	380 ... 480 V 3 AC ±10 % (in operation -15 % <1 min)
Line frequency	47 ... 63 Hz
SCCR (short-circuit current rating)	100 kA in conjunction with the recommended Class J fuse, or circuit breaker according to UL489 / CSA 22.2 No. 5-02 see recommended line-side components
Line power factor at rated power	
• Fundamental power factor (cos φ_1)	>0.96
• Total (λ)	0.65 ... 0.9
Overvoltage category according to EN 60664-1	Class III
DC link voltage, approx.	1.35 x line voltage[1)]
Electronics power supply	24 V DC -15 %/+20 %
Radio interference suppression	
• Standard	No radio interference suppression
• With line filter	Category C2 to EN 61800-3 Total cable length up to 350 m (1148 ft) (shielded)
Type of cooling	Internal air cooling (power units with increased air cooling by built-in fan)
Permissible ambient and coolant temperature (air) during operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 ... 55 °C (104 ... 131 °F), see derating characteristics
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, > 1000 ... 4000 m (3281 ... 13124 ft) above sea level, see derating characteristics
Declarations of conformity	CE (Low Voltage and EMC Directives)
Certificate of suitability	cULus

[1)] The DC link voltage is maintained at the mean value of the rectified line voltage.For further information, see section Configuration notes.

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Technical specifications

Line voltage 380 ... 480 V 3 AC		Smart Line Module in booksize format	
Internal air cooling		6SL3130-6AE15-0AB1	6SL3130-6AE21-0AB1
Infeed/regenerative feedback power			
• Rated power P_{rated}			
- At 380 V 3 AC	kW	**5**	**10**
- At 460 V 3 AC [2]	(hp)	(5)	(10)
• For S6 duty (40 %) P_{S6}	kW	6.5	13
• P_{max}	kW	10	20
DC link current			
• At 540/600 V DC	A	9.3/8.3	18.5/16.6
• For S6 duty (40 %)	A	11	22
• Maximum	A	16.6	33.2
Input current			
• Rated current at 380/400/480 V 3 AC	A	8.6/8.1/6.7	17/16.2/12.8
• For S6 duty (40 %) at 400 V	A	10.6	21.1
• At 400 V max.	A	15.7	31.2
Current requirement 24 V DC electronics power supply, max.	A	0.8	0.9
Current carrying capacity			
• 24 V DC busbars	A	20	20
• DC link busbars	A	100	100
DC link capacitance			
• Smart Line Module	µF	220	330
• Drive line-up, max.	µF	6000	6000
Power loss [1]	kW	0.08	0.14
Cooling air requirement	m^3/s (ft^3/s)	0.008 (0.3)	0.008 (0.3)
Sound pressure level L_{pA} (1 m)mxu	dB	<60	<60
Line connection U1, V1, W1		Screw-type terminals (X1)	Screw-type terminals (X1)
• Conductor cross-section	mm^2	2.5 ... 6	2.5 ... 6
Shield connection		Shield connection plate integrated into the connector	Shield connection plate integrated into t he connector
PE connection		M5 screw	M5 screw
Cable length, max. (total of all motor power cables and DC link)			
• Shielded	m (ft)	350 (1148)	350 (1148)
• Unshielded	m (ft)	560 (1837)	560 (1837)
Degree of protection		IP20	IP20
Dimensions			
• Width	mm (in)	50 (1.97)	50 (1.97)
• Height	mm (in)	380 (14.96)	380 (14.96)
• Depth	mm (in)	270 (10.63)	270 (10.63)
Weight, approx.	kg (lb)	4.7 (10.4)	4.8 (10.6)

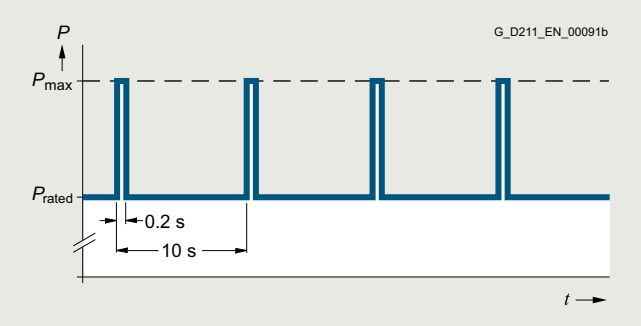
[1] Power loss of Smart Line Module at rated output including losses of 24 V DC electronics power supply.

[2] Nominal hp ratings are provided for ease of assigning components only. The Line Module outputs are dependent on the Motor Module loading and are to be dimensioned accordingly.

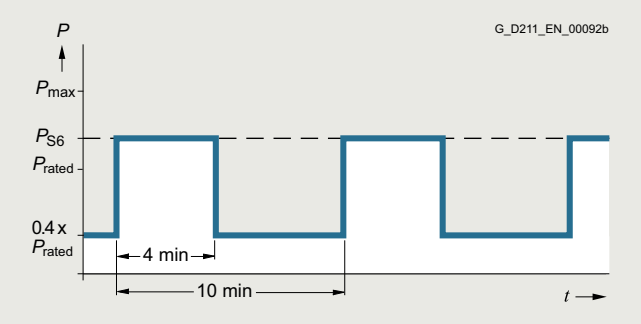
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Characteristic curves

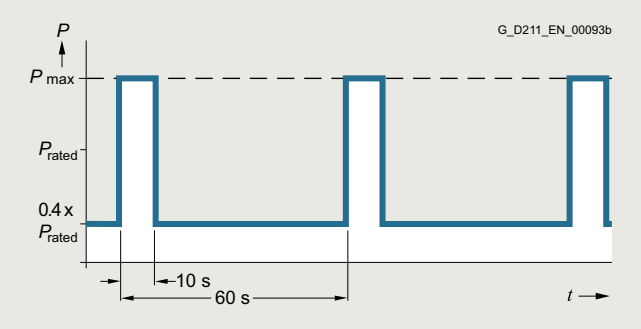
Overload capability



Duty cycle with previous load

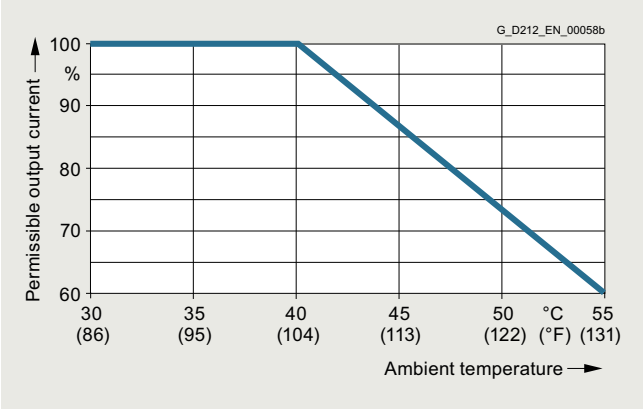


S6 duty cycle with previous load



S6 duty cycle with previous load

Derating characteristics



Output power as a function of ambient temperature

Installation altitude

- >1000 ... 4000 m (3281 ... 13124 ft) above sea level
  - Reduction of the output current by 10 % per 1000 m (3281 ft), or
  - Reduction of the ambient temperature by 5 °C (9 °F) per 1000 m (3281 ft)
- >2000 ... 4000 m (6562 ... 13124 ft) above sea level
  - Operation on line supply systems with grounded neutral point, or

Operation with an isolating transformer with secondary grounded neutral point

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Line reactors for Smart Line Modules

Overview



Example: Line reactor for Smart Line Modules 5 kW to 10 kW

Line reactors are required in order for the Smart Line Modules to function. The use of other makes of line reactor can lead to malfunctions or irreparable damage to equipment.

Selection and ordering data

Rated power of the Smart Line Module kW (hp)	Suitable for Smart Line Module in booksize or booksize compact format	**Line reactor** Article No.
Line voltage 380 ... 480 V 3 AC		
5 (5)	6SL3130-6AE15-0AB1	**6SL3000-0CE15-0AA0**
10 (10)	6SL3130-6AE21-0AB1	**6SL3000-0CE21-0AA0**

Technical specifications

Line voltage 380 ... 480 V 3 AC		**Line reactor**	
		6SL3000-0CE15-0AA0	6SL3000-0CE21-0AA0
Power loss	kW	0.062	0.116
Line/load connection 1U1, 1V1, 1W1 / 1U2, 1V2, 1W2		Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	4	10
PE connection		M4 screw	M4 screw
Degree of protection		IP20	IP20
Dimensions			
• Width	mm (in)	150 (5.91)	177 (6.97)
• Height	mm (in)	175 (6.89)	196 (7.72)
• Depth	mm (in)	66.5 (2.62)	86 (3.39)
Weight, approx.	kg (lb)	3.7 (8.16)	7.5 (16.5)
Certificate of suitability		cURus	cURus
Suitable for Smart Line Module in booksize or booksize compact format	Type	6SL3130-6AE15-0AB1	6SL3130-6AE21-0AB1
• Rated power of the Smart Line Module	kW (hp)	5 (5)	10 (10)

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Overview



In plants with stringent EMC requirements, line filters work together with line reactors to restrict the conducted interference emanating from the Power Modules to the limit values of Class A1 as defined in EN 55011 and Category C2 as defined in EN 61800-3. Line filters are only suitable for direct connection to TN line systems.

Selection and ordering data

Rated power of the Smart Line Module kW (hp)	Suitable for Smart Line Module in booksize or booksize compact format	**Line filter** Article No.
Line voltage 380 ... 480 V 3 AC		
5 (5)	6SL3130-6AE15-0AB1	**6SL3000-0HE15-0AA0**
10 (10)	6SL3130-6AE21-0AB1	**6SL3000-0HE21-0AA0**

Technical specifications

Line voltage 380 ... 480 V 3 AC		**Line filter**	
		6SL3000-0HE15-0AA0	6SL3000-0HE21-0AA0
Rated current	A	12	24
Power loss	kW	0.02	0.02
Line/load connection L1, L2, L3 / U, V, W • Conductor cross-section	 mm^2	Screw-type terminals 10	Screw-type terminals 10
PE connection		M6 screw studs according to DIN 46234	M6 screw studs according to DIN 46234
Degree of protection		IP20	IP20
Dimensions • Width • Height • Depth	 mm (in) mm (in) mm (in)	 60 (2.36) 285 (11.22) 122 (4.80)	 60 (2.36) 285 (11.22) 122 (4.80)
Weight, approx.	kg (lb)	2.1 (4.63)	2.3 (5.07)
Certificate of suitability		cURus	cURus
Suitable for Smart Line Module in booksize or booksize compact format • Rated power of the Smart Line Module	Type kW (hp)	6SL3130-6AE15-0AB1 5 (5)	6SL3130-6AE21-0AB1 10 (10)

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Recommended line-side components for Smart Line Modules

Selection and ordering data

Suitable line-side power components are assigned depending on the power rating of the Smart Line Module.

Additional information about the line-side power components can be found in Catalogs LV 10 and IC 10 as well as SiePortal.

The tables below list recommended components.

Assignment of line-side power components to Smart Line Modules in booksize or booksize compact format

Rated power	Suitable for Smart Line Module in booksize or booksize compact format	**LV HRC fuse (gL/gG)**			**UL/CSA fuse, Class J** [1] Available from: Mersen www.ep.mersen.com		
kW (hp)	Type	Rated current	Size	Article No.	Rated current	Size mm (in)	Reference No.
Line voltage 380 ... 480 V 3 AC							
5 (5)	6SL3130-6AE15-0AB1	16 A	000	**3NA3805**	17.5 A	21 × 57 (0.83 x 2.24)	AJT17-1/2
10 (10)	6SL3130-6AE21-0AB1	35 A	000	**3NA3814**	35 A	27 × 60 (1.06 x 2.36)	AJT35

Recommendations on further overcurrent protection devices are available at:
https://support.industry.siemens.com/cs/document/109749282

[1] Not suitable for 3NP and 3KL switch disconnectors.

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Overview



Basic Line Modules in booksize format

Basic Line Modules are used for applications in which no energy is returned to the supply or where the energy exchange between motor and generator axes takes place in the DC link. Basic Line Modules can only feed energy from the supply system into the DC link, energy cannot be fed back into the supply system. The DC link voltage is directly derived from the 3-phase line voltage via a 6-pulse bridge circuit. Basic Line Modules are suitable for connection to grounded, star TN, TT and non-grounded symmetrical IT supply systems. The connected Motor Modules are pre-charged over the integrated pre-charging resistors (20 kW and 40 kW) or through activation of the thyristors (100 kW).

The 20 kW and 40 kW Basic Line Modules are equipped with an integrated brake chopper and can be directly used for applications in generating mode after connecting an external braking resistor.
A Braking Module is only required with a 100 kW Basic Line Module in generating mode.

Design

The Basic Line Modules in booksize format feature the following connections and interfaces as standard:

- 1 power connection
- 1 connection for the 24 V DC electronics power supply
- 1 DC link connection
- 3 DRIVE-CLiQ sockets
- 1 connection for braking resistor
  (20 kW (25 hp) and 40 kW (50 hp) Basic Line Modules only)
- 1 temperature sensor input for KTY84-130, Pt1000 or PTC
  (Pt1000 can be used from firmware V4.7 HF17)

The status of the Basic Line Modules is indicated via two multi-color LEDs.

The scope of supply of the Basic Line Modules includes:

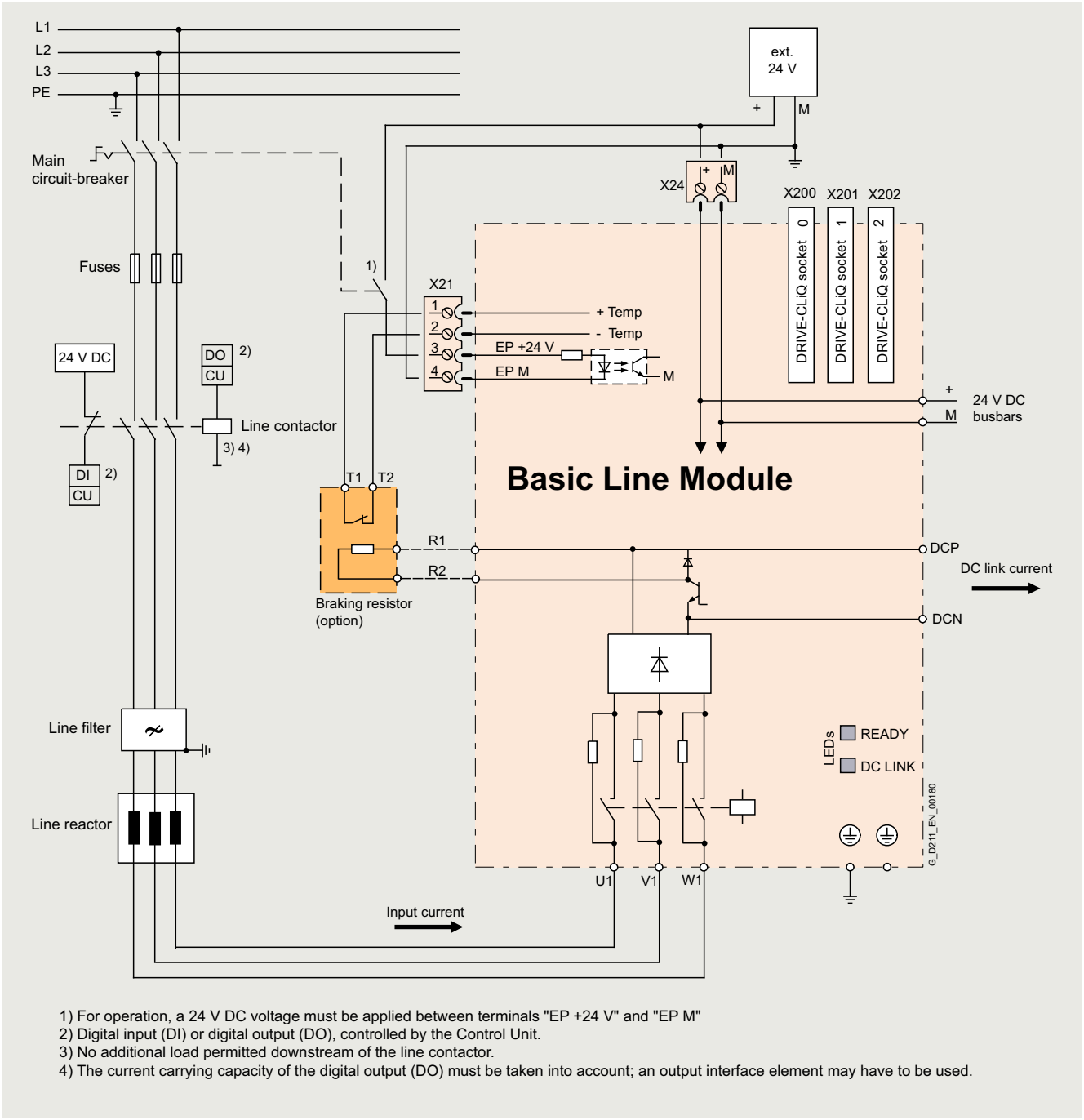
- DRIVE-CLiQ cable for connection to the adjacent Control Unit on the left for drive control, length 0.11 m (4.33 in)
- DRIVE-CLiQ cable (length depends on Basic Line Module width) for connection to the adjacent Motor Module, length = width of Basic Line Module + 0.11 m (4.33 in)
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- 24 V terminal adapter (X24)
- Connector X21
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- 1 set of warning labels in 36 languages

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Integration

The Basic Line Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit
- SINUMERIK 840D sl
- SINUMERIK ONE
- SINUMERIK MC



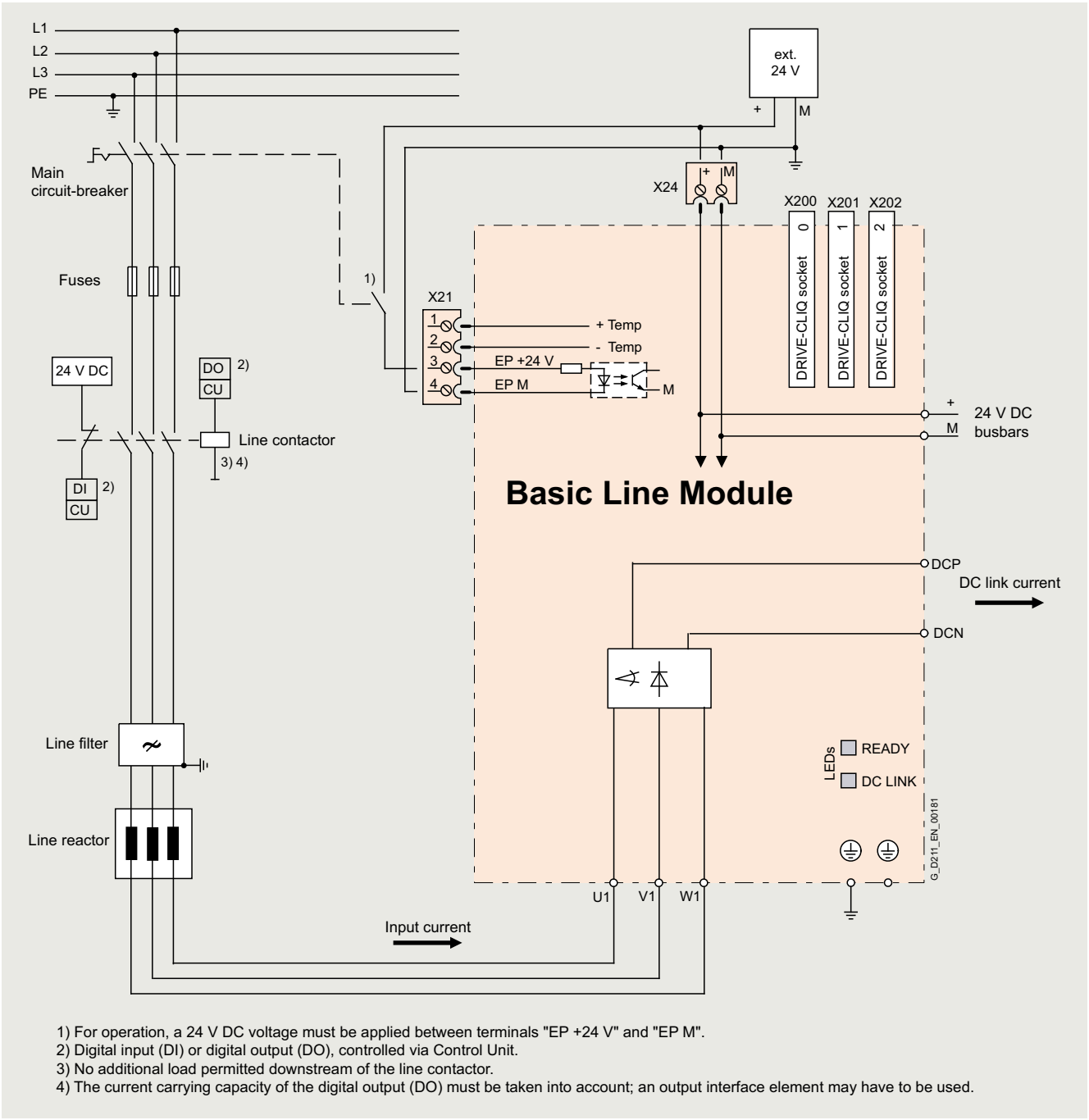
Connection example of 20 kW and 40 kW Basic Line Modules in booksize format

Note:

The thermostatic switch built into the braking resistor must be looped into the shutdown chain of the drive to prevent thermal overloading of the system in the event of a fault. If a braking resistor is not connected, a jumper must be connected between X21.1 and X21.2.

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Integration



1) For operation, a 24 V DC voltage must be applied between terminals "EP +24 V" and "EP M".
2) Digital input (DI) or digital output (DO), controlled via Control Unit.
3) No additional load permitted downstream of the line contactor.
4) The current carrying capacity of the digital output (DO) must be taken into account; an output interface element may have to be used.

Connection example of 100 kW Basic Line Module in booksize format

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Basic Line Modules in booksize format

Selection and ordering data

Rated power	Basic Line Modules in booksize format
kW (hp)	Article No.
Line voltage 380 ... 480 V 3 AC	
20 (25)	**6SL3130-1TE22-0AA0**
40 (50)	**6SL3130-1TE24-0AA0**
100 (125)	**6SL3130-1TE31-0AA0**

Description	Article No.
Accessories	
Shield connection plate For Line Modules and Motor Modules in booksize format	
• With a width of 150 mm (5.91 in)	**6SL3162-1AF00-0AA1**
• With a width of 200 mm (7.87 in)	**6SL3162-1AH01-0AA0**
DC link rectifier adapter For direct infeed of DC link voltage	
• Screw-type terminals 0.5 ... 10 mm^2 For Line Modules and Motor Modules in booksize format with a width of 50 mm, 75 mm and 100 mm (1.97 in, 2.95 in and 3.94 in)	**6SL3162-2BD00-0AA0**
• Screw-type terminals 35 ... 120 mm^2 For Line Modules and Motor Modules in booksize format with a width of 150 mm, 200 mm and 300 mm (5.91 in, 7.87 in and 11.81 in)	**6SL3162-2BM00-0AA0**
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 120 mm^2 For all Line Modules and Motor Modules in booksize format	**6SL3162-2BM01-0AA0**
Accessories for re-ordering	
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
24 V jumper For connection of the 24 V busbars (for booksize format)	**6SL3162-2AA01-0AA0**
Terminal Kit (plug-in terminals, DRIVE-CLiQ jumper (length = module width + 60 mm (2.36 in)), dust protection blanking plugs) For DRIVE-CLiQ port For Basic Line Modules with a width of	
• 100 mm (3.94 in)	**6SL3163-8LD00-0AA0**
• 150 mm (5.91 in)	**6SL3163-8GF00-0AA0**
• 200 mm (7.87 in)	**6SL3163-8HH00-0AA0**
Warning labels in 36 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, CN, ID, IL, IR, JP, KR, SA, TH, TW	**6SL3166-3AB00-0AA0**
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

Technical specifications

	Basic Line Module in booksize format
	6SL313...
Line voltage (up to 2000 m (6562 ft) above sea level)	380 ... 480 V 3 AC ±10 % (-15 % <1 min)
Line frequency	47 ... 63 Hz
SCCR **(short-circuit current rating)**	100 kA in conjunction with the recommended Class J fuse, or circuit breaker according to UL489 / CSA 22.2 No. 5-02 see recommended line-side components
Line power factor at rated power	
• Fundamental (cos φ_1)	>0.96
• Total (λ)	0.75 ... 0.93
Overvoltage category according to EN 60664-1	Class III
DC link voltage, approx.	1.35 × line voltage [1]
Electronics power supply	24 V DC -15 %/+20 %
Radio interference suppression	
• Standard	
- 20 kW and 40 kW Basic Line Modules	No radio interference suppression
- 100 kW Basic Line Module	Category C3 to EN 61800-3 Total cable length up to 350 m (1148 ft) (shielded)
• With line filter	Category C2 to EN 61800-3 Total cable length up to 350 m (1148 ft) (shielded)
Type of cooling	Internal air cooling (power units with increased air cooling by built-in fan)
Permissible ambient and coolant temperature (air) during operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 ... 55 °C (104 ... 131 °F), see derating characteristics
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, > 1000 ... 4000 m (3281 ... 13124 ft) above sea level, see derating characteristics
Declarations of conformity	CE (Low Voltage and EMC Directives)
Certificate of suitability	cULus

[1] The DC link voltage is unregulated and load-dependent.
For further information, see section Configuration notes

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Technical specifications

Line voltage 380 ... 480 V 3 AC		Basic Line Modules in booksize format		
Internal air cooling		6SL3130-1TE22-0AA0	6SL3130-1TE24-0AA0	6SL3130-1TE31-0AA0
Power				
• Rated power P_{rated}				
- At 380 V 3 AC	kW	20	40	100
- At 460 V 3 AC [2]	(hp)	(25)	(50)	(125)
• For S6 duty (40 %) P_{S6}	kW	26	52	130
• P_{max}	kW	60	120	175
Braking power with external braking resistor				
• $P_{Bmax.}$ (=2 × P_{rated})	kW	40	80	–
• Continuous braking power P_d (=0.25 × P_{rated})	kW	5	10	–
DC link current				
• At 600 V DC	A	33.5	67	167
• For S6 duty (40 %)	A	43	87	217
• Maximum	A	100	200	292
Input current				
• Rated current at 380 V 3 AC	A	35	70	172
• Maximum	A	100	188	290
Activation threshold Braking module	V	774	774	–
Resistance value of the external braking resistor	Ω	≥14.8	≥7.4	–
Cable length, max. to braking resistor	m (ft)	15 (50)	15 (50)	–
Connection for braking resistor (X2)		Screw terminals	Screw terminals	–
• Conductor cross-section, max.	mm^2	0.5 ... 4	0.5 ... 10	–
Current requirement, max. 24 V DC electronic power supply	A	1	1.4	2
Current carrying capacity				
• 24 V DC busbars	A	20	20	20
• DC link busbars	A	100	200	200
DC link capacitance				
• Basic Line Module	µF	940	1880	4100
• Drive line-up, max.	µF	20000	20000	50000
Power loss [1]	kW	0.144	0.284	0.628
Cooling air requirement	m^3/s (ft^3/s)	0.016 (0.6)	0.031 (1.1)	0.05 (1.8)
Sound pressure level L_{pA} (1 m)	dB	<60	<65	<65
Line connection U1, V1, W1		Screw-type terminals	Screw-type terminals	M8 screw stud
• Conductor cross-section, max.	mm^2	0.5 … 16	10 ... 50	1 × 35 ... 120 or 2 × 50
Shield connection		Integrated into the power plug	See Accessories	See Accessories
PE connection		M5 screw	M6 screw	M6 screw
Cable length, max. (total of all motor power cables and DC link)				
• Shielded/unshielded	m (ft)	630/850 (2067/2789)	630/850 (2067/2789)	1000/1500 (3281/4922)
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	100 (3.94)	150 (5.91)	200 (7.87)
• Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)
• Depth	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)
Weight, approx.	kg (lb)	6.8 (14.9)	11.3 (24.9)	15.8 (34.8)

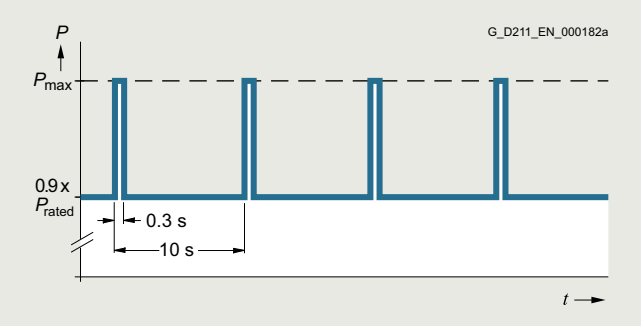
[1] Power loss of Basic Line Module at rated output including losses of 24 V DC electronics power supply.

[2] Nominal hp ratings are provided for ease of assigning components only. The Line Module outputs are dependent on the Motor Module loading and are to be dimensioned accordingly.

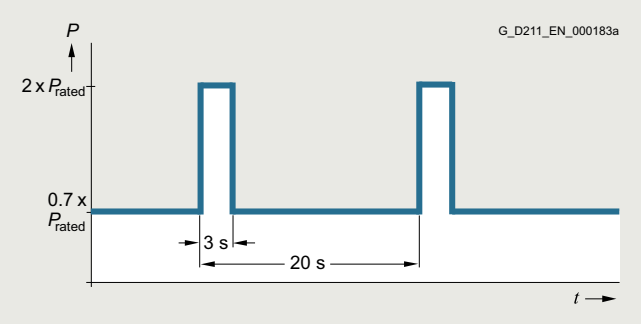
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Characteristic curves

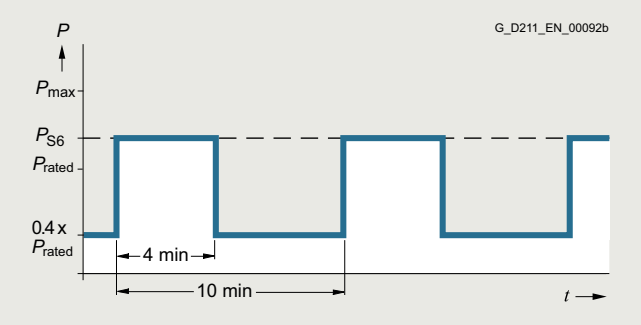
Overload capability



Duty cycle with previous load

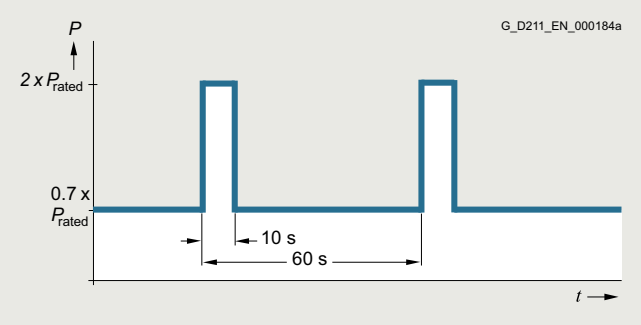


Duty cycle with previous load



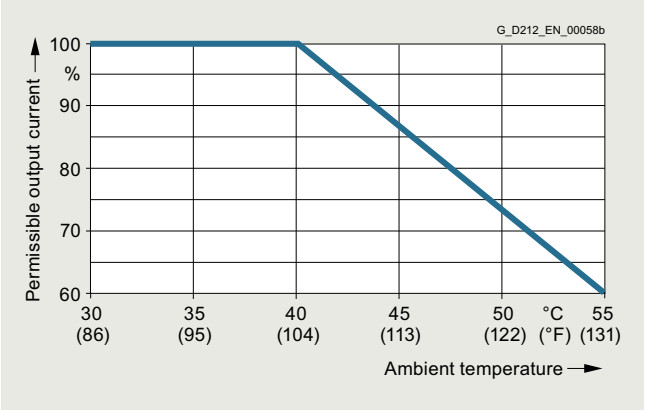
S6 duty cycle with previous load

20 kW (25 hp) and 40 kW (50 hp) Basic Line Modules only



Duty cycle with previous load

Derating characteristics



Output power as a function of ambient temperature

Installation altitude

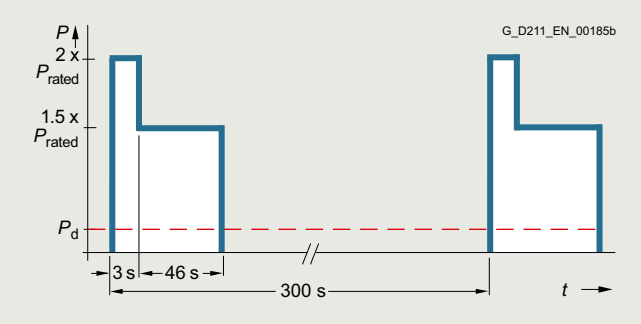
- >1000 ... 4000 m (3281 ... 13124 ft) above sea level
  - Reduction of the output current by 10 % per 1000 m (3281 ft), or
  - Reduction of the ambient temperature by 5 °C (9 °F) per 1000 m (3281 ft)
- >2000 ... 4000 m (6562 ... 13124 ft) above sea level
  - Operation on line supply systems with grounded neutral point, or
  - Operation with an isolating transformer with secondary grounded neutral point

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Characteristic curves

Braking power with external braking resistor

The following duty cycles are defined for the braking modules of the 20 kW and 40 kW Basic Line Modules:



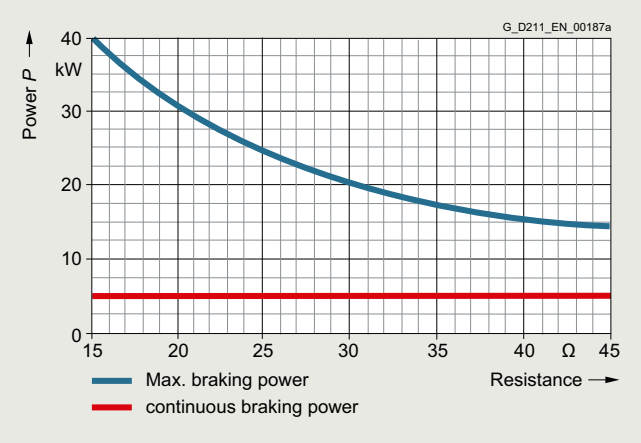
The maximum possible braking power P_{max} is calculated using the following formula:

$P_{max} = U^2/R$

U = Activation threshold

R = Resistance value of the external braking resistor

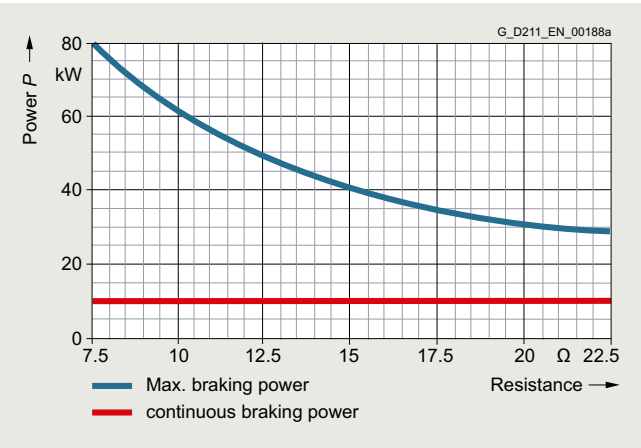
The maximum braking power is achieved with the smallest permissible resistance value. The maximum possible braking power falls at larger resistance values.



Braking power of the 20 kW Basic Line Modules depending on the connected braking resistor

When the recommended braking resistor is used, the following values result for the maximum braking power or continuous braking power:

Braking resistor 6SE7023-2ES87-2DC0
Resistance value = 20 Ω → max. braking power = 30 kW; continuous braking power = 5 kW



Braking power of the 40 kW Basic Line Modules depending on the connected braking resistor

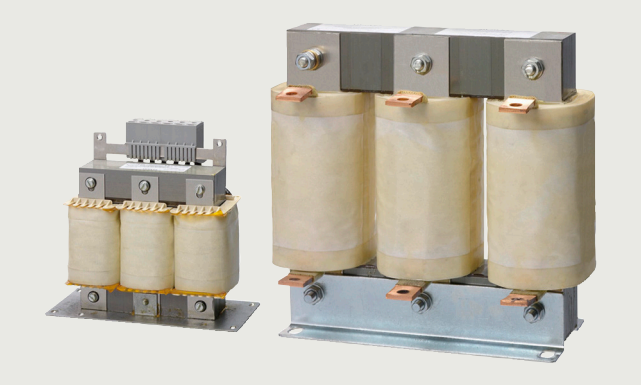
When the recommended braking resistor is used, the following values result for the maximum braking power or continuous braking power:

Braking resistor 6SE7028-0ES87-2DC0
Resistance value = 8 Ω → max. braking power = 75 kW; continuous braking power = 10 kW (limited by braking module)

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Line reactors for Basic Line Modules

Overview



20 kW (25 hp) and 100 kW (125 hp) line reactors

Line reactors reduce low-frequency line harmonic distortions and offload the semiconductors of the Basic Line Module.

Selection and ordering data

Rated power of the Basic Line Module kW (hp)	Suitable for Basic Line Module in booksize format	**Line reactor** Article No.
Line voltage 380 ... 480 V 3 AC		
20 (25)	6SL3130-1TE22-0AA0	**6SL3000-0CE22-0AA0**
40 (50)	6SL3130-1TE24-0AA0	**6SL3000-0CE24-0AA0**
100 (125)	6SL3130-1TE31-0AA0	**6SL3000-0CE31-0AA0**

Technical specifications

Line voltage 380 ... 480 V 3 AC		**Line reactor**		
		6SL3000-0CE22-0AA0	6SL3000-0CE24-0AA0	6SL3000-0CE31-0AA0
Rated current	A	37	74	185 (7.28)
Power loss at 50/60 Hz	kW	0.13/0.154	0.27/0.32	0.48/0.565
Line/load connection		Screw-type terminals	Screw-type terminals	Flat connector for M8 screw
• Conductor cross-section	mm^2	0.5 … 16	2.5 ... 35	–
PE connection		M4 screw	M6 screw studs	M8 screw studs
Degree of protection		IP20	IP20	IP00
Dimensions				
• Width	mm (in)	178 (7.01)	210 (8.27)	261 (10.28)
• Height	mm (in)	165 (6.50)	239 (9.41)	228 (8.98)
• Depth	mm (in)	100 (3.94)	105 (4.13)	138 (5.43)
Weight, approx.	kg (lb)	5.2 (11.5)	11.2 (24.7)	21.7 (47.9)
Certificate of suitability		cURus	cURus	cURus
Suitable for Basic Line Module in booksize format	Type	6SL3130-1TE22-0AA0	6SL3130-1TE24-0AA0	6SL3130-1TE31-0AA0
• Rated power of the Basic Line Module	kW (hp)	20 (25)	40 (50)	100 (125)

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Overview



In plants with strict EMC requirements, line filters work together with line reactors to restrict the conducted interference emanating from the power modules to the limit values of Class A1 as defined in EN 55011 and Category C2 as defined in EN 61800-3. The line filters are suitable for TN and TT supply systems grounded at the neutral point.

Selection and ordering data

Rated power of the Basic Line Module kW (hp)	Suitable for Basic Line Module in booksize format	**Line filter** Article No.
Line voltage 380 ... 480 V 3 AC		
20 (25)	6SL3130-1TE22-0AA0	**6SL3000-0BE21-6DA0**
40 (50)	6SL3130-1TE24-0AA0	**6SL3000-0BE23-6DA1**
100 (125)	6SL3130-1TE31-0AA0	**6SL3000-0BE31-2DA0**

Technical specifications

Line voltage 380 ... 480 V 3 AC		**Line filter**		
		6SL3000-0BE21-6DA0	6SL3000-0BE23-6DA1	6SL3000-0BE31-2DA0
Rated current	A	36	74	192
Power loss	kW	0.016	0.026	0.043
Line/load connection L1, L2, L3 / U, V, W		Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	10	35	95
PE connection		M6 screw stud	M6 screw stud	M10 screw stud
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	50 (1.97)	75 (2.95)	150 (5.91)
• Height	mm (in)	429 (16.89)	433 (17.05)	479 (18.86)
• Depth	mm (in)	226 (8.90)	226 (8.90)	226 (8.90)
Weight, approx.	kg (lb)	5 (11.3)	7.5 (16.5)	18.5 (40.8)
Certificate of suitability		cURus	cURus	cURus
Suitable for Basic Line Module in booksize format	Type	6SL3130-1TE22-0AA0	6SL3130-1TE24-0AA0	6SL3130-1TE31-0AA0
• Rated power of the Basic Line Module	kW (hp)	20 (25)	40 (50)	100 (125)

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Recommended line-side components for Basic Line Modules

Selection and ordering data

Suitable line-side power components are assigned depending on the power rating of the Basic Line Module.

The tables below list recommended components.

Additional information about the line-side power components can be found in Catalogs LV 10 and IC 10 as well as SiePortal.

Assignment of line-side power components to Basic Line Modules in booksize format

Rated power	Suitable for Basic Line Module in booksize format	**LV HRC fuse** (gL/gG)			**UL/CSA fuse, Class J** [1] Available from: Mersen www.ep.mersen.com		
kW (hp)	Type 6SL3130-...	Rated current	Size	Article No.	Rated current	Size mm (in)	Reference No.
Line voltage 380 ... 480 V 3 AC							
20 (25)	1TE22-0AA0	63 A	000	**3NA3822**	60 A	27 × 60 (1.06 x 2.36)	AJT60
40 (50)	1TE24-0AA0	100 A	000	**3NA3830**	100 A	29 × 117 (1.14 x 4.61)	AJT100
100 (125)	1TE31-0AA0	250 A	1	**3NA3144**	250 A	54 × 181 (2.13 x 7.13)	AJT250

Recommendations on further overcurrent protection devices are available at:
https://support.industry.siemens.com/cs/document/109749282

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[1] Not suitable for 3NP and 3KL switch disconnectors.

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Design



Single Motor Modules in booksize compact format

The Single Motor Modules in booksize compact format feature the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 1 electronics power supply connection via integrated 24 V DC bars
- 3 DRIVE-CLiQ sockets
- 1 motor connection via connector
- 1 safe standstill input
- 1 safe motor brake control
- 1 temperature sensor input for KTY84-130, Pt1000 or PTC (Pt1000 can be used from firmware V4.7 HF17)
- 2 PE (protective earth) connections

The status of the Motor Modules is indicated via two multi-color LEDs.

The shield of the motor cable is routed over the connector to the motor connection.

The signal cable shield can be connected to the Motor Module by means of a shield connection clamp, e.g. Weidmüller type KLBÜ 3-8 SC.

The scope of supply of the Motor Modules includes:

- DRIVE-CLiQ cable appropriate to the width of the Motor Module for connection to the adjacent Motor Module, length 0.11 m (4.33 in) for Motor Modules with a width of 50 mm (1.97 in) or length 0.16 m (6.3 in) for Motor Modules with a width of 75 mm (2.95 in).
- 2 dust protection blanking plugs for sealing unused DRIVE-CLiQ sockets
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- Connector X21
- Connector X11 for motor brake connection
- Connector X1 for motor connection
- 1 set of warning labels in 36 languages

Selection and ordering data

Rated output current A	Type rating [1] kW (hp)	**Single Motor Module in booksize compact format** Article No.
DC link voltage 510 ... 720 V DC		
3	1.6 (1.5)	**6SL3420-1TE13-0AA1**
5	2.7 (3)	**6SL3420-1TE15-0AA1**
9	4.8 (5)	**6SL3420-1TE21-0AA1**
18	9.7 (10)	**6SL3420-1TE21-8AA1**

Description	Article No.
Accessories	
DC link rectifier adapter For direct infeed of DC link voltage Screw-type terminals 0.5 ... 10 mm^2 For Line Modules and Motor Modules in booksize format with a width of 50 mm (1.97 in), 75 mm (2.95 in) and 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 120 mm^2 For all Line Modules and Motor Modules in booksize format	**6SL3162-2BM01-0AA0**
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
Spacing bolt (4 units) The mounting depth of modules in booksize compact format is increased when it is mounted on these spacing bolts by such an amount that it can be integrated into a drive line-up in booksize format. 2 spacing bolts are required to mount 50 mm (1.97 in) wide modules, and 4 spacing bolts for 75 mm (2.95 in) wide modules.	**6SL3462-1CC00-0AA0**
Accessories for re-ordering	
24 V jumper For connection of the 24 V busbars (for booksize format)	**6SL3162-2AA01-0AA0**
Warning labels in 36 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, CN, ID, IL, IR, JP, KR, SA, TH, TW	**6SL3166-3AB00-0AA0**
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

[1] Nominal hp ratings based on asynchronous (induction) motors. Match the motor nameplate current for specific sizing.

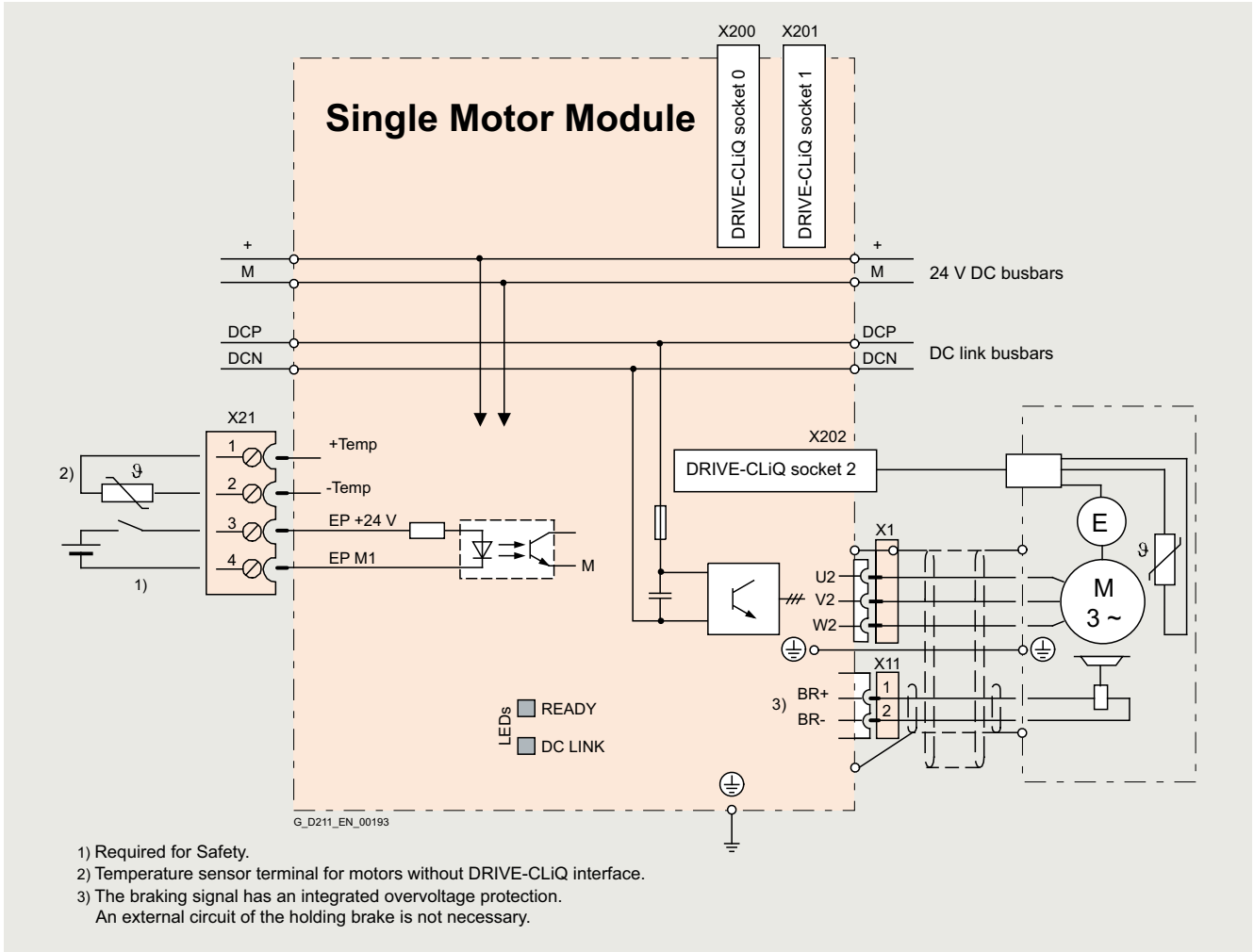
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Integration

The Single Motor Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit
- SINUMERIK 840D sl
- SINUMERIK ONE
- SINUMERIK MC



Connection example of Single Motor Module in booksize compact format

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Technical specifications

	Single Motor Module in booksize compact format 6SL3420-1TE...
DC link voltage (up to 2000 m (6562 ft) above sea level)	510 ... 720 V DC (line voltage 380 ... 480 V 3 AC)
Output frequency	
• Control mode Servo	0 ... 650 Hz [1) 2)]
• Control mode Vector	0 ... 300 Hz [1)]
• Control mode V/f	0 ... 600 Hz [1) 2)]
Electronics power supply	24 V DC -15 %/+20 %
Type of cooling	Internal air cooling (power units with increased air cooling by built-in fan)
Permissible ambient and coolant temperature (air) during operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 ... 55 °C (104 ... 131 °F), see derating characteristics
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, > 1000 ... 4000 m (3281 ... 13124 ft) above sea level, see derating characteristics
Declarations of conformity	CE (Low Voltage and EMC Directives)
Certificate of suitability	UL-recognized
Safety Integrated	Safety Integrity Level 2 (SIL 2) acc. to IEC 61508, Performance Level d (PL d) acc. to ISO 13849-1 and Control Category 3 acc. to ISO 13849-1 or EN 954-1 For further information, see section Safety Integrated.

1) Note the correlation between max. output frequency, pulse frequency and current derating. For further information, see section Configuration notes.

2) The output frequency is currently limited to 550 Hz. The specified values apply to systems with license for high output frequency.
For further information, see section Control Units and https://support.industry.siemens.com/cs/document/104020669

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Technical specifications

DC link voltage 510 ... 720 V DC		Single Motor Module in booksize compact format			
Internal air cooling		6SL3420-1TE13-0AA1	6SL3420-1TE15-0AA1	6SL3420-1TE21-0AA1	6SL3420-1TE21-8AA1
Output current					
• Rated current I_{rated}	A	3	5	9	18
• Base-load current I_H	A	2.6	4.3	7.7	15.3
• For S6 duty (40 %) I_{S6}	A	3.5	6	10	24
• I_{max}	A	9	15	27	54
Type rating [1]					
• Based on I_{rated}	kW (hp)	1.6 (1.5)	2.7 (3)	4.8 (5)	9.7 (10)
• Based on I_H	kW (hp)	1.4 (1)	2.3 (2.5)	4.1 (5)	8.2 (10)
Rated pulse frequency	kHz	8	8	4	4
DC link current I_d [2]	A	3.6	6	11	22
Current carrying capacity					
• DC link busbars	A	100	100	100	100
• 24 V DC busbars [3]	A	20	20	20	20
DC link capacitance	µF	110	110	110	235
Current requirement At 24 V DC, max.	A	0.85	0.85	0.85	0.85
Power loss	kW	0.07	0.1	0.1	0.18
Cooling air requirement	m^3/s (ft^3/s)	0.008 (0.3)	0.008 (0.3)	0.008 (0.3)	0.008 (0.3)
Sound pressure level L_{pA} (1 m/3.28 ft)	dB	<60	<60	<60	<60
Motor connection U2, V2, W2		Connector (X1) with screw-type terminals	Connector (X1) with screw-type terminals	Connector (X1) with screw-type terminals	Connector (X1) with screw-type terminals
• Conductor cross-section	mm^2	0.2 ... 6	0.2 ... 6	0.2 ... 6	0.2 ... 6
Shield connection		Integrated in connector (X1)	Integrated in connector (X1)	Integrated in connector (X1)	Integrated in connector (X1)
PE connection		M5 screw	M5 screw	M5 screw	M5 screw
Motor brake connection		Connector (X11), 24 V DC, 2 A	Connector (X11), 24 V DC, 2 A	Connector (X11), 24 V DC, 2 A	Connector (X11), 24 V DC, 2 A
Motor cable length, max.					
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	70 (230)
• Unshielded	m (ft)	75 (246)	75 (246)	75 (246)	100 (328)
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	50 (1.97)	50 (1.97)	50 (1.97)	75 (2.95)
• Height	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
• Depth	mm (in)	226 (8.90)	226 (8.90)	226 (8.90)	226 (8.90)
Weight, approx.	kg (lb)	2.7 (5.95)	2.7 (5.95)	2.7 (5.95)	3.4 (7.50)

[1] Rated power of a typical standard asynchronous (induction) motor at 400 V AC.

[2] Rated DC link current for dimensioning an external DC connection. For DC link current calculation for dimensioning the Line Module, see section Configuration notes.

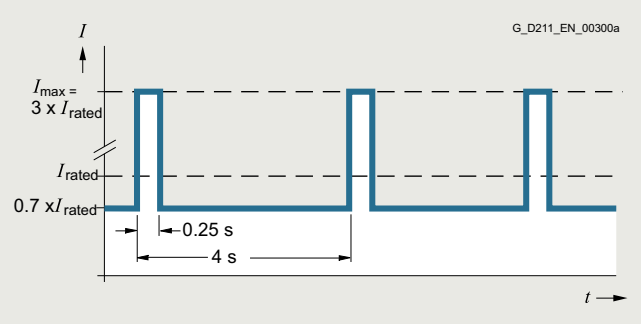
[3] If, due to a number of Line Modules and Motor Modules being mounted side-by-side, the current carrying capacity exceeds 20 A, an additional 24 V DC connection using a 24 V terminal adapter is required (max. cross-section 6 mm^2, max. fuse protection 20 A).

[4] Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.

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Characteristic curves

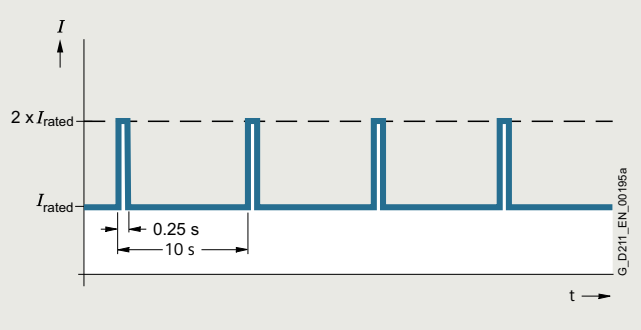
Overload capability



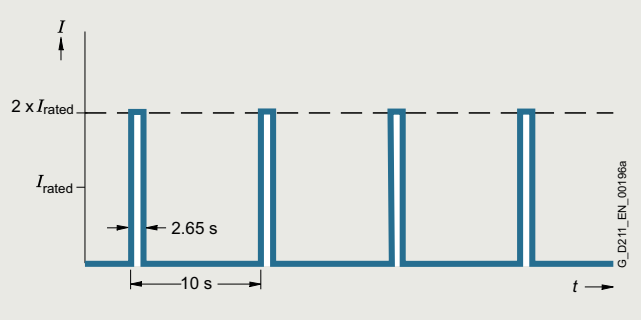
Peak current duty cycle with previous load (300 % overload)

Note:

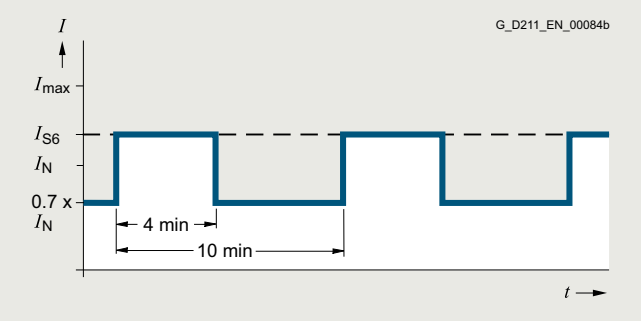
I_{max} stands for 2 × I_{rated} in the following overload characteristics.



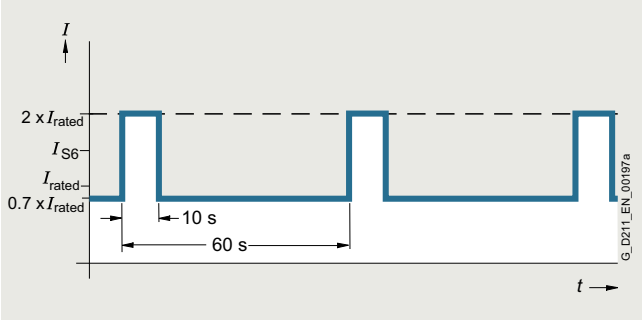
Duty cycle with previous load



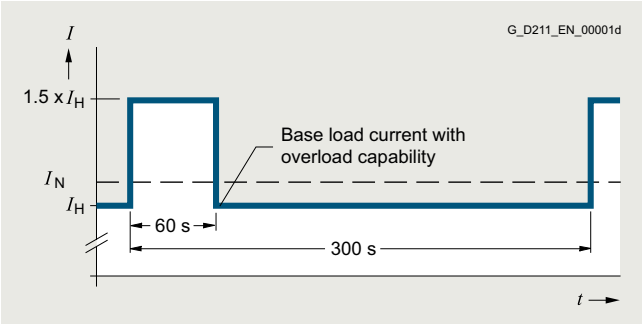
Duty cycle without previous load



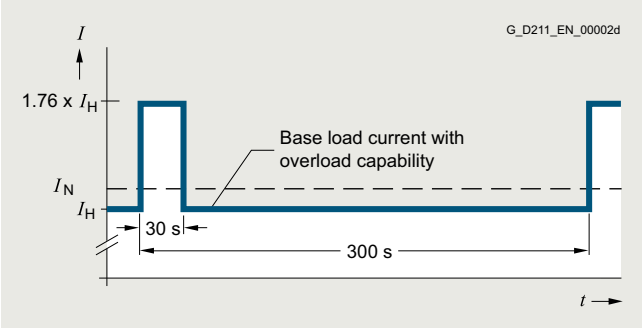
S6 duty cycle with previous load with a duty cycle duration of 600 s



S6 duty cycle with previous load with a duty cycle duration of 60 s



Duty cycle with 60 s overload with a duty cycle duration of 300 s



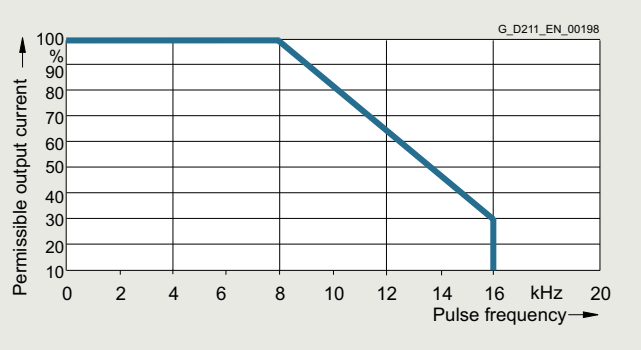
Duty cycle with 30 s overload with a duty cycle duration of 300 s

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Characteristic curves

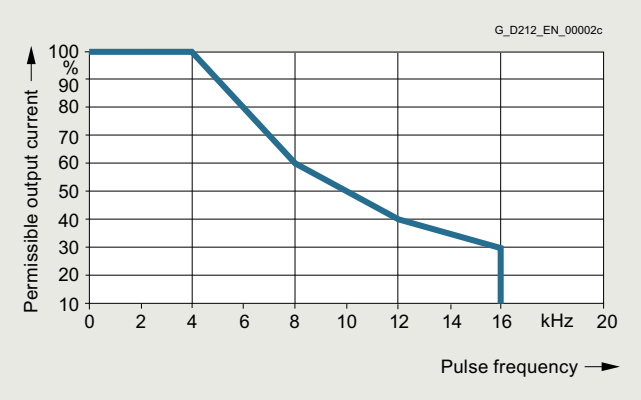
Derating characteristics

3 A and 5 A Single Motor Modules in booksize compact format

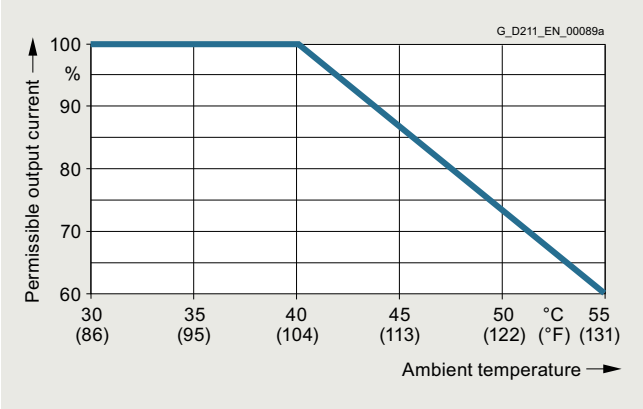


Output current as a function of pulse frequency

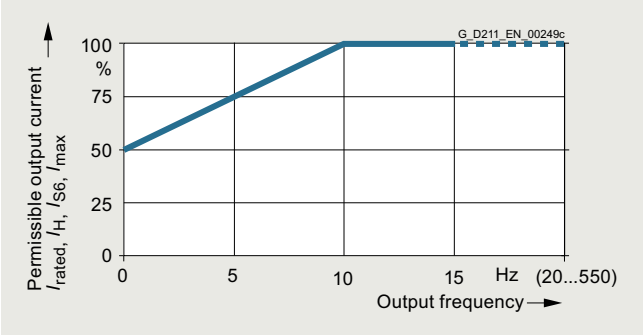
9 A and 18 A Single Motor Modules in booksize compact format



Output current a function of pulse frequency



Output current a function of ambient temperature



Output current a function of output frequency

Installation altitude

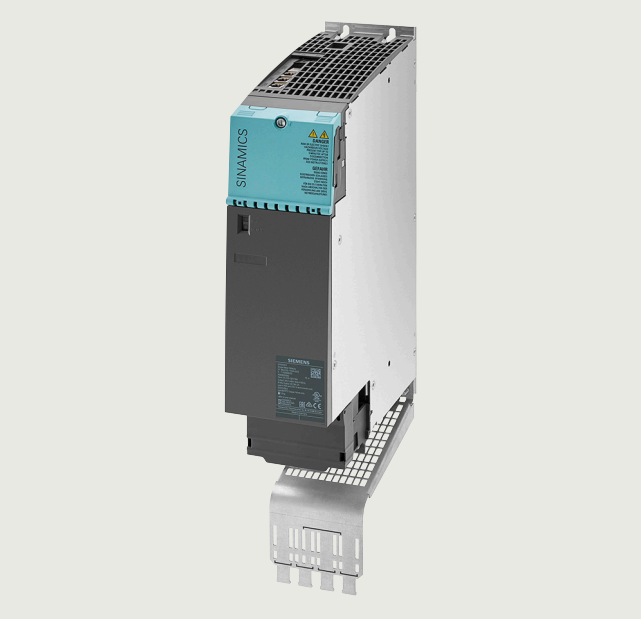
- >1000 ... 4000 m (3281 ... 13124 ft) above sea level
  - Reduction of the output current by 10 % per 1000 m (3281 ft), or
  - Reduction of the ambient temperature by 5 °C (9 °F) per 1000 m (3281 ft)
- >2000 ... 4000 m (6562 ... 13124 ft) above sea level
  - Operation on line supply systems with grounded neutral point, or
  - Operation with an isolating transformer with secondary grounded neutral point

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Design



Single Motor Module in booksize format C/D type, 3 A to 30 A



Single Motor Module in booksize format C type, 45 A and 60 A, with optional shield connection plate

The Single Motor Modules in booksize format feature the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 1 electronics power supply connection via integrated 24 V DC bars
- 3 DRIVE-CLiQ sockets
- 1 motor connection via connector X1 for C/D type 3 A to 30 A (not included in the scope of delivery)
- 1 safe standstill input
- 1 safe motor brake control
- 1 temperature sensor input for KTY84-130, Pt1000 or PTC (Pt1000 can be used from firmware V4.7 HF17)
- 2 PE (protective earth) connections – a PE connection is integrated in the connector for C/D types 3 A to 30 A

The status of the Motor Modules is indicated via two multi-color LEDs.

Motor Modules 3 A to 30 A are supplied with a mounted shield connection plate. The associated shield connection clamp can be found in the Terminal Kit supplied. A shield connection plate is optionally available for Motor Modules 45 A to 200 A. On these modules, the motor cable shield can be connected using a shield connection clamp or a hose clip.

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Single Motor Modules in booksize format

Design

Motor Modules in booksize format C/D types, 3 A to 60 A

Rated current	3 A	5 A	9 A	18 A	24 A	30 A	45 A	60 A
	D types							
Single Motor Modules	**3 A / 9 A** 50 mm (1.97 in)	**5 A / 15 A** 50 mm (1.97 in)	**9 A / 27 A** 50 mm (1.97 in)	**18 A / 54 A** 50 mm (1.97 in)	**24 A / 72 A** 50 mm (1.97 in)	**30 A / 90 A** 100 mm (3.94 in)	–	–
Double Motor Modules	**2 x 3 A / 2 x 9 A** 50 mm (1.97 in)	**2 x 5 A / 2 x 15 A** 50 mm (1.97 in)	**2 x 9 A / 2 x 27 A** 50 mm (1.97 in)	**2 x 18 A / 2 x 54 A** 100 mm (3.94 in)	–	–	–	–
				C types				
			Single Motor Modules	**18 A / 36 A** 50 mm (1.97 in)	**24 A / 48 A** 50 mm (1.97 in)	**30 A / 56 A** 100 mm (3.94 in)	**45 A / 90 A** 100 mm (3.94 in)	**60 A / 120 A** 100 mm (3.94 in)
Rated current / maximum current in A 50 mm (1.97 in) or 100 mm (3.94 in) widths			Double Motor Module	**2 x 18 A / 2 x 36 A** 100 mm (3.94 in)	–	–	–	–

G_PM21_EN_00266a

Overview of available Single Motor Modules in booksize format C/D types

- C type: Optimized for continuous load with up to 200 % overload (continuous motion)
- D type: Optimized for highly dynamic, intermittent duty cycles with up to 300 % overload (discontinuous motion)

Devices in booksize format C/D types are optimized for multi-axis applications and are mounted next to one another. The connection for the common DC link is an integral feature. The device is internally air cooled.

The Motor Modules in booksize format C/D types have been developed to be fully compatible with the booksize series regarding spare parts and offer the following advantages:

- The portfolio is extended by Single Motor Modules 18 A (C type), 24 A (C/D types) and 30 A (D type), as well as by a Double Motor Module 18 A (D type).
- The width of Motor Modules 45 A and 60 A has been reduced from 150 mm to 100 mm, which makes a significant contribution toward saving space in the cabinet
- The amount of space required beneath the Motor Modules has been reduced thanks to improvements in the design and a new motor plug connector
- With the new motor plug connector design, the brake conductors and the PE connection are integrated directly in the plug connector
- The motor connections on the Double Motor Module are located side by side, resulting in a significantly improved level of accessibility
- The fan can be simply replaced without having to remove the Motor Module

The signal cable shield can be connected to the Motor Module by means of a shield connection clamp, e.g. Weidmüller type KLBUE 3-8 SC.

The scope of delivery of the Motor Modules includes:

- DRIVE-CLiQ cable appropriate to the width of the Motor Module for connection to the adjacent Motor Module, length = width of Motor Module + 0.06 m (0.20 ft)
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- Connector X21
- Connector X11 for the motor brake connection (for Motor Modules 45 A to 200 A)
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- Fan insert for the 132 A and 200 A Motor Modules (the voltage for the fan insert is supplied by the Motor Module)
- 1 shield connection plate with shield connection clamp (for Motor Modules 3 A to 30 A)
- 1 set of warning labels in 36 languages

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Selection and ordering data

Rated output current	Type rating [2]	Single Motor Module in booksize format		
			C type	**D type**
A	kW (hp)	Article No.	Article No.	Article No.
DC link voltage 510 ... 720 V DC				
3	1.6 (1.5)	–	–	**6SL3120-1TE13-0AD0**
5	2.7 (3)	–	–	**6SL3120-1TE15-0AD0**
9	4.8 (5)	–	–	**6SL3120-1TE21-0AD0**
18	9.7 (10)	–	**6SL3120-1TE21-8AC0**	**6SL3120-1TE21-8AD0**
24	12.9 (15)	–	**6SL3120-1TE22-4AC0**	**6SL3120-1TE22-4AD0**
30	16 (20)	–	**6SL3120-1TE23-0AC0**	**6SL3120-1TE23-0AD0**
45	24 (30)	–	**6SL3120-1TE24-5AC0**	–
60	32 (40)	–	**6SL3120-1TE26-0AC0**	–
85	46 (60)	**6SL3120-1TE28-5AA3**	–	–
132	71 (100)	**6SL3120-1TE31-3AA3**	–	–
200	107 (150)	**6SL3120-1TE32-0AA4**	–	–

Description	Article No.
Accessories	
Power connector (X1) with screw-type terminal At Motor Module end, with screw-type terminals 1.5 ... 6 mm² For Motor Modules in booksize format C/D types with rated output current of 3 ... 30 A	**6SL3162-2MA00-0AC0**
Power connector (X1) with push-in connection with snap-in actuators At Motor Module end, with spring-loaded terminals 1.5 ... 6 mm² For Motor Modules in booksize format C/D types with rated output current of 3 ... 30 A	**6SL3162-2MB00-0AC0**
Shield connection plate For Motor Modules in booksize format with a width of	
• 100 mm (3.94 in) (Motor Modules in booksize format C type 45 A/60 A)	**6SL3162-1AD00-0AA0**
• 200 mm (7.87 in)	**6SL3162-1AH01-0AA0**
• 300 mm (11.81 in)	**6SL3162-1AH00-0AA0**
Shield connection clamp For Motor Modules in booksize format C type with rated output current of 45 A/60 A	
• Diameter 3 ... 14 mm (0.12 ... 0.55 in)	**8WH9130-0MA00**
• Diameter 20 ... 35 mm (0.79 ... 1.38 in)	**8WH9130-0PA00**
DC link rectifier adapter For direct infeed of DC link voltage	
• Screw-type terminals 0.5 ... 10 mm² For Motor Modules in booksize format with a width of 50 mm (1.97 in) or 100 mm (3.94 in) [1]	**6SL3162-2BD00-0AA0**
• Screw-type terminals 35 ... 120 mm² For Motor Modules in booksize format with a width of 200 mm or 300 mm (7.87 in and 11.81 in)	**6SL3162-2BM00-0AA0**
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 120 mm² For all Line Modules and Motor Modules in booksize format	**6SL3162-2BM01-0AA0**
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
Reinforced DC link bridge 6 mm (0.24 in) For replacement of the DC link bridge in Single Motor Modules 3 A ... 24 A Double Motor Modules 2 x 3 A ... 2 x 9 A	**6SL3162-2BB00-0AA0**

Description	Article No.
Accessories for re-ordering	
24 V jumper For connection of the 24 V busbars (for booksize format)	**6SL3162-2AA01-0AA0**
Terminal Kit for Motor Modules C/D types, 3 A to 30 A (24 V jumper, plug-in terminals, DRIVE-CLiQ jumper (length = module width + 60 mm (2.36 in)), shield connection clamp with pressure plate, dust protection blanking plugs, coding plug for X1) For Motor Modules with a width of	
• 50 mm (1.97 in), C/D type	**6SL3162-8AC00-0AA0**
• 100 mm (3.94 in), C/D type	**6SL3162-8BE00-0AA0**
Terminal Kit for Motor Modules 45 A to 200 A (24 V jumper, plug-in terminals, DRIVE-CLiQ jumper (length = module width + 60 mm (2.36 in)), dust protection blanking plugs) For Motor Modules with a width of	
• 100 mm (3.94 in), C type	**6SL3162-8BG00-0AA0**
• 200 mm (7.87 in)	**6SL3162-8DH00-0AA0**
• 300 mm (11.81 in)	**6SL3162-8EM00-0AA0**
Shield connection clamp For Single Motor Modules in booksize format C/D types with rated output current of 3 A to 30 A	**6SL3162-0AQ00-0AA0**
Warning labels in 36 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, CN, ID, IL, IR, JP, KR, SA, TH, TW	**6SL3166-3AB00-0AA0**
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**
Replacement fan For Motor Modules with a width of	
• 50 mm (1.97 in), C/D type (3 A ... 18 A)	**6SL3162-0AN00-0AA0**
• 50 mm (1.97 in), C/D type (24 A)	**6SL3162-0AS00-0AA0**
• 100 mm (3.94 in), C/D type (30 A)	**6SL3162-0AP00-0AA0**
• 100 mm (3.94 in), C type (45 A and 60 A)	**6SL3162-0AT00-0AA0**
• 200 mm (7.87 in) (85 A)	**6SL3162-0AH00-0AA1**
• 300 mm (11.81 in) (132 A and 200 A)	**6SL3162-0AM00-0AA0**

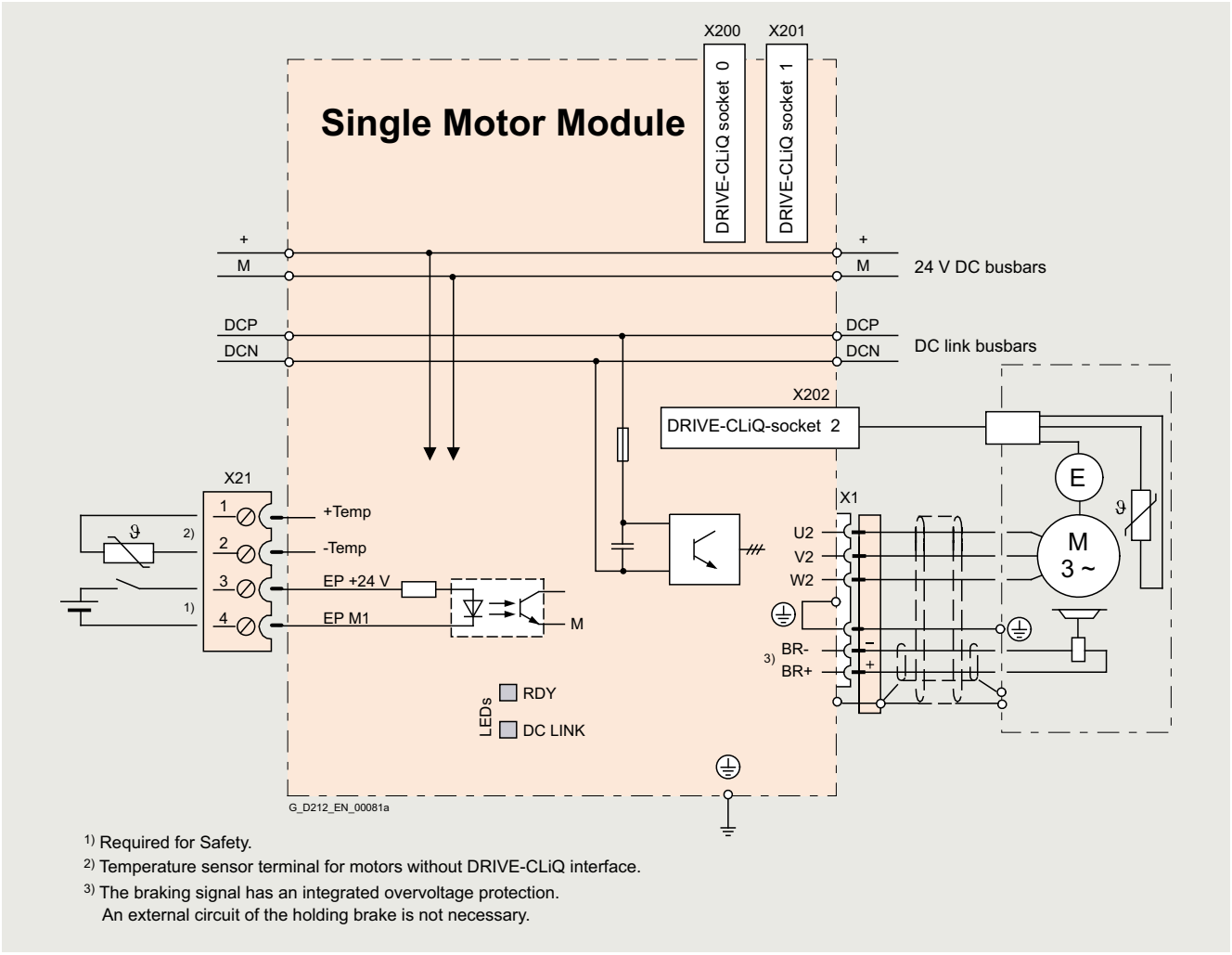
[1] **NOTICE**: The DC link rectifier adapter must **not** be used for Motor Modules C type, 45 A and 60 A.
[2] Nominal hp ratings based on asynchronous (induction) motors. Match the motor nameplate current for specific sizing.

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Integration

The Single Motor Module receives its control information via DRIVE-CLiQ from:

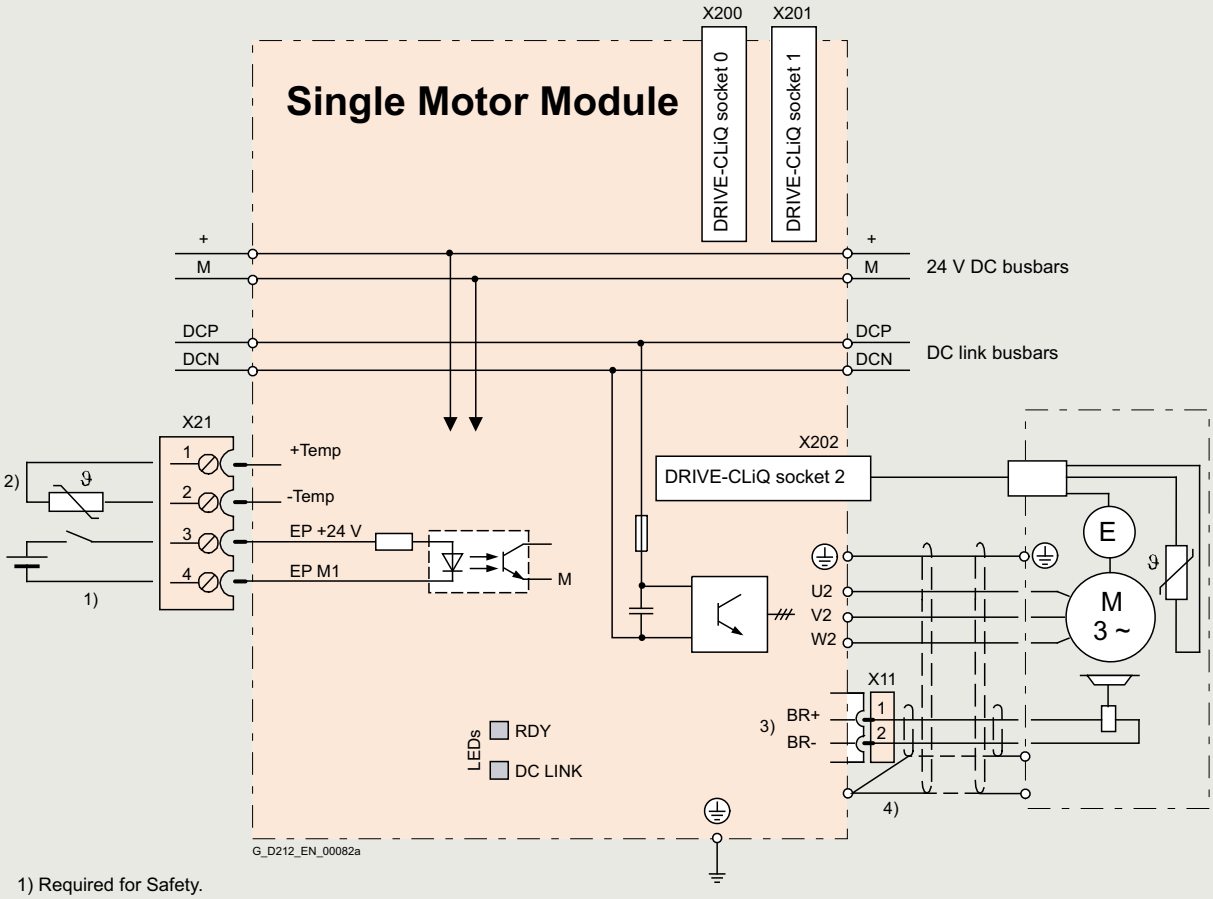
- CU320-2 Control Unit
- SINUMERIK 840D sl
- SINUMERIK ONE
- SINUMERIK MC



Connection example of Single Motor Modules in booksize format C/D types, 3 A to 30 A

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Integration

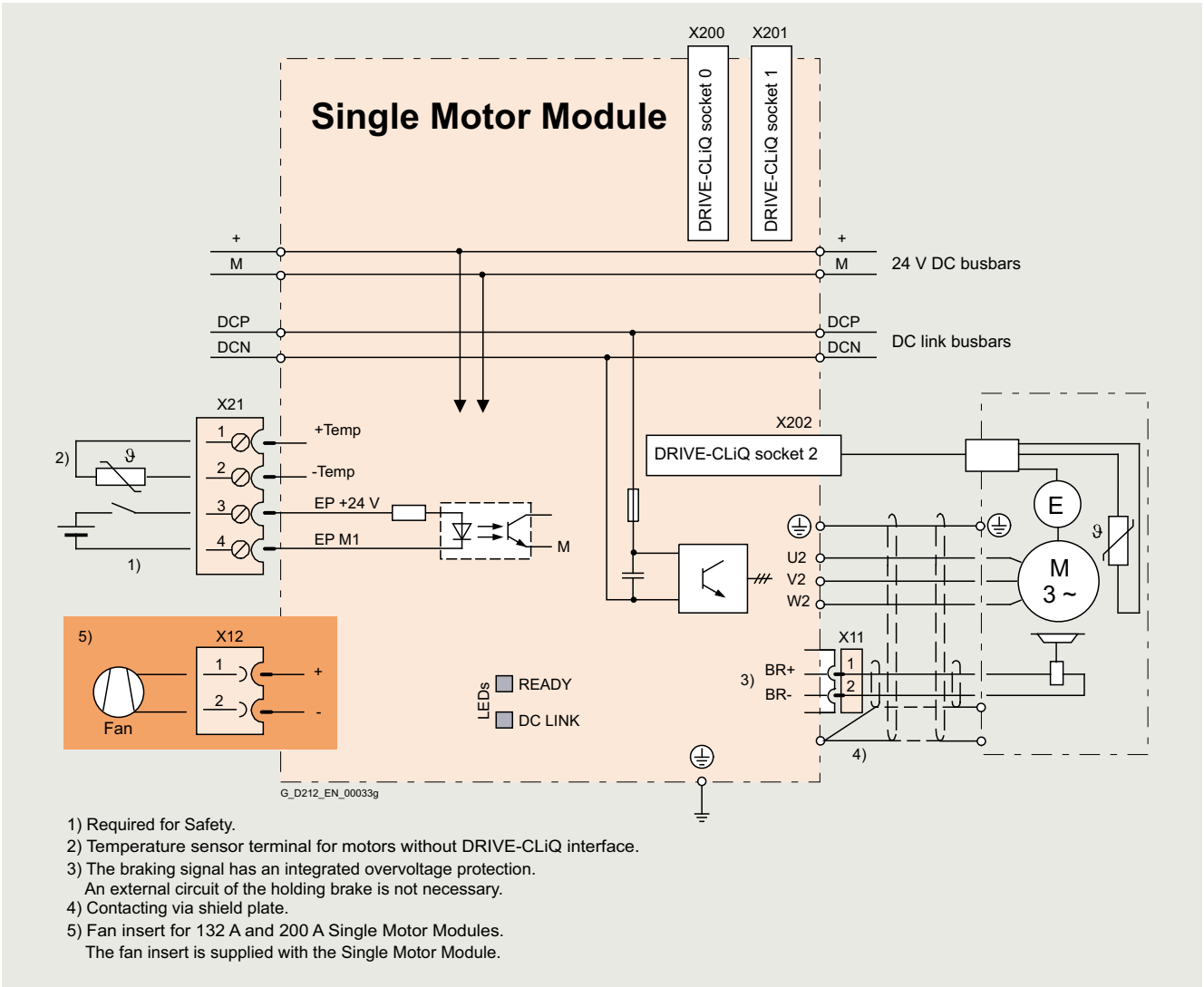


1) Required for Safety.
2) Temperature sensor terminal for motors without DRIVE-CLiQ interface.
3) The braking signal has an integrated overvoltage protection.
An external circuit of the holding brake is not necessary.
4) Contacting via shield plate.

Connection example of Single Motor Modules in booksize format C type, 45 A and 60 A

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Integration



1) Required for Safety.
2) Temperature sensor terminal for motors without DRIVE-CLiQ interface.
3) The braking signal has an integrated overvoltage protection.
An external circuit of the holding brake is not necessary.
4) Contacting via shield plate.
5) Fan insert for 132 A and 200 A Single Motor Modules.
The fan insert is supplied with the Single Motor Module.

Connection example of Single Motor Modules in booksize format, 85 A to 200 A

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Technical specifications

	Single Motor Module in booksize format 6SL3120-1TE...
DC link voltage (up to 2000 m (6562 ft) above sea level)	510 ... 720 V DC (line voltage 380 ... 480 V 3 AC)
Output frequency	
• Control mode Servo	0 ... 650 Hz [1) 2) 3)]
• Control mode Vector	0 ... 300 Hz [2)]
• Control mode V/f	0 ... 600 Hz [2) 3)]
Electronics power supply	24 V DC -15 %/+20 %
Type of cooling	Internal air cooling (power units with increased air cooling by built-in fan)
Permissible ambient and coolant temperature (air) during operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, >40 ... 55 °C (104 ... 131 °F), see derating characteristics
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, > 1000 ... 4000 m (3281 ... 13124 ft) above sea level, see derating characteristics
Declarations of conformity	CE (Low-Voltage and EMC Directives)
Certificate of suitability	cULus
Safety Integrated	Safety Integrity Level 2 (SIL 2) according to IEC 61508, Performance Level d (PL d) and Category 3 according to ISO 13849-1 For further information, see section Safety Integrated.

[1)] At rated output current (max. output frequency 1300 Hz for 62.5 µs current control cycle, 8 kHz pulse frequency, 60 % permissible output current).

[2)] Note the correlation between max. output frequency, pulse frequency and current derating.
For further information, see section Configuration notes.

[3)] The output frequency is currently limited to 550 Hz. The specified values apply to systems with license for high output frequency.
For further information, see section Control Units and
https://support.industry.siemens.com/cs/document/104020669

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Technical specifications

DC link voltage 510 ... 720 V DC		Single Motor Module in booksize format			
Internal air cooling C type	6SL3120-...	–	–	–	1TE21-8AC0
Internal air cooling D type	6SL3120-...	1TE13-0AD0	1TE15-0AD0	1TE21-0AD0	1TE21-8AD0
Output current					
• Rated current I_{rated}	A	**3**	**5**	**9**	**18**
• Base-load current I_H	A	2.6	4.3	7.7	15.3
• For S6 duty (40 %) I_{S6}	A	4	6.7	12	24
• I_{max}					
- C type	A	–	–	–	36
- D type	A	9	15	27	54
Type rating [1]					
• Based on I_{rated}	kW (hp)	1.6 (1.5)	2.7 (3)	4.8 (5)	9.7 (10)
• Based on I_H	kW (hp)	1.4 (1)	2.3 (2.5)	4.1 (5)	8.2 (10)
Rated pulse frequency	kHz	4	4	4	4
DC link current I_d [2]	A	3.6	6	11	22
Current carrying capacity					
• DC link busbars	A	100 [3]	100 [3]	100 [3]	100 [3]
• 24 V DC busbars [4]	A	20	20	20	20
DC link capacitance	µF	110	110	110	220
Current requirement At 24 V DC, max.	A	0.75	0.75	0.75	0.75
Power loss [5] typ. [6]/max.	kW	0.03/0.05	0.04/0.07	0.06/0.1	0.14/0.19
Cooling air requirement	m^3/s (ft^3/s)	0.009 (0.32)	0.009 (0.32)	0.009 (0.32)	0.009 (0.32)
Sound pressure level L_{pA} (1 m)	dB	<60	<60	<60	<60
Motor connection U2, V2, W2		Plug-in connector (X1) [7], 1.5 ... 6 mm^2	Plug-in connector (X1) [7], 1.5 ... 6 mm^2	Plug-in connector (X1) [7], 1.5 ... 6 mm^2	Plug-in connector (X1) [7], 1.5 ... 6 mm^2
PE connection		M5 screw	M5 screw	M5 screw	M5 screw
Motor brake connection		Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1), 24 V DC, 2 A
Motor cable length, max.					
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	70 (230)
• Unshielded	m (ft)	75 (246)	75 (246)	75 (246)	100 (328)
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	50 (1.97)	50 (1.97)	50 (1.97)	50 (1.97)
• Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
• Depth	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
Weight, approx.	kg (lb)	4.6 (10.1)	4.6 (10.1)	4.6 (10.1)	4.6 (10.1)

[1] Rated power of a typical standard asynchronous (induction) motor at 400 V AC.

[2] Rated DC link current for dimensioning an external DC connection.

[3] With reinforced DC link bridges, (Article No. 6SL3162-2BB00-0AA0) 200 A is possible (Accessories).

[4] If, due to a number of Line Modules and Motor Modules being mounted side by side, the current carrying capacity exceeds 20 A, an additional 24 V DC connection using a 24 V terminal adapter is required (max. cross-section 6 mm^2, max. fuse protection 20 A).

[5] Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.

[6] At max. motor cable length 30 m (98.43 ft), pulse frequency 4 kHz and DC link voltage 540 ... 600 V.

[7] Connector not included in scope of delivery, see Accessories.

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Technical specifications

DC link voltage 510 ... 720 V DC		Single Motor Module in booksize format			
Internal air cooling C type	6SL3120-...	1TE22-4AC0	1TE23-0AC0	1TE24-5AC0	1TE26-0AC0
Internal air cooling D type	6SL3120-...	1TE22-4AD0	1TE23-0AD0	–	–
Output current					
• Rated current I_{rated}	A	**24**	**30**	**45**	**60**
• Base-load current I_H	A	20.4	25.5	38	51
• For S6 duty (40 %) I_{S6}	A	32	40	60	80
• I_{max}					
- C type	A	48	56	90 [8]	120 [8]
- D type	A	72	90	–	–
Type rating [1]					
• Based on I_{rated}	kW (hp)	12.9 (15)	16 (20)	24 (30)	32 (40)
• Based on I_H	kW (hp)	10.9 (15)	13.7 (18)	21 (25)	28 (40)
Rated pulse frequency	kHz	4	4	4	4
DC link current I_d [2]	A	29	36	54	72
Current carrying capacity					
• DC link busbars	A	100 [3]	200	200	200
• 24 V DC busbars [4]	A	20	20	20	20
DC link capacitance	µF	390	705	1230	1410
Current requirement At 24 V DC, max.	A	1.0	0.8	0.9	0.9
Power loss [5] typ. [6]/max.	kW	0.19/0.20	0.26/0.31	0.34/0.36	0.46/0.48
Cooling air requirement	m^3/s (ft^3/s)	0.0147 (0.52)	0.0155 (0.55)	0.0233 (0.82)	0.0233 (0.82)
Sound pressure level L_{pA} (1 m)	dB	<68	<60	<71	<71
Motor connection U2, V2, W2		Plug-in connector (X1) [7], 1.5 ... 6 mm^2	Plug-in connector (X1) [7], 1.5 ... 6 mm^2	M6 screw studs (X1)	M6 screw studs (X1)
Shield connection		At the shield connection plate of the Motor Modules	At the shield connection plate of the Motor Modules	See Accessories	See Accessories
PE connection		M5 screw	M5 screw	M5 screw	M5 screw
Motor brake connection		Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A
Motor cable length, max.					
• Shielded	m (ft)	70 (230)	100 (328)	100 (328)	100 (328)
• Unshielded	m (ft)	100 (328)	150 (492)	150 (492)	150 (492)
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	50 (1.97)	100 (3.94)	100 (3.94)	100 (3.94)
• Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
• Depth	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
Weight, approx.	kg (lb)	4.7 (10.4)	7.9 (17.4)	8.5 (18.7)	8.6 (19)

1) Rated power of a typical standard asynchronous (induction) motor at 400 V AC.

2) Rated DC link current for dimensioning an external DC connection.

3) With reinforced DC link bridges, (Article No. 6SL3162-2BB00-0AA0) 200 A is possible (Accessories).

4) If, due to a number of Line Modules and Motor Modules being mounted side by side, the current carrying capacity exceeds 20 A, an additional 24 V DC connection using a 24 V terminal adapter is required (max. cross-section 6 mm^2, max. fuse protection 20 A).

5) Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.

6) At max. motor cable length 30 m (98.43 ft), pulse frequency 4 kHz and DC link voltage 540 ... 600 V.

7) Connector not included in scope of delivery, see Accessories.

8) The specified values are valid as from firmware V4.8.

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Single Motor Modules in booksize format

Technical specifications

DC link voltage 510 ... 720 V DC		Single Motor Module in booksize format		
Internal air cooling	6SL3120-...	1TE28-5AA3	1TE31-3AA3	1TE32-0AA4
Output current				
• Rated current I_{rated}	A	**85**	**132**	**200**
• Base-load current I_H	A	68	105	141
• For S6 duty (40 %) I_{S6}	A	110	150	230
• I_{max}	A	141	210	282
Type rating [1]				
• Based on I_{rated}	kW (hp)	46 (60)	71 (100)	107 (150)
• Based on I_H	kW (hp)	37 (50)	57 (75)	76 (100)
Rated pulse frequency	kHz	4	4	4
DC link current I_d [2]	A	102	158	200
Current carrying capacity				
• DC link busbars	A	200	200	200
• 24 V DC busbars [3]	A	20	20	20
DC link capacitance	µF	1880	2820	3995
Current requirement At 24 V DC, max.	A	1.5	1.5	1.5
Power loss [4] typ. [5]/max.	kW	0.77/0.79	1.26/1.29	2.03/2.09
Cooling air requirement	m^3/s (ft^3/s)	0.044 (1.6)	0.144 (5.1)	0.144 (5.1)
Sound pressure level L_{pA} (1 m)	dB	<60	<73	<73
Motor connection U2, V2, W2		M8 screw studs (X1)	M8 screw studs (X1)	M8 screw studs (X1)
• Conductor cross-section, max.	mm^2	2.5 ... 95, 2 × 35	2.5 ... 120, 2 × 50	2.5 ... 120, 2 × 50
Shield connection		See Accessories	See Accessories	See Accessories
PE connection		M6 screw	M8 screw	M8 screw
Motor brake connection		Plug-in connector (X11), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A
Motor cable length, max.				
• Shielded	m (ft)	100 (328)	100 (328)	100 (328)
• Unshielded	m (ft)	150 (492)	150 (492)	150 (492)
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	200 (7.87)	300 (11.81)	300 (11.81)
• Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)
- With fan [6]	mm (in)	–	629 (24.76)	629 (24.76)
• Depth	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)
Weight, approx.	kg (lb)	14.8 (32.6)	21 (46.3)	21 (46.3)

[1] Rated power of a typical standard asynchronous (induction) motor at 400 V AC.

[2] Rated DC link current for dimensioning an external DC connection.

[3] If, due to a number of Line Modules and Motor Modules being mounted side-by-side, the current carrying capacity exceeds 20 A, an additional 24 V DC connection using a 24 V terminal adapter is required (max. cross-section 6 mm^2, max. fuse protection 20 A).

[4] Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.

[5] At max. motor cable length 30 m (98.43 ft), pulse frequency 4 kHz and DC link voltage 540 ... 600 V.

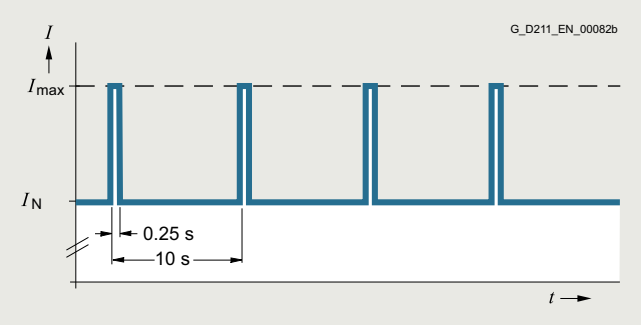
[6] The fan is supplied with the Motor Module and must be installed before the Motor Module is commissioned.

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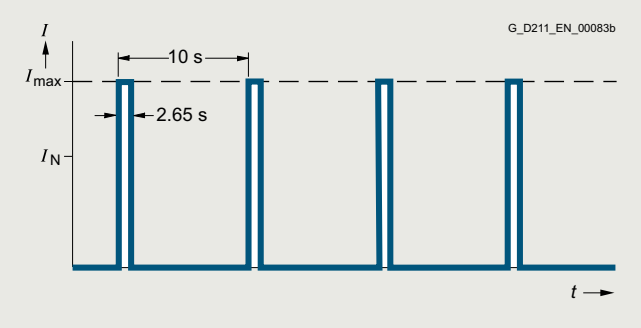
Characteristic curves

Overload capability

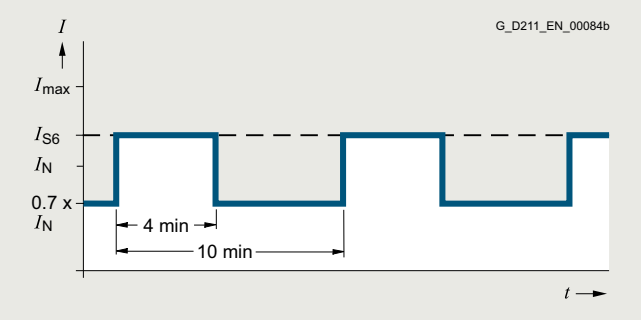
Motor Modules in booksize format C type 3 A to 60 A and booksize format 85 A to 200 A



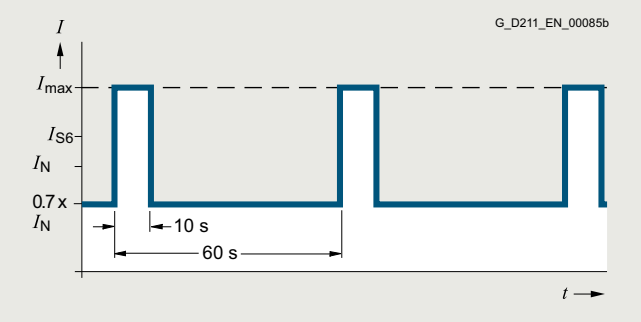
Duty cycle with previous load



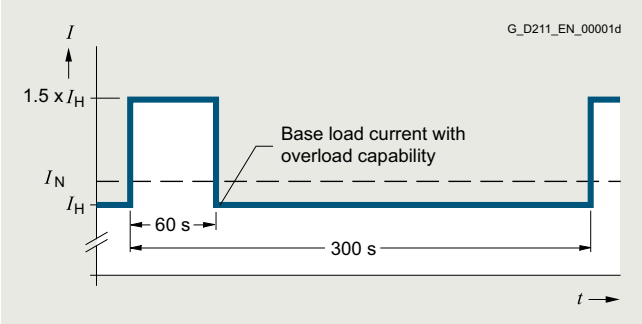
Duty cycle without previous load



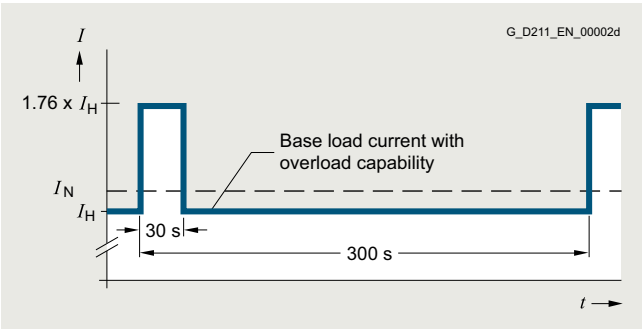
S6 duty cycle with previous load with a duty cycle duration of 600 s



S6 duty cycle with previous load with a duty cycle duration of 60 s



Duty cycle with 60 s overload with a duty cycle duration of 300 s

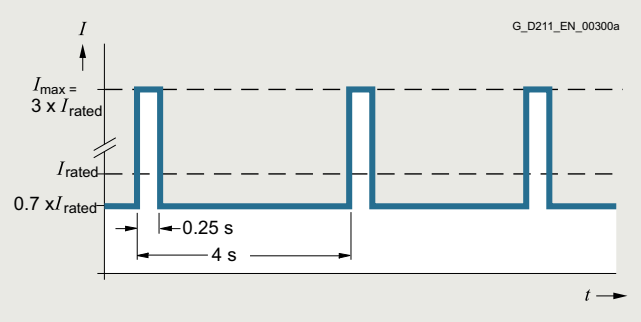


Duty cycle with 30 s overload with a duty cycle duration of 300 s

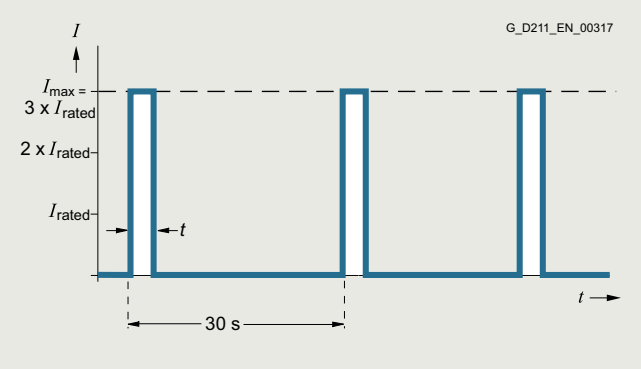
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Characteristic curves

Motor Modules in booksize format D type, 3 A to 30 A



Peak current duty cycle with previous load (300 % overload)

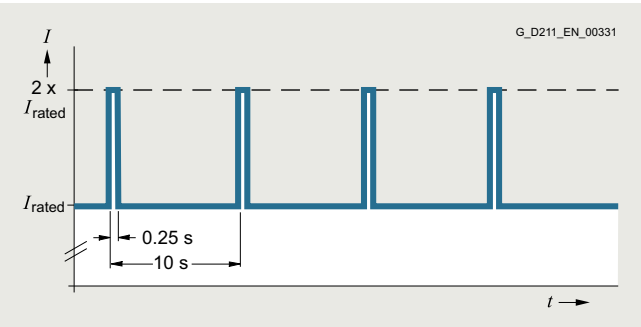


Peak current duty cycle without previous load (300 % overload)

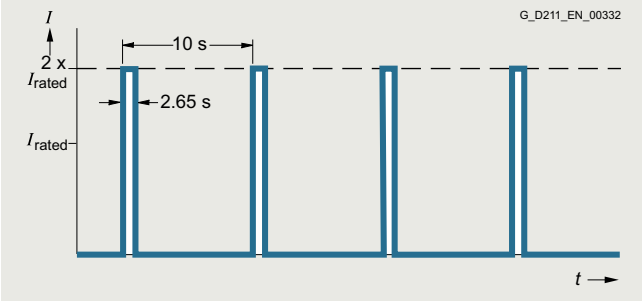
Single Motor Module	Time t at I_{max}
3 A	0.5 s
5 A	0.5 s
9 A	0.5 s
18 A	1.25 s
24 A	1.25 s
30 A	3 s

Note:

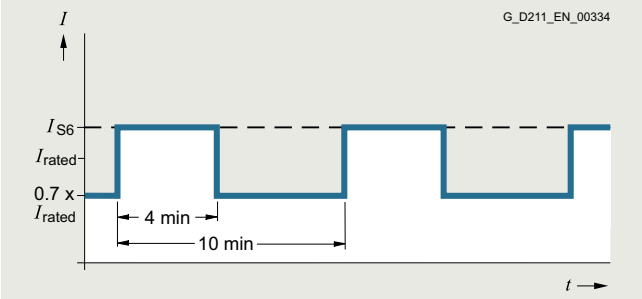
The duty cycle shown above is not permissible for a pulse frequency of 16 kHz. The current must be derated for a pulse frequency of 8 kHz.



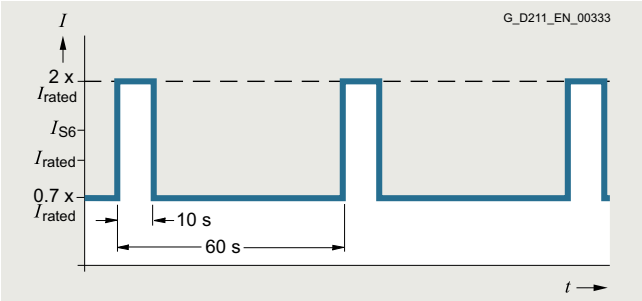
Duty cycle with previous load



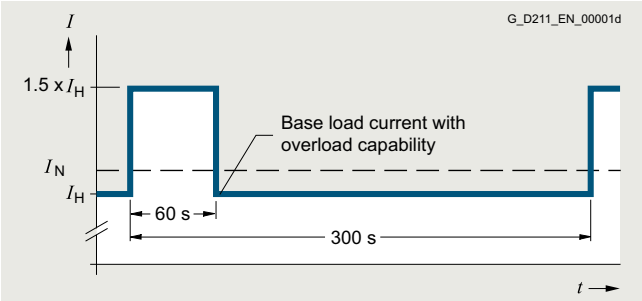
Duty cycle without previous load



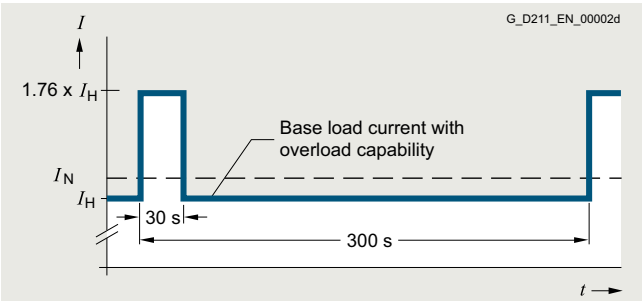
S6 duty cycle with previous load with a duty cycle duration of 600 s



S6 duty cycle with previous load with a duty cycle duration of 60 s



Duty cycle with 60 s overload with a duty cycle duration of 300 s

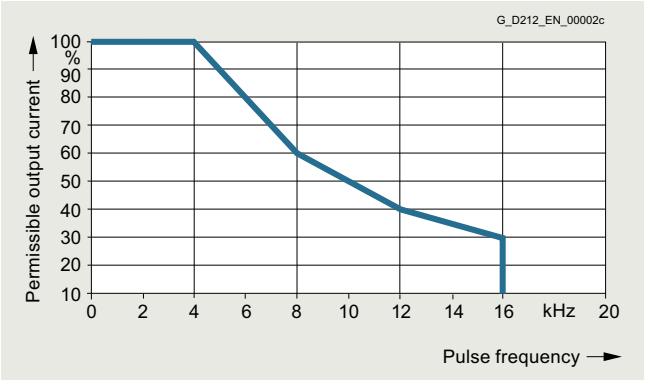


Duty cycle with 30 s overload with a duty cycle duration of 300 s

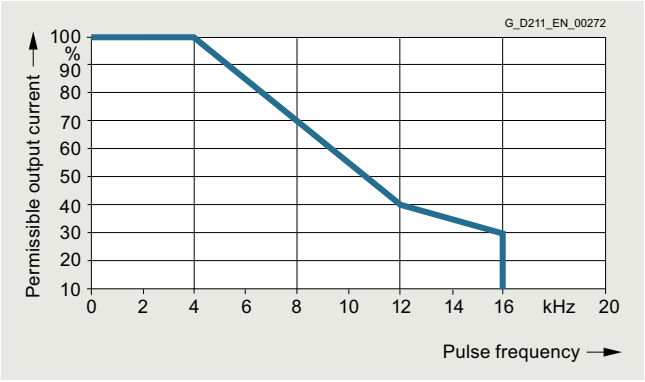
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Characteristic curves

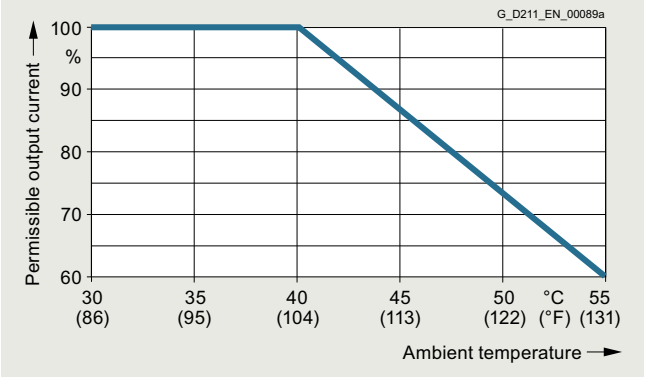
Derating characteristics



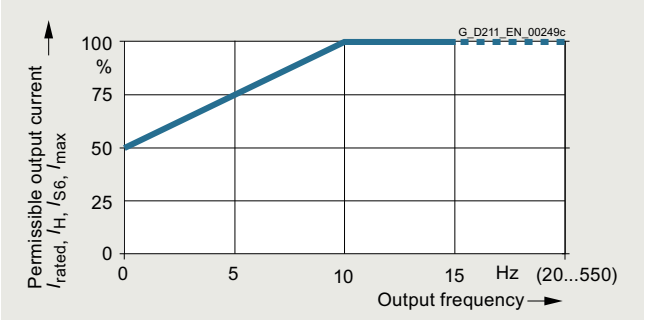
Output current as a function of pulse frequency
(Single Motor Modules, 3 A to 132 A)



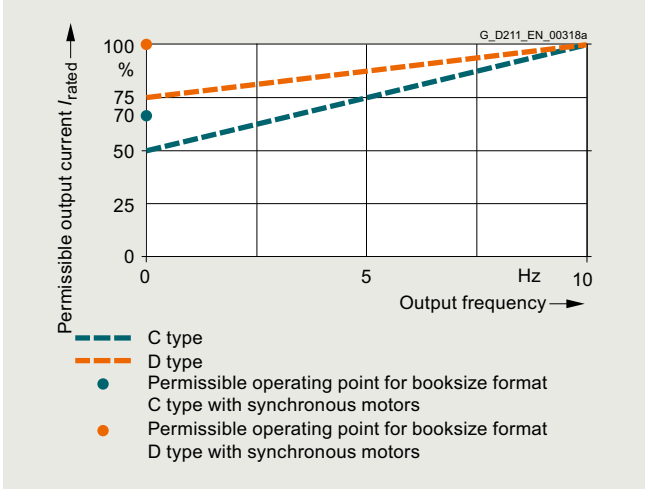
Output current as a function of pulse frequency
(Single Motor Modules, 200 A)



Output current as a function of ambient temperature



Output current as a function of output frequency
(Single Motor Modules in booksize format, 85 A to 200 A)



Output current at low output frequencies
(Single Motor Modules in booksize format C/D types, 3 A to 60 A)

Installation altitude

- >1000 ... 4000 m (3281 ... 13124 ft) above sea level
  - Reduction of the output current by 10 % per 1000 m (3281 ft), or
  - Reduction of the ambient temperature by 5 °C (9 °F) per 1000 m (3281 ft)
- >2000 ... 4000 m (6562 ... 13124 ft) above sea level
  - Operation on line supply systems with grounded neutral point, or
  - Operation with an isolating transformer with secondary grounded neutral point

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Double Motor Modules in booksize compact format

Design



Double Motor Module in booksize compact format

Double Motor Modules feature the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 2 electronics power supply connections via integrated 24 V DC busbars
- 4 DRIVE-CLiQ sockets
- 2 motor connections via connector
- 2 safe standstill inputs (1 input per axis)
- 2 safe motor brake controls
- 2 temperature sensor inputs for KTY84-130, Pt1000 or PTC (Pt1000 can be used from firmware V4.7 HF17)
- 3 PE (protective earth) connections

The status of the Motor Modules is indicated via two multi-color LEDs.

The shield of the motor cables is routed over the connectors to the motor connection.

The signal cable shield can be connected to the Motor Module by means of a shield connection clamp, e.g. Weidmüller type KLBÜ 3-8 SC.

The scope of supply of the Motor Modules includes:

- DRIVE-CLiQ cable for connecting to the adjacent Motor Module, length 0.16 m (6.3 in)
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- Connectors X21 and X22
- Connectors X1 and X2 for motor connection
- 1 set of warning labels in 36 languages

Selection and ordering data

Rated output current A	Type rating [1] kW (hp)	**Double Motor Module in booksize compact format** Article No.
DC link voltage 510 ... 720 V DC		
2 × 1.7 A	2 × 0.9 kW (2 × 0.75 hp)	**6SL3420-2TE11-7AA1**
2 × 3 A	2 × 1.6 kW (2 × 1.5 hp)	**6SL3420-2TE13-0AA1**
2 × 5 A	2 × 2.7 kW (2 × 3 hp)	**6SL3420-2TE15-0AA1**

Description	Article No.
Accessories	
DC link rectifier adapter For direct infeed of DC link voltage Screw-type terminals 0.5 ... 10 mm² For Line Modules and Motor Modules in booksize format with a width of 50 mm (1.97 in), 75 mm (2.95 in) and 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 120 mm² For all Line Modules and Motor Modules in booksize format	**6SL3162-2BM01-0AA0**
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
Spacing bolt (4 units) The mounting depth of modules in booksize compact format is increased when it is mounted on these spacing bolts by such an amount that it can be integrated into a drive line-up in booksize format. 2 spacing bolts are required to mount 50 mm (1.97 in) wide modules, and 4 spacing bolts for 75 mm (2.95 in) wide modules.	**6SL3462-1CC00-0AA0**
Accessories for re-ordering	
24 V jumper For connection of the 24 V busbars (for booksize format)	**6SL3162-2AA01-0AA0**
Warning labels in 36 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, CN, ID, IL, IR, JP, KR, SA, TH, TW	**6SL3166-3AB00-0AA0**
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

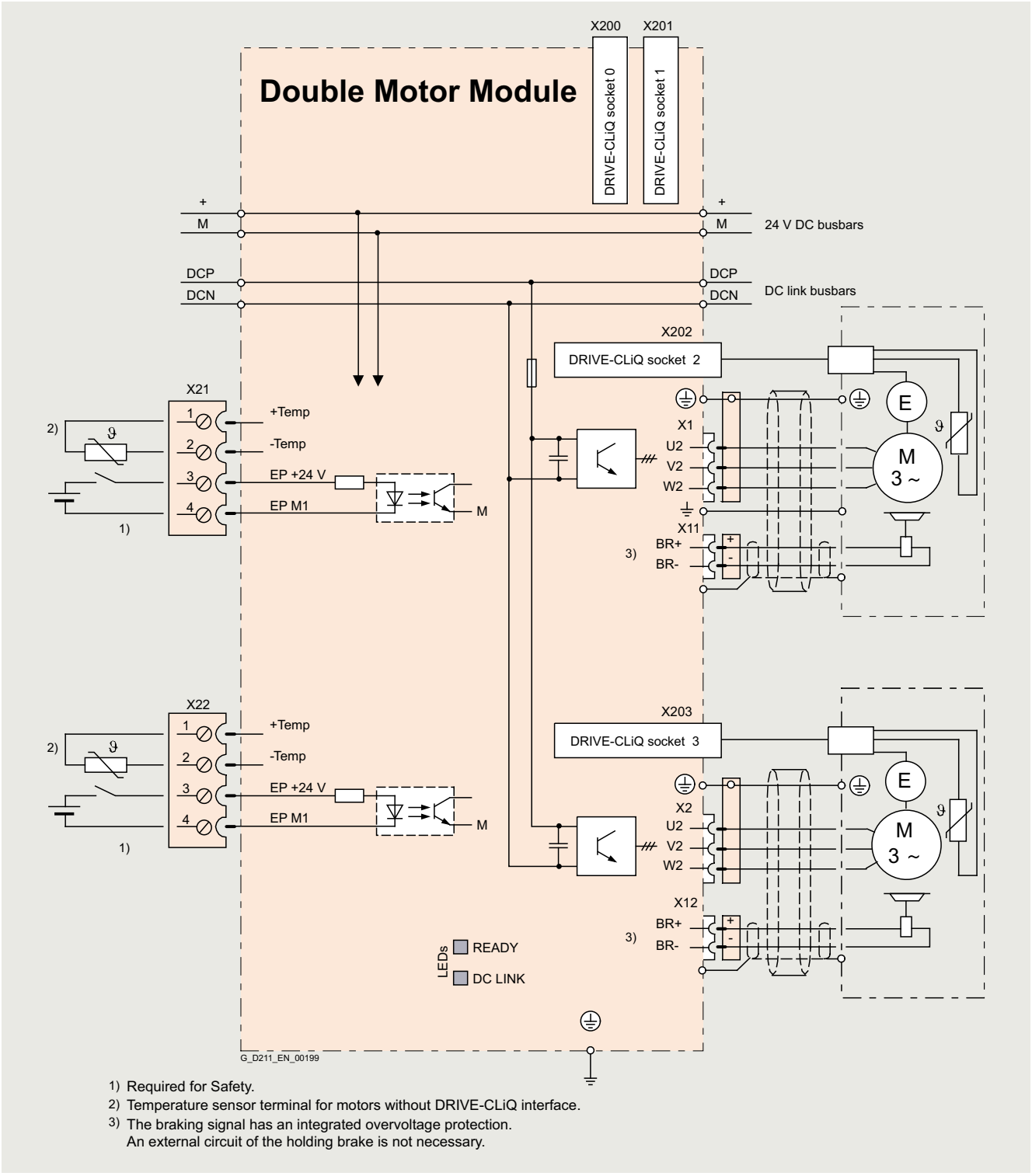
[1] Nominal hp ratings based on asynchronous (induction) motors. Match the motor nameplate current for specific sizing.

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Integration

The Double Motor Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit
- SINUMERIK 840D sl
- SINUMERIK ONE
- SINUMERIK MC



Connection example of Double Motor Modules in booksize compact format 2 × 3 A to 2 × 18 A

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Double Motor Modules in booksize compact format

Technical specifications

	Double Motor Module in booksize compact format 6SL3420-2TE1...
DC link voltage (up to 2000 m (6562 ft) above sea level)	510 ... 720 V DC (line voltage 380 ... 480 V 3 AC)
Output frequency	
• Control mode Servo	0 ... 650 Hz [1) 2)]
• Control mode Vector	0 ... 300 Hz [1)]
• Control mode V/f	0 ... 600 Hz [1) 2)]
Electronics power supply	24 V DC -15 %/+20 %
Type of cooling	Internal air cooling (power units with increased air cooling by built-in fan)
Permissible ambient and coolant temperature (air) during operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 ... 55 °C (104 ... 131 °F), see derating characteristics
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, > 1000 ... 4000 m (3281 ... 13124 ft) above sea level, see derating characteristics
Declarations of conformity	CE (Low Voltage and EMC Directives)
Certificate of suitability	cURus
Safety Integrated	Safety Integrity Level 2 (SIL 2) acc. to IEC 61508, Performance Level d (PL d) acc. to ISO 13849-1 and Control Category 3 acc. to ISO 13849-1 or EN 954-1 For further information, see section Safety Integrated.

1) Note the correlation between max. output frequency, pulse frequency and current derating.
Further information, see section Configuration notes.

2) The output frequency is currently limited to 550 Hz. The specified values apply to systems with license for high output frequency.
For further information, see section Control Units and
https://support.industry.siemens.com/cs/document/104020669

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Technical specifications

DC link voltage 510 ... 720 V DC		Double Motor Module in booksize compact format		
Internal air cooling		6SL3420-2TE11-7AA1	6SL3420-2TE13-0AA1	6SL3420-2TE15-0AA1
Output current				
• Rated current I_{rated}	A	2 × 1.7	2 × 3	2 × 5
• For S6 duty (40 %) I_{S6}	A	2 × 2	2 × 3.5	2 × 6
• Base-load current I_H	A	2 × 1.5	2 × 2.6	2 × 4.3
• I_{max}	A	2 × 5.1	2 × 9	2 × 15
Type rating [1]				
• Based on I_{rated}	kW (hp)	2 × 0.9 (0.75)	2 × 1.6 (1.5)	2 × 2.7 (3)
• Based on I_H	kW (hp)	2 × 0.8 (0.5)	2 × 1.4 (1)	2 × 2.3 (2.5)
Rated pulse frequency	kHz	8	8	8
DC link current I_d [2]	A	4.1	7.2	12
Current carrying capacity				
• DC link busbars	A	100	100	100
• 24 V DC busbars [3]	A	20	20	20
DC link capacitance	µF	165	165	165
Current requirement At 24 V DC, max.	A	1	1	1
Power loss [4]	kW	0.11	0.13	0.19
Cooling air requirement	m^3/s (ft^3/s)	0.008 (0.3)	0.008 (0.3)	0.008 (0.3)
Sound pressure level L_{pA} (1 m)	dB	<60	<60	<60
Motor connection U2, V2, W2		2 connectors (X1, X2) with screw-type terminals	2 connectors (X1, X2) with screw-type terminals	2 connectors (X1, X2) with screw-type terminals
• Conductor cross-section	mm^2	0.2 ... 6	0.2 ... 6	0.2 ... 6
Shield connection		Integrated in connector (X1, X2)	Integrated in connector (X1, X2)	Integrated in connector (X1, X2)
PE connection		M5 screw	M5 screw	M5 screw
Motor brake connection		Connector (X11, X12), 24 V DC, 2 A	Connector (X11, X12), 24 V DC, 2 A	Connector (X11, X12), 24 V DC, 2 A
Motor cable length, max.				
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)
• Unshielded	m (ft)	75 (246)	75 (246)	75 (246)
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	75 (2.95)	75 (2.95)	75 (2.95)
• Height	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)
• Depth	mm (in)	226 (8.90)	226 (8.90)	226 (8.90)
Weight, approx.	kg (lb)	3.4 (7.50)	3.4 (7.50)	3.4 (7.50)

[1] Rated power of a typical standard asynchronous (induction) motor at 400 V AC.

[2] Rated DC link current for dimensioning an external DC connection. For DC link current calculation for dimensioning the Line Module, see section Configuration notes.

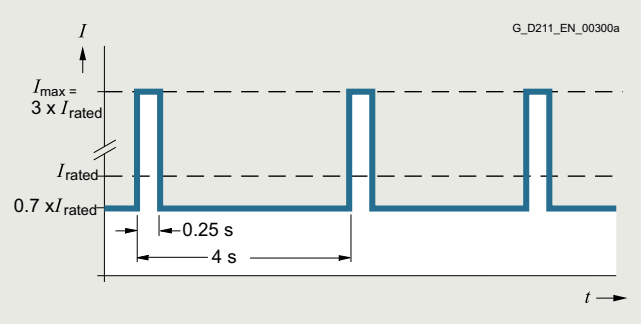
[3] If, due to a number of Line Modules and Motor Modules being mounted side-by-side, the current carrying capacity exceeds 20 A, an additional 24 V DC connection using a 24 V terminal adapter is required (max. cross-section 6 mm^2, max. fuse protection 20 A).

[4] Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.

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Characteristic curves

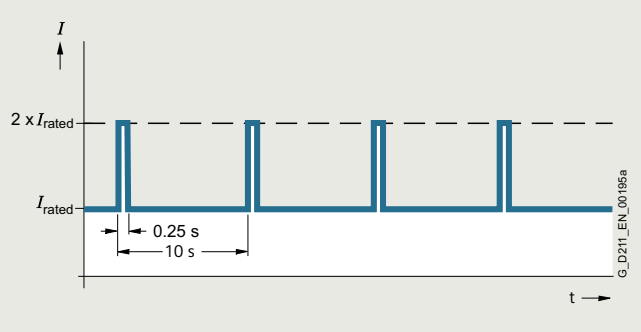
Overload capability



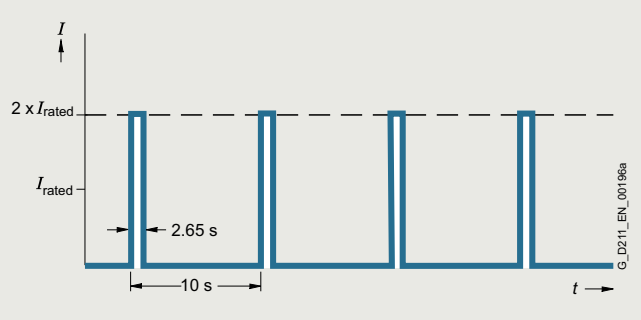
Peak current duty cycle with previous load (300 % overload)

Note:

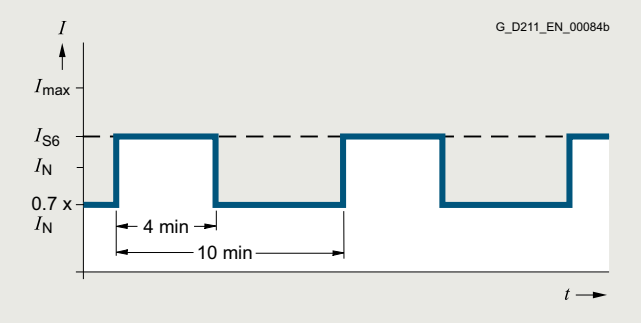
I_{max} stands for 2 × I_{rated} in the following overload characteristics.



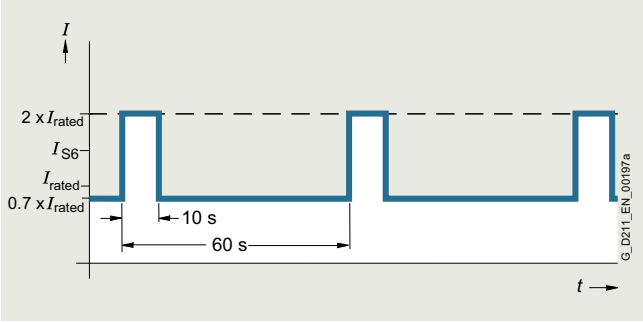
Duty cycle with previous load



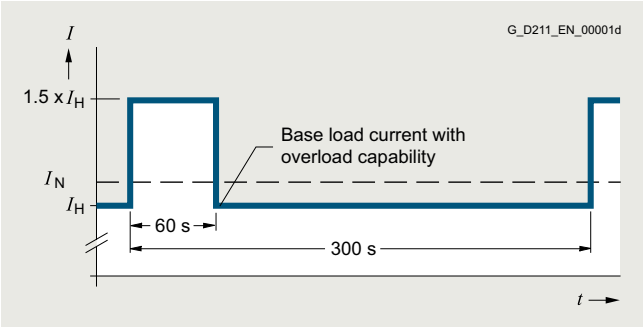
Duty cycle without previous load



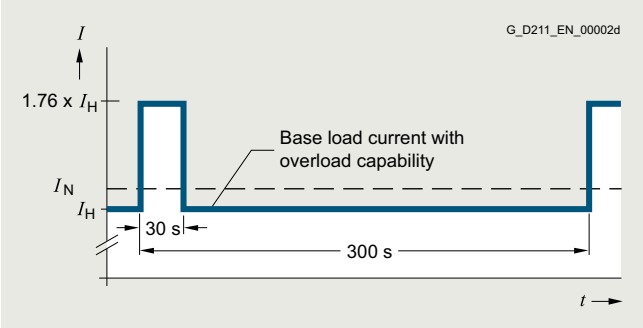
S6 duty cycle with previous load with a duty cycle duration of 600 s



S6 duty cycle with previous load with a duty cycle duration of 60 s



Duty cycle with 60 s overload with a duty cycle duration of 300 s

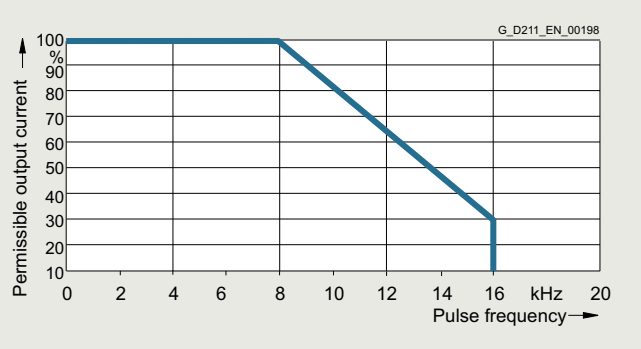


Dtuy cycle with 30 s overload with a duty cycle duration of 300 s

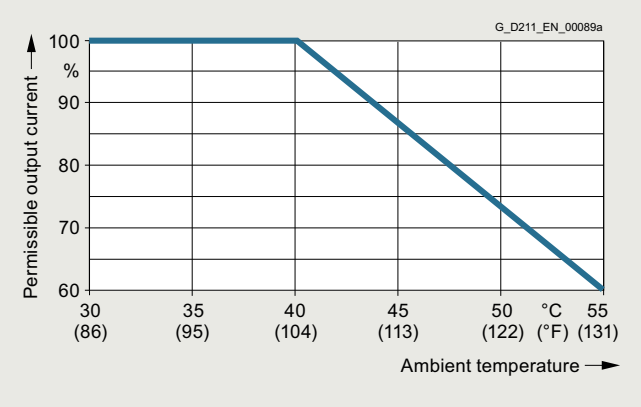
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Characteristic curves

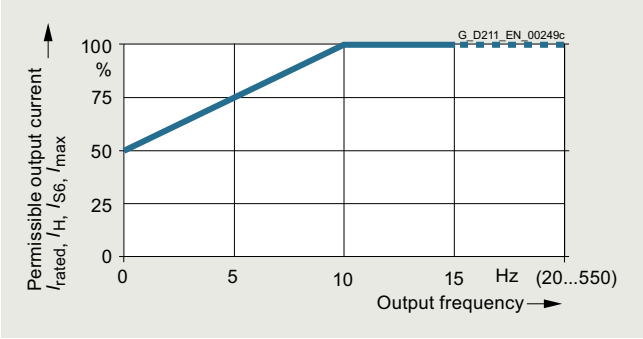
Derating characteristics



Output current as a function of pulse frequency



Output current as a function of ambient temperature



Current derating as a function of output frequency

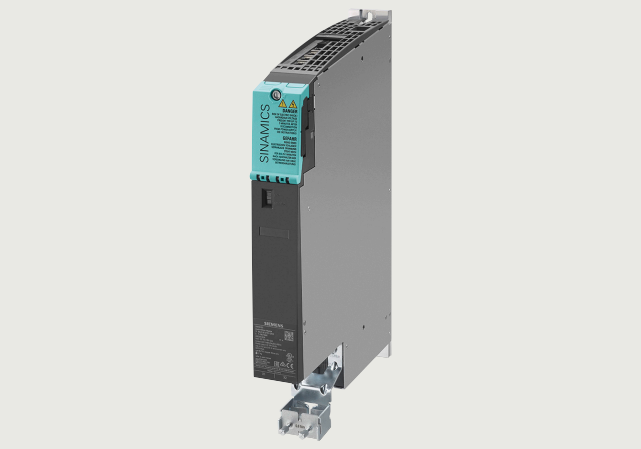
Installation altitude

- >1000 ... 4000 m (3281 ... 13124 ft) above sea level
  - Reduction of the output current by 10 % per 1000 m (3281 ft), or
  - Reduction of the ambient temperature by 5 °C (9 °F) per 1000 m (3281 ft)
- >2000 ... 4000 m (6562 ... 13124 ft) above sea level
  - Operation on line supply systems with grounded neutral point, or
  - Operation with an isolating transformer with secondary grounded neutral point

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Double Motor Modules in booksize format

Design



Double Motor Module in booksize format C/D type

Double Motor Modules feature the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 2 electronics power supply connections via integrated 24 V DC busbars
- 4 DRIVE-CLiQ sockets
- 2 motor connections via connectors X1 and X2 (not included in the scope of delivery)
- 2 safe standstill inputs (1 input per axis)
- 2 safe motor brake controls
- 2 temperature sensor inputs for KTY84-130, Pt1000 or PTC (Pt1000 can be used from firmware V4.7 HF17)
- 1 PE (protective earth) connection

The status of the Motor Modules is indicated via two multi-color LEDs.

The Motor Modules are supplied with a mounted shield connection plate. The associated shield connection clamp can be found in the Terminal Kit supplied.

Motor Modules in booksize format C/D types, 2 × 3 A to 2 × 18 A

Rated current	3 A	5 A	9 A	18 A	24 A	30 A	45 A	60 A
	D types							
Single Motor Modules	**3 A / 9 A** 50 mm (1.97 in)	**5 A / 15 A** 50 mm (1.97 in)	**9 A / 27 A** 50 mm (1.97 in)	**18 A / 54 A** 50 mm (1.97 in)	**24 A / 72 A** 50 mm (1.97 in)	**30 A / 90 A** 100 mm (3.94 in)	–	–
Double Motor Modules	**2 x 3 A / 2 x 9 A** 50 mm (1.97 in)	**2 x 5 A / 2 x 15 A** 50 mm (1.97 in)	**2 x 9 A / 2 x 27 A** 50 mm (1.97 in)	**2 x 18 A / 2 x 54 A** 100 mm (3.94 in)	–	–	–	–
			C types					
			Single Motor Modules	**18 A / 36 A** 50 mm (1.97 in)	**24 A / 48 A** 50 mm (1.97 in)	**30 A / 56 A** 100 mm (3.94 in)	**45 A / 90 A** 100 mm (3.94 in)	**60 A / 120 A** 100 mm (3.94 in)
Rated current / maximum current in A 50 mm (1.97 in) or 100 mm (3.94 in) widths			Double Motor Module	**2 x 18 A / 2 x 36 A** 100 mm (3.94 in)	–	–	–	–

G_PM21_EN_00267a

Overview of available Double Motor Modules in booksize format C/D types

- C type: Optimized for continuous load with up to 200 % overload (continuous motion)
- D type: Optimized for highly dynamic, intermittent duty cycles with up to 300 % overload (discontinuous motion)

Devices in booksize format C/D types are optimized for multi-axis applications and are mounted next to one another. The connection for the common DC link is an integral feature. The device is internally air cooled.

The Motor Modules in booksize format C/D types have been developed to be fully compatible with the booksize series regarding spare parts and offer the following advantages:

- The amount of space required beneath the Motor Modules has been reduced thanks to improvements in the design and a new motor plug connector
- With the new motor plug connector design, the brake conductors and the PE connection are integrated directly in the plug connector
- The motor connections on the Double Motor Module are located side by side, resulting in a significantly improved level of accessibility
- The fan can be simply replaced without having to remove the Motor Module
- The Double Motor Module 2 x 18 A is available with double and treble overload

The signal cable shield can be connected to the Motor Module by means of a shield connection clamp, e.g. Weidmüller type KLBUE 3-8 SC.

The scope of delivery of the Motor Modules includes:

- DRIVE-CLiQ cable appropriate to the width of the Motor Module for connection to the adjacent Motor Module, length = width of Motor Module + 0.06 m (0.20 ft)
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- Connectors X21 and X22
- Device fans supplied from the internal voltage levels for cooling the power unit
- 1 shield connection plate with shield connection clamp
- 1 set of warning labels in 36 languages

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Selection and ordering data

Rated output current	Type rating[1]	Double Motor Module in booksize format	
		C type	D type
A	kW (hp)	Article No.	Article No.
DC link voltage 510 ... 720 V DC			
2 × 3	2 × 1.6 (2 × 1.5)	–	**6SL3120-2TE13-0AD0**
2 × 5	2 × 2.7 (2 × 3)	–	**6SL3120-2TE15-0AD0**
2 × 9	2 × 4.8 (2 × 5)	–	**6SL3120-2TE21-0AD0**
2 × 18	2 × 9.7 (2 × 10)	**6SL3120-2TE21-8AC0**	**6SL3120-2TE21-8AD0**

Description	Article No.
Accessories	
Power connector (X1/X2) with screw-type terminal At Motor Module end, with screw-type terminals 1.5 ... 6 mm^2 For Motor Modules in booksize format C/D types with rated output current of 3 ... 30 A	**6SL3162-2MA00-0AC0**
Power connector (X1/X2) with push-in connection with snap-in actuators At Motor Module end, with spring-loaded terminals 1.5 ... 6 mm^2 For Motor Modules in booksize format C/D types with rated output current of 3 ... 30 A	**6SL3162-2MB00-0AC0**
DC link rectifier adapter For direct infeed of DC link voltage Screw-type terminals 0.5 ... 10 mm^2 For Motor Modules in booksize format with a width of 50 mm (1.97 in) or 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 120 mm^2 For all Line Modules and Motor Modules in booksize format	**6SL3162-2BM01-0AA0**
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
Reinforced DC link bridge 6 mm (0.24 in) For replacement of the DC link bridge in Single Motor Modules 3 A ... 24 A Double Motor Modules 2 x 3 A ... 2 x 9 A	**6SL3162-2BB00-0AA0**

Description	Article No.
Accessories for re-ordering	
24 V jumper For connection of the 24 V busbars (for booksize format)	**6SL3162-2AA01-0AA0**
Terminal Kit (24 V jumper, plug-in terminals, DRIVE-CLiQ jumper (length = module width + 60 mm (2.36 in)), shield connection clamp with pressure plate, dust protection blanking plugs, coding plug for X1 and X2) For Motor Modules with a width of	
• 50 mm (1.97 in), C/D type	**6SL3162-8AD00-0AA0**
• 100 mm (3.94 in), C/D type	**6SL3162-8BF00-0AA0**
Shield connection clamp For Double Motor Modules in booksize format C/D types	**6SL3162-0AR00-0AA0**
Warning labels in 36 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, CN, ID, IL, IR, JP, KR, SA, TH, TW	**6SL3166-3AB00-0AA0**
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**
Replacement fan For Motor Modules with a width of	
• 50 mm (1.97 in), C/D type	**6SL3162-0AN00-0AA0**
• 100 mm (3.94 in), C/D type	**6SL3162-0AP00-0AA0**

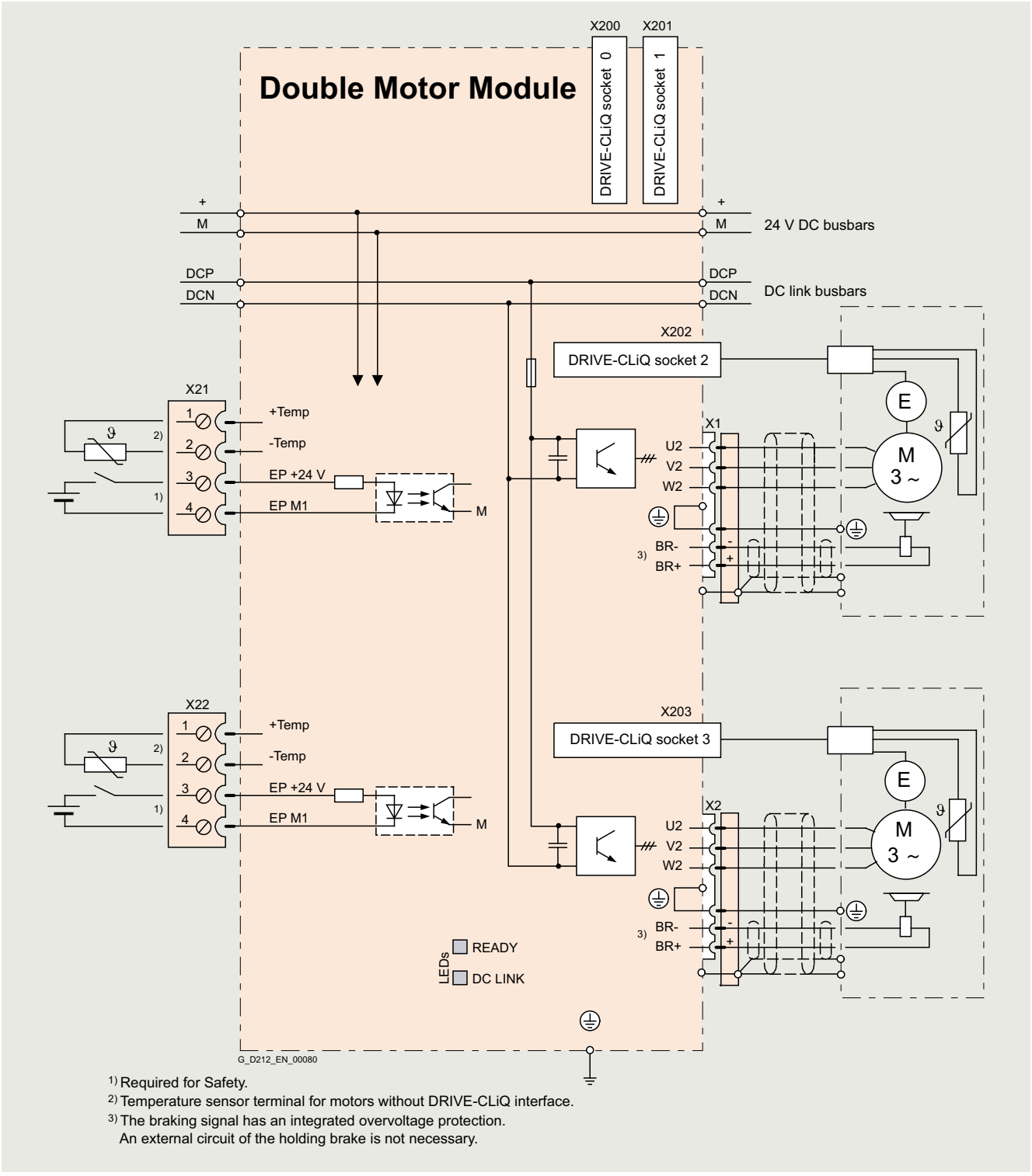
[1] Nominal hp ratings based on asynchronous (induction) motors. Match the motor nameplate current for specific sizing.

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Integration

The Double Motor Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit
- SINUMERIK 840D sl
- SINUMERIK ONE
- SINUMERIK MC



Connection example of Double Motor Modules in booksize format C/D types, 2 × 3 A to 2 × 18 A

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Technical specifications

	Double Motor Module in booksize format 6SL3120-2TE...
DC link voltage (up to 2000 m (6562 ft) above sea level)	510 ... 720 V DC (line voltage 380 ... 480 V 3 AC)
Output frequency	
• Control mode Servo	0 ... 650 Hz [1) 2) 3)]
• Control mode Vector	0 ... 300 Hz [2)]
• Control mode V/f	0 ... 600 Hz [2) 3)]
Electronics power supply	24 V DC -15 %/+20 %
Type of cooling	Internal air cooling (power units with increased air cooling by built-in fan)
Permissible ambient and coolant temperature (air) during operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, >40 ... 55 °C (104 ... 131 °F), see derating characteristics
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, > 1000 ... 4000 m (3281 ... 13124 ft) above sea level, see derating characteristics
Declarations of conformity	CE (Low-Voltage and EMC Directives)
Certificate of suitability	cULus
Safety Integrated	Safety Integrity Level 2 (SIL 2) according to IEC 61508, Performance Level d (PL d) and Category 3 according to ISO 13849-1 For further information, see section Safety Integrated.

[1)] At rated output current (max. output frequency 1300 Hz for 62.5 µs current control cycle, 8 kHz pulse frequency, 60 % permissible output current).

[2)] Note the correlation between max. output frequency, pulse frequency and current derating.
For further information, see section Configuration notes.

[3)] The output frequency is currently limited to 550 Hz. The specified values apply to systems with license for high output frequency.
For further information, see section Control Units and https://support.industry.siemens.com/cs/document/104020669

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Double Motor Modules in booksize format

Technical specifications

DC link voltage 510 ... 720 V DC		Double Motor Module in booksize format			
Internal air cooling C type	6SL3120-...	–	–	–	2TE21-8AC0
Internal air cooling D type	6SL3120-...	2TE13-0AD0	2TE15-0AD0	2TE21-0AD0	2TE21-8AD0
Output current					
• Rated current I_{rated}	A	2 × 3	2 × 5	2 × 9	2 × 18
• For S6 duty (40 %) I_{S6}					
- C type	A	–	–	–	2 × 24
- D type	A	2 × 4	2 × 6.7	2 × 12	2 × 24
• Base-load current I_H	A	2 × 2.6	2 × 4.3	2 × 7.7	2 × 15.3
• I_{max}					
- C type	A	–	–	–	2 × 36
- D type	A	2 × 9	2 × 15	2 × 27	2 × 54
Type rating [1]					
• Based on I_{rated}	kW (hp)	2 × 1.6 (1.5)	2 × 2.7 (3)	2 × 4.8 (5)	2 × 9.7 (10)
• Based on I_H	kW (hp)	2 × 1.4 (1)	2 × 2.3 (2.5)	2 × 4.1 (5)	2 × 8.2 (10)
DC link current I_d [2]	A	7.2	12	22	43
Current carrying capacity					
• DC link busbars	A	100	100	100	200
• 24 V DC busbars [3]	A	20	20	20	20
DC link capacitance	µF	220	220	220	705
Current requirement At 24 V DC, max.	A	0.9	0.9	0.9	1.1
Power loss [4] typ. [5]/max.	kW	0.05/0.1	0.08/0.13	0.15/0.19	0.28/0.35
Cooling air requirement	m^3/s (ft^3/s)	0.009 (0.32)	0.009 (0.32)	0.009 (0.32)	0.0155 (0.55)
Sound pressure level L_{pA} (1 m)	dB	<60	<60	<60	<60
Motor connection U2, V2, W2		2 × plug-in connector (X1, X2) [6], 2 × (1.5 ... 6 mm^2)	2 × plug-in connector (X1, X2) [6], 2 × (1.5 ... 6 mm^2)	2 × plug-in connector (X1, X2) [6], 2 × (1.5 ... 6 mm^2)	2 × plug-in connector (X1, X2) [6], 2 × (1.5 ... 6 mm^2)
PE connection		M5 screw	M5 screw	M5 screw	M5 screw
Motor brake connection		Integrated into the plug-in motor connector (X1, X2), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1, X2), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1, X2), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1, X2), 24 V DC, 2 A
Motor cable length, max.					
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	70 (230)
• Unshielded	m (ft)	75 (246)	75 (246)	75 (246)	100 (328)
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	50 (1.97)	50 (1.97)	50 (1.97)	100 (3.94)
• Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
• Depth	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
Weight, approx.	kg (lb)	4.7 (10.4)	4.7 (10.4)	4.7 (10.4)	7.7 (17.0)

[1] Rated power of a typical standard asynchronous (induction) motor at 400 V AC.

[2] Rated DC link current for dimensioning an external DC connection. For DC link current calculation for dimensioning the Line Module, see section Configuration notes.

[3] If, due to a number of Line Modules and Motor Modules being mounted side-by-side, the current carrying capacity exceeds 20 A, an additional 24 V DC connection using a 24 V terminal adapter is required (max. cross-section 6 mm^2, max. fuse protection 20 A).

[4] Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.

[5] At max. motor cable length 30 m (98.43 ft), pulse frequency 4 kHz and DC link voltage 540 ... 600 V.

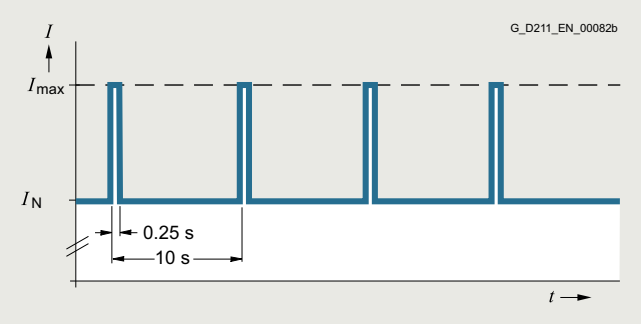
[6] Connector not included in scope of delivery, see Accessories.

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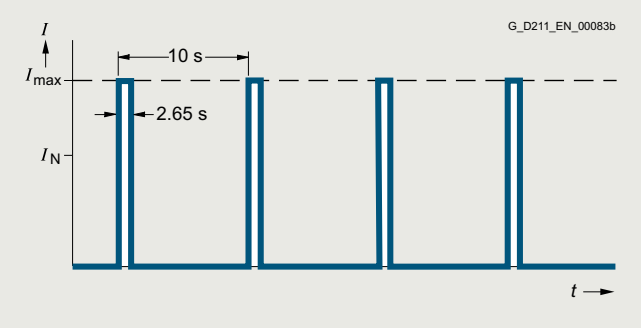
Characteristic curves

Overload capability

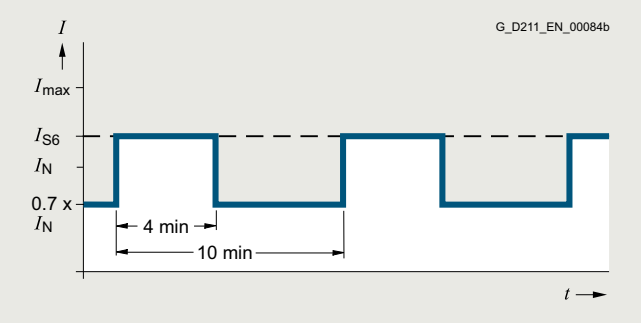
Motor Modules in booksize format C type



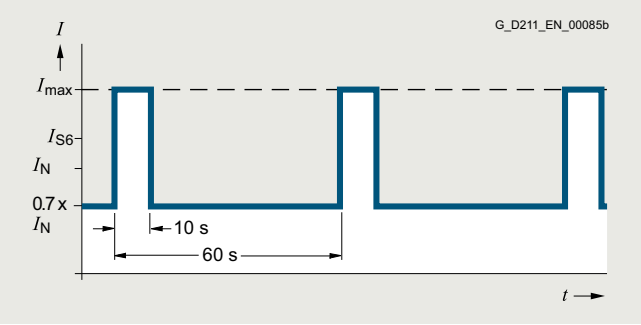
Duty cycle with previous load



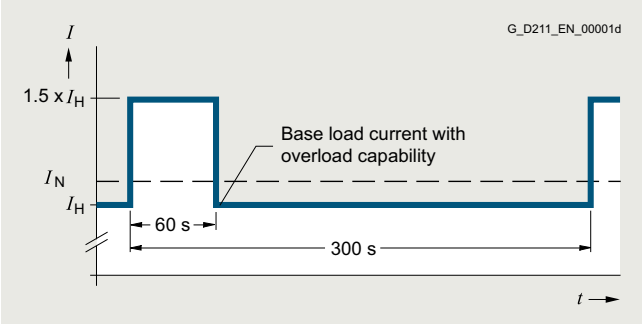
Duty cycle without previous load



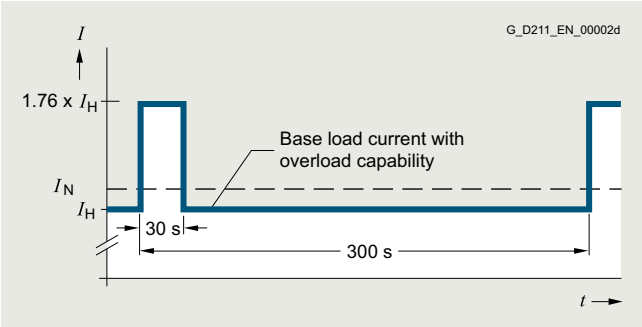
S6 duty cycle with previous load with a duty cycle duration of 600 s



S6 duty cycle with previous load with a duty cycle duration of 60 s



Duty cycle with 60 s overload with a duty cycle duration of 300 s

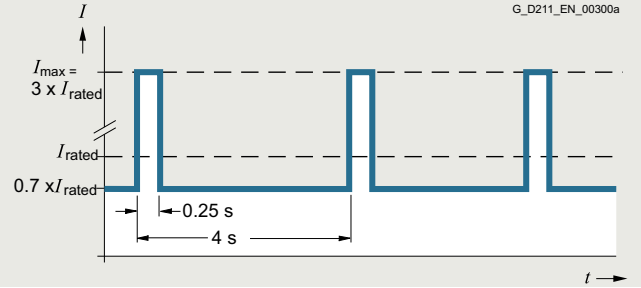


Duty cycle with 30 s overload with a duty cycle duration of 300 s

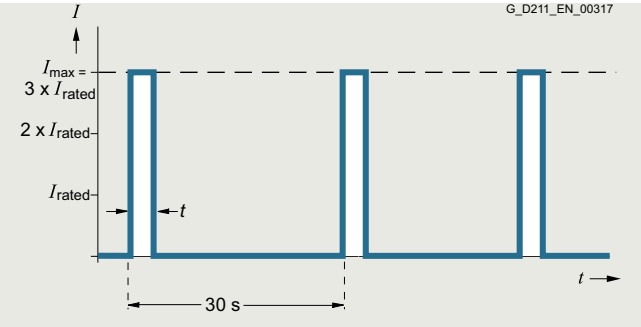
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Characteristic curves

Motor Modules in booksize format D type



Peak current duty cycle with previous load (300 % overload)

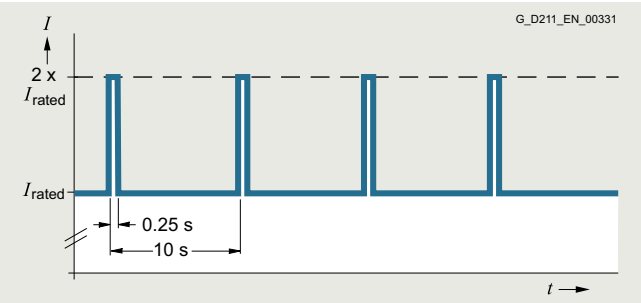


Peak current duty cycle without previous load (300 % overload)

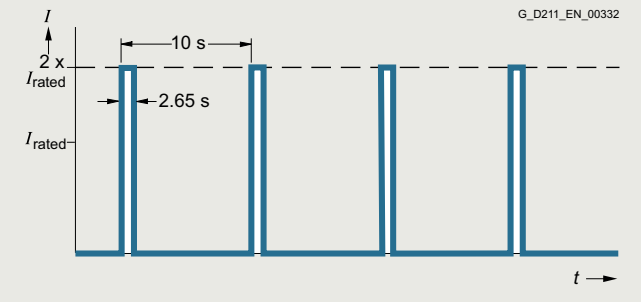
Double Motor Module	Time t at I_{max}
2 × 3 A	0.5 s
2 × 5 A	0.5 s
2 × 9 A	0.5 s
2 × 18 A	1.25 s

Note:

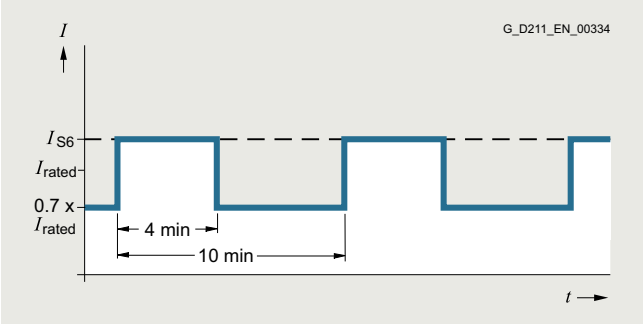
The duty cycle shown above is not permissible for a pulse frequency of 16 kHz. The current must be derated for a pulse frequency of 8 kHz.



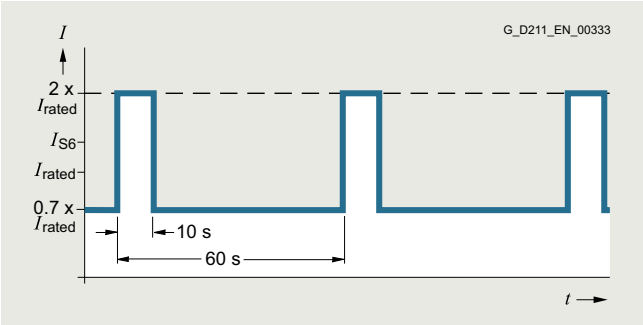
Duty cycle with previous load



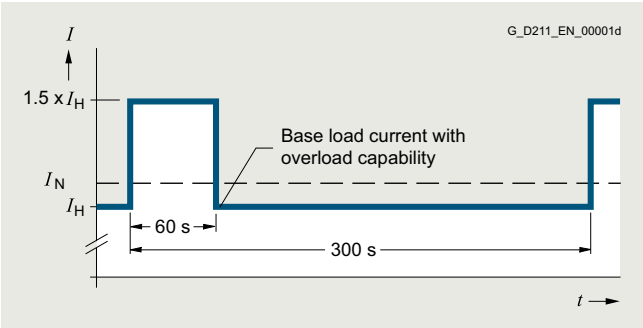
Duty cycle without previous load



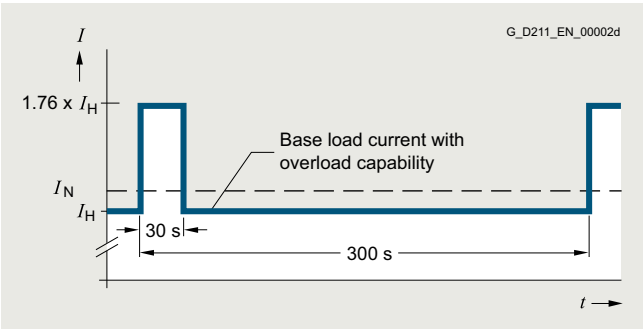
S6 duty cycle with previous load with a duty cycle duration of 600 s



S6 duty cycle with previous load with a duty cycle duration of 60 s



Duty cycle with 60 s overload with a duty cycle duration of 300 s

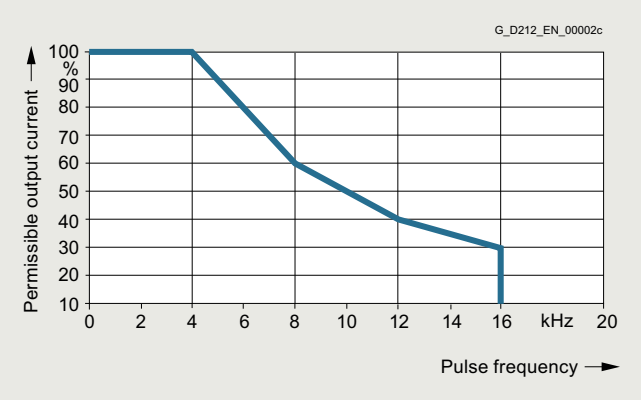


Duty cycle with 30 s overload with a duty cycle duration of 300 s

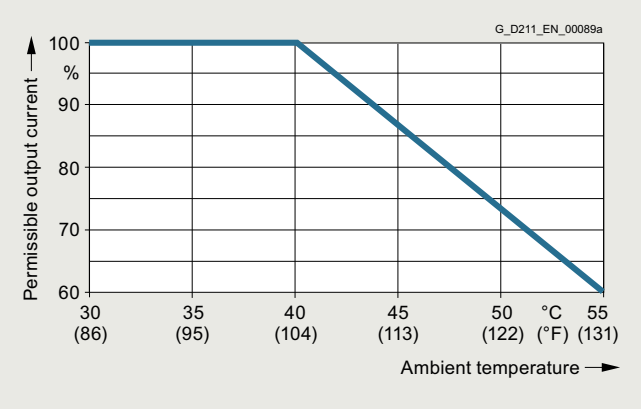
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Characteristic curves

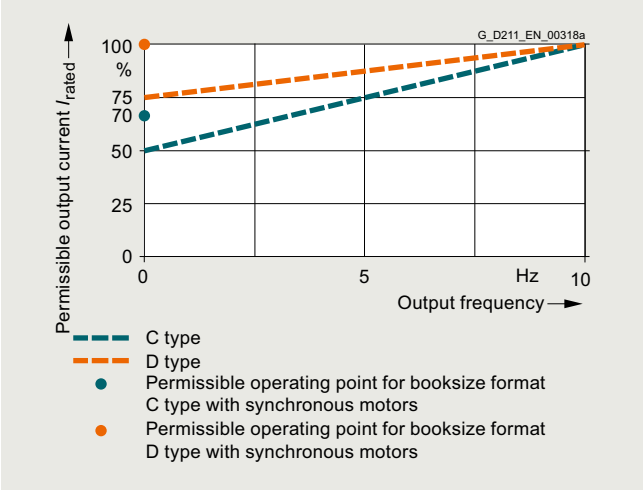
Derating characteristics



Output current as a function of pulse frequency



Output current as a function of ambient temperature



Output current at low output frequencies

Installation altitude

- >1000 ... 4000 m (3281 ... 13124 ft) above sea level
  - Reduction of the output current by 10 % per 1000 m (3281 ft), or
  - Reduction of the ambient temperature by 5 °C (9 °F) per 1000 m (3281 ft)
- >2000 ... 4000 m (6562 ... 13124 ft) above sea level
  - Operation on line supply systems with grounded neutral point, or
  - Operation with an isolating transformer with secondary grounded neutral point

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Braking Module in booksize compact format

Overview



Braking Module booksize compact format

A Braking Module and the matching external braking resistor are required to bring drives to a controlled standstill in the event of a power failure (e.g. emergency retraction or EMERGENCY OFF category 1) or limit the DC link voltage for brief periods of generator operation, e.g. when the regenerative feedback capability of the Line Module is deactivated. The Braking Module includes the power electronics and the associated control circuit. During operation, the DC link power is converted into heat loss in an external braking resistor. Braking Modules function autonomously. Several Braking Modules in booksize compact format can be operated in parallel. In this case, each Braking Module must have its own braking resistor. Braking Modules in booksize compact format can also be used for rapid discharge of the DC link.

Design

The Braking Modules in booksize compact format can be integrated in drive line-ups in booksize and booksize compact formats.

The Braking Module in booksize compact format features the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 2 electronics power supply connections via integrated 24 V DC busbars
- Connector X1 for connecting the braking resistor
- Connection for thermostatic switch for monitoring the braking resistor
- 4 DIP switches for setting the operating threshold, selecting the braking resistor and the cooling method for the Braking Module
- 2 digital inputs (disable Braking Module/acknowledge faults and rapid discharge of DC link)
- 3 digital outputs (Braking Module disabled, prewarning from $I \times t$ monitor and set activation threshold)
- 2 PE (protective earth) connections

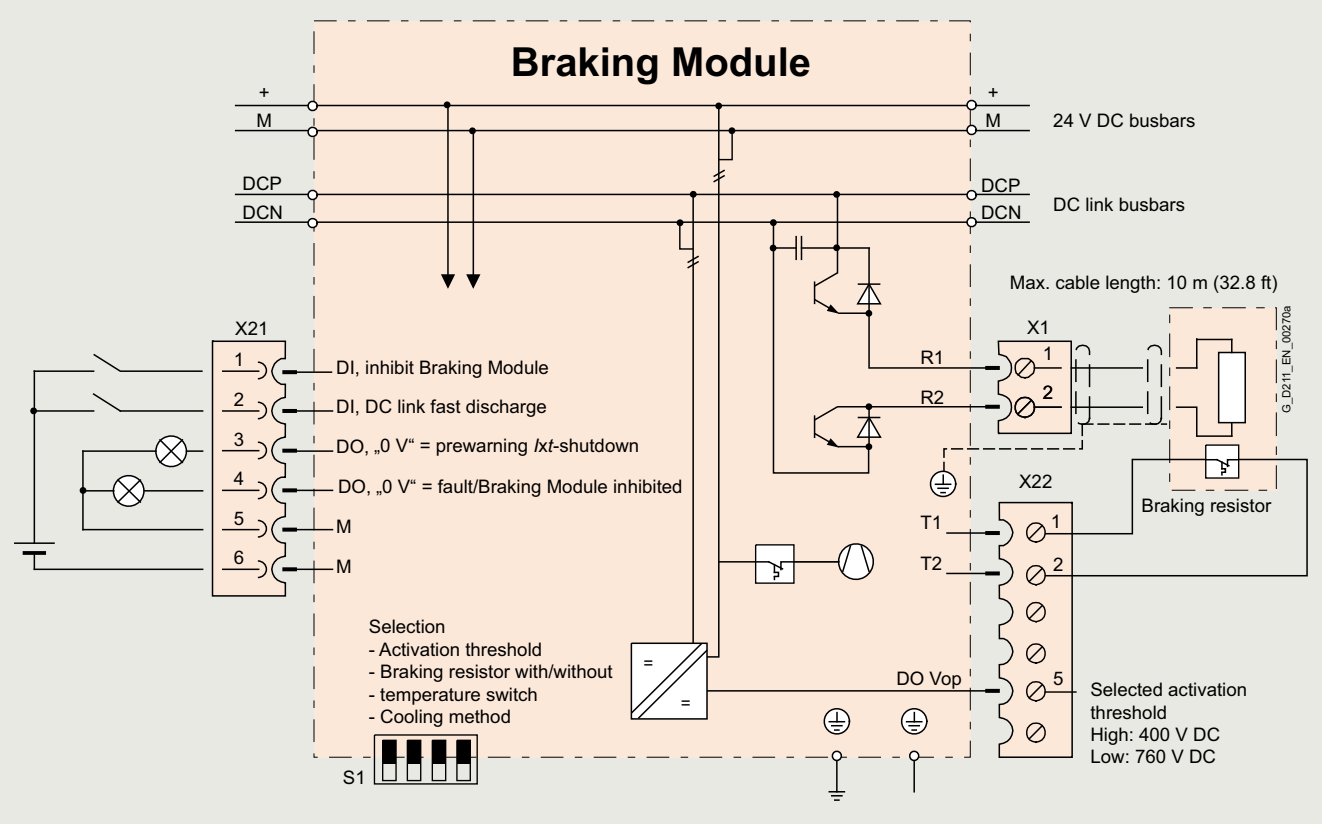
The status of the Braking Module is indicated via two 2-color LEDs.

Selection and ordering data

Description	Article No.
DC link voltage 510 ... 720 V DC	
Braking Module in booksize compact format	**6SL3400-1AE31-0AA1**
Accessories	
Spacing bolt (4 units) The mounting depth of modules in booksize compact format is increased when it is mounted on these spacing bolts by such an amount that it can be integrated into a drive line-up in booksize format. 2 spacing bolts are needed to mount 50 mm (1.97 in) wide modules.	**6SL3462-1CC00-0AA0**
Warning labels in 36 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, CN, ID, IL, IR, JP, KR, SA, TH, TW	**6SL3166-3AB00-0AA0**

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Integration



Connection example of Braking Module in booksize compact format

Technical specifications

DC link voltage 510 ... 720 V DC	Braking Module in booksize compact format Internal air cooling 6SL3400-1AE31-0AA1
Rated power P_{DB}	5 kW (2.5 kW) [1) 2)]
Peak power P_{max}	100 kW (50 kW) [1) 2)]
Activation threshold	760 V (400 V) [1)]
Cable length to braking resistor, max.	10 m (32.8 ft)
DC link capacitance	6 µF
Current requirement with 24 V DC, max.	0.5 A
Digital inputs In accordance with IEC 61131-2 Type 1	
• Voltage	-3 ... +30 V
• Low level (an open digital input is interpreted as "low")	-3 ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC, typ.	10 mA
• Conductor cross-section, max.	1.5 mm^2

DC link voltage 510 ... 720 V DC	Braking Module in booksize compact format Internal air cooling 6SL3400-1AE31-0AA1
Digital outputs (sustained-short-circuit-proof)	
• Voltage	24 V DC
• Load current per digital output, max.	100 mA
• Conductor cross-section, max.	1.5 mm^2
Current carrying capacity	
• 24 V DC busbars	20 A
• DC link busbars	100 A
PE connection	M5 screw
Dimensions	
• Width	50 mm (1.97 in)
• Height	270 mm (10.63 in)
• Depth	226 mm (8.90 in)
Weight, approx.	2.7 kg (5.95 lb)
Certificate of suitability	cURus

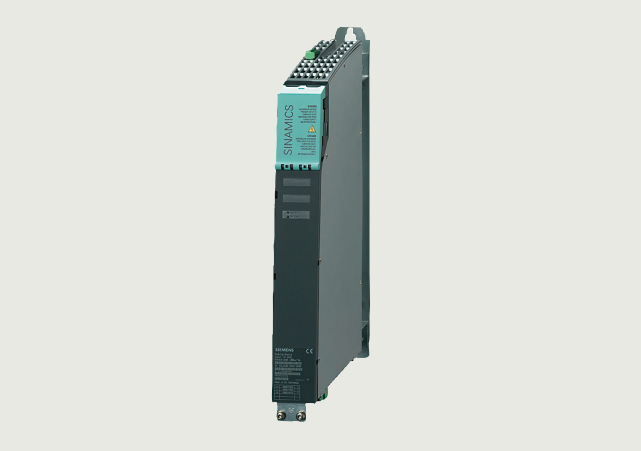
[1)] The activation threshold of the Braking Module in booksize compact format can be set on a DIP switch. The higher values for peak or rated braking power apply in operation at the upper activation threshold 760 V DC (factory setting). The outputs specified in parentheses are possible at the lower activation threshold 400 V DC.

[2)] Several Braking Modules in the booksize format can be operated in parallel, typically up to 4 modules.

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Braking Module in booksize format

Overview



Braking Module in booksize format

A Braking Module and the matching external braking resistor are required to bring drives to a controlled standstill in the event of a power failure (e.g. emergency retraction or EMERGENCY STOP category 1) or limit the DC link voltage for brief periods of generator operation, e.g. when the regenerative feedback capability of the Line Module is deactivated. The Braking Module includes the power electronics and the associated control circuit. During operation, the DC link energy is converted into heat loss in an external braking resistor. Braking Modules function autonomously.

Braking Modules in booksize format can also be used for rapid discharge of the DC link.

Design

The Braking Module in booksize format features the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 2 electronics power supply connections via integrated 24 V DC bars
- Terminals for connecting the braking resistor
- 2 digital inputs (disable Braking Module/acknowledge faults and rapid discharge of DC link)
- 2 digital outputs (Braking Module disabled and prewarning – $I \times t$ monitoring)
- 2 PE (protective earth) connections

The status of the Braking Module is indicated via two 2-color LEDs.

Selection and ordering data

Description	Article No.
DC link voltage 510 ... 720 V DC	
Braking Module in booksize format	**6SL3100-1AE31-0AB1**
Accessories	
Warning labels in 36 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, CN, ID, IL, IR, JP, KR, SA, TH, TW	**6SL3166-3AB00-0AA0**

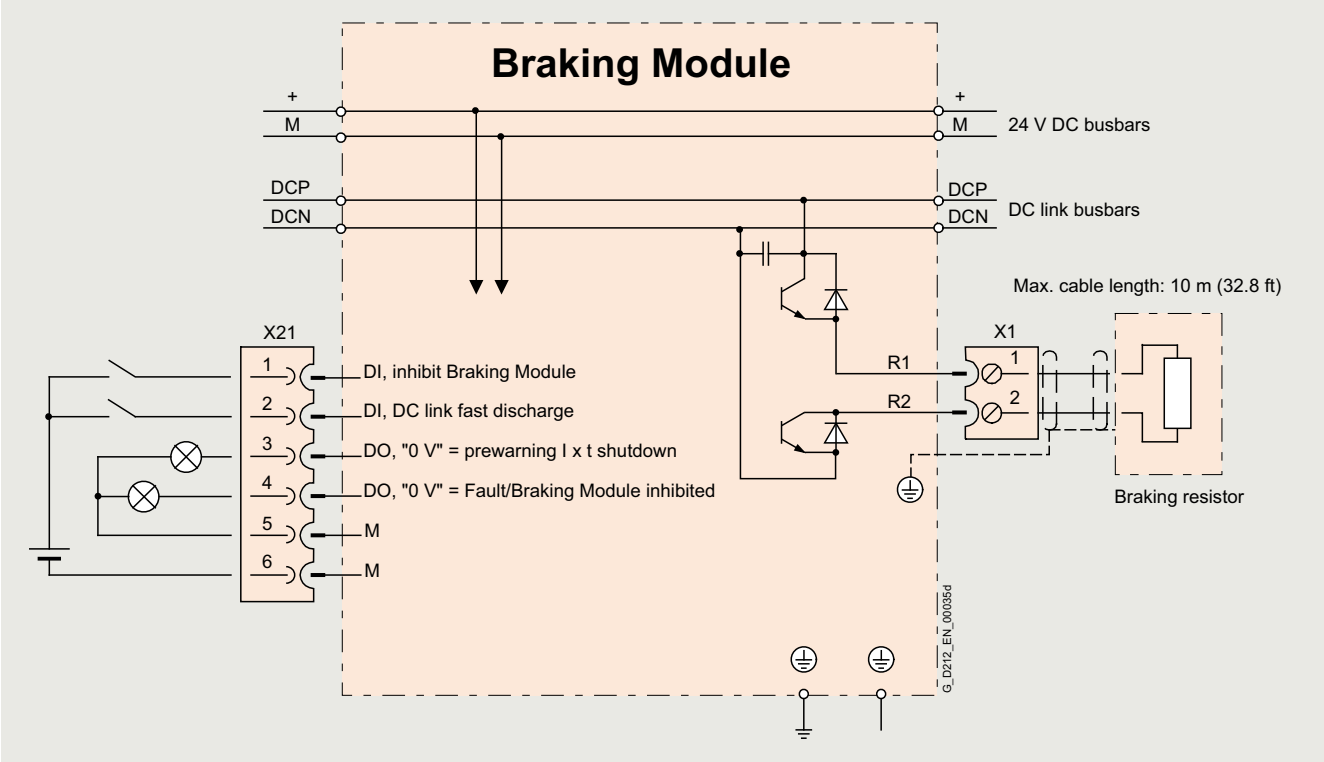
Technical specifications

DC link voltage 510 ... 720 V DC	**Braking Module in booksize format Internal air cooling** 6SL3100-1AE31-0AB1
Rated power P_{DB}	1.5 kW [1]
Peak power P_{max}	100 kW [1]
Activation threshold	770 V
Cable length to braking resistor, max.	10 m (32.81 ft)
DC link capacitance	110 µF
Current requirement with 24 V DC, max.	0.5 A
Digital inputs In accordance with IEC 61131-2 Type 1	
• Voltage	-3 V ... +30 V
• Low level (an open digital input is interpreted as "low")	-3 V ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC, typ.	10 mA
• Conductor cross-section, max.	1.5 mm²
Digital outputs (continuously short-circuit proof)	
• Voltage	24 V DC
• Load current per digital output, max.	100 mA
• Conductor cross-section, max.	1.5 mm²
Current carrying capacity	
• 24 V DC busbars	20 A
• DC link busbars	100 A
PE connection	M5 screw
Dimensions	
• Width	50 mm (1.97 in)
• Height	380 mm (14.96 in)
• Depth, with spacer (included in scope of supply)	270 mm (10.63 in)
Weight, approx.	4.1 kg (9 lb)
Certificate of suitability	cURus

[1] Connecting Braking Modules in the booksize format in parallel should be avoided, as it cannot be guaranteed that the power will be evenly divided between the modules.

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Integration



Connection example of Braking Module in booksize format

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Braking resistors for booksize format

Overview



The excess energy of the DC link is dissipated via the braking resistor.

The corresponding braking resistor is connected to a Braking Module or Basic Line Module. Mounting the braking resistor outside the control cabinet or switchgear room allows the power losses to be dissipated, thereby allowing a corresponding reduction in the level of air conditioning required.

Selection and ordering data

Power P_{DB}/P_{max}	Suitable for	**Braking resistor** Article No.
DC link voltage 510 ... 720 V DC		
0.3 kW/25 kW	Braking Module 6SL3100-1AE31-0AB1	**6SN1113-1AA00-0DA0**
1.5 kW/100 kW	Braking Module 6SL3100-1AE31-0AB1	**6SL3100-1BE31-0AA0**
5 kW/30 kW	Basic Line Module 20 kW 6SL3130-1TE22-0AA0	**6SE7023-2ES87-2DC0**
12.5 kW/75 kW	Basic Line Module 40 kW 6SL3130-1TE24-0AA0	**6SE7028-0ES87-2DC0**

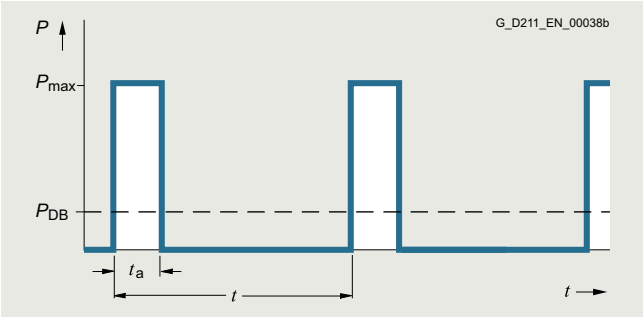
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Technical specifications

DC link voltage 510 V ... 720 V DC		Braking resistor for Braking Module in booksize and booksize compact format			
		6SN1113-1AA00-0DA0		6SL3100-1BE31-0AA0	
Resistance	Ω	17		5.7	
Rated power P_{DB}	kW	0.3		1.5	
Peak power P_{max}	kW	25		100	
Load duration for peak output t_a	s	0.1	0.4	1	2
Cycle duration of braking duty cycle t	s	11.5	210	68	460
Degree of protection		IP54 Braking resistor with connected 1.5 mm² cable (shielded), 3 m (9.84 ft) long		IP20	
Dimensions					
• Width	mm (in)	80 (3.15)		193 (7.60)	
• Height	mm (in)	210 (8.27)		410 (16.1)	
• Depth	mm (in)	53 (2.09)		240 (9.45)	
Weight, approx.	kg (lb)	3.4 (7.50)		5.6 (12.3)	
Certificate of suitability		cULus		–	

DC link voltage 510 V ... 720 V DC		Braking resistor	
		6SE7023-2ES87-2DC0	6SE7028-0ES87-2DC0
Resistance	Ω	20	8
Rated power P_{DB}	kW	5	12.5
Peak power P_{max}	kW	30	75
Load duration for peak output t_a	s	15	15
Cycle duration of braking duty cycle t	s	90	90
Degree of protection		IP20	IP20
Power connection		M6 screw stud	M6 screw stud
PE connection		M6 screw stud	M6 screw stud
Thermostatic switch (NC contact)		Screw-type terminals	Screw-type terminals
• Switching capacity		250 V AC/max. 10 A 42 V/0.2 A DC	250 V AC/max. 10 A 42 V/0.2 A DC
• Conductor cross-section	mm²	2.5	1.5
Dimensions			
• Width	mm (in)	450 (17.72)	745 (29.33)
• Height	mm (in)	305 (12.01)	305 (12.01)
• Depth	mm (in)	485 (19.09)	485 (19.09)
Weight, approx.	kg (lb)	17 (37.5)	27 (59.5)
Certificate of suitability		UL, CSA	UL, CSA
Suitable for			
Basic Line Module in booksize format	Type	6SL3130-1TE22-0AA0	6SL3130-1TE24-0AA0
Braking Module in booksize compact format	Type	6SL3400-1AE31-0AA1	–

Characteristic curves



Load diagram for Braking Module in booksize format and braking resistors for booksize format

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Capacitor Module in booksize format

Overview



Capacitor Module in booksize format

Capacitor Modules are used to increase the DC link capacitance to bridge momentary power losses.

Capacitor Modules are connected to the DC link voltage via the integrated DC link busbars. Capacitor Modules function autonomously.

Several Capacitor Modules can be operated in parallel.

Design

Capacitor Modules feature the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 2 PE (protective earth) connections

Selection and ordering data

Description	Article No.
Capacitor Module	**6SL3100-1CE14-0AA0**
Accessories	
Warning labels in 36 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, CN, ID, IL, IR, JP, KR, SA, TH, TW	**6SL3166-3AB00-0AA0**

Technical specifications

DC link voltage 510 ... 720 V DC	**Capacitor Module Internal air cooling** 6SL3100-1CE14-0AA0
Capacitance	4000 µF
Current carrying capacity	
• 24 V DC busbars	20 A
• DC link busbars	100 A
PE connection	M5 screw
Dimensions	
• Width	100 mm (3.94 in)
• Height	380 mm (14.96 in)
• Depth, with spacer (included in scope of supply)	270 mm (10.63 in)
Weight, approx.	7.2 kg (16 lb)
Certificate of suitability	cULus

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Overview



Control Supply Module in booksize format

The Control Supply Module in booksize format provides a 24 V to 28.8 V DC power supply that can be set using an integrated poteniomenter via the line or DC link. The Control Supply Module can either be operated individually or in a parallel connection with a maximum of 10 devices. A DIP switch on the top of the module is used to change over in the de-energized state (details of connection for parallel operation are given in the manual for booksize modules).

Using the Control Supply Module, it is possible for example to make specific emergency retraction movements in the event of a power failure, provided that the DC link voltage is available.

Design

Control Supply Modules feature the following connections and interfaces as standard:

- 1 line connection
- 2 DC link connections via integrated DC link busbars
- 2 electronics power supply connections via integrated 24 V DC bars
- 1 connection for the electronics power supply for Control Units, Terminal Modules, Sensor Modules, etc., via the 24 V terminal adapter provided in the scope of supply (max. cross-section 6 mm^2, max. fuse protection 20 A)
- 1 integrated potentiometer for setting the output voltage
- 1 digital output to signal the error-free state
- 1 DIP switch to change over between single and parallel mode
- 2 PE (protective earth) connections

The status of the Control Supply Modules is indicated via two multi-color LEDs.

Selection and ordering data

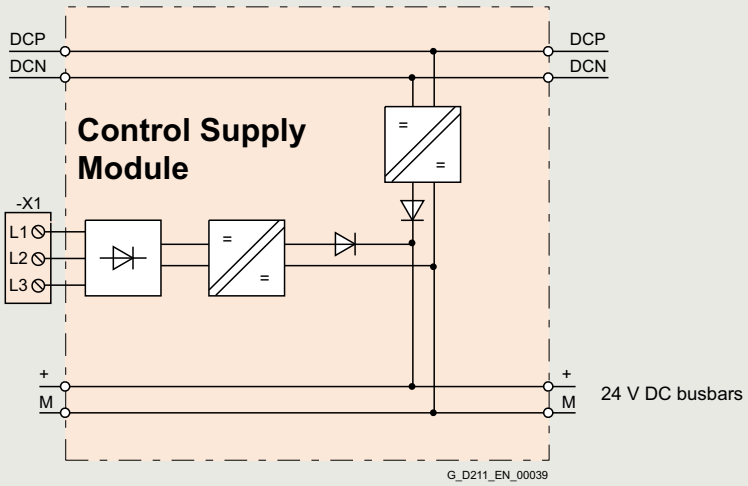
Description	Article No.
Control Supply Module in booksize format	**6SL3100-1DE22-0AA1**
Accessories	
Warning labels in 36 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, CN, ID, IL, IR, JP, KR, SA, TH, TW	**6SL3166-3AB00-0AA0**

Technical specifications

DC link voltage 510 ... 720 V DC **Line voltage 380 ... 480 V 3 AC**	**Control Supply Module in booksize format Internal air cooling** 6SL3100-1DE22-0AA1
Rated input current	
• At 400 V 3 AC	≤2 A
• At 600 V DC	1.1 A
DC link voltage range	300 … 882 V DC (operation in 300 … 430 V DC range is permitted temporarily for < 1 min)
Radio interference suppression (standard)	Category C2 to EN 61800-3
Rated output voltage	24 V ... 28.8 V DC (adjustable via potentiometer)
Rated output current	20 A
Current carrying capacity	
• 24 V DC busbars	20 A
• DC link busbars	100 A
Line connection L1, L2, L3 (X1)	Screw-type terminals
• Conductor cross-section	0.2 ... 4 mm^2
PE connection	M5 screw
Dimensions	
• Width	50 mm (1.97 in)
• Height	380 mm (14.96 in)
• Depth, with spacer (included in scope of supply)	270 mm (10.63 in)
Weight, approx.	4.8 kg (10.6 lb)
Certificate of suitability	cULus

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Integration



Connection example of Control Supply Module

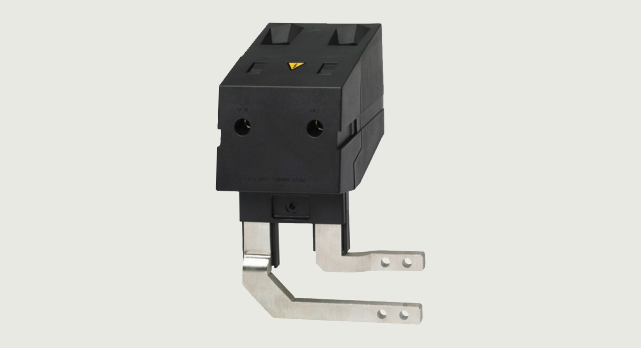
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Overview

DC link rectifier adapter



DC link rectifier adapter for unit widths of 50 mm (1.97 in) and 100 mm (3.94 in)



DC link rectifier adapter for unit widths of 150 mm ... 300 mm (5.91 in ... 11.81 in)

If the internal DC link busbars of the Motor Modules are not used, the DC link voltage must be supplied externally through a DC link rectifier adapter, e.g. when devices of booksize format are coupled with devices of chassis format via an external DC busbar. The DC link rectifier adapter is mounted on the DC link busbars of the Motor Module. The DC link cables are routed from above.

DC link adapter



DC link adapter (multi-tier) for all unit widths

If a multi-tier Motor Module configuration is used, a DC link adapter can be provided for linking the DC links of two drive line-ups. The DC link adapter is mounted sideways on the DC link busbars of the Motor Module. Installation is possible on the right or left side of the Motor Module. The marking of the poles (DCN and DCP) at the DC link adapter matches the side chosen for installation. The DC link cables are routed from behind. The DC link adapter (multi-tier) cannot be used in combination with the reinforced DC link busbars for Motor Modules ≤ 100 mm wide. DC link adapters are supplied in sets of 2 units.

Selection and ordering data

Description	Article No.
DC link rectifier adapter	
For direct infeed of DC link voltage	
For Line Modules and Motor Modules in the booksize and booksize compact format with a width of	
• 50 mm (1.97 in) and 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
• 100 mm (3.94 in), 150 mm (5.91 in), 200 mm (7.87 in) and 300 mm (11.81 in)	**6SL3162-2BE00-0AA0**
• 150 mm (5.91 in), 200 mm (7.87 in) and 300 mm (11.81 in)	**6SL3162-2BM00-0AA0**
DC link adapter set (2 units)	
For multi-tier configuration	
• For all Line Modules and Motor Modules in booksize and booksize compact format	**6SL3162-2BM01-0AA0**

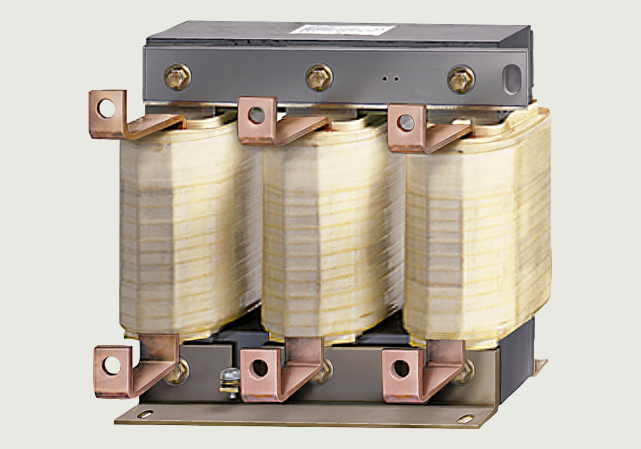
Technical specifications

		DC link rectifier adapter			DC link adapter set
		6SL3162-2BD00-0AA0	6SL3162-2BE00-0AA0	6SL3162-2BM00-0AA0	6SL3162-2BM01-0AA0
Connection		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	0.5 ... 10	35	35 ... 120	35 ... 120
Current carrying capacity	A	43	75	200	200
Weight, approx.	kg (lb)	0.06 (0.13)	0.12 (0.26)	0.48 (1.06)	0.76 (1.68)
Certificate of suitability		cURus	cURus	cURus	cURus
Suitable for Line Modules and Motor Modules	Formats	Booksize and booksize compact	Booksize	Booksize	Booksize and booksize compact

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Motor reactors for booksize format

Overview



Motor reactors reduce the voltage loading on the motor windings. At the same time, the capacitive charge/discharge currents that place an additional load on the power unit when long motor cables are used are reduced. The maximum permissible output frequency when a motor reactor is used is 120 Hz.

The motor reactors are designed for a pulse frequency of 4 kHz. Higher pulse frequencies are not permissible.

The motor reactor must be installed as close as possible to the Motor Module.

Selection and ordering data

Rated output current of Motor Module	Suitable for Motor Module in booksize format	**Motor reactor** Article No.
3 A and 2 × 3 A	6SL3120-1TE13-0AD0 6SL3120-2TE13-0AD0	**6SE7021-0ES87-1FE0**
5 A and 2 × 5 A	6SL3120-1TE15-0AD0 6SL3120-2TE15-0AD0	**6SE7021-0ES87-1FE0**
9 A and 2 × 9 A	6SL3120-1TE21-0AD0 6SL3120-2TE21-0AD0	**6SL3000-2BE21-0AA0**
18 A and 2 × 18 A	6SL3120-1TE21-8AC0 6SL3120-1TE21-8AD0 6SL3120-2TE21-8AC0 6SL3120-2TE21-8AD0	**6SE7022-6ES87-1FE0**
24 A	6SL3120-1TE22-4AC0 6SL3120-1TE22-4AD0	**6SE7024-7ES87-1FE0**
30 A	6SL3120-1TE23-0AC0 6SL3120-1TE23-0AD0	**6SE7024-7ES87-1FE0**
45 A	6SL3120-1TE24-5AC0	**6SE7027-2ES87-1FE0**
60 A	6SL3120-1TE26-0AC0	**6SL3000-2BE26-0AA0**
85 A	6SL3120-1TE28-5AA3	**6SE7031-5ES87-1FE0**
132 A	6SL3120-1TE31-3AA3	**6SE7031-8ES87-1FE0**
200 A	6SL3120-1TE32-0AA4	**6SE7032-6ES87-1FE0**

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Technical specifications

DC link voltage 510 ... 720 V DC or Line voltage 380 ... 480 V 3 AC		Motor reactor (for a 4 kHz pulse frequency)			
		6SE7021-0ES87-1FE0	6SL3000-2BE21-0AA0	6SE7022-6ES87-1FE0	
Rated current	A	5	9	18	
Maximum current	A	10	18	36	
Rated inductance	µH	1243	1000	332	
Power loss	kW	0.08	0.09	0.11	
Connection Motor Module/Motor		Screw-type terminals 4 mm^2	Screw-type terminals 16 mm^2	Screw-type terminals 16 mm^2	
PE connection		M6 screw stud	M6 screw stud	M6 screw stud	
Cable length between motor reactor and motor, max.					
(number of reactors in series)		(1)	(1)	(1)	(2)
• Shielded	m (ft)	100 (328)	135 (443)	160 (525)	320 (1050)
• Unshielded	m (ft)	150 (492)	200 (656)	240 (787)	480 (1575)
Degree of protection		IP00	IP00	IP00	
Dimensions					
• Width	mm (in)	178 (7.01)	178 (7.01)	219 (8.62)	
• Height	mm (in)	153 (6.02)	159 (6.26)	180 (7.09)	
• Depth	mm (in)	88 (3.46)	111 (4.37)	119 (4.69)	
Weight, approx.	kg (lb)	5.5 (12.13)	4.8 (10.6)	7.8 (17.2)	
Certificate of suitability		cURus	cURus	cURus	
Suitable for Motor Module in booksize format	Type	6SL3120-1TE13-0AD0 6SL3120-2TE13-0AD0	6SL3120-1TE15-0AD0 6SL3120-2TE15-0AD0	6SL3120-1TE21-0AD0 6SL3120-2TE21-0AD0	6SL3120-1TE21-8AC0 6SL3120-1TE21-8AD0 6SL3120-2TE21-8AC0 6SL3120-2TE21-8AD0
• Rated current of the Motor Module	A	3	5	9	18

DC link voltage 510 ... 720 V DC or Line voltage 380 ... 480 V 3 AC		Motor reactor (for a 4 kHz pulse frequency)									
		6SE7024-7ES87-1FE0				6SE7027-2ES87-1FE0			6SL3000-2BE26-0AA0		
Rated current	A	30				45			60		
Maximum current	A	60				90			120		
Rated inductance	µH	180				59			62		
Power loss	kW	0.165		0.19		0.2			0.1		
Connection Motor Module/Motor		Flat connector for M8 screw				Flat connector for M8 screw			Flat connector for M8 screw		
PE connection		M6 screw stud				M6 screw stud			M6 screw stud		
Cable length between motor reactor and motor, max.											
(number of reactors in series)		(1)	(2)	(1)	(2)	(1)	(2)	(3)	(1)	(2)	(3)
• Shielded	m (ft)	190 (623)	375 (1230)	190 (623)	375 (1230)	200 (656)	400 (1312)	600 (1969)	200 (656)	400 (1312)	600 (1969)
• Unshielded	m (ft)	280 (919)	560 (1837)	280 (919)	560 (1837)	300 (984)	600 (1969)	900 (2953)	300 (984)	600 (1969)	900 (2953)
Degree of protection		IP00				IP00			IP00		
Dimensions											
• Width	mm (in)	197 (7.76)				267 (10.51)			267 (10.51)		
• Height	mm (in)	220 (8.66)				221 (8.70)			220 (8.66)		
• Depth	mm (in)	104 (4.09)				107 (4.21)			126 (4.96)		
Weight, approx.	kg (lb)	13 (28.7)				11 (24.3)			10.5 (23.2)		
Certificate of suitability		cURus				cURus			cURus		
Suitable for Motor Module in booksize format	Type	6SL3120-1TE22-4AC0 6SL3120-1TE22-4AD0		6SL3120-1TE23-0AC0 6SL3120-1TE23-0AD0		6SL3120-1TE24-5AC0			6SL3120-1TE26-0AC0		
• Rated current of the Motor Module	A	24		30		45			60		

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Motor reactors for booksize format

Technical specifications

DC link voltage 510 ... 720 V DC or Line voltage 380 ... 480 V 3 AC		Motor reactor (for a 4 kHz pulse frequency)								
		6SE7031-5ES87-1FE0			6SE7031-8ES87-1FE0			6SE7032-6ES87-1FE0		
Rated current	A	85			132			200		
Rated inductance	µH	29			23			16		
Power loss	kW	0.22			0.29			0.29		
Connection Motor Module/Motor		Flat connector for M8 screw			Flat connector for M10 screw			Flat connector for M10 screw		
PE connection		M6 screw			M6 screw			M6 screw		
Cable length between motor reactor and motor, max.										
(number of reactors in series)		(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
• Shielded	m (ft)	200 (656)	400 (1312)	600 (1969)	200 (656)	400 (1312)	600 (1969)	200 (656)	400 (1312)	600 (1969)
• Unshielded	m (ft)	300 (984)	600 (1969)	900 (2953)	300 (984)	600 (1969)	900 (2953)	300 (984)	600 (1969)	900 (2953)
Degree of protection		IP00			IP00			IP00		
Dimensions										
• Width	mm (in)	197 (7.76)			281 (11.06)			281 (11.06)		
• Height	mm (in)	220 (8.66)			250 (9.84)			250 (9.84)		
• Depth	mm (in)	128 (5.04)			146 (5.75)			146 (5.75)		
Weight, approx.	kg (lb)	20.5 (45.2)			27.2 (60)			30.6 (67.5)		
Certificate of suitability		cURus			cURus			cURus		
Suitable for Motor Module in booksize format	Type	6SL3120-1TE28-5AA3			6SL3120-1TE31-3AA3			6SL3120-1TE32-0AA4		
• Rated current of the Motor Module	A	85			132			200		

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Overview



SINAMICS S120M

SINAMICS S120M is the distributed version of the modular SINAMICS S120 drive system. This drive is a compact and turnkey drive unit that comprises

- AM600 Adapter Module for supplying the distributed drive unit
- Distributed drive unit (synchronous servomotor with integrated power unit and encoder)
- Hybrid cable for power and communication

The power unit is not integrated in the control cabinet, as is normally the case, but in the motor for the driven axis. This brings advantages and freedoms for existing or new machine concepts.

Benefits

- Reduced heat losses in the control cabinet thanks to distributed configuration
- Reduced air conditioning in the control cabinet thanks to the power unit integrated into the motor
- Reduced control cabinet volume thanks to the power unit integrated into the motor
- Increased degree of flexibility for modernizations/retrofits thanks to specified control cabinet sizes
- Less time spent on cabling, because the pre-assembled hybrid cable contains all signal and power cables
- Reduction in overall cable length, because the pre-assembled hybrid cable contains all signal and power cables
- Up to 12 distributed drive units can be operated on one AM600 Adapter Module, depending on their power ratings
- Any number of AM600 Adapter Modules can be operated on one appropriately dimensioned infeed
- Drive-integrated DI/DOs for easy adaptation to the machine environment
- All safety variants and communication variants of the SINAMICS S120 system are also available in SINAMICS S120M
- With the Terminal Module (TM54F), all of the safety functions available in the SINAMICS S120 drive system are available
- Optimum integration into the SINUMERIK system landscape

Application

Typical SINAMICS S120M applications include the packaging, printing, glass and textile industries.

Design

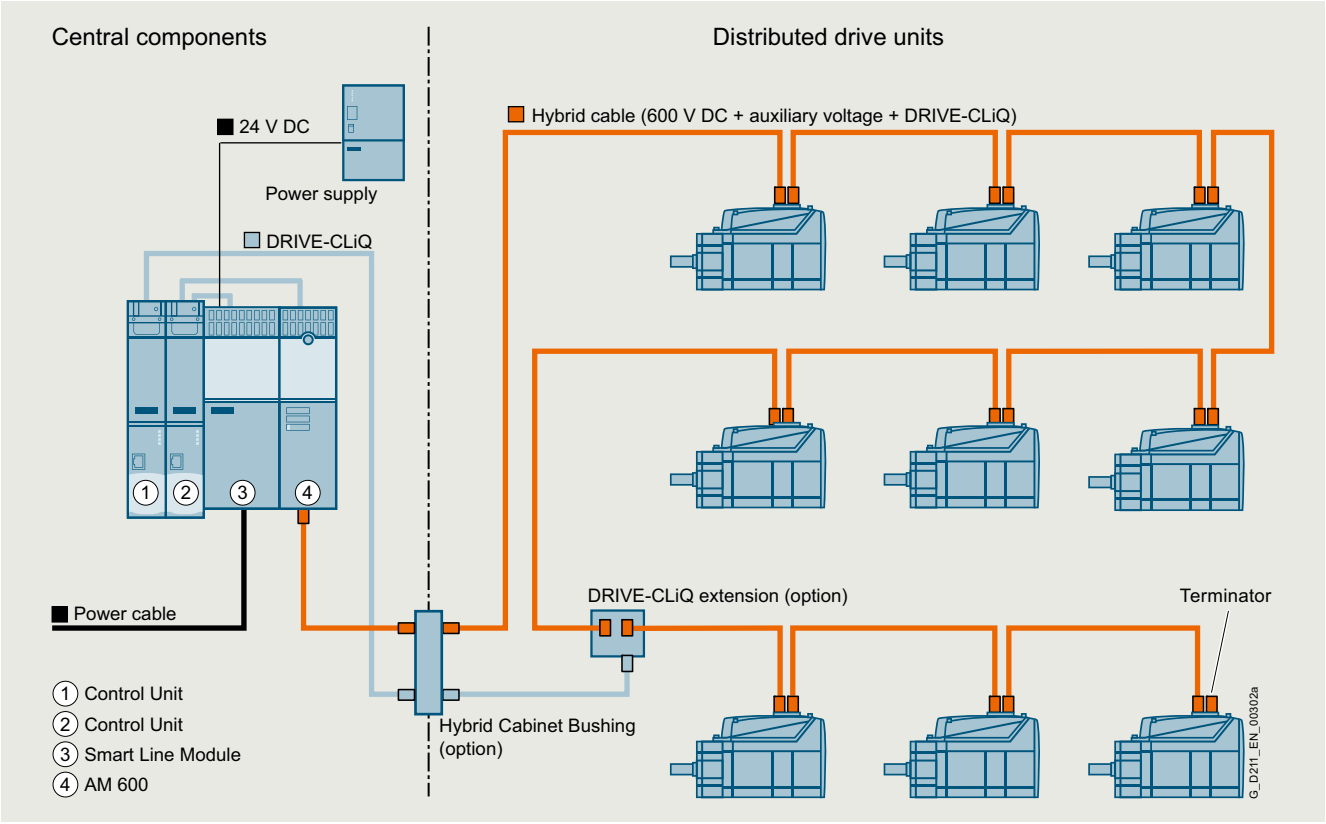
The SINAMICS S120M distributed drive system comprises the following units:

- AM600 Adapter Module
- Distributed drive unit (1FK7 synchronous servomotor with integrated Motor Module and multi-turn absolute encoder)
- MOTION-CONNECT hybrid cable
  Additional information on cables is provided in Section, MOTION-CONNECT connection systems.
- DRIVE-CLiQ Extension (necessary with more than 6 distributed drive units)
- Hybrid Cabinet Bushing, optional
- Terminating connector (essential for achieving the degree of protection; included in scope of supply of AM600 Adapter Module)

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Function

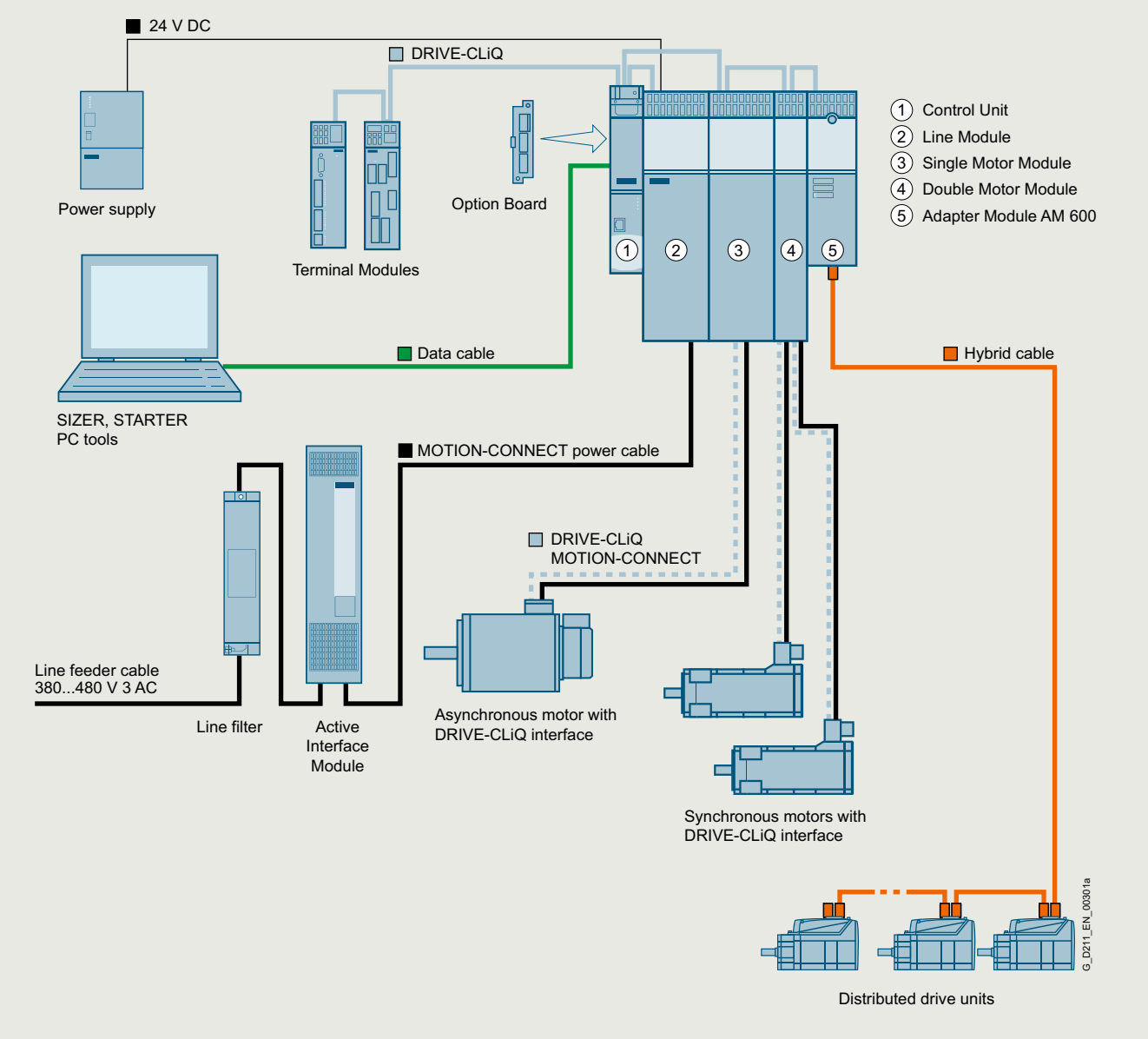
- The 24 V electronics power supply is either provided from an external supply or from a Control Supply Module (CSM). The supply can also be taken from the central drive line-up using the 24 V terminal connector
- Use of Line Modules (Active Line Module, Basic Line Module and Smart Line Module) from the SINAMICS S120 product family
- The AM600 Adapter Module opens a line of distributed drive units. It feeds the DC link, auxiliary voltage, and DRIVE-CLiQ in a hybrid cable.
- If several drive units are to be operated, then the possible number depends on the central Control Unit. If an additional Control Unit is used, the closed-loop control signals are fed into the DRIVE-CLiQ line via a DRIVE-CLiQ Extension
- AM600 Adapter Module, DRIVE-CLiQ Extension and Hybrid Cabinet Bushing are not "visible" DRIVE-CLiQ nodes in the topology. The number of DRIVE-CLiQ Extensions is not restricted.
- As Control Unit or control, all multi-axis Control Units in the SINAMICS/SINUMERIK range can generally be used (CU320-2, NCU). The releases of SINAMICS S120M for the corresponding systems are published via SiePortal: https://support.industry.siemens.com



Principle of a SINAMICS S120M topology

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Integration



Integration of SINAMICS S120M into the SINAMICS S120 drive system

Modular system for complex drive tasks

SINAMICS S120 solves complex drive tasks for a very wide range of industrial applications and is, therefore, designed as a modular system. Users can choose from many different harmonized components and functions to create a solution that best meets their requirements.

The powerful SIZER for Siemens Drives (integrated in the TIA Selection Tool) configuration tool makes it easier to choose and determine the optimum drive configuration.

SINAMICS S120 optimally supports:

- Synchronous and asynchronous motors
- Linear and torque motors
- SINAMICS S120M

System architecture with a central Control Unit:

On the SINAMICS S120, the drive intelligence is combined with closed-loop control functions into Control Units. These units are capable of controlling drives in the vector, servo and V/f modes. They also perform the speed and torque control functions plus other intelligent drive functions for all axes on the drive. Inter-axis connections can be established within a component and easily configured in the STARTER commissioning tool using a mouse.

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Integration

Functions for higher efficiency

- Basic functions: Speed control, torque control, positioning functions
- Intelligent starting functions for independent restart after power supply interruption
- BICO technology with interconnection of drive-specific DI/DOs for easy adaptation of the drive system to its machine environment
- Integrated safety functions for rational implementation of safety concepts
- Regulated infeed/regenerative feedback functions for preventing undesirable reactions on the supply, allowing recovery of braking energy and ensuring greater stability against line fluctuations.

DRIVE-CLiQ – the digital interface between SINAMICS components

The SINAMICS S120 components, including the motors and encoders, are interconnected via a joint serial interface called DRIVE-CLiQ. The standardized cables and connectors reduce the variety of different parts and cut storage costs. Encoder evaluations for converting standard encoder signals to DRIVE-CLiQ are available for third-party motors or retrofit applications.

Electronic rating plates in all components

An important digital linkage element of the SINAMICS S120 drive system are the electronic rating plates integrated in every component. They allow all drive components to be detected automatically via DRIVE-CLiQ wiring. As a result, data do not need to be entered manually during commissioning or component replacement – helping to ensure that drives are commissioned successfully!

The electronic rating plate contains all the relevant technical data about that particular component. In the motors, for example, this data includes the parameters of the electric equivalent circuit diagram and characteristic values for the built-in motor encoder. In addition to the technical data, the electronic rating plate includes logistical data (manufacturer ID, article number, and ID). Since this data can be called up electronically on site or remotely, all the components used in a machine can always be individually identified, which helps simplify servicing.

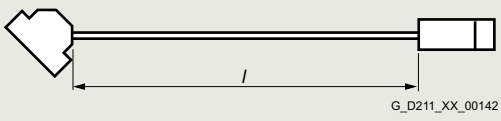
Selection and ordering data

Designation		Article No.
AM600 Adapter Module		**6SL3555-2BC10-0AA0**
For connecting SINAMICS S120M to SINAMICS S120		
Distributed drive unit		
Comprising 1FK7 synchronous servomotor with integrated Motor Module and multi-turn absolute encoder		
• Shaft height 48 short		**6SL3540-6DF71-0R ■ ■**
• Shaft height 48 long		**6SL3542-6DF71-0R ■ ■**
• Shaft height 63 short		**6SL3562-6DF71-0R ■ ■**
• Shaft height 63 long		**6SL3563-6DF71-0R ■ ■**
Feather key	Without holding brake	**A**
	with holding brake	**B**
Plain shaft	Without holding brake	**G**
	with holding brake	**H**
Degree of protection	IP65	**1**
	and shaft sealing ring IP67	**2**
MOTION-CONNECT hybrid cable		**6FX8002-7HY ■ ■-....** *)
Containing signal and power cables		
Outlet direction	NDE (rear) / NDE (rear)	**0 0**
	NDE (rear) / DE (front)	**1 1**
	DE (front) / DE (front)	**2 2**
Accessories		
Hybrid Cabinet Bushing		**6SL3555-2DA00-0AA0**
Cabinet bushing		
DRIVE-CLiQ Extension		**6SL3555-0AA00-6AB0**
Necessary for more than six distributed drive units and a second Control Unit		
Spacing bolts (4 units)		**6SL3462-1CC00-0AA0**
The mounting depth of the AM600 Adapter Module in booksize compact format is increased when it is mounted on these spacing bolts by such an amount that it can be integrated into a drive line-up in booksize format.		

*) Article No. supplement for length code required.

Description	Article No. supplement
Length code for pre-assembled cables	**6FX8002-7HY..- ■ ■ ■ ■**
0 m (0 ft)	**1**
100 m (328 ft)	**2**
0 m (0 ft)	**A**
10 m (32.8 ft)	**B**
20 m (65.6 ft)	**C**
30 m (98.4 ft)	**D**
40 m (131 ft)	**E**
50 m (164 ft)	**F**
60 m (197 ft)	**G**
70 m (230 ft)	**H**
80 m (262 ft)	**J**
90 m (295 ft)	**K**
0 m (0 ft)	**A**
1 m (3.28 ft)	**B**
2 m (6.56 ft)	**C**
3 m (9.84 ft)	**D**
4 m (13.1 ft)	**E**
5 m (16.4 ft)	**F**
6 m (19.7 ft)	**G**
7 m (22.9 ft)	**H**
8 m (26.3 ft)	**J**
9 m (29.5 ft)	**K**
0 m (0 in)	**0**
0.1 m (3.94 in)	**1**
0.2 m (7.87 in)	**2**
0.3 m (11.81 in)	**3**
0.4 m (15.75 in)	**4**
0.5 m (19.96 in)	**5**
0.6 m (23.62 in)	**6**
0.7 m (27.56 in)	**7**
0.8 m (31.5 in)	**8**
Examples:	1.0 m (3.28 ft) 1 A B 0
	2.2 m (7.22 ft) 1 A C 2
	8.0 m (26.3 ft) 1 A J 0

Definition of lengths for pre-assembled cables



Cable with pre-assembled connectors at both ends

Tolerance:

- Cable lengths up to 10 m (32.8 ft): ± 2 %
- Cable lengths of 10 m (32.8 ft) and longer: ± 1 %

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Technical specifications

	AM600 Adapter Module 6SL3555-2BC10-0AA0
Line connection voltage	380 ... 480 V 3 AC ±10 % (in operation -15 % <1 min)
Line frequency	47 ... 63 Hz
Electronics power supply (input)	
• Electronics voltage	24 V DC -15 ... +20 %
• Electronics current	20 A
• 24 V busbar current-carrying capacity	20 A
Electronics line supply (output)	
• Electronics power supply	48 V DC
• Rated power P_{out} [1]	0.45 kW
• Output current	10 A
DC link supply	
• DC link voltage	510 ... 720 V DC
• Output current I_{rated}	25 A
• Base-load current I_{base}	21.3 A
• S6 current I_{S6} 40 %	30 A
• Peak current I_{max}	50 A
• DC link capacitance	705 µF ±20 %
• DC link busbar current-carrying capacity	100 A

	AM600 Adapter Module 6SL3555-2BC10-0AA0
Rated power, electrical For a DC link voltage of 600 V DC	14.7 kW
Total power loss Including electronics losses	0.06 kW
Minimum cable length to the 1st axis	3 m (9.84 ft)
Format	Booksize compact
Degree of protection	IP20
Ambient temperature during operation, perm.	0 ... 40 °C (32 ... 104 °F) >40 ... 55 °C (104 ... 131 °F) see derating characteristics of the Line Modules
Dimensions	
• Width	75 mm (2.95 in)
• Height	270 mm (10.63 in)
• Depth	224 mm (8.82 in)
Weight, approx.	3.2 kg (7.05 lb)

		Distributed drive unit (synchronous servomotor with Motor Module and encoder)			
		6SL3540- 6DF71-0R..	6SL3542- 6DF71-0R..	6SL3562- 6DF71-0R..	6SL3563- 6DF71-0R..
Type of construction		IM B5 IM V1 IM V3	IM B5 IM V1 IM V3	IM B5 IM V1 IM V3	IM B5 IM V1 IM V3
Cooling method		Surface convection	Surface convection	Surface convection	Surface convection
Ambient temperature during operation, perm.	°C (°F)	-15 ... +40 (5 ... 104) >40 ... 55 °C (104 ... 131) with derating	-15 ... +40 (5 ... 104) >40 ... 55 °C (104 ... 131) with derating	-15 ... +40 (5 ... 104) >40 ... 55 °C (104 ... 131) with derating	-15 ... +40 (5 ... 104) >40 ... 55 °C (104 ... 131) with derating
Installation altitude, max.	m (ft)	1000 (3281) [2]	1000 (3281) [2]	1000 (3281) [2]	1000 (3281) [2]
Sound pressure level L_{pA} (1 m) acc. to DIN EN ISO 1680, max. Tolerance +3 dB	dB	55	55	65	65
Vibrational load in operation Acc. to IEC 68-2-6, DIN EN 60721 Part 3-0 and Part 3-3		Class 3M3	Class 3M3	Class 3M3	Class 3M3
• Constant deflection in frequency range 2 … 9 Hz	mm (in)	1.5 (0.06)	1.5 (0.06)	1.5 (0.06)	1.5 (0.06)
• Constant deflection in frequency range 10 … 200 Hz		0.5 × *g*	0.5 × *g*	0.5 × *g*	0.5 × *g*
Shock load in operation Acc. to DIN EN 60721 Part 3-0 and Part 3-3		Class 3M3	Class 3M3	Class 3M3	Class 3M3
• Max. peak acceleration		7 × *g*	7 × *g*	7 × *g*	7 × *g*
• Shock duration	ms	22	22	22	22
Degree of protection					
• Standard		IP65	IP65	IP65	IP65
• Optional		IP67	IP67	IP67	IP67
Weight, approx.					
• Without brake	kg (lb)	6 (13.2)	7.4 (16.3)	11.9 (26.2)	13.9 (30.6)
• With brake	kg (lb)	6.4 (14.1)	7.7 (17.0)	13.3 (29.3)	15.3 (33.7)

[1] Only applies for an electronics input voltage > 26.5 V.

[2] From 1000 m (3281 ft) to 4000 m (13124 ft) above sea level: - Reduction of the output current by 10 % per 1000 m (3281 ft) or - Reduction of the ambient temperature by 5 K per 1000 m (3281 ft) from 2000 m (6562 ft) to 4000 m (13124 ft) above sea level additionally - Operation on line supply systems with grounded neutral point or - Operation with an isolating transformer with secondary grounded neutral point

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Technical specifications

		Distributed drive unit (synchronous servomotor with Motor Module and encoder)			
		6SL3540-6DF71-0R..	6SL3542-6DF71-0R..	6SL3562-6DF71-0R..	6SL3563-6DF71-0R..
Synchronous servomotor					
Shaft height		48 short	48 long	63 short	63 long
Rated speed	r/min	3000	3000	3000	3000
Max. speed	r/min	9000	6400	5600	6400
Rated torque	Nm (lb_f-ft)	1.05 (0.77)	1.8 (1.33)	2.7 (1.99)	2.2 (1.62)
Torque, max.	Nm (lb_f-ft)	4.9 (3.61)	10 (7.38)	19.3 (14.2)	27 (19.9)
Static torque	Nm (lb_f-ft)	1.3 (0.96)	2.5 (1.84)	5 (3.69)	7.1 (5.24)
Stall current	A	1.9	1.8	3.15	5
Moment of inertia					
• Without brake	kgm² (lb_f-in-s²)	0.16 (1.42) × 10^{-3}	0.29 (2.57) × 10^{-3}	1.12 (9.91) × 10^{-3}	1.47 (13.01) × 10^{-3}
• With brake	kgm² (lb_f-in-s²)	0.192 (1.70) × 10^{-3}	0.32 (2.83) × 10^{-3}	1.22 (10.8) × 10^{-3}	1.57 (13.9) × 10^{-3}
Shaft torsional stiffness	Nm/rad (lb_f-ft/rad)	13000 (9589)	11400 (8409)	26500 (19546)	25000 (18440)
Motor Module					
Electronics power supply	V DC	48	48	48	48
Power consumption, max. Electronics power supply	W	12	12	12	12
Power consumption, brake	W	15	15	20	20
Rated DC link voltage	V DC	600	600	600	600
DC link voltage	V DC	510 ... 720	510 ... 720	510 ... 720	510 ... 720
Output voltage	V AC	0 ... 0.717 × DC-link voltage	0 ... 0.717 × DC-link voltage	0 ... 0.717 × DC-link voltage	0 ... 0.717 × DC-link voltage
Overvoltage trip	V DC	820 ±2 %	820 ±2 %	820 ±2 %	820 ±2 %
Undervoltage trip	V DC	380 ±2 %	380 ±2 %	380 ±2 %	380 ±2 %
Current-carrying capacity of the DC link	A	25	25	25	25
DC link capacitance	µF	24	24	48	48
Pulse frequency	kHz	4	4	4	4
Output current					
• Output current I_{rated}	A	1.7	1.4	1.9	2
• Base-load current I_{base}	A	2.5	2	1.4	1.5
• S6 current I_{S6} 40 %	A	1.3	1.1	2.8	2.9
• Peak current I_{max}	A	7.7	7.6	14	21
Surface temperature	°C (°F)	<100 (212)	<100 (212)	<100 (212)	<100 (212)
Encoder (absolute encoder AM20DQI)					
Resolution within one revolution	bit	20	20	20	20
Traversing range (multi-turn)	Revolutions	4096	4096	4096	4096

		Hybrid cable 6FX8002-7HY..-....
Cross-section	mm²	4
Max. line length per AM600 Adapter Module	m (ft)	100 (328)
Max. current-carrying capacity	A	25

More information

Additional information is available at
www.siemens.com/sinamics-s120m

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Overview

PM240-2 Power Modules – 0.55 kW to 250 kW (0.75 hp to 400 hp), IP20 degree of protection



PM240-2 Power Modules, frame sizes FSA to FSG, with CU310-2 PN Control Unit and BOP20 Basic Operator Panel

The PM240-2 Power Modules are based on a hardware platform, which permits an increase in power density.

Furthermore, the PM240-2 Power Module is also suitable for use in safety-oriented applications. In conjunction with a fail-safe Control Unit, the drive can be transformed into a Safety Integrated Drive.

The PM240-2 Power Modules in frame sizes FSA to FSF are available both with and without an integrated line filter class A of compact design for 200 V, 400 V and 690 V line voltages (except PM240-2 frame sizes FSD to FSF: 200 V). The PM240-2 Power Modules in frame size FSG are available with an integrated line filter Category C3 of compact design for 400 V and 690 V line voltages, also with integrated line filter Category C2 for a line voltage of 400 V. In addition, a DC link reactor is integrated in the PM240-2 Power Modules, frame sizes FSD to FSG, and therefore no line reactor is required.

The PM240-2 Power Modules with integrated line filter class A are suitable for connection to TN supply systems. Power Modules without integrated line filter can be connected to grounded TN/TT systems and non-grounded IT systems.

The PM240-2 Power Module has an integrated braking chopper. In generating mode, the excess energy of the DC link can be dissipated by means of an optional braking resistor.

The permissible cable lengths between converter and motor are limited. Longer cables can be used if output reactors are connected.

Shield plates and shield connection kits are available for use in the wiring installation of Power Modules to ensure that it complies with EMC guidelines.
For more information, see shield connection kits for blocksize format.

Additional options

Further selected accessories are available from "Siemens Product Partner for Drives Options":
www.siemens.com/drives-options-partner

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Integration

All Power Modules have the following connections and interfaces:

- PM-IF interface to connect the Power Module to the Control Unit. The Power Module also supplies power to the Control Unit using an integrated power supply
- Motor connection using screw terminals or screw studs
- 2 PE/protective conductor connections
- Shield connection plate

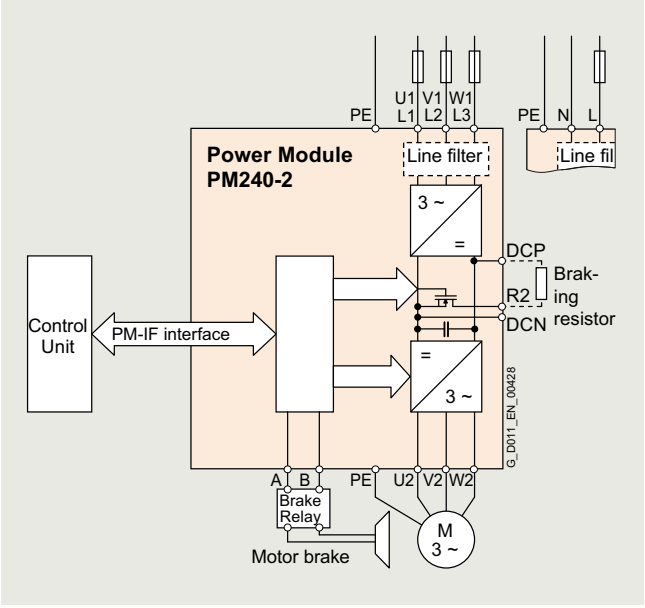
The PM240-2 Power Modules together with the CU310-2 and CU320-2 Control Units, which are responsible for the communication and open-loop/closed-loop control functions, create powerful SINAMICS S120 drives.

PM240-2 Power Modules in blocksize format communicate via the PM-IF interface with:

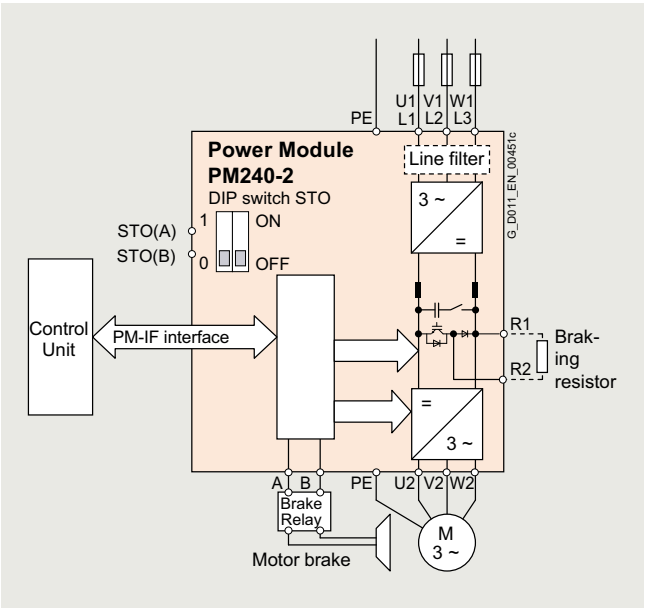
- the CU310-2 Control Unit
- CUA31 or CUA32 Control Unit Adapter

With a CUA31/CUA32 Control Unit Adapter snapped on, the PM240-2 Power Module communicates via a DRIVE-CLiQ connection with:

- CU320-2 Control Unit
- SINUMERIK 840D sl
- SINUMERIK ONE
- SINUMERIK MC



Connection example for PM240-2 Power Modules, frame sizes FSA to FSC, with or without integrated line filter



Connection example for PM240-2 Power Modules, frame sizes FSD to FSG, with or without integrated line filter

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Integration

Power and DC link components that are optionally available depending on the Power Module used

The following line-side components, DC link components and load-side power components are optionally available in the appropriate frames sizes for the Power Modules:

	Frame size						
	FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**	**FSG**
PM240-2 Power Module with integrated braking chopper							
• 200 V versions	✓	✓	✓	✓ 1)	✓ 1)	✓ 1)	–
• 400 V versions	✓	✓	✓	✓	✓	✓	✓
• 690 V versions	–	–	–	✓	✓	✓	✓
Line-side components							
Line filter class A	**F**	**F**	**F**	**F** 1)	**F** 1)	**F** 1)	–
Line filter class B (only for 400 V versions)	**U**	**U**	**U**	–	–	–	–
Line filters of Category C2 or C3 (for 400 V versions frame size FSG)	–	–	–	–	–	–	**I** 2)
Line filters of Category C3 (for 690 V versions frame size FSG)	–	–	–	–	–	–	**I** 2)
Line Harmonics Filters (only for 400 V versions, frame sizes FSD to FSG)	–	–	–	**S**	**S**	**S**	**S**
Line reactor (only for 3 AC versions 3))	**S** 4)	**S** 4)	**S** 4)	**I**	**I**	**I**	**I**
DC link components							
Braking resistor	**S**	**S**	**S**	**S**	**S**	**S**	**S**
Load-side power components							
Output reactor	**S**	**S**	**S**	**S**	**S**	**S**	**S**
Sine-wave filters (only for 400 V versions)	**S**	**S**	**S**	**S**	**S**	**S**	**S**
dv/dt filters plus VPL (only for 400 V versions)	–	–	–	**S**	**S**	**S**	–
dv/dt filters plus VPL (only for 690 V versions 5))	–	–	–	**S**	**S**	**S**	**S**

U = Base component
S = Lateral mounting
I = Integrated
F = Power Modules available with and without integrated filter class A
– = Not possible

1) The 200 V versions of the PM240-2 Power Modules, frame sizes FSD to FSF, are only available without integrated line filter.

2) PM240-2 Power Modules in frame size FSG, equipped with an integrated Category C3 line filter, can be operated in the following power supply systems (up to 600 V):
- TN systems with a grounded line conductor
- TT systems without a grounded neutral point
- IT systems, provided the functional grounding screw is removed

Note: Removing the functional grounding screw is required for operation in IT systems. However, this action degrades the EMC performance, and the device no longer complies with Category C3 requirements.

3) With the appropriate wiring, the line reactors for 200 V 3 AC can be used for the 200 V versions for 200 V 1 AC. More information can be found on the internet at:
https://support.industry.siemens.com/cs/document/109486005
https://support.industry.siemens.com/cs/document/109482011

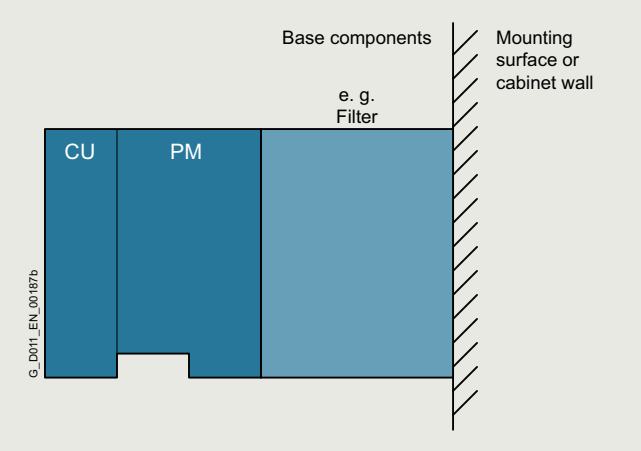
4) For frame sizes FSA to FSC, for lines with u_k < 1 %, it is recommended that you use a line reactor or the next more powerful Power Module. More information can be found on the internet at:
https://support.industry.siemens.com/cs/document/109482011

5) The 690 V versions of the PM240-2 Power Modules require motors with a suitable isolating system for 690 V converter operation (IVIC-C premium).

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Integration

General design information



Converter comprising a Power Module (PM), a Control Unit (CU), and base components (side view)

- If at all possible, the line filter should be mounted directly below the converter.
- With lateral mounting, the line-side components have to be mounted on the left side of the converter, and the load-side components on the right side.
- Braking resistors have to be mounted directly on the control cabinet wall due to heating issues.

Recommended installation combinations of the converter and optional power and DC link components

Power Module Frame size	Base	Lateral mounting **Left of the converter (for line-side components)**	**Right of the converter (for load-side power components and DC link components)**
FSA and FSB	Line filters, sine-wave filters	Line reactor	Output reactor and/or braking resistor
FSC	Line filters, sine-wave filters	Line reactor	Output reactor and/or braking resistor
FSD and FSE	–	Line filters, Line Harmonics Filters	Output reactor or sine-wave filter or dv/dt filter plus VPL and/or braking resistor
FSF and FSG	–	Line filters, Line Harmonics Filters	Output reactor or sine-wave filter or dv/dt filter plus VPL and/or braking resistor

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Selection and ordering data

To ensure that a suitable Power Module is selected, the following currents should be used for applications:

- Rated output current for applications with low overload (LO)
- Base-load current for applications with high overload (HO)

With reference to the rated output current, the modules support at least 2-pole to 6-pole low-voltage motors. The rated power is merely a guide value. For a description of the overload performance, please refer to the general technical specifications of the Power Modules.

PM240-2 Power Modules standard variant

Rated power [1]		Rated output current I_N [2]	Power based on the base-load current [3]		Base-load current I_H [3]	Frame size	**PM240-2 Power Module standard variant without integrated line filter**	**PM240-2 Power Module standard variant with integrated line filter class A**
kW	hp	A	kW	hp	A		Article No.	Article No.
200 ... 240 V 1 AC/3 AC								
0.55	0.75	3.2	**0.37**	0.5	2.3	FSA	**6SL3210-1PB13-0UL0**	**6SL3210-1PB13-0AL0**
0.75	1	4.2	**0.55**	0.75	3.2	FSA	**6SL3210-1PB13-8UL0**	**6SL3210-1PB13-8AL0**
1.1	1.5	6	**0.75**	1	4.2	FSB	**6SL3210-1PB15-5UL0**	**6SL3210-1PB15-5AL0**
1.5	2	7.4	**1.1**	1.5	6	FSB	**6SL3210-1PB17-4UL0**	**6SL3210-1PB17-4AL0**
2.2	3	10.4	**1.5**	2	7.4	FSB	**6SL3210-1PB21-0UL0**	**6SL3210-1PB21-0AL0**
3	4	13.6	**2.2**	3	10.4	FSC	**6SL3210-1PB21-4UL0**	**6SL3210-1PB21-4AL0**
4	5	17.5	**3**	4	13.6	FSC	**6SL3210-1PB21-8UL0**	**6SL3210-1PB21-8AL0**
200 ... 240 V 3 AC								
5.5	7.5	22	**4**	5	17.5	FSC	**6SL3210-1PC22-2UL0**	**6SL3210-1PC22-2AL0**
7.5	10	28	**5.5**	7.5	22	FSC	**6SL3210-1PC22-8UL0**	**6SL3210-1PC22-8AL0**
11	15	42	**7.5**	10	35	FSD	**6SL3210-1PC24-2UL0**	–
15	20	54	**11**	15	42	FSD	**6SL3210-1PC25-4UL0**	–
18.5	25	68	**15**	20	54	FSD	**6SL3210-1PC26-8UL0**	–
22	30	80	**18.5**	25	68	FSE	**6SL3210-1PC28-0UL0**	–
30	40	104	**22**	30	80	FSE	**6SL3210-1PC31-1UL0**	–
37	50	130	**30**	40	104	FSF	**6SL3210-1PC31-3UL0**	–
45	60	154	**37**	50	130	FSF	**6SL3210-1PC31-6UL0**	–
55	75	178	**45**	60	154	FSF	**6SL3210-1PC31-8UL0**	–
380 ... 480 V 3 AC [4]								
0.55	0.75	1.7	**0.37**	0.5	1.3	FSA	**6SL3210-1PE11-8UL1**	**6SL3210-1PE11-8AL1**
0.75	1	2.2	**0.55**	0.75	1.7	FSA	**6SL3210-1PE12-3UL1**	**6SL3210-1PE12-3AL1**
1.1	1.5	3.1	**0.75**	1	2.2	FSA	**6SL3210-1PE13-2UL1**	**6SL3210-1PE13-2AL1**
1.5	2	4.1	**1.1**	1.5	3.1	FSA	**6SL3210-1PE14-3UL1**	**6SL3210-1PE14-3AL1**
2.2	3	5.9	**1.5**	2	4.1	FSA	**6SL3210-1PE16-1UL1**	**6SL3210-1PE16-1AL1**
3	4	7.7	**2.2**	3	5.9	FSA	**6SL3210-1PE18-0UL1**	**6SL3210-1PE18-0AL1**
4	5	10.2	**3**	4	7.7	FSB	**6SL3210-1PE21-1UL0**	**6SL3210-1PE21-1AL0**
5.5	7.5	13.2	**4**	5	10.2	FSB	**6SL3210-1PE21-4UL0**	**6SL3210-1PE21-4AL0**
7.5	10	18	**5.5**	7.5	13.2	FSB	**6SL3210-1PE21-8UL0**	**6SL3210-1PE21-8AL0**
11	15	26	**7.5**	10	18	FSC	**6SL3210-1PE22-7UL0**	**6SL3210-1PE22-7AL0**
15	20	32	**11**	15	26	FSC	**6SL3210-1PE23-3UL0**	**6SL3210-1PE23-3AL0**
18.5	25	38	**15**	20	32	FSD	**6SL3210-1PE23-8UL0**	**6SL3210-1PE23-8AL0**
22	30	45	**18.5**	25	38	FSD	**6SL3210-1PE24-5UL0**	**6SL3210-1PE24-5AL0**
30	40	60	**22**	30	45	FSD	**6SL3210-1PE26-0UL0**	**6SL3210-1PE26-0AL0**
37	50	75	**30**	40	60	FSD	**6SL3210-1PE27-5UL0**	**6SL3210-1PE27-5AL0**
45	60	90	**37**	50	75	FSE	**6SL3210-1PE28-8UL0**	**6SL3210-1PE28-8AL0**
55	75	110	**45**	60	90	FSE	**6SL3210-1PE31-1UL0**	**6SL3210-1PE31-1AL0**
75	100	145	**55**	75	110	FSF	**6SL3210-1PE31-5UL0**	**6SL3210-1PE31-5AL0**
90	125	178	**75**	100	145	FSF	**6SL3210-1PE31-8UL0**	**6SL3210-1PE31-8AL0**
110	150	205	**90**	125	178	FSF	**6SL3210-1PE32-1UL0**	**6SL3210-1PE32-1AL0**
132	200	250	**110**	150	205	FSF	**6SL3210-1PE32-5UL0**	**6SL3210-1PE32-5AL0**

[1] Rated power based on the rated output current I_N. The rated output current I_N is based on the duty cycle for low overload (LO).

[2] The rated output current I_N is based on the duty cycle for low overload (LO). These current values are valid for 200 V, 400 V or 690 V and are specified on the rating plate of the Power Module.

[3] The base-load current I_H is based on the duty cycle for high overload (HO).

[4] SIPLUS components for extreme requirements are available. More information is available on the internet at www.siemens.com/siplus-drives

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Selection and ordering data

Rated power [1]		Rated output current I_N [2]	Power based on the base-load current [3]		Base-load current I_H [3]	Frame size	PM240-2 Power Module standard variant without integrated line filter	PM240-2 Power Module standard variant with integrated line filter class A
kW	hp	A	kW	hp	A		Article No.	Article No.
500 ... 690 V 3 AC								
11	10	14	**7.5**	7.5	11	FSD	**6SL3210-1PH21-4UL0**	**6SL3210-1PH21-4AL0**
15	15	19	**11**	10	14	FSD	**6SL3210-1PH22-0UL0**	**6SL3210-1PH22-0AL0**
18.5	20	23	**15**	15	19	FSD	**6SL3210-1PH22-3UL0**	**6SL3210-1PH22-3AL0**
22	25	27	**18.5**	20	23	FSD	**6SL3210-1PH22-7UL0**	**6SL3210-1PH22-7AL0**
30	30	35	**22**	25	27	FSD	**6SL3210-1PH23-5UL0**	**6SL3210-1PH23-5AL0**
37	40	42	**30**	30	35	FSD	**6SL3210-1PH24-2UL0**	**6SL3210-1PH24-2AL0**
45	50	52	**37**	40	42	FSE	**6SL3210-1PH25-2UL0**	**6SL3210-1PH25-2AL0**
55	60	62	**45**	50	52	FSE	**6SL3210-1PH26-2UL0**	**6SL3210-1PH26-2AL0**
75	75	80	**55**	60	62	FSF	**6SL3210-1PH28-0UL0**	**6SL3210-1PH28-0AL0**
90	100	100	**75**	75	80	FSF	**6SL3210-1PH31-0UL0**	**6SL3210-1PH31-0AL0**
110	100	115	**90**	100	100	FSF	**6SL3210-1PH31-2UL0**	**6SL3210-1PH31-2AL0**
132	125	142	**110**	100	115	FSF	**6SL3210-1PH31-4UL0**	**6SL3210-1PH31-4AL0**

Rated power [1]		Rated output current I_N [2]	Power based on the base-load current [3]		Base-load current I_H [3]	Frame size	PM240-2 Power Module standard variant with integrated line filter Category C3	PM240-2 Power Module standard variant with integrated line filter Category C2
kW	hp	A	kW	hp	A		Article No.	Article No.
380 ... 480 V 3 AC [4]								
160	250	302	**132**	200	250	FSG [4]	**6SL3210-1PE33-0CL0**	**6SL3210-1PE33-0AL0**
200	300	370	**160**	250	302	FSG [4]	**6SL3210-1PE33-7CL0**	**6SL3210-1PE33-7AL0**
250	400	477	**200**	300	370	FSG [4]	**6SL3210-1PE34-8CL0**	**6SL3210-1PE34-8AL0**
500 ... 690 V 3 AC								
160	150	171	**132**	150	142	FSG [4]	**6SL3210-1PH31-7CL0**	–
200	200	208	**160**	150	171	FSG [4]	**6SL3210-1PH32-1CL0**	–
250	250	250	**200**	200	208	FSG [4]	**6SL3210-1PH32-5CL0**	–

Shield connection kit for Power Modules

The shield connection kit makes it easier to connect the shields of supply and control cables, provides mechanical strain relief and thus ensures optimum EMC performance.

A shield connection kit is supplied as standard with PM240-2 Power Modules in frame sizes FSA to FSC. A set of shield plates is included in the scope of delivery for the motor and signal cables corresponding to the frame size for the frame sizes FSD to FSG. For the electromagnetically compatible connection of an optionally connectable braking resistor, the corresponding shield connection kit is to be ordered for frame sizes FSD to FSG.

For more information, see shield connection kits for Power Modules in the section Supplementary system components.

[1] Rated power based on the rated output current I_N. The rated output current I_N is based on the duty cycle for low overload (LO).

[2] The rated output current I_N is based on the duty cycle for low overload (LO). These current values are valid for 200 V, 400 V or 690 V and are specified on the rating plate of the Power Module.

[3] The base-load current I_H is based on the duty cycle for high overload (HO).

[4] PM240-2 Power Modules in frame size FSG, equipped with an integrated Category C3 line filter, can be operated in the following power supply systems (up to 600 V):
- TN systems with a grounded line conductor
- TT systems without a grounded neutral point
- IT systems, provided the functional grounding screw is removed

Note: Removing the functional grounding screw is required for operation in IT systems. However, this action degrades the EMC performance, and the device no longer complies with Category C3 requirements.

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Technical specifications

General technical specifications

Note:
When engineering the complete SINAMICS S120 drive, the system data of the associated Control Units, supplementary system components, DC link components and Sensor Modules must be taken into consideration.

Power Modules	PM240-2
System operating voltage	FSA ... FSC: 200 … 240 V 1 AC/3 AC ±10 % 380 … 480 V 3 AC ±10 % FSD ... FSG: 200 … 240 V 3 AC ±10 % (in operation -20 % < 1 min) 380 ... 480 V 3 AC ±10 % (in operation -20 %) 500 … 690 V 3 AC ±10 % (in operation -20 % < 1 min)
Line supply requirements **Short-circuit power ratio R_{SC}**	200 V: >25 With RSC >50 it is advisable for FSA to FSC to install a line reactor, or alternatively, to select a Power Module with the next-higher power rating. 400 V: >25 With RSC >100 it is advisable for FSA to FSC to install a line reactor, or alternatively, to select a Power Module with the next-higher power rating. 690 V: No restriction
Input frequency	47 ... 63 Hz
Output frequency	
• Control mode V/f	0 ... 550 Hz
• Control mode Vector	0 ... 240 Hz
Pulse frequency	200 V: 4 kHz 400 V: ≤90 kW: 4 kHz; >90 kW: 2 kHz 690 V: 2 kHz For higher pulse frequencies, see derating data
Power factor λ	FSA ... FSC: 0.7 ... 0.85 FSD ... FSG: - 200 V: >0.95 - 400 V and 690 V: >0.9
Displacement factor cos φ	FSA ... FSC: >0.96 FSD ... FSG: 0.98 ... 0.99
Converter efficiency According to IEC 61800-9-2	200 V: >96.2 ... 97.1 % 400 V: >96.0 ... 98.0 % 690 V: >97.3 ... 98.2 %
Efficiency class According to IEC 61800-9-2	IE2
Output voltage, max. as % of input voltage	95 %
Overload capability	
• Low overload (LO) Note: No reduction in rated current I_N for use of overload.	1.5 × rated current I_N (i.e. 150 % overload) for 3 s **plus** 1.1 × rated current I_N (i.e. 110 % overload) for 57 s within a cycle time of 300 s
• High overload (HO) Note: No reduction in base-load current I_H for use of overload.	2 × base-load current I_H (i.e. 200 % overload) for 3 s **plus** 1.5 × base-load current I_H (i.e. 150 % overload) for 57 s within a cycle time of 300 s

For more information on overload capability, see in section characteristic curves.

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Air-cooled Power Modules in blocksize format

Technical specifications

Power Modules	PM240-2
Possible braking methods	DC braking Compound braking Dynamic braking with integrated braking chopper
Degree of protection	IP20 (standard)
Operating temperature	
• Low overload (LO)	Frame sizes FSA ... FSC: -10 ... +40 °C (14 ... 104 °F) without derating >40 ... 60 °C (>104 ... 140 °F) see derating characteristics Frame sizes FSD ... FSG: -20 ... +40 °C (-4 ... +104 °F) without derating >40 ... 60 °C (>104 ... 140 °F) see derating characteristics
• High overload (HO)	Frame sizes FSA ... FSC: -10 ... +50 °C (14 ... 122 °F) without derating >50 ... 60 °C (>122 ... 140 °F) see derating characteristics Frame sizes FSD ... FSG: -20 ... +50 °C (-4 ... +122 °F) without derating >50 ... 60 °C (>122 ... 140 °F) see derating characteristics
Relative humidity	< 95 % RH, condensation not permissible
Cooling	200 V, 400 V from 1.5 kW, 690 V: Internal air cooling, power units with increased air cooling by built-in fans 400 V 0.55 kW to 1.1 kW: Convection cooling
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, > 1000 m (3281 ft) see derating characteristics
Protection functions	• Undervoltage • Overvoltage • Overload • Ground fault • Short-circuit • Stall protection • Motor blocking protection • Motor overtemperature • Converter overtemperature • Parameter locking
Short-Circuit Current Rating SCCR according to UL (Short-Circuit Current Rating) [1]	200 V: 100 kA 400 V: 100 kA 690 V: 100 kA
Compliance with standards	CE, UKCA, cULus, RCM, SEMI F47, RoHS, EAC KC (only with internal or external line filters Category C2) For frame size FSD ... FSG also: WEEE (Waste Electrical & Electronic Equipment)
CE marking, according to	Low-Voltage Directive 2014/35/EU Ecodesign requirements of the EU Directive 2019/1781 EMC Directive 2014/30/EU

Environmental Product Declaration (EPD)

Environmental Product Declarations (EPD) are available as PDFs for this product.
The EPD PDF provides brief and concise information about the ecological properties of a product.

You can find more information on the internet at:
https://support.industry.siemens.com/cs/ww/en/ps/13224/cert?ci=5690

[1] Applies to industrial control panel installations to NEC Article 409 or UL 508A.

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Technical specifications

PM240-2 Power Modules standard variant

Line voltage 200 ... 240 V 1 AC/3 AC		**PM240-2 Power Modules standard variant**				
Without integrated line filter		6SL3210-1PB13-0UL0	6SL3210-1PB13-8UL0	6SL3210-1PB15-5UL0	6SL3210-1PB17-4UL0	6SL3210-1PB21-0UL0
With integrated line filter class A		6SL3210-1PB13-0AL0	6SL3210-1PB13-8AL0	6SL3210-1PB15-5AL0	6SL3210-1PB17-4AL0	6SL3210-1PB21-0AL0
Output current at 50 Hz 230 V 1 AC						
• Rated current I_N [1]	A	3.2	4.2	6	7.4	10.4
• For S6 duty (40 %) I_{S6}	A	3.3	4.3	6.1	8.2	11.5
• Base-load current I_H [2]	A	2.3	3.2	4.2	6	7.4
• Maximum current I_{max}	A	4.6	6	8.3	11.1	15.6
Rated power						
• Based on I_N	kW (hp)	0.55 (0.75)	0.75 (1)	1.1 (1.5)	1.5 (2)	2.2 (3)
• Based on I_H	kW (hp)	0.37 (0.50)	0.55 (0.75)	0.75 (1)	1.1 (1.5)	1.5 (2)
Rated pulse frequency	kHz	4	4	4	4	4
Efficiency η According to IEC 61800-9-2	%	>96.2	>96.4	>96.7	>96.4	>96.3
Power loss [3] According to IEC 61800-9-2 At rated current	kW	0.037	0.046	0.061	0.082	0.118
Cooling air requirement	m^3/s (ft^3/s)	0.005 (0.18)	0.005 (0.18)	0.0092 (0.325)	0.0092 (0.325)	0.0092 (0.325)
Sound pressure level L_{pA} (1 m)	dB	<50	<50	<62	<62	<62
Input current [4]						
• Rated input current 1 AC/3 AC	A	7.5/4.2	9.6/5.5	13.5/7.8	18.1/9.7	24/13.6
• Based on I_H 1 AC/3 AC	A	6.6/3	8.4/4.2	11.8/5.5	15.8/7.8	20.9/9.7
Line supply connection U1/L1, V1/L2, W1/L3		Terminal connector	Terminal connector	Terminal connector	Terminal connector	Terminal connector
• Conductor cross-section	mm^2	1.5 ... 2.5	1.5 ... 2.5	1.5 ... 6	1.5 ... 6	1.5 ... 6
Motor connection U2, V2, W2		Terminal connector	Terminal connector	Terminal connector	Terminal connector	Terminal connector
• Conductor cross-section	mm^2	1.5 ... 2.5	1.5 ... 2.5	1.5 ... 6	1.5 ... 6	1.5 ... 6
PE connection		Included in terminal connector	Included in terminal connector	Included in terminal connector	Included in terminal connector	Included in terminal connector
Motor cable length, max.						
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	50 (164)	50 (164)
• Unshielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	73 (2.87)	73 (2.87)	100 (3.94)	100 (3.94)	100 (3.94)
• Height	mm (in)	196 (7.72)	196 (7.72)	292 (11.5)	292 (11.5)	292 (11.5)
• Depth without operator panel	mm (in)	165 (6.50)	165 (6.50)	165 (6.50)	165 (6.50)	165 (6.50)
Frame size		FSA	FSA	FSB	FSB	FSB
Weight, approx.						
• Without integrated line filter	kg (lb)	1.4 (3.09)	1.4 (3.09)	2.8 (6.17)	2.8 (6.17)	2.8 (6.17)
• With integrated line filter	kg (lb)	1.6 (3.53)	1.6 (3.53)	3.1 (6.84)	3.1 (6.84)	3.1 (6.84)

[1] The rated output current I_N is based on the duty cycle for low overload (LO).

[2] The base-load current I_H is based on the duty cycle for high overload (HO).

[3] Typical values. You can find more information on the internet at: https://support.industry.siemens.com/cs/document/94059311

[4] The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_N) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the Power Module.

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Technical specifications

Line voltage 200 ... 240 V 1 AC/3 AC		**PM240-2 Power Modules standard variant**	
Without integrated line filter		6SL3210-1PB21-4UL0	6SL3210-1PB21-8UL0
With integrated line filter class A		6SL3210-1PB21-4AL0	6SL3210-1PB21-8AL0
Output current at 50 Hz 230 V 1 AC			
• Rated current I_N [1]	A	13.6	17.5
• For S6 duty (40 %) I_{S6}	A	15	19.3
• Base-load current I_H [2]	A	10.4	13.6
• Maximum current I_{max}	A	20.8	27.2
Rated power			
• Based on I_N	kW (hp)	3 (4)	4 (5)
• Based on I_H	kW (hp)	2.2 (3)	3 (4)
Rated pulse frequency	kHz	4	4
Efficiency η According to IEC 61800-9-2	%	>96.7	>96.7
Power loss [3] According to IEC 61800-9-2 At rated current	kW	0.137	0.176
Cooling air requirement	m^3/s (ft^3/s)	0.0185 (0.65)	0.0185 (0.65)
Sound pressure level L_{pA} (1 m)	dB	<65	<65
Input current [4]			
• Rated input current 1 AC/3 AC	A	35.9/17.7	43/22.8
• Based on I_H 1 AC/3 AC	A	31.3/13.6	37.5/17.7
Line supply connection U1/L1, V1/L2, W1/L3		Terminal connector	Terminal connector
• Conductor cross-section	mm^2	6 ... 16	6 ... 16
Motor connection U2, V2, W2		Terminal connector	Terminal connector
• Conductor cross-section	mm^2	6 ... 16	6 ... 16
PE connection		Included in terminal connector	Included in terminal connector
Motor cable length, max.			
• Shielded	m (ft)	50 (164)	50 (164)
• Unshielded	m (ft)	100 (328)	100 (328)
Degree of protection		IP20	IP20
Dimensions			
• Width	mm (in)	140 (5.51)	140 (5.51)
• Height	mm (in)	355 (13.98)	355 (13.98)
• Depth without operator panel	mm (in)	165 (6.50)	165 (6.50)
Frame size		FSC	FSC
Weight, approx.			
• Without integrated line filter	kg (lb)	5 (11)	5 (11)
• With integrated line filter	kg (lb)	5.2 (11.5)	5.2 (11.5)

1) The rated output current I_N is based on the duty cycle for low overload (LO).

2) The base-load current I_H is based on the duty cycle for high overload (HO).

3) Typical values. You can find more information on the internet at: https://support.industry.siemens.com/cs/document/94059311

4) The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_N) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the Power Module.

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Technical specifications

Line voltage 200 ... 240 V 3 AC		**PM240-2 Power Modules standard variant**				
Without integrated line filter		6SL3210-1PC22-2UL0	6SL3210-1PC22-8UL0	6SL3210-1PC24-2UL0	6SL3210-1PC25-4UL0	6SL3210-1PC26-8UL0
With integrated line filter class A		6SL3210-1PC22-2AL0	6SL3210-1PC22-8AL0	–	–	–
Output current at 50 Hz 230 V 3 AC						
• Rated current I_N [1]	A	22	28	42	54	68
• For S6 duty (40 %) I_{S6}	A	24.2	30.8	50	64	81
• Base-load current I_H [2]	A	17.5	22	35	42	54
• Maximum current I_{max}	A	35	44	70	84	108
Rated power						
• Based on I_N	kW (hp)	5.5 (7.5)	7.5 (10)	11 (15)	15 (20)	18.5 (25)
• Based on I_H	kW (hp)	4 (5)	5.5 (7.5)	7.5 (10)	11 (15)	15 (20)
Rated pulse frequency	kHz	4	4	4	4	4
Efficiency η According to IEC 61800-9-2	%	>97.0	>96.9	>96.7	>96.5	>96.3
Power loss [3] According to IEC 61800-9-2 At rated current	kW	0.217	0.282	0.463	0.626	0.843
Cooling air requirement	m^3/s (ft^3/s)	0.0185 (0.65)	0.0185 (0.65)	0.055 (1.94)	0.055 (1.94)	0.055 (1.94)
Sound pressure level L_{pA} (1 m)	dB	<65	<65	45 ... 65 [4]	45 ... 65 [4]	45 ... 65 [4]
Input current [5]						
• Rated input current	A	28.6	36.4	40	51	64
• Based on I_H	A	22.8	28.6	36	43	56
Line supply connection U1/L1, V1/L2, W1/L3		Terminal connector	Terminal connector	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	6 ... 16	6 ... 16	10 ... 35	10 ... 35	10 ... 35
Motor connection U2, V2, W2		Terminal connector	Terminal connector	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	6 ... 16	6 ... 16	10 ... 35	10 ... 35	10 ... 35
PE connection		Included in terminal connector	Included in terminal connector	Screw terminals	Screw terminals	Screw terminals
Motor cable length, max.						
• Shielded	m (ft)	50 (164)	50 (164)	200 (656)	200 (656)	200 (656)
• Unshielded	m (ft)	100 (328)	100 (328)	300 (984)	300 (984)	300 (984)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	140 (5.51)	140 (5.51)	200 (7.87)	200 (7.87)	200 (7.87)
• Height	mm (in)	355 (13.98)	355 (13.98)	472 (18.58)	472 (18.58)	472 (18.58)
• Depth without operator panel	mm (in)	165 (6.50)	165 (6.50)	237 (9.33)	237 (9.33)	237 (9.33)
Frame size		FSC	FSC	FSD	FSD	FSD
Weight, approx.						
• Without integrated line filter	kg (lb)	5 (11)	5 (11)	17 (37.5)	17 (37.5)	17 (37.5)
• With integrated line filter	kg (lb)	5.2 (11.5)	5.2 (11.5)	–	–	–

[1] The rated output current I_N is based on the duty cycle for low overload (LO).

[2] The base-load current I_H is based on the duty cycle for high overload (HO).

[3] Typical values. You can find more information on the internet at: https://support.industry.siemens.com/cs/document/94059311

[4] Values dependent on ambient temperature and utilization.

[5] The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_N) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the Power Module.

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Air-cooled Power Modules in blocksize format

Technical specifications

Line voltage 200 ... 240 V 3 AC		**PM240-2 Power Modules standard variant**				
Without integrated line filter		6SL3210-1PC28-0UL0	6SL3210-1PC31-1UL0	6SL3210-1PC31-3UL0	6SL3210-1PC31-6UL0	6SL3210-1PC31-8UL0
With integrated line filter class A		–	–	–	–	–
Output current at 50 Hz 230 V 3 AC						
• Rated current I_N [1]	A	80	104	130	154	178
• For S6 duty (40 %) I_{S6}	A	96	124	156	184	213
• Base-load current I_H [2]	A	68	80	104	130	154
• Maximum current I_{max}	A	136	160	208	260	308
Rated power						
• Based on I_N	kW (hp)	22 (30)	30 (40)	37 (50)	45 (60)	55 (75)
• Based on I_H	kW (hp)	18.5 (25)	22 (30)	30 (40)	37 (50)	45 (60)
Rated pulse frequency	kHz	4	4	4	4	4
Efficiency η According to IEC 61800-9-2	%	>96.5	>96.2	>96.7	>96.5	>96.4
Power loss [3] According to IEC 61800-9-2 At rated current	kW	0.937	1.31	1.45	1.81	2.20
Cooling air requirement	m^3/s (ft^3/s)	0.083 (2.93)	0.083 (2.93)	0.153 (5.40)	0.153 (5.40)	0.153 (5.40)
Sound pressure level L_{pA} (1 m)	dB	44 ... 62 [4]	44 ... 62 [4]	56 ... 68 [4]	56 ... 68 [4]	56 ... 68 [4]
Input current [5]						
• Rated input current	A	76	98	126	149	172
• Based on I_H	A	71	83	110	138	164
Line supply connection U1/L1, V1/L2, W1/L3		Screw terminals	Screw terminals	M10 screw stud	M10 screw stud	M10 screw stud
• Conductor cross-section	mm^2	25 ... 70	25 ... 70	35 ... 2 × 120	35 ... 2 × 120	35 ... 2 × 120
Motor connection U2, V2, W2		Screw terminals	Screw terminals	M10 screw stud	M10 screw stud	M10 screw stud
• Conductor cross-section	mm^2	25 ... 70	25 ... 70	35 ... 2 × 120	35 ... 2 × 120	35 ... 2 × 120
PE connection		Screw terminals	Screw terminals	M10 screw stud	M10 screw stud	M10 screw stud
Motor cable length, max.						
• Shielded	m (ft)	200 (656)	200 (656)	300 (984)	300 (984)	300 (984)
• Unshielded	m (ft)	300 (984)	300 (984)	450 (1476)	450 (1476)	450 (1476)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	275 (10.83)	275 (10.83)	305 (12.01)	305 (12.01)	305 (12.01)
• Height	mm (in)	551 (21.69)	551 (21.69)	708 (27.87)	708 (27.87)	708 (27.87)
• Depth without operator panel	mm (in)	237 (9.33)	237 (9.33)	357 (14.06)	357 (14.06)	357 (14.06)
Frame size		FSE	FSE	FSF	FSF	FSF
Weight, approx.						
• Without integrated line filter	kg (lb)	26 (57.3)	26 (57.3)	57 (126)	57 (126)	57 (126)
• With integrated line filter	kg (lb)	–	–	–	–	–

1) The rated output current I_N is based on the duty cycle for low overload (LO).

2) The base-load current I_H is based on the duty cycle for high overload (HO).

3) Typical values. You can find more information on the internet at: https://support.industry.siemens.com/cs/document/94059311

4) Values dependent on ambient temperature and utilization.

5) The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_N) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the Power Module.

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Technical specifications

Line voltage 380 ... 480 V 3 AC		**PM240-2 Power Modules standard variant**					
Without integrated line filter		6SL3210-1PE11-8UL1	6SL3210-1PE12-3UL1	6SL3210-1PE13-2UL1	6SL3210-1PE14-3UL1	6SL3210-1PE16-1UL1	6SL3210-1PE18-0UL1
With integrated line filter class A		6SL3210-1PE11-8AL1	6SL3210-1PE12-3AL1	6SL3210-1PE13-2AL1	6SL3210-1PE14-3AL1	6SL3210-1PE16-1AL1	6SL3210-1PE18-0AL1
Output current at 50 Hz 400 V 3 AC							
• Rated current I_N [1]	A	1.7	2.2	3.1	4.1	5.9	7.7
• For S6 duty (40 %) I_{S6}	A	2.0	2.5	3.5	4.5	6.5	8.5
• Base-load current I_H [2]	A	1.3	1.7	2.2	3.1	4.1	5.9
• Maximum current I_{max}	A	2.6	3.4	4.7	6.2	8.9	11.8
Rated power							
• Based on I_N	kW (hp)	0.55 (0.75)	0.75 (1)	1.1 (1.5)	1.5 (2)	2.2 (3)	3 (4)
• Based on I_H	kW (hp)	0.37 (0.50)	0.55 (0.75)	0.75 (1)	1.1 (1.5)	1.5 (2)	2.2 (3)
Rated pulse frequency	kHz	4	4	4	4	4	4
Efficiency η According to IEC 61800-9-2	%	>96.0	>96.7	>97.1	>97.3	>97.3	>97.3
Power loss [3] According to IEC 61800-9-2 At rated current	kW	0.032	0.037	0.047	0.057	0.080	0.103
Cooling air requirement	m^3/s (ft^3/s)	0.005 (0.18)	0.005 (0.18)	0.005 (0.18)	0.005 (0.18)	0.005 (0.18)	0.005 (0.18)
Sound pressure level L_{pA} (1 m)	dB	<50	<50	<50	<50	<57	<57
Input current [4]							
• Rated input current	A	2.3	2.9	4.1	5.5	7.7	10.1
• Based on I_H	A	2	2.6	3.3	4.7	6.1	8.8
Line supply connection U1/L1, V1/L2, W1/L3		Terminal connector	Terminal connector	Terminal connector	Terminal connector	Terminal connector	Terminal connector
• Conductor cross-section	mm^2	1 ... 2.5	1 ... 2.5	1 ... 2.5	1 ... 2.5	1 ... 2.5	1 ... 2.5
Motor connection U2, V2, W2		Terminal connector	Terminal connector	Terminal connector	Terminal connector	Terminal connector	Terminal connector
• Conductor cross-section	mm^2	1 ... 2.5	1 ... 2.5	1 ... 2.5	1 ... 2.5	1 ... 2.5	1 ... 2.5
PE connection		Included in terminal connector	Included in terminal connector	Included in terminal connector	Included in terminal connector	Included in terminal connector	Included in terminal connector
Motor cable length, max.							
• Without filter, shielded/unshielded	m (ft)	150/150 (492/492)	150/150 (492/492)	150/150 (492/492)	150/150 (492/492)	150/150 (492/492)	150/150 (492/492)
• With integrated filter class A, shielded/unshielded	m (ft)	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20
Dimensions							
• Width	mm (in)	73 (2.87)	73 (2.87)	73 (2.87)	73 (2.87)	73 (2.87)	73 (2.87)
• Height	mm (in)	196 (7.72)	196 (7.72)	196 (7.72)	196 (7.72)	196 (7.72)	196 (7.72)
• Depth without operator panel	mm (in)	165 (6.50)	165 (6.50)	165 (6.50)	165 (6.50)	165 (6.50)	165 (6.50)
Frame size		FSA	FSA	FSA	FSA	FSA	FSA
Weight, approx.							
• Without integrated line filter	kg (lb)	1.3 (2.87)	1.3 (2.87)	1.3 (2.87)	1.4 (3.09)	1.4 (3.09)	1.4 (3.09)
• With integrated line filter	kg (lb)	1.5 (3.31)	1.5 (3.31)	1.5 (3.31)	1.6 (3.53)	1.6 (3.53)	1.6 (3.53)

[1] The rated output current I_N is based on the duty cycle for low overload (LO).

[2] The base-load current I_H is based on the duty cycle for high overload (HO).

[3] Typical values. You can find more information on the internet at: https://support.industry.siemens.com/cs/document/94059311

[4] The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_N) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the Power Module.

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Air-cooled Power Modules in blocksize format

Technical specifications

Line voltage 380 ... 480 V 3 AC		PM240-2 Power Modules standard variant				
Without integrated line filter		6SL3210-1PE21-1UL0	6SL3210-1PE21-4UL0	6SL3210-1PE21-8UL0	6SL3210-1PE22-7UL0	6SL3210-1PE23-3UL0
With integrated line filter class A		6SL3210-1PE21-1AL0	6SL3210-1PE21-4AL0	6SL3210-1PE21-8AL0	6SL3210-1PE22-7AL0	6SL3210-1PE23-3AL0
Output current at 50 Hz 400 V 3 AC						
• Rated current I_N [1]	A	10.2	13.2	18	26	32
• For S6 duty (40 %) I_{S6}	A	11.2	14.5	19.8	28.6	37.1
• Base-load current I_H [2]	A	7.7	10.2	13.2	18	26
• Maximum current I_{max}	A	15.4	20.4	27	39	52
Rated power						
• Based on I_N	kW (hp)	4 (5)	5.5 (7.5)	7.5 (10)	11 (15)	15 (20)
• Based on I_H	kW (hp)	3 (4)	4 (5)	5.5 (7.5)	7.5 (10)	11 (15)
Rated pulse frequency	kHz	4	4	4	4	4
Efficiency η According to IEC 61800-9-2	%	>97.4	>97.6	>97.7	>97.8	>97.9
Power loss [3] According to IEC 61800-9-2 At rated current	kW	0.135	0.175	0.229	0.313	0.365
Cooling air requirement	m^3/s (ft^3/s)	0.0092 (0.325)	0.0092 (0.325)	0.0092 (0.325)	0.0185 (0.65)	0.0185 (0.65)
Sound pressure level L_{pA} (1 m)	dB	<62	<62	<62	<65	<65
Input current [4]						
• Rated input current	A	13.3	17.2	22.2	32.6	39.9
• Based on I_H	A	11.6	15.3	19.8	27	36
Line supply connection U1/L1, V1/L2, W1/L3		Terminal connector	Terminal connector	Terminal connector	Terminal connector	Terminal connector
• Conductor cross-section	mm^2	1.5 ... 6	1.5 ... 6	1.5 ... 6	6 ... 16	6 ... 16
Motor connection U2, V2, W2		Terminal connector	Terminal connector	Terminal connector	Terminal connector	Terminal connector
• Conductor cross-section	mm^2	1.5 ... 6	1.5 ... 6	1.5 ... 6	6 ... 16	6 ... 16
PE connection		Included in terminal connector	Included in terminal connector	Included in terminal connector	Included in terminal connector	Included in terminal connector
Motor cable length, max.						
• Without filter, shielded/unshielded	m (ft)	150/150 (492/492)	150/150 (492/492)	150/150 (492/492)	150/150 (492/492)	150/150 (492/492)
• With integrated filter class A, shielded/unshielded	m (ft)	100/100 (328/328) [5]	100/100 (328/328) [5]	100/100 (328/328) [5]	150/150 (492/492) [5]	150/150 (492/492) [5]
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	100 (3.94)	100 (3.94)	100 (3.94)	140 (5.51)	140 (5.51)
• Height	mm (in)	292 (11.5)	292 (11.5)	292 (11.5)	355 (13.98)	355 (13.98)
• Depth without operator panel	mm (in)	165 (6.50)	165 (6.50)	165 (6.50)	165 (6.50)	165 (6.50)
Frame size		FSB	FSB	FSB	FSC	FSC
Weight, approx.						
• Without integrated line filter	kg (lb)	2.9 (6.39)	2.9 (6.39)	3 (6.62)	4.7 (10.4)	4.8 (10.6)
• With integrated line filter	kg (lb)	3.1 (6.84)	3.1 (6.84)	3.2 (7.06)	5.3 (11.7)	5.4 (11.9)

[1] The rated output current I_N is based on the duty cycle for low overload (LO).

[2] The base-load current I_H is based on the duty cycle for high overload (HO).

[3] Typical values. You can find more information on the internet at: https://support.industry.siemens.com/cs/document/94059311

[4] The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_N) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the Power Module.

[5] The values apply with low-capacitance CY cables – the max. permissible motor cable length is 50 m (164 ft) (shielded) and 100 m (328 ft) (unshielded) as standard.

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Technical specifications

Line voltage 380 ... 480 V 3 AC		**PM240-2 Power Modules standard variant**					
Without integrated line filter		6SL3210-1PE23-8UL0	6SL3210-1PE24-5UL0	6SL3210-1PE26-0UL0	6SL3210-1PE27-5UL0	6SL3210-1PE28-8UL0	6SL3210-1PE31-1UL0
With integrated line filter class A		6SL3210-1PE23-8AL0	6SL3210-1PE24-5AL0	6SL3210-1PE26-0AL0	6SL3210-1PE27-5AL0	6SL3210-1PE28-8AL0	6SL3210-1PE31-1AL0
Output current at 50 Hz 400 V 3 AC							
• Rated current I_N [1]	A	38	45	60	75	90	110
• For S6 duty (40 %) I_{S6}	A	45	54	72	90	108	132
• Base-load current I_H [2]	A	32	38	45	60	75	90
• Maximum current I_{max}	A	64	76	90	120	150	180
Rated power							
• Based on I_N	kW (hp)	18.5 (25)	22 (30)	30 (40)	37 (50)	45 (60)	55 (75)
• Based on I_H	kW (hp)	15 (20)	18.5 (25)	22 (30)	30 (40)	37 (50)	45 (60)
Rated pulse frequency	kHz	4	4	4	4	4	4
Efficiency η According to IEC 61800-9-2	%	>97.2	>97.2	>97.5	>97.3	>97.4	>97.3
Power loss [3] According to IEC 61800-9-2 At rated current							
• Without integrated line filter	kW	0.584	0.713	0.848	1.12	1.31	1.69
• With integrated line filter	kW	0.587	0.716	0.854	1.13	1.32	1.70
Cooling air requirement	m^3/s (ft^3/s)	0.055 (1.94)	0.055 (1.94)	0.055 (1.94)	0.055 (1.94)	0.083 (2.93)	0.083 (2.93)
Sound pressure level L_{pA} (1 m)	dB	45 ... 65 [4]	45 ... 65 [4]	45 ... 65 [4]	45 ... 65 [4]	44 ... 62 [4]	44 ... 62 [4]
Input current [5]							
• Rated input current	A	36	42	57	70	86	104
• Based on I_H	A	33	38	47	62	78	94
Line supply connection U1/L1, V1/L2, W1/L3		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	10 ... 35	10 ... 35	10 ... 35	10 ... 35	25 ... 70	25 ... 70
Motor connection U2, V2, W2		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	10 ... 35	10 ... 35	10 ... 35	10 ... 35	25 ... 70	25 ... 70
PE connection		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
Motor cable length, max.							
• Shielded	m (ft)	200 (656)	200 (656)	200 (656)	200 (656)	200 (656)	200 (656)
• Unshielded	m (ft)	300 (984)	300 (984)	300 (984)	300 (984)	300 (984)	300 (984)
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20
Dimensions							
• Width	mm (in)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	275 (10.83)	275 (10.83)
• Height	mm (in)	472 (18.58)	472 (18.58)	472 (18.58)	472 (18.58)	551 (21.69)	551 (21.69)
• Depth without operator panel	mm (in)	237 (9.33)	237 (9.33)	237 (9.33)	237 (9.33)	237 (9.33)	237 (9.33)
Frame size		FSD	FSD	FSD	FSD	FSE	FSE
Weight, approx.							
• Without integrated line filter	kg (lb)	16 (35.3)	16 (35.3)	17 (37.5)	17.5 (38.6)	26 (57.3)	26 (57.3)
• With integrated line filter	kg (lb)	17.5 (38.6)	17.5 (38.6)	18.5 (40.8)	18.5 (40.8)	28 (61.7)	28 (61.7)

[1] The rated output current I_N is based on the duty cycle for low overload (LO).

[2] The base-load current I_H is based on the duty cycle for high overload (HO).

[3] Typical values. You can find more information on the internet at: https://support.industry.siemens.com/cs/document/94059311

[4] Values dependent on ambient temperature and utilization.

[5] The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_N) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the Power Module.

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Air-cooled Power Modules in blocksize format

Technical specifications

Line voltage 380 ... 480 V 3 AC		PM240-2 Power Modules standard variant			
Without integrated line filter		6SL3210-1PE31-5UL0	6SL3210-1PE31-8UL0	6SL3210-1PE32-1UL0	6SL3210-1PE32-5UL0
With integrated line filter class A		6SL3210-1PE31-5AL0	6SL3210-1PE31-8AL0	6SL3210-1PE32-1AL0	6SL3210-1PE32-5AL0
Output current at 50 Hz 400 V 3 AC					
• Rated current I_N [1]	A	145	178	205	250
• For S6 duty (40 %) I_{S6}	A	174	213	246	300
• Base-load current I_H [2]	A	110	145	178	205
• Maximum current I_{max}	A	220	290	356	410
Rated power					
• Based on I_N	kW (hp)	75 (100)	90 (125)	110 (150)	132 (200)
• Based on I_H	kW (hp)	55 (75)	75 (100)	90 (125)	110 (150)
Rated pulse frequency	kHz	2	2	2	2
Efficiency η According to IEC 61800-9-2	%	>97.6	>97.4	>97.9	>97.8
Power loss [3] According to IEC 61800-9-2 At rated current					
• Without integrated line filter	kW	1.97	2.56	2.37	3.10
• With integrated line filter	kW	1.98	2.58	2.39	3.14
Cooling air requirement	m^3/s (ft^3/s)	0.153 (5.40)	0.153 (5.40)	0.153 (5.40)	0.153 (5.40)
Sound pressure level L_{pA} (1 m)	dB	56 ... 68 [4]	56 ... 68 [4]	56 ... 68 [4]	56 ... 68 [4]
Input current [5]					
• Rated input current	A	140	172	198	242
• Based on I_H	A	117	154	189	218
Line supply connection U1/L1, V1/L2, W1/L3		M10 screw stud	M10 screw stud	M10 screw stud	M10 screw stud
• Conductor cross-section	mm^2	35 ... 2 × 120	35 ... 2 × 120	35 ... 2 × 120	35 ... 2 × 120
Motor connection U2, V2, W2		M10 screw stud	M10 screw stud	M10 screw stud	M10 screw stud
• Conductor cross-section	mm^2	35 ... 2 × 120	35 ... 2 × 120	35 ... 2 × 120	35 ... 2 × 120
PE connection		M10 screw stud	M10 screw stud	M10 screw stud	M10 screw stud
Motor cable length, max.					
• Shielded	m (ft)	300 (984)	300 (984)	300 (984)	300 (984)
• Unshielded	m (ft)	450 (1476)	450 (1476)	450 (1476)	450 (1476)
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	305 (12.01)	305 (12.01)	305 (12.01)	305 (12.01)
• Height	mm (in)	708 (27.87)	708 (27.87)	708 (27.87)	708 (27.87)
• Depth without operator panel	mm (in)	357 (14.06)	357 (14.06)	357 (14.06)	357 (14.06)
Frame size		FSF	FSF	FSF	FSF
Weight, approx.					
• Without integrated line filter	kg (lb)	57 (126)	57 (126)	61 (135)	61 (135)
• With integrated line filter	kg (lb)	63 (139)	63 (139)	65 (143)	65 (143)

[1] The rated output current I_N is based on the duty cycle for low overload (LO).

[2] The base-load current I_H is based on the duty cycle for high overload (HO).

[3] Typical values. You can find more information on the internet at: https://support.industry.siemens.com/cs/document/94059311

[4] Values dependent on ambient temperature and utilization.

[5] The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_N) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the Power Module.

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Technical specifications

Line voltage 380 ... 480 V 3 AC		**PM240-2 Power Modules standard variant**		
With integrated line filter Category C2		6SL3210-1PE33-0AL0	6SL3210-1PE33-7AL0	6SL3210-1PE34-8AL0
With integrated line filter Category C3		6SL3210-1PE33-0CL0	6SL3210-1PE33-7CL0	6SL3210-1PE34-8CL0
Output current at 50 Hz 400 V 3 AC				
• Rated current I_N [1]	A	302	370	477
• For S6 duty (40 %) I_{S6}	A	362	444	572
• Base-load current I_H [2]	A	250	302	370
• Maximum current I_{max}	A	500	604	740
Rated power				
• Based on I_N	kW (hp)	160 (250)	200 (300)	250 (400)
• Based on I_H	kW (hp)	132 (200)	160 (250)	200 (300)
Rated pulse frequency	kHz	2	2	2
Efficiency η According to IEC 61800-9-2	%	>97.9	>97.8	>97.7
Power loss [3] According to IEC 61800-9-2 At rated current	kW	3.66	4.61	6.17
Cooling air requirement	m^3/s (ft^3/s)	0.21 (7.42)	0.21 (7.42)	0.21 (7.42)
Sound pressure level L_{pA} (1 m)	dB	<74.7	<74.7	<74.7
Input current [4]				
• Rated input current	A	300	365	470
• Based on I_H	A	275	330	400
Line supply connection U1/L1, V1/L2, W1/L3		M10 screw stud	M10 screw stud	M10 screw stud
• Conductor cross-section	mm^2	35 ... 2 × 185	35 ... 2 × 185	35 ... 2 × 185
Motor connection U2, V2, W2		M10 screw stud	M10 screw stud	M10 screw stud
• Conductor cross-section	mm^2	35 ... 2 × 185	35 ... 2 × 185	35 ... 2 × 185
PE connection		M10 screw stud	M10 screw stud	M10 screw stud
Motor cable length, max.				
• Shielded	m (ft)	300 (984)	300 (984)	300 (984)
• Unshielded	m (ft)	450 (1476)	450 (1476)	450 (1476)
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	305 (12.01)	305 (12.01)	305 (12.01)
• Height	mm (in)	1000 (39.37)	1000 (39.37)	1000 (39.37)
• Depth without operator panel	mm (in)	357 (14.06)	357 (14.06)	357 (14.06)
Frame size		FSG	FSG	FSG
Weight, approx.				
• With integrated line filter Category C2	kg (lb)	107 (236)	114 (251)	122 (269)
• With integrated line filter Category C3	kg (lb)	105 (231)	113 (249)	120 (265)

[1] The rated output current I_N is based on the duty cycle for low overload (LO).

[2] The base-load current I_H is based on the duty cycle for high overload (HO).

[3] Typical values. You can find more information on the internet at: https://support.industry.siemens.com/cs/document/94059311

[4] The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_N) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the Power Module.

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Air-cooled Power Modules in blocksize format

Technical specifications

Line voltage 500 ... 690 V 3 AC		PM240-2 Power Modules standard variant					
Without integrated line filter		6SL3210-1PH21-4UL0	6SL3210-1PH22-0UL0	6SL3210-1PH22-3UL0	6SL3210-1PH22-7UL0	6SL3210-1PH23-5UL0	6SL3210-1PH24-2UL0
With integrated line filter class A		6SL3210-1PH21-4AL0	6SL3210-1PH22-0AL0	6SL3210-1PH22-3AL0	6SL3210-1PH22-7AL0	6SL3210-1PH23-5AL0	6SL3210-1PH24-2AL0
Output current at 50 Hz 690 V 3 AC							
• Rated current I_N [1]	A	14	19	23	27	35	42
• For S6 duty (40 %) I_{S6}	A	16	22	27	32	42	50
• Base-load current I_H [2]	A	11	14	19	23	27	35
• Maximum current I_{max}	A	22	29	38	46	54	70
Rated power							
• Based on I_N	kW (hp)	11 (10)	15 (15)	18.5 (20)	22 (25)	30 (30)	37 (40)
• Based on I_H	kW (hp)	7.5 (7.5)	11 (10)	15 (15)	18.5 (20)	22 (25)	30 (30)
Rated pulse frequency	kHz	2	2	2	2	2	2
Efficiency η According to IEC 61800-9-2	%	>97.3	>97.5	>97.6	>97.6	>97.6	>97.6
Power loss [3] According to IEC 61800-9-2 At rated current							
• Without integrated line filter	kW	0.359	0.452	0.533	0.614	0.797	0.971
• With integrated line filter	kW	0.360	0.453	0.535	0.617	0.802	0.980
Cooling air requirement	m^3/s (ft^3/s)	0.055 (1.94)	0.055 (1.94)	0.055 (1.94)	0.055 (1.94)	0.055 (1.94)	0.055 (1.94)
Sound pressure level L_{pA} (1 m)	dB	45 ... 65 [4]	45 ... 65 [4]	45 ... 65 [4]	45 ... 65 [4]	45 ... 65 [4]	45 ... 65 [4]
Input current [5]							
• Rated input current	A	14	18	22	25	33	40
• Based on I_H	A	11	14	20	24	28	36
Line supply connection U1/L1, V1/L2, W1/L3		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	10 ... 35	10 ... 35	10 ... 35	10 ... 35	10 ... 35	10 ... 35
Motor connection U2, V2, W2		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	10 ... 35	10 ... 35	10 ... 35	10 ... 35	10 ... 35	10 ... 35
PE connection		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
Motor cable length, max.							
• Shielded	m (ft)	200 (656)	200 (656)	200 (656)	200 (656)	200 (656)	200 (656)
• Unshielded	m (ft)	300 (984)	300 (984)	300 (984)	300 (984)	300 (984)	300 (984)
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20
Dimensions							
• Width	mm (in)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)
• Height	mm (in)	472 (18.58)	472 (18.58)	472 (18.58)	472 (18.58)	472 (18.58)	472 (18.58)
• Depth without operator panel	mm (in)	237 (9.33)	237 (9.33)	237 (9.33)	237 (9.33)	237 (9.33)	237 (9.33)
Frame size		FSD	FSD	FSD	FSD	FSD	FSD
Weight, approx.							
• Without integrated line filter	kg (lb)	17 (37.5)	17 (37.5)	17 (37.5)	17 (37.5)	17 (37.5)	17 (37.5)
• With integrated line filter	kg (lb)	18.5 (40.8)	18.5 (40.8)	18.5 (40.8)	18.5 (40.8)	18.5 (40.8)	18.5 (40.8)

[1] The rated output current I_N is based on the duty cycle for low overload (LO).

[2] The base-load current I_H is based on the duty cycle for high overload (HO).

[3] Typical values. You can find more information on the internet at: https://support.industry.siemens.com/cs/document/94059311

[4] Values dependent on ambient temperature and utilization.

[5] The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_N) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the Power Module.

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Technical specifications

Line voltage 500 ... 690 V 3 AC		**PM240-2 Power Modules standard variant**					
Without integrated line filter		6SL3210-1PH25-2UL0	6SL3210-1PH26-2UL0	6SL3210-1PH28-0UL0	6SL3210-1PH31-0UL0	6SL3210-1PH31-2UL0	6SL3210-1PH31-4UL0
With integrated line filter class A		6SL3210-1PH25-2AL0	6SL3210-1PH26-2AL0	6SL3210-1PH28-0AL0	6SL3210-1PH31-0AL0	6SL3210-1PH31-2AL0	6SL3210-1PH31-4AL0
Output current at 50 Hz 690 V 3 AC							
• Rated current I_N [1]	A	52	62	80	100	115	142
• For S6 duty (40 %) I_{S6}	A	62	74	96	120	138	170
• Base-load current I_H [2]	A	42	52	62	80	100	115
• Maximum current I_{max}	A	84	104	124	160	200	230
Rated power							
• Based on I_N	kW (hp)	45 (50)	55 (60)	75 (75)	90 (100)	110 (100)	132 (125)
• Based on I_H	kW (hp)	37 (40)	45 (50)	55 (60)	75 (75)	90 (100)	110 (100)
Rated pulse frequency	kHz	2	2	2	2	2	2
Efficiency η According to IEC 61800-9-2	%	>97.8	>97.8	>98.2	>98.1	>98.2	>98.1
Power loss [3] According to IEC 61800-9-2 At rated current							
• Without integrated line filter	kW	1.11	1.35	1.41	1.80	2.02	2.59
• With integrated line filter	kW	1.12	1.36	1.41	1.82	2.04	2.62
Cooling air requirement	m^3/s (ft^3/s)	0.083 (2.93)	0.083 (2.93)	0.153 (5.40)	0.153 (5.40)	0.153 (5.40)	0.153 (5.40)
Sound pressure level L_{pA} (1 m)	dB	44 ... 62 [4]	44 ... 62 [4]	56 ... 68 [4]	56 ... 68 [4]	56 ... 68 [4]	56 ... 68 [4]
Input current [5]							
• Rated input current	A	50	59	78	97	111	137
• Based on I_H	A	44	54	66	85	106	122
Line supply connection U1/L1, V1/L2, W1/L3		Screw terminals	Screw terminals	M10 screw stud	M10 screw stud	M10 screw stud	M10 screw stud
• Conductor cross-section	mm^2	25 ... 70	25 ... 70	35 ... 2 × 120	35 ... 2 × 120	35 ... 2 × 120	35 ... 2 × 120
Motor connection U2, V2, W2		Screw terminals	Screw terminals	M10 screw stud	M10 screw stud	M10 screw stud	M10 screw stud
• Conductor cross-section	mm^2	25 ... 70	25 ... 70	35 ... 2 × 120	35 ... 2 × 120	35 ... 2 × 120	35 ... 2 × 120
PE connection		Screw terminals	Screw terminals	M10 screw stud	M10 screw stud	M10 screw stud	M10 screw stud
Motor cable length, max.							
• Shielded	m (ft)	200 (656)	200 (656)	300 (984)	300 (984)	300 (984)	300 (984)
• Unshielded	m (ft)	300 (984)	300 (984)	450 (1476)	450 (1476)	450 (1476)	450 (1476)
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20
Dimensions							
• Width	mm (in)	275 (10.83)	275 (10.83)	305 (12.01)	305 (12.01)	305 (12.01)	305 (12.01)
• Height	mm (in)	551 (21.69)	551 (21.69)	708 (27.87)	708 (27.87)	708 (27.87)	708 (27.87)
• Depth without operator panel	mm (in)	237 (9.33)	237 (9.33)	357 (14.06)	357 (14.06)	357 (14.06)	357 (14.06)
Frame size		FSE	FSE	FSF	FSF	FSF	FSF
Weight, approx.							
• Without integrated line filter	kg (lb)	26 (57.3)	26 (57.3)	60 (132)	60 (132)	60 (132)	60 (132)
• With integrated line filter	kg (lb)	28 (61.7)	28 (61.7)	64 (141)	64 (141)	64 (141)	64 (141)

1) The rated output current I_N is based on the duty cycle for low overload (LO).

2) The base-load current I_H is based on the duty cycle for high overload (HO).

3) Typical values. You can find more information on the internet at: https://support.industry.siemens.com/cs/document/94059311

4) Values dependent on ambient temperature and utilization.

5) The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_N) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the Power Module.

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Technical specifications

Line voltage 500 ... 690 V 3 AC		**PM240-2 Power Modules standard variant**		
With integrated line filter Category C3		6SL3210-1PH31-7CL0	6SL3210-1PH32-1CL0	6SL3210-1PH32-5CL0
Output current at 50 Hz 690 V 3 AC				
• Rated current I_N [1]	A	171	208	250
• For S6 duty (40 %) I_{S6}	A	205	250	300
• Base-load current I_H [2]	A	144	171	208
• Maximum current I_{max}	A	288	342	416
Rated power				
• Based on I_N	kW (hp)	160 (150)	200 (200)	250 (250)
• Based on I_H	kW (hp)	132 (150)	160 (150)	200 (200)
Rated pulse frequency	kHz	2	2	2
Efficiency η According to IEC 61800-9-2	%	>98.2	>98.2	>98.1
Power loss [3] According to IEC 61800-9-2 At rated current	kW	2.93	3.70	4.63
Cooling air requirement	m^3/s (ft^3/s)	0.21 (7.42)	0.21 (7.42)	0.21 (7.42)
Sound pressure level L_{pA} (1 m)	dB	<74.7	<74.7	<74.7
Input current [4]				
• Rated input current	A	170	205	250
• Based on I_H	A	160	185	225
Line supply connection U1/L1, V1/L2, W1/L3		M10 screw stud	M10 screw stud	M10 screw stud
• Conductor cross-section	mm^2	35 ... 2 × 185	35 ... 2 × 185	35 ... 2 × 185
Motor connection U2, V2, W2		M10 screw stud	M10 screw stud	M10 screw stud
• Conductor cross-section	mm^2	35 ... 2 × 185	35 ... 2 × 185	35 ... 2 × 185
PE connection		M10 screw stud	M10 screw stud	M10 screw stud
Motor cable length, max.				
• Shielded	m (ft)	300 (984)	300 (984)	300 (984)
• Unshielded	m (ft)	450 (1476)	450 (1476)	450 (1476)
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	305 (12.01)	305 (12.01)	305 (12.01)
• Height	mm (in)	1000 (39.37)	1000 (39.37)	1000 (39.37)
• Depth without operator panel	mm (in)	357 (14.06)	357 (14.06)	357 (14.06)
Frame size		FSG	FSG	FSG
Weight, approx.	kg (lb)	114 (251)	114 (251)	114 (251)

[1] The rated output current I_N is based on the duty cycle for low overload (LO).

[2] The base-load current I_H is based on the duty cycle for high overload (HO).

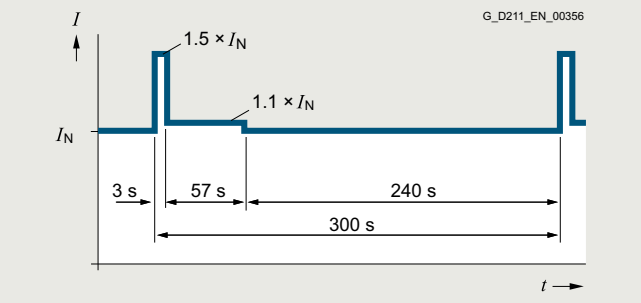
[3] Typical values. You can find more information on the internet at: https://support.industry.siemens.com/cs/document/94059311

[4] The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_N) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the Power Module.

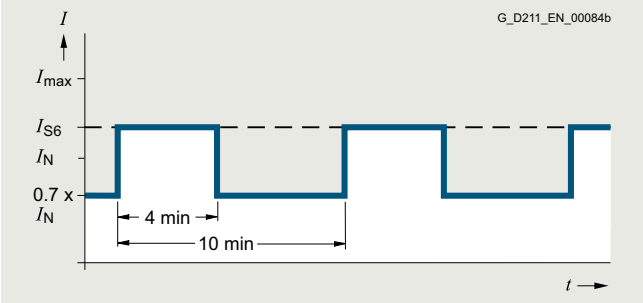
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Characteristic curves

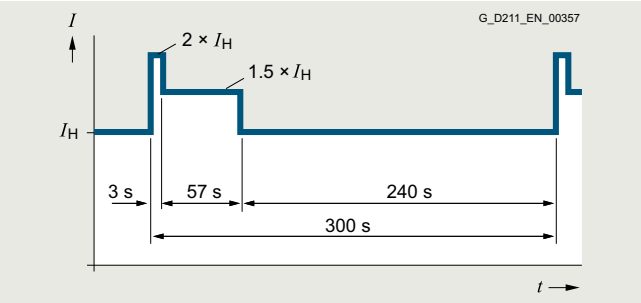
Overload capability



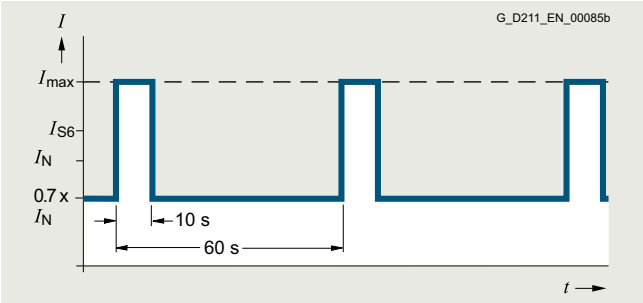
300 s duty cycle based on low overload



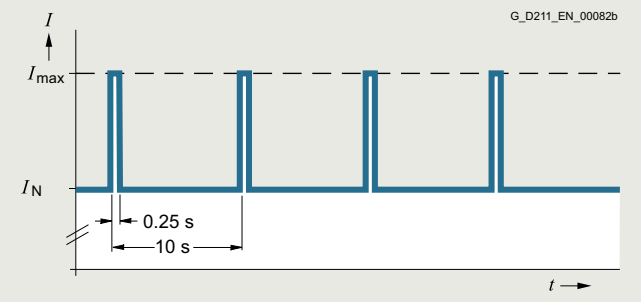
S6 duty cycle with initial load with a duty cycle duration of 600 s



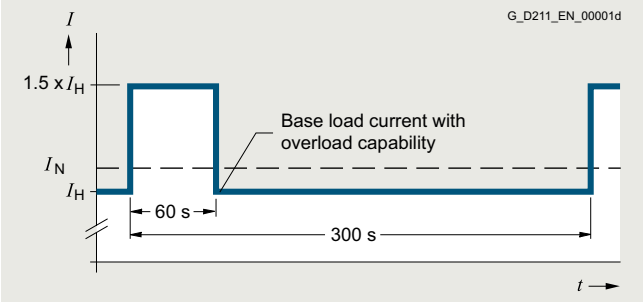
300 s duty cycle based on high overload



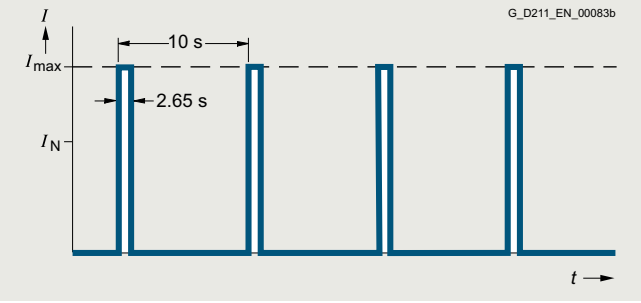
S6 duty cycle with initial load with a duty cycle duration of 60 s



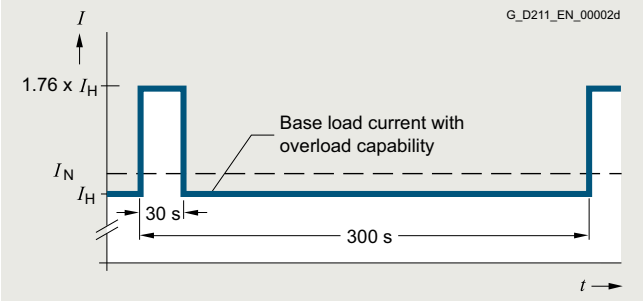
Duty cycle with initial load



Duty cycle with 60 s overload with a duty cycle duration of 300 s



Duty cycle without initial load



Duty cycle with 30 s overload with a duty cycle duration of 300 s

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Characteristic curves

Derating data, PM240-2 Power Modules

Pulse frequency

Rated power [1] at 50 Hz 200 V 1 AC/3 AC		**Rated output current in A** for a pulse frequency of							
kW	hp	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
0.55	0.75	3.2	3.2	2.7	2.2	1.9	1.6	1.4	1.3
0.75	1	4.2	4.2	3.6	2.9	2.5	2.1	1.9	1.7
1.1	1.5	6	6	5.1	4.2	3.6	2.3	2.7	2.4
1.5	2	7.4	7.4	6.3	5.2	4.4	3.7	3.3	3
2.2	3	10.4	10.4	8.8	7.3	6.2	5.2	4.7	4.2
3	4	13.6	13.6	11.6	9.5	8.2	6.8	6.1	5.4
4	5	17.5	17.5	14.9	12.3	10.5	8.8	7.9	7
5.5	7.5	22	22	18.7	15.4	13.2	11	9.9	8.8
7.5	10	28	28	23.8	19.6	16.8	14	12.6	11.2
11	15	42	42	35.7	29.4	25.2	21	18.9	16.8
15	20	54	54	45.9	37.8	32.4	27	24.3	21.6
18.5	25	68	68	57.8	47.6	40.8	34	30.6	27.2
22	30	80	80	68	56	48	40	36	32
30	40	104	104	88.4	72.8	62.4	52	46.8	41.6
37	50	130	130	110.5	91	–	–	–	–
45	60	154	154	130.9	107.8	–	–	–	–
55	75	178	178	151.3	124.6	–	–	–	–

Rated power [1] at 50 Hz 400 V 3 AC		**Rated output current in A** for a pulse frequency of							
kW	hp	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
0.55	0.75	1.7	1.7	1.4	1.2	1	0.9	0.8	0.7
0.75	1	2.2	2.2	1.9	1.5	1.3	1.1	1	0.9
1.1	1.5	3.1	3.1	2.6	2.2	1.9	1.6	1.4	1.2
1.5	2	4.1	4.1	3.5	2.9	2.5	2.1	1.8	1.6
2.2	3	5.9	5.9	5	4.1	3.5	3	2.7	2.4
3	4	7.7	7.7	6.5	5.4	4.6	3.9	3.5	3.1
4	5	10.2	10.2	8.7	7.1	6.1	5.1	4.6	4.1
5.5	7.5	13.2	13.2	11.2	9.2	7.9	6.6	5.9	5.3
7.5	10	18	18	15.3	12.6	10.8	9	8.1	7.2
11	15	26	26	22.1	18.2	15.6	13	11.7	10.4
15	20	32	32	27.2	22.4	19.2	16	14.4	12.8
18.5	25	38	38	32.3	26.6	22.8	19	17.1	15.2
22	30	45	45	38.3	31.5	27	22.5	20.3	18
30	40	60	60	51	42	36	30	27	24
37	50	75	75	63.8	52.5	45	37.5	33.8	30
45	60	90	90	76.5	63	54	45	40.5	36
55	75	110	110	93.5	77	–	–	–	–
75	100	145	145	123.3	101.5	–	–	–	–
90	125	178	178	151.3	124.6	–	–	–	–
110	150	205	143.5	102.5	82	–	–	–	–
132	200	250	175	125	100	–	–	–	–
160	250	302	211.4	151	120.8	–	–	–	–
200	300	370	259	185	148	–	–	–	–
250	400	477	333.9	238.5	190.8	–	–	–	–

[1] Rated power based on the rated output current I_N. The rated output current I_N is based on the duty cycle for low overload (LO).

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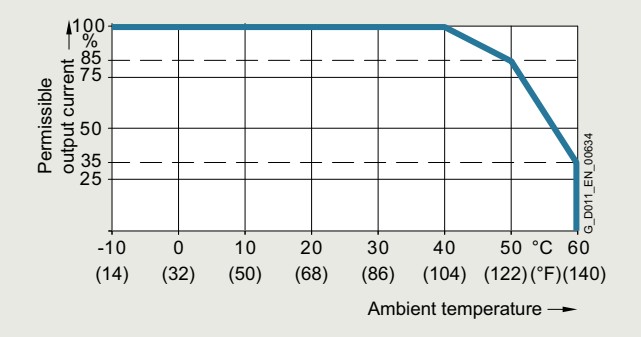
Characteristic curves

Derating data, PM240-2 Power Modules (continued)

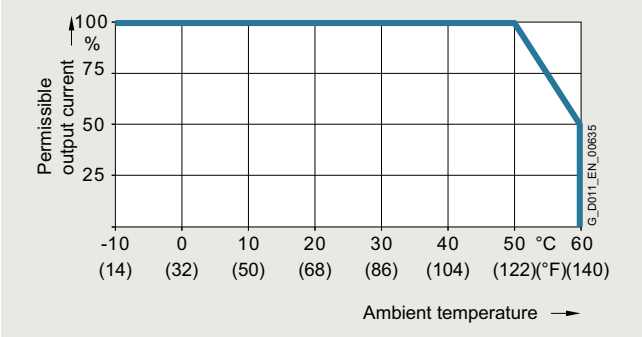
Rated power [1] at 50 Hz 690 V 3 AC		**Rated output current in A** for a pulse frequency of							
kW	hp	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
11	10	14	8.4	–	–	–	–	–	–
15	15	19	11.4	–	–	–	–	–	–
18.5	20	23	13.8	–	–	–	–	–	–
22	25	27	16.2	–	–	–	–	–	–
30	30	35	21	–	–	–	–	–	–
37	40	42	25.2	–	–	–	–	–	–
45	50	52	31.2	–	–	–	–	–	–
55	60	62	37.2	–	–	–	–	–	–
75	75	80	48	–	–	–	–	–	–
90	100	100	60	–	–	–	–	–	–
110	100	115	69	–	–	–	–	–	–
132	125	142	85.2	–	–	–	–	–	–
160	150	171	102.6	–	–	–	–	–	–
200	200	208	124.8	–	–	–	–	–	–
250	250	250	150	–	–	–	–	–	–

The permissible motor cable length depends on the cable type and the pulse frequency.

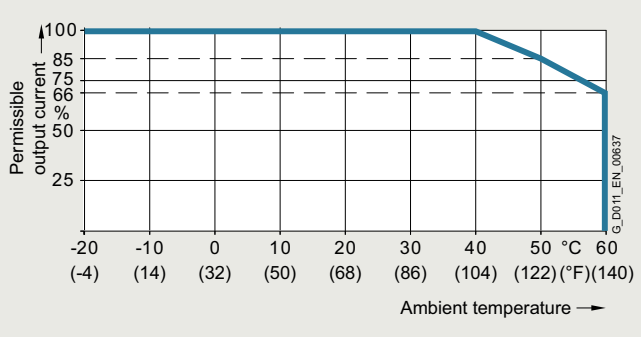
Ambient temperature



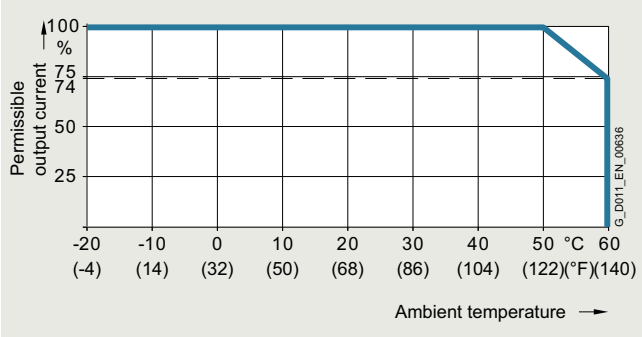
Permissible output current as a function of ambient temperature for low overload (LO) for PM240-2 Power Modules
FSA to FSC at 200 V and 400 V
FSD to FSF at 690 V
FSG at 400 V and 690 V



Permissible output current as a function of ambient temperature for high overload (HO) for PM240-2 Power Modules
FSA to FSC at 200 V and 400 V
FSD to FSF at 690 V
FSG at 400 V and 690 V



Permissible output current as a function of ambient temperature for low overload (LO) for PM240-2 Power Modules
FSD to FSF at 200 V and 400 V



Permissible output current as a function of ambient temperature for high overload (HO) for PM240-2 Power Modules
FSD to FSF at 200 V and 400 V

The operating temperature ranges of the Control Units should be taken into account. The temperature ranges are specified in the section Technical specifications under Control Units.

[1] Rated power based on the rated output current I_N. The rated output current I_N is based on the duty cycle for low overload (LO).

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Characteristic curves

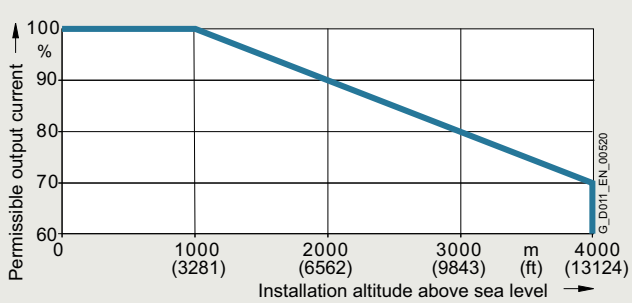
Derating data, PM240-2 Power Modules (continued)

Installation altitude

Permissible line supplies as a function of the installation altitude

- Installation altitude up to 2000 m (6562 ft) above sea level
  - Connection to every supply system permitted for the converter
- Installation altitudes between 2000 m (6562 ft) and 4000 m (13124 ft) above sea level
  - Connection only to a TN system with grounded neutral point
  - TN systems with grounded line conductor are not permitted
  - The TN line system with grounded neutral point can also be supplied using an isolation transformer
  - The phase against phase voltage does not have to be reduced

The connected motors, power elements and components must be considered separately.



Permissible output current as a function of the installation altitude for PM240-2 Power Modules at 40 °C for low overload (LO)

System operating voltage

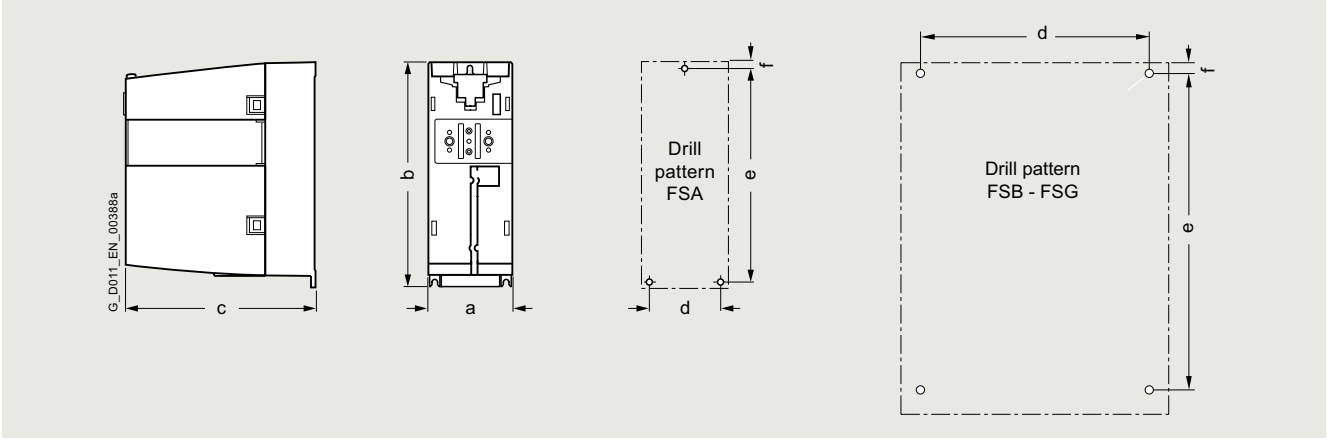
The rated output current is constant within the respective supply voltage range.

More information on the derating data of the PM240-2 Power Modules is available in the Hardware Installation Manual on the internet at:
www.siemens.com/sinamics-g120/documentation

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Dimensional drawings

PM240-2 Power Modules, standard variant



Principle dimension drawing and drill pattern for PM240-2 Power Modules, standard variant, with/without integrated line filter

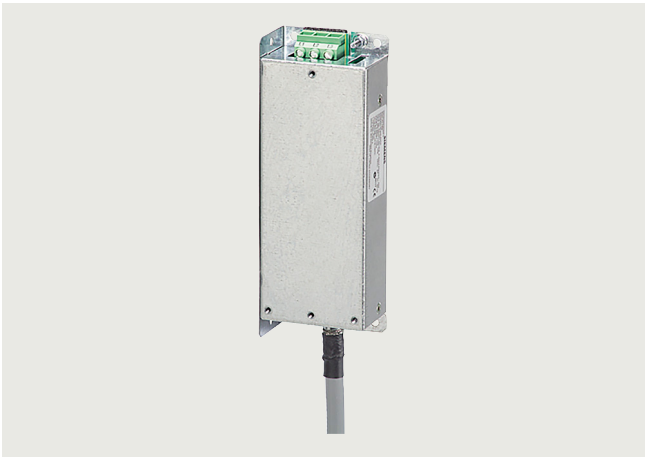
Frame size	**Dimensions** in mm (inches)			**Drilling dimensions** in mm (inches)			**Cooling clearance** [1] in mm (inches)			**Mounting**
	a (width)	b (height)	c (depth)	d	e	f	top	bottom	front	With bolts
PM240-2 Power Modules, standard variant, with/without integrated line filter										
FSA	73 (2.87)	196 (7.72)	165 (6.5)	62.3 (2.45)	186 (7.32)	6 (0.24)	80 (3.15)	100 (3.94)	0 (0)	3 × M4
FSB	100 (3.94)	292 (11.5)	165 (6.5)	80 (3.15)	281 (11.06)	6 (0.24)	80 (3.15)	100 (3.94)	0 (0)	4 × M4
FSC	140 (5.51)	355 (13.98)	165 (6.5)	120 (4.72)	343 (13.5)	6 (0.24)	80 (3.15)	100 (3.94)	0 (0)	4 × M5
FSD	200 (7.87)	472 (18.58)	237 (9.33)	170 (6.69)	430 (16.93)	7 (0.28)	300 (11.81)	350 (13.78)	100 (3.94)	4 × M5
FSE	275 (10.83)	551 (21.69)	237 (9.33)	230 (9.06)	509 (20.04)	8.5 (0.33)	300 (11.81)	350 (13.78)	100 (3.94)	4 x M6
FSF	305 (12.01)	708 (27.87)	357 (14.06)	270 (10.63)	680 (26.77)	13 (0.51)	300 (11.81)	350 (13.78)	100 (3.94)	4 × M8
FSG	305 (12.01)	1000 (39.37)	357 (14.06)	265 (10.43)	970.5 (38.21)	15 (0.59)	300 (11.81)	350 (13.78)	100 (3.94)	4 × M10

[1] The Power Modules can be mounted side by side. A side clearance of 1 mm (0.04 in) is recommended for tolerance-related reasons.

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Line filters for blocksize format

Overview



Line filters for PM240-2 Power Modules, frame size FSA

With one of the additional line filters, the Power Module reaches a higher radio interference class.

Integration

Line filters that are optionally available depending on the Power Module used

	Frame size						
	FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**	**FSG**
PM240-2 Power Module with integrated braking chopper							
• 200 V versions	✓	✓	✓	✓ 1)	✓ 1)	✓ 1)	–
• 400 V versions	✓	✓	✓	✓	✓	✓	✓
• 690 V versions	–	–	–	✓	✓	✓	✓
Line-side components							
Line filter class A	**F**	**F**	**F**	**F** 1)	**F** 1)	**F** 1)	–
Line filter class B (only for 400 V versions)	**U**	**U**	**U**	–	–	–	–
Line filters of Category C2 or C3 (for 400 V versions frame size FSG)	–	–	–	–	–	–	**I** 2)
Line filters of Category C3 (for 690 V versions frame size FSG)	–	–	–	–	–	–	**I** 2)

U = Base component
S = Lateral mounting
I = Integrated
F = Power Modules available with and without integrated filter class A
– = Not possible

1) PM240-2 200 V versions, frame sizes FSD to FSF are only available without integrated line filter.

2) PM240-2 Power Modules in frame size FSG, equipped with an integrated Category C3 line filter, can be operated in the following power supply systems (up to 600 V):
- TN systems with a grounded line conductor
- TT systems without a grounded neutral point
- IT systems, provided the functional grounding screw is removed

Note: Removing the functional grounding screw is required for operation in IT systems. However, this action degrades the EMC performance, and the device no longer complies with Category C3 requirements.

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Selection and ordering data

Rated power		PM240-2 Power Module Standard variant		Line filter class B according to EN 55011
kW	hp	Type 6SL3210-...	Frame size	Article No.
380 ... 480 V 3 AC				
0.55	0.75	1PE11-8UL1	FSA	**6SL3203-0BE17-7BA0**
0.75	1	1PE12-3UL1		
1.1	1.5	1PE13-2UL1		
1.5	2	1PE14-3UL1		
2.2	3	1PE16-1UL1		
3	4	1PE18-0UL1		
4	5	1PE21-1UL0	FSB	**6SL3203-0BE21-8BA0**
5.5	7.5	1PE21-4UL0		
7.5	10	1PE21-8UL0		
11	15	1PE22-7UL0	FSC	**6SL3203-0BE23-8BA0**
15	20	1PE23-3UL0		

Note:

Especially for dry-room applications conditions, line filters 6SL3203-0B...-.... can be used in environment with relative humidity of 0.2 % at 25 °C.

Technical specifications

Line voltage 380 ... 480 V 3 AC		**Line filter class B**		
		6SL3203-0BE17-7BA0	6SL3203-0BE21-8BA0	6SL3203-0BE23-8BA0
Rated current	A	11.4	23.5	49.4
Pulse frequency	kHz	4 ... 16	4 ... 16	4 ... 16
Line supply connection L1, L2, L3		Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	1 ... 2.5	2.5 ... 6	6 ... 16
Load connection U, V, W		Shielded cable	Shielded cable	Shielded cable
• Cable cross-section	mm^2	1.5	4	10
• Length	m (ft)	0.45 (1.48)	0.5 (1.64)	0.54 (1.77)
PE connection		On housing via M5 screw stud	On housing via M5 screw stud	On housing via M6 screw studs
• Conductor cross-section	mm^2	1 ... 2.5	2.5 ... 6	6 ... 16
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	73 (2.87)	100 (3.94)	140 (5.51)
• Height	mm (in)	202 (7.95)	297 (11.7)	359 (14.1)
• Depth	mm (in)	65 (2.56)	85 (3.35)	95 (3.74)
Possible as base component		Yes	Yes	Yes
Weight, approx.	kg (lb)	1.75 (3.86)	4 (8.82)	7.3 (16.1)
Suitable for **PM240-2 Power Module** **standard variant** **380 ... 480 V 3 AC**	Type	6SL3210-1PE11-8UL1 6SL3210-1PE12-3UL1 6SL3210-1PE13-2UL1 6SL3210-1PE14-3UL1 6SL3210-1PE16-1UL1 6SL3210-1PE18-0UL1	6SL3210-1PE21-1UL0 6SL3210-1PE21-4UL0 6SL3210-1PE21-8UL0	6SL3210-1PE22-7UL0 6SL3210-1PE23-3UL0
• Frame size		FSA	FSB	FSC

Note:

Especially for dry-room applications conditions, line filters 6SL3203-0B...-.... can be used in environment with relative humidity of 0.2 % at 25 °C.

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Line Harmonics Filters for blocksize format

Overview

Using a Line Harmonics Filter (only for PM240-2 Power Modules, frame sizes FSD to FSG) makes for a substantial reduction in unwanted harmonics. In this way, a THD(I) value less than 5 % can be achieved and observance of the limit values according to IEC 61000-3-12, IEC 61000-2-2 and IEEE 519 is possible independently of the line impedance.

A line reactor is not required for a Line Harmonics Filter.

The permissible line voltage is 380 V to 415 V 3 AC, frequency 50 Hz.
For Line Harmonics Filters for higher line voltages up to 480 V and other line frequencies see:
www.schaffner.com

Integration

Line Harmonics Filters that are optionally available depending on the Power Module used

	Frame size						
	FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**	**FSG**
PM240-2 Power Module with integrated braking chopper							
• 200 V versions	✓	✓	✓	✓	✓	✓	–
• 400 V versions	✓	✓	✓	✓	✓	✓	✓
• 690 V versions	–	–	–	✓	✓	✓	✓
Line-side components							
Line Harmonics Filters (only for 400 V versions)	–	–	–	**S**	**S**	**S**	**S**

S = Lateral mounting
– = Not possible

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Selection and ordering data

Rated power		PM240-2 Power Module Standard variant		Line Harmonics Filters (The prefix **"UAC:"** is part of a Siemens internal order code, which does not belong to the product number of the original equipment manufacturer Schaffner EMV AG)
kW	hp	Type 6SL3210-...	Frame size	Article No.
380 ... 415 V 3 AC, 50 Hz				
18.5	25	1PE23-8 . L0	FSD	**UAC:FN344019113E2FAJRX**
22	30	1PE24-5 . L0		**UAC:FN344022115E2FAJRX**
30	40	1PE26-0 . L0		**UAC:FN344030115E2FAJRX**
37	50	1PE27-5 . L0		**UAC:FN344037115E2FAJRX**
45	60	1PE28-8 . L0	FSE	**UAC:FN344045115E2FAJRX**
55	75	1PE31-1 . L0		**UAC:FN344055115E2FAJRX**
75	100	1PE31-5 . L0	FSF	**UAC:FN344075116E2FAJRX**
90	125	1PE31-8 . L0		**UAC:FN344090116E2FAJRX**
110	150	1PE32-1 . L0		**UAC:FN3440110118E2FAJRX**
132	200	1PE32-5 . L0		**UAC:FN3440132118E2FAJXX**
160 [1]	250	1PE33-0 . L0	FSG	**UAC:FN3440160118E2FAJXX**
200 [1]	300	1PE33-7 . L0		**UAC:FN3440200118E2FAJXX**
250 [1] [2]	400	1PE34-8 . L0		**UAC:FN3440132118E2FAJXX**

Note:

The permissible line voltage is 380 V to 415 V 3 AC, frequency 50 Hz.
For Line Harmonics Filters for higher line voltages up to 480 V and other line frequencies see:
www.schaffner.com

[1] 160 kW to 250 kW Power Modules with Line Harmonics Filters can only be operated with Vector control. U/f control is not permitted.

[2] Two Line Harmonics Filters must be ordered for 250 kW, which must be connected in parallel.

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Line Harmonics Filters for blocksize format

Technical specifications

Line voltage 380 ... 415 V 3 AC, 50 Hz [1]		Line Harmonics Filters			
		UAC: FN344019113E2FAJRX	UAC: FN344022115E2FAJRX	UAC: FN344030115E2FAJRX	UAC: FN344037115E2FAJRX
Rated current	A	28.2	32.5	44.4	54.8
Line supply connection L1, L2, L3		Threaded screw M6	Threaded screw M8	Threaded screw M8	Threaded screw M8
Load connection L1', L2', L3'		Threaded screw M6	Threaded screw M8	Threaded screw M8	Threaded screw M8
PE connection		Threaded bolt M8	Threaded bolt M8	Threaded bolt M8	Threaded bolt M8
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	260 (10.24)	290 (11.42)	290 (11.42)	290 (11.42)
• Height	mm (in)	560 (22.05)	705 (27.76)	705 (27.76)	705 (27.76)
• Depth	mm (in)	252 (9.92)	319 (12.56)	319 (12.56)	319 (12.56)
Possible as base component		No	No	No	No
Weight, approx.	kg (lb)	37 (81.6)	53 (117)	55 (121)	66 (146)
Suitable for PM240-2 Power Module standard variant 380 ... 480 V 3 AC	Type	6SL3210-1PE23-8 . L0	6SL3210-1PE24-5 . L0	6SL3210-1PE26-0 . L0	6SL3210-1PE27-5 . L0
• Frame size		FSD	FSD	FSD	FSD

Line voltage 380 ... 415 V 3 AC, 50 Hz [1]		Line Harmonics Filters			
		UAC: FN344045115E2FAJRX	UAC: FN344055115E2FAJRX	UAC: FN344075116E2FAJRX	UAC: FN344090116E2FAJRX
Rated current	A	66.7	81.6	111	134
Line supply connection L1, L2, L3		Threaded screw M8	Threaded screw M8	Threaded screw M8	Threaded screw M8
Load connection L1', L2', L3'		Threaded screw M8	Threaded screw M8	Threaded screw M8	Threaded screw M8
PE connection		Threaded bolt M8	Threaded bolt M8	Threaded bolt M10	Threaded bolt M10
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	290 (11.42)	290 (11.42)	353 (13.90)	353 (13.90)
• Height	mm (in)	705 (27.76)	705 (27.76)	960 (37.80)	960 (37.80)
• Depth	mm (in)	319 (12.56)	319 (12.56)	386 (15.20)	386 (15.20)
Possible as base component		No	No	No	No
Weight, approx.	kg (lb)	73 (161)	75 (165)	126 (278)	147 (324)
Suitable for PM240-2 Power Module standard variant 380 ... 480 V 3 AC	Type	6SL3210-1PE28-8 . L0	6SL3210-1PE31-1 . L0	6SL3210-1PE31-5 . L0	6SL3210-1PE31-8 . L0
• Frame size		FSE	FSE	FSF	FSF

[1] The permissible line voltage amounts to 380 V to 415 V 3 AC, frequency 50 Hz. For Line Harmonics Filters for higher line voltages up to 480 V and other line frequencies see: www.schaffner.com

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Technical specifications

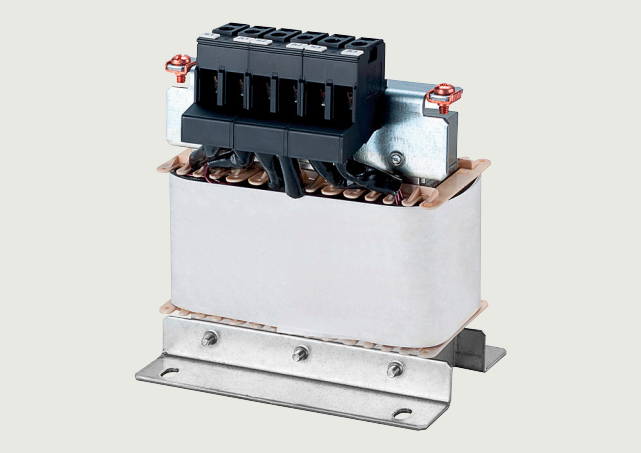
Line voltage 380 ... 415 V 3 AC, 50 Hz [1]		**Line Harmonics Filters**			
		UAC: FN3440110118E2FAJRX	UAC: FN3440132118E2FAJXX	UAC: FN3440160118E2FAJXX	UAC: FN3440200118E2FAJXX
Rated current	A	164	197	240	300
Line supply connection L1, L2, L3		Threaded screw M10	Threaded screw M10	Threaded screw M10	Threaded screw M10
Load connection L1', L2', L3'		Threaded screw M10	Threaded screw M10	Threaded screw M10	Threaded screw M10
PE connection		Threaded bolt M10	Threaded bolt M10	Threaded bolt M10	Threaded bolt M10
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	462 (18.19)	462 (18.19)	462 (18.19)	462 (18.19)
• Height	mm (in)	1150 (45.28)	1150 (45.28)	1150 (45.28)	1150 (45.28)
• Depth	mm (in)	456 (17.95)	456 (17.95)	456 (17.95)	456 (17.95)
Possible as base component		No	No	No	No
Weight, approx.	kg (lb)	175 (386)	194 (428)	219 (483)	267 (589)
Suitable for PM240-2 Power Module standard variant 380 ... 480 V 3 AC	Type	6SL3210-1PE32-1 . L0	6SL3210-1PE32-5 . L0 6SL3210-1PE34-8 . L0 (for 250 kW (FSG) two Line Harmonics Filters must be connected in parallel)	6SL3210-1PE33-0 . L0	6SL3210-1PE33-7 . L0
• Frame size		FSF	FSF/FSG	FSG	FSG

[1] The permissible line voltage amounts to 380 V to 415 V 3 AC, frequency 50 Hz. For Line Harmonics Filters for higher line voltages up to 480 V and other line frequencies see: www.schaffner.com

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Line reactors for blocksize format

Overview



Line reactor for PM240-2 Power Modules, frame size FSA

Line reactors smooth the current drawn by the converter and thus reduce harmonic components in the line current. Through the reduction of the current harmonics, the thermal load on the power components in the rectifier and in the DC link capacitors is reduced as well as the harmonic effects on the supply. The use of a line reactor increases the service life of the converter.

Integration

A DC link reactor is integrated in the PM240-2 Power Modules, frame sizes FSD to FSG, and therefore no line reactor is required.

Line reactors that are optionally available depending on the Power Module used

	Frame size						
	FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**	**FSG**
PM240-2 Power Module with integrated braking chopper							
• 200 V versions	✓	✓	✓	✓	✓	✓	–
• 400 V versions	✓	✓	✓	✓	✓	✓	✓
• 690 V versions	–	–	–	✓	✓	✓	✓
Line-side components							
Line reactors (only for 3 AC versions [1])	**S** [2]	**S** [2]	**S** [2]	**I**	**I**	**I**	**I**

S = Lateral mounting
I = Integrated
– = Not possible

[1] With the appropriate wiring, the line reactors for 200 V 3 AC can be used for the 200 V versions for 200 V 1 AC.
More information can be found on the internet at:
https://support.industry.siemens.com/cs/document/109486005
https://support.industry.siemens.com/cs/document/109482011

[2] For frame sizes FSA to FSC, for lines with u_k < 1 %, it is recommended that you use a line reactor or the next more powerful Power Module.
More information can be found on the internet at:
https://support.industry.siemens.com/cs/document/109482011

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Selection and ordering data

Rated power		PM240-2 Power Module Standard variant		Line reactor
kW	hp	Type 6SL3210-...	Frame size	Article No.
200 … 240 V 3 AC [1]				
0.55	0.75	1PB13-0 . L0	FSA	**6SL3203-0CE13-2AA0**
0.75	1	1PB13-8 . L0		
1.1	1.5	1PB15-5 . L0	FSB	**6SL3203-0CE21-0AA0**
1.5	2	1PB17-4 . L0		
2.2	3	1PB21-0 . L0		
3	4	1PB21-4 . L0	FSC	**6SL3203-0CE21-8AA0**
4	5	1PB21-8 . L0		
5.5	7.5	1PC22-2 . L0	FSC	**6SL3203-0CE23-8AA0**
7.5	10	1PC22-8 . L0		
380 ... 480 V 3 AC				
0.55	0.75	1PE11-8 . L1	FSA	**6SL3203-0CE13-2AA0**
0.75	1	1PE12-3 . L1		
1.1	1.5	1PE13-2 . L1		
1.5	2	1PE14-3 . L1	FSA	**6SL3203-0CE21-0AA0**
2.2	3	1PE16-1 . L1		
3	4	1PE18-0 . L1		
4	5	1PE21-1 . L0	FSB	**6SL3203-0CE21-8AA0**
5.5	7.5	1PE21-4 . L0		
7.5	10	1PE21-8 . L0		
11	15	1PE22-7 . L0	FSC	**6SL3203-0CE23-8AA0**
15	20	1PE23-3 . L0		

Note:

Especially for dry-room applications conditions, line reactors 6SL3203-0CE..-.... can be used in environment with relative humidity of 0.2 % at 25 °C.

[1] With the appropriate wiring, the line reactors for 200 V 3 AC can be used for the 200 V versions for 200 V 1 AC. More information can be found on the internet at:
https://support.industry.siemens.com/cs/document/109486005
https://support.industry.siemens.com/cs/document/109482011

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Line reactors for blocksize format

Technical specifications

Line voltage 200 … 240 V 3 AC [1] or 380 ... 480 V 3 AC		Line reactor			
		6SL3203-0CE13-2AA0	6SL3203-0CE21-0AA0	6SL3203-0CE21-8AA0	6SL3203-0CE23-8AA0
Rated current	A	4	11.3	22.3	47
Power loss at 50/60 Hz	W	23/26	36/40	53/59	88/97
Line supply/load connection 1L1, 1L2, 1L3 2L1, 2L2, 2L3		Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	4	4	10	16
PE connection		M4 × 8; U washer; spring lock washer	M4 × 8; U washer; spring lock washer	M5 × 10; U washer; spring lock washer	M5 × 10; U washer; spring lock washer
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	125 (4.92)	125 (4.92)	125 (4.92)	190 (7.48)
• Height	mm (in)	120 (4.72)	140 (5.51)	145 (5.71)	220 (8.66)
• Depth	mm (in)	71 (2.8)	71 (2.8)	91 (3.58)	91 (3.58)
Weight, approx.	kg (lb)	1.1 (2.43)	2.1 (4.63)	2.95 (6.5)	7.8 (17.2)
Suitable for PM240-2 Power Module standard variant 200 ... 240 V 3 AC [1]	Type	6SL3210-1PB13-0 . L0 6SL3210-1PB13-8 . L0	6SL3210-1PB15-5 . L0 6SL3210-1PB17-4 . L0 6SL3210-1PB21-0 . L0	6SL3210-1PB21-4 . L0 6SL3210-1PB21-8 . L0	6SL3210-1PC22-2 . L0 6SL3210-1PC22-8 . L0
• Frame size		FSA	FSB	FSC	FSC
Suitable for PM240-2 Power Module standard variant 380 ... 480 V 3 AC	Type	6SL3210-1PE11-8 . L1 6SL3210-1PE12-3 . L1 6SL3210-1PE13-2 . L1	6SL3210-1PE14-3 . L1 6SL3210-1PE16-1 . L1 6SL3210-1PE18-0 . L1	6SL3210-1PE21-1 . L0 6SL3210-1PE21-4 . L0 6SL3210-1PE21-8 . L0	6SL3210-1PE22-7 . L0 6SL3210-1PE23-3 . L0
• Frame size		FSA	FSA	FSB	FSC

Note:

Especially for dry-room applications conditions, line reactors 6SL3203-0CE..-.... can be used in environment with relative humidity of 0.2 % at 25 °C.

[1] With the appropriate wiring, the line reactors for 200 V 3 AC can be used for the 200 V versions for 200 V 1 AC. Further information can be found on the internet at:
https://support.industry.siemens.com/cs/document/109486005
https://support.industry.siemens.com/cs/document/109482011

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Selection and ordering data

Overcurrent protection devices are absolutely necessary for the operation of the converters. The following tables list recommendations for fuses.

- Siemens fuses of type 3NA3 and 3NE1 for use in the area of validity of IEC
- UL-listed fuses Class J or Siemens 3NE1 fuses for use in the USA and Canada

Recommendations on further overcurrent protection devices are available at:
www.siemens.com/sinamics-g120/ocpd

The Short-Circuit Current Rating (SCCR) according to UL for industrial control panel installations to NEC Article 409 or UL 508A/508C or UL 61800-5-1 is as follows for Class J fuses for

- PM240-2 Power Modules for SINAMICS S120 blocksize: 100 kA

SCCR and ICC values for combination with further overcurrent protection devices are available at:
www.siemens.com/sinamics-g120/ocpd

Notes for installations in Canada:

The converters are intended for line supply systems with overvoltage category III. Additional information is available in the technical documentation on the internet at:
https://support.industry.siemens.com/cs/document/109771795

Additional information about the listed Siemens fuses is available in Catalog LV 10 as well as in SiePortal.

Rated power [1]		**PM240-2 Power Module**		**IEC-compliant**		**UL/cUL-compliant**	
		Standard variant		**Fuse**		**Fuse type** Rated voltage 600 V AC	
		Type		Current			Current
kW	hp	6SL3210-...	Frame size	A	Article No.	Class	A
200 ... 240 V 1 AC/3 AC							
0.55	0.75	1PB13-0 . L0	FSA	16	**3NA3805**	J	15
0.75	1	1PB13-8 . L0	FSA	16	**3NA3805**	J	15
1.1	1.5	1PB15-5 . L0	FSB	32	**3NA3812**	J	35
1.5	2	1PB17-4 . L0	FSB	32	**3NA3812**	J	35
2.2	3	1PB21-0 . L0	FSB	32	**3NA3812**	J	35
3	4	1PB21-4 . L0	FSC	50	**3NA3820**	J	50
4	5	1PB21-8 . L0	FSC	50	**3NA3820**	J	50
200 ... 240 V 3 AC							
5.5	7.5	1PC22-2 . L0	FSC	50	**3NA3820**	J	50
7.5	10	1PC22-8 . L0	FSC	50	**3NA3820**	J	50
11	15	1PC24-2UL0	FSD	63	**3NA3822**	J	60
15	20	1PC25-4UL0	FSD	80	**3NA3824**	J	70
18.5	25	1PC26-8UL0	FSD	100	**3NA3830**	J	90
22	30	1PC28-0UL0	FSE	100	**3NA3830**	J	100
30	40	1PC31-1UL0	FSE	160	**3NA3836**	J	150
37	50	1PC31-3UL0	FSF	200	**3NA3140**	J	175
45	60	1PC31-6UL0	FSF	200	**3NA3140**	J	200
55	75	1PC31-8UL0	FSF	224	**3NA3142**	J	250

[1] Rated power based on the rated output current I_N. The rated output current I_N is based on the duty cycle for low overload (LO).

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Recommended line-side overcurrent protection devices for blocksize format

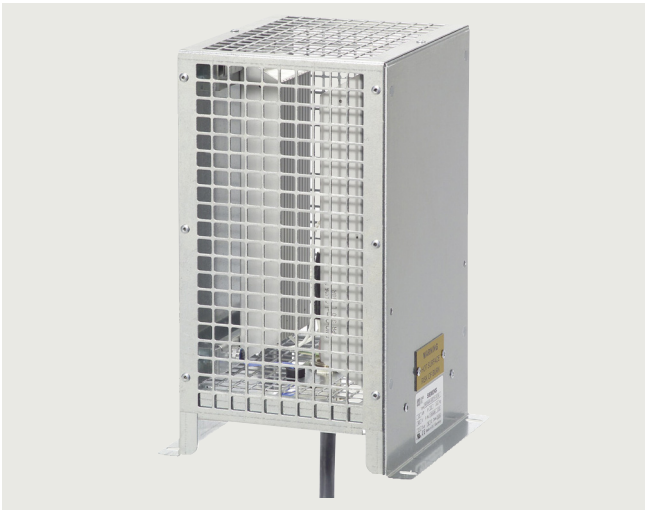
Selection and ordering data

Rated power [1]		PM240-2 Power Module Standard variant		IEC-compliant Fuse		UL/cUL-compliant Fuse type Rated voltage 600 V AC	
		Type		Current			Current
kW	hp	6SL3210-...	Frame size	A	Article No.	Class	A
380 ... 480 V 3 AC							
0.55	0.75	1PE11-8 . L1	FSA	10	**3NA3803**	J	10
0.75	1	1PE12-3 . L1	FSA	10	**3NA3803**	J	10
1.1	1.5	1PE13-2 . L1	FSA	16	**3NA3805**	J	15
1.5	2	1PE14-3 . L1	FSA	16	**3NA3805**	J	15
2.2	3	1PE16-1 . L1	FSA	16	**3NA3805**	J	15
3	4	1PE18-0 . L1	FSA	16	**3NA3805**	J	15
4	5	1PE21-1 . L0	FSB	32	**3NA3812**	J	35
5.5	7.5	1PE21-4 . L0	FSB	32	**3NA3812**	J	35
7.5	10	1PE21-8 . L0	FSB	32	**3NA3812**	J	35
11	15	1PE22-7 . L0	FSC	50	**3NA3820**	J	50
15	20	1PE23-3 . L0	FSC	50	**3NA3820**	J	50
18.5	25	1PE23-8 . L0	FSD	63	**3NA3822**	J	60
22	30	1PE24-5 . L0	FSD	80	**3NA3824**	J	70
30	40	1PE26-0 . L0	FSD	100	**3NA3830**	J	90
37	50	1PE27-5 . L0	FSD	100	**3NA3830**	J	100
45	60	1PE28-8 . L0	FSE	125	**3NA3832**	J	125
55	75	1PE31-1 . L0	FSE	160	**3NA3836**	J	150
75	100	1PE31-5 . L0	FSF	200	**3NA3140**	J	200
90	125	1PE31-8 . L0	FSF	224	**3NA3142**	J	250
110	150	1PE32-1 . L0	FSF	300	**3NA3250**	J	300
132	200	1PE32-5 . L0	FSF	315	**3NA3252**	J	350
160	250	1PE33-0 . L0	FSG	355	**3NA3254**	J	400
200	300	1PE33-7 . L0	FSG	400	**3NA3260**	J	500
250	400	1PE34-8 . L0	FSG	630	**3NA3372**	J	600
500 ... 690 V 3 AC							
11	10	1PH21-4 . L0	FSD	20	**3NA3807-6**	J	20
15	15	1PH22-0 . L0	FSD	25	**3NA3810-6**	J	25
18.5	20	1PH22-3 . L0	FSD	32	**3NA3812-6**	J	30
22	25	1PH22-7 . L0	FSD	40	**3NA3817-6KJ**	J	35
30	30	1PH23-5 . L0	FSD	50	**3NA3820-6KJ**	J	50
37	40	1PH24-2 . L0	FSD	63	**3NA3822-6**	J	60
45	50	1PH25-2 . L0	FSE	80	**3NA3824-6**	J	80
55	60	1PH26-2 . L0	FSE	80	**3NA3824-6**	J	80
75	75	1PH28-0 . L0	FSF	100	**3NA3830-6**	J	110
90	100	1PH31-0 . L0	FSF	125	**3NA3132-6**	J	150
110	100	1PH31-2 . L0	FSF	160	**3NA3136-6**	J	150
132	125	1PH31-4 . L0	FSF	200	**3NA3140-6**	J	200
				IEC and UL-compliant			
				Fuse		**Fuse**	
				Current		Current	
				A	Article No.	A	Article No.
160	150	1PH31-7CL0	FSG	250	**3NE1227-0**	250	**3NE1227-0**
200	200	1PH32-1CL0	FSG	315	**3NE1230-0**	315	**3NE1230-0**
250	250	1PH32-5CL0	FSG	355	**3NE1331-0**	355	**3NE1331-0**

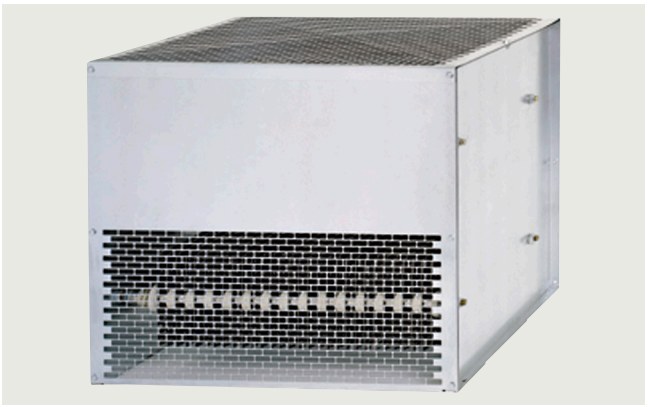
[1] Rated power based on the rated output current I_N. The rated output current I_N is based on the duty cycle for low overload (LO).

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Overview



Braking resistor for PM240-2 Power Modules, frame size FSD



Braking resistor for PM240-2 Power Modules, frame size FSG

Excess energy in the DC link is dissipated in the braking resistor. The braking resistors are intended for use with PM240-2 Power Modules which feature an integrated braking chopper, but cannot regenerate energy to the supply system. For regenerative operation, e.g. the braking of a rotating mass with high moment of inertia, a braking resistor must be connected to convert the resulting energy into heat.

The braking resistors can be installed laterally next to the PM240-2 Power Modules. The braking resistors for the Power Modules, frame sizes FSD to FSG, should be placed outside the control cabinet or outside the switchgear room so that the heat is dissipated away from the Power Modules. The level of air conditioning required is therefore reduced.

Every braking resistor has a temperature switch (UL-listed). The temperature switch should be evaluated to prevent consequential damage if the braking resistor overheats.

Note:

For the electromagnetically compatible connection of an optionally connectable braking resistor, the corresponding shield connection kit is to be ordered for frame sizes FSD to FSG.

For more information, see shield connection kits for blocksize format.

Integration

Braking resistors that are optionally available depending on the Power Module used

	Frame size						
	FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**	**FSG**
PM240-2 Power Module with integrated braking chopper							
• 200 V versions	✓	✓	✓	✓	✓	✓	–
• 400 V versions	✓	✓	✓	✓	✓	✓	✓
• 690 V versions	–	–	–	✓	✓	✓	✓
DC link components							
Braking resistor	**S**	**S**	**S**	**S**	**S**	**S**	**S**

S = Lateral mounting
– = Not possible

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Braking resistors for blocksize format

Selection and ordering data

Rated power		PM240-2 Power Module Standard variant		Braking resistor (The prefix **"JJY:"** is part of a Siemens internal order code which does not belong to the product number of the original equipment manufacturer Heine Resistor GmbH)
kW	hp	Type 6SL3210-...	Frame size	Article No.
200 ... 240 V 1 AC/3 AC				
0.55	0.75	1PB13-0 . L0	FSA	**JJY:023146720008**
0.75	1	1PB13-8 . L0		
1.1	1.5	1PB15-5 . L0	FSB	**JJY:023151720007**
1.5	2	1PB17-4 . L0		
2.2	3	1PB21-0 . L0		
3	4	1PB21-4 . L0	FSC	**JJY:023163720018**
4	5	1PB21-8 . L0		
200 ... 240 V 3 AC				
5.5	7.5	1PC22-2 . L0	FSC	**JJY:023433720001**
7.5	10	1PC22-8 . L0		
11	15	1PC24-2UL0	FSD	**JJY:023422620002**
15	20	1PC25-4UL0		
18.5	25	1PC26-8UL0		
22	30	1PC28-0UL0	FSE	**JJY:023423320001**
30	40	1PC31-1UL0		
37	50	1PC31-3UL0	FSF	**JJY:023434020003**
45	60	1PC31-6UL0		
55	75	1PC31-8UL0		
380 ... 480 V 3 AC				
0.55	0.75	1PE11-8 . L1	FSA	**6SL3201-0BE14-3AA0**
0.75	1	1PE12-3 . L1		
1.1	1.5	1PE13-2 . L1		
1.5	2	1PE14-3 . L1		
2.2	3	1PE16-1 . L1	FSA	**6SL3201-0BE21-0AA0**
3	4	1PE18-0 . L1		
4	5	1PE21-1 . L0	FSB	**6SL3201-0BE21-8AA0**
5.5	7.5	1PE21-4 . L0		
7.5	10	1PE21-8 . L0		
11	15	1PE22-7 . L0	FSC	**6SL3201-0BE23-8AA0**
15	20	1PE23-3 . L0		
18.5	25	1PE23-8 . L0	FSD	**JJY:023422620001**
22	30	1PE24-5 . L0		
30	40	1PE26-0 . L0	FSD	**JJY:023424020001**
37	50	1PE27-5 . L0		
45	60	1PE28-8 . L0	FSE	**JJY:023434020001**
55	75	1PE31-1 . L0		
75	100	1PE31-5 . L0	FSF	**JJY:023454020001**
90	125	1PE31-8 . L0		
110	150	1PE32-1 . L0	FSF	**JJY:023464020001**
132	200	1PE32-5 . L0		
160	250	1PE33-0 . L0	FSG	**6SL3000-1BE32-5AA0**
200	300	1PE33-7 . L0		
250	400	1PE34-8 . L0		

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Selection and ordering data

Rated power		**PM240-2 Power Module** **Standard variant**		**Braking resistor** (The prefix **"JJY:"** is part of a Siemens internal order code which does not belong to the product number of the original equipment manufacturer Heine Resistor GmbH)
kW	hp	Type 6SL3210-...	Frame size	Article No.
500 ... 690 V 3 AC				
11	10	1PH21-4 . L0	FSD	**JJY:023424020002**
15	15	1PH22-0 . L0		
18.5	20	1PH22-3 . L0		
22	25	1PH22-7 . L0		
30	30	1PH23-5 . L0		
37	40	1PH24-2 . L0		
45	50	1PH25-2 . L0	FSE	**JJY:023434020002**
55	60	1PH26-2 . L0		
75	75	1PH28-0 . L0	FSF	**JJY:023464020002**
90	100	1PH31-0 . L0		
110	100	1PH31-2 . L0		
132	125	1PH31-4 . L0		
160	150	1PH31-7CL0	FSG	**6SL3000-1BH32-5AA0**
200	200	1PH32-1CL0		
250	250	1PH32-5CL0		

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Braking resistors for blocksize format

Technical specifications

Line voltage 200 ... 240 V 1 AC/3 AC		Braking resistor		
		JJY:023146720008	JJY:023151720007	JJY:023163720018
Resistance	Ω	200	68	37
Rated power P_{DB} (Continuous braking power)	kW	0.0375	0.11	0.2
Peak power P_{max} (load duration t_a = 12 s with period t = 240 s)	kW	0.75	2.2	4
Power connection		Cable	Cable	Cable
Thermostatic switch		Integrated	Integrated	Integrated
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	60 (2.36)	60 (2.36)	60 (2.36)
• Height	mm (in)	167 (6.57)	217 (8.54)	337 (13.27)
• Depth	mm (in)	30 (1.18)	30 (1.18)	30 (1.18)
Weight, approx.	kg (lb)	0.5 (1.10)	0.7 (1.54)	1.1 (2.43)
Suitable for PM240-2 Power Module standard variant	Type	6SL3210-1PB13-0 . L0 6SL3210-1PB13-8 . L0	6SL3210-1PB15-5 . L0 6SL3210-1PB17-4 . L0 6SL3210-1PB21-0 . L0	6SL3210-1PB21-4 . L0 6SL3210-1PB21-8 . L0
• Frame size		FSA	FSB	FSC

Line voltage 200 ... 240 V 3 AC		Braking resistor			
		JJY:023433720001	JJY:023422620002	JJY:023423320001	JJY:023434020003
Resistance	Ω	20	7.5	4.5	2.5
Rated power P_{DB} (Continuous braking power)	kW	0.375	0.93	1.5	2.75
Peak power P_{max} (load duration t_a = 12 s with period t = 240 s)	kW	7.5	18.5	30	55
Power connection		Cable	Cable	Cable	Cable
Thermostatic switch		Integrated	Integrated	Integrated	Integrated
Degree of protection		IP20	IP21	IP21	IP21
Dimensions					
• Width	mm (in)	337 (13.27)	220 (8.66)	220 (8.66)	350 (13.78)
• Height	mm (in)	120 (4.72)	470 (18.5)	560 (22.05)	630 (24.8)
• Depth	mm (in)	30 (1.18)	180 (7.09)	180 (7.09)	180 (7.09)
Weight, approx.	kg (lb)	2 (4.41)	7 (15.4)	8.5 (18.7)	13.5 (29.8)
Suitable for PM240-2 Power Module standard variant	Type	6SL3210-1PC22-2 . L0 6SL3210-1PC22-8 . L0	6SL3210-1PC24-2UL0 6SL3210-1PC25-4UL0 6SL3210-1PC26-8UL0	6SL3210-1PC28-0UL0 6SL3210-1PC31-1UL0	6SL3210-1PC31-3UL0 6SL3210-1PC31-6UL0 6SL3210-1PC31-8UL0
• Frame size		FSC	FSD	FSE	FSF

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Technical specifications

Line voltage 380 ... 480 V 3 AC		Braking resistor			
		6SL3201-0BE14-3AA0	6SL3201-0BE21-0AA0	6SL3201-0BE21-8AA0	6SL3201-0BE23-8AA0
Resistance	Ω	370	140	75	30
Rated power P_{DB} (Continuous braking power)	kW	0.075	0.2	0.375	0.925
Peak power P_{max} (load duration t_a = 12 s with period t = 240 s)	kW	1.5	4	7.5	18.5
Power connection		Terminal block	Terminal block	Terminal block	Terminal block
• Conductor cross-section	mm^2	2.5	2.5	4	6
Thermostatic switch		NC contact	NC contact	NC contact	NC contact
• Contact load, max.		250 V AC/2.5 A	250 V AC/2.5 A	250 V AC/2.5 A	250 V AC/2.5 A
• Conductor cross-section	mm^2	2.5	2.5	2.5	2.5
PE connection					
• Via terminal block		Yes	Yes	Yes	Yes
• PE connection on housing		M4 screw	M4 screw	M4 screw	M4 screw
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	105 (4.13)	105 (4.13)	175 (6.89)	250 (9.84)
• Height	mm (in)	295 (11.61)	345 (13.58)	345 (13.58)	490 (19.29)
• Depth	mm (in)	100 (3.94)	100 (3.94)	100 (3.94)	140 (5.51)
Weight, approx.	kg (lb)	1.48 (3.26)	1.8 (3.97)	2.73 (6.02)	6.2 (13.7)
Suitable for PM240-2 Power Module standard variant	Type	6SL3210-1PE11-8 . L1 6SL3210-1PE12-3 . L1 6SL3210-1PE13-2 . L1 6SL3210-1PE14-3 . L1	6SL3210-1PE16-1 . L1 6SL3210-1PE18-0 . L1	6SL3210-1PE21-1 . L0 6SL3210-1PE21-4 . L0 6SL3210-1PE21-8 . L0	6SL3210-1PE22-7 . L0 6SL3210-1PE23-3 . L0
• Frame size		FSA	FSA	FSB	FSC

Line voltage 380 ... 480 V 3 AC		Braking resistor				
		JJY:023422620001	JJY:023424020001	JJY:023434020001	JJY:023454020001 [1]	JJY:023464020001 [2]
Resistance	Ω	25	15	10	7.1	5
Rated power P_{DB} (Continuous braking power)	kW	1.1	1.85	2.75	3.85	5.5
Peak power P_{max} (load duration t_a = 12 s with period t = 240 s)	kW	22	37	55	77	110
Power connection		Cable	Cable	Cable	Cable	Cable
Thermostatic switch		Integrated	Integrated	Integrated	Integrated	Integrated
Degree of protection		IP21	IP21	IP21	IP21	IP21
Dimensions						
• Width	mm (in)	220 (8.66)	220 (8.66)	350 (13.78)	[1]	[2]
• Height	mm (in)	470 (18.5)	610 (24.02)	630 (24.8)	[1]	[2]
• Depth	mm (in)	180 (7.09)	180 (7.09)	180 (7.09)	[1]	[2]
Weight, approx.	kg (lb)	7 (15.4)	9.5 (20.9)	13.5 (29.8)	20.5 (45.2)	27 (59.5)
Suitable for PM240-2 Power Module standard variant	Type	6SL3210-1PE23-8 . L0 6SL3210-1PE24-5 . L0	6SL3210-1PE26-0 . L0 6SL3210-1PE27-5 . L0	6SL3210-1PE28-8 . L0 6SL3210-1PE31-1 . L0	6SL3210-1PE31-5 . L0 6SL3210-1PE31-8 . L0	6SL3210-1PE32-1 . L0 6SL3210-1PE32-5 . L0
• Frame size		FSD	FSD	FSE	FSF	FSF

[1] This braking resistor consists of the two braking resistors, JJY:023422620001 and JJY:023434020001, which must be connected in parallel on the plant/system side.

[2] This braking resistor consists of two JJY:023434020001 braking resistors, which must be connected in parallel on the plant/system side.

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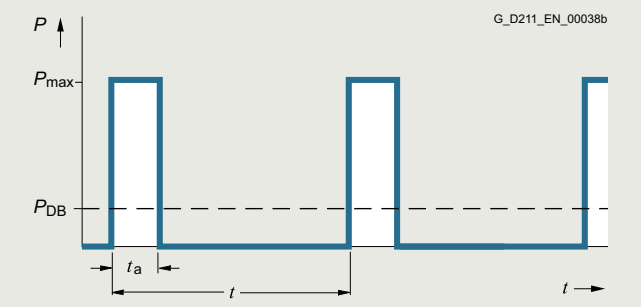
Braking resistors for blocksize format

Technical specifications

Line voltage 500 ... 690 V 3 AC		Braking resistor		
		JJY:023424020002	JJY:023434020002	JJY:023464020002 [1]
Resistance	Ω	31	21	10.5
Rated power P_{DB} (Continuous braking power)	kW	1.85	2.75	5.5
Peak power P_{max} (load duration t_a = 12 s with period t = 240 s)	kW	37	55	110
Power connection		Cable	Cable	Cable
Thermostatic switch		Integrated	Integrated	Integrated
Degree of protection		IP21	IP21	IP21
Dimensions				
• Width	mm (in)	220 (8.66)	350 (13.78)	[1]
• Height	mm (in)	610 (24.02)	630 (24.8)	[1]
• Depth	mm (in)	180 (7.09)	180 (7.09)	[1]
Weight, approx.	kg (lb)	9.5 (20.9)	13.5 (29.8)	27 (59.5)
Suitable for PM240-2 Power Module	Type	6SL3210-1PH21-4 . L0 6SL3210-1PH22-0 . L0 6SL3210-1PH22-3 . L0 6SL3210-1PH22-7 . L0 6SL3210-1PH23-5 . L0 6SL3210-1PH24-2 . L0	6SL3210-1PH25-2 . L0 6SL3210-1PH26-2 . L0	6SL3210-1PH28-0 . L0 6SL3210-1PH31-0 . L0 6SL3210-1PH31-2 . L0 6SL3210-1PH31-4 . L0
• Frame size		FSD	FSE	FSF

Line voltage 380 ... 480 V 3 AC or 500 ... 690 V 3 AC		Braking resistor	
		6SL3000-1BE32-5AA0	6SL3000-1BH32-5AA0
Resistance	Ω	2.2	4.9
Rated power P_{DB} (Continuous braking power for operation with PM240-2)	kW	12.5	12.5
Peak power P_{max} (load duration t_a = 12 s with period t = 240 s)	kW	250	250
Power connection		M10 screw stud	M10 screw stud
Thermostatic switch		NC contact	NC contact
• Contact load, max.		250 V AC/2.5 A	250 V AC/2.5 A
Degree of protection		IP20	IP20
Dimensions			
• Width	mm (in)	810 (31.89)	810 (31.89)
• Height	mm (in)	1325 (52.17)	1325 (52.17)
• Depth	mm (in)	485 (19.09)	485 (19.09)
Weight, approx.	kg (lb)	120 (265)	120 (265)
Suitable for PM240-2 Power Module	Type	400 V: 6SL3210-1PE33-0 . L0 6SL3210-1PE33-7 . L0 6SL3210-1PE34-8 . L0	690 V: 6SL3210-1PH31-7CL0 6SL3210-1PH32-1CL0 6SL3210-1PH32-5CL0
• Frame size		FSG	FSG

Characteristic curves



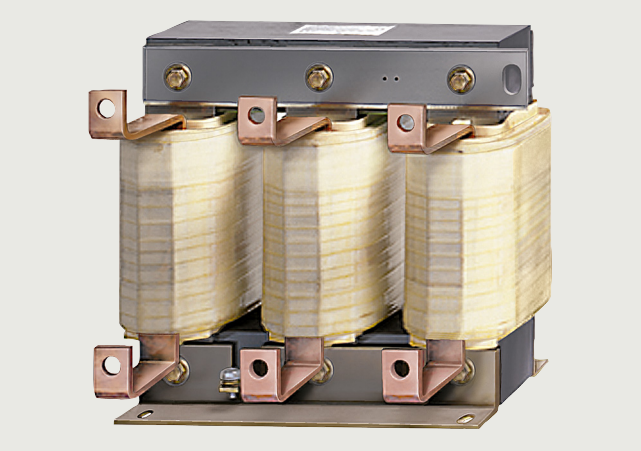
Load diagram for the braking resistors

t_a = 12 s
t = 240 s

[1] This braking resistor consists of two JJY:023434020002 braking resistors, which must be connected in parallel on the plant/system side.

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Overview



Output reactor for PM240-2 Power Modules, frame size FSG

Output reactors reduce the rate of voltage rise (*dv/dt*) and the height of the current peaks, and enable longer motor cables to be connected.

Owing to the high rates of voltage rise of the fast-switching IGBTs, the capacitance of long motor cables reverses polarity very quickly with every switching operation in the inverter. As a result, the inverter is loaded with additional current peaks of substantial magnitude.

Output reactors reduce the magnitude of these additional peaks because the cable capacitance reverses polarity more slowly across the reactor inductance, thereby attenuating the amplitudes of the current peaks.

When using output reactors, the following should be observed:

- Max. permissible output frequency 150 Hz
- Max. permissible pulse frequency 4 kHz
- The output reactor must be installed as close as possible to the Power Module

Integration

Output reactors that are optionally available depending on the Power Module used

	Frame size						
	FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**	**FSG**
PM240-2 Power Module with integrated braking chopper							
• 200 V versions	✓	✓	✓	✓	✓	✓	–
• 400 V versions	✓	✓	✓	✓	✓	✓	✓
• 690 V versions	–	–	–	✓	✓	✓	✓
Load-side power components							
Output reactor	**S**	**S**	**S**	**S**	**S**	**S**	**S**

S = Lateral mounting
– = Not possible

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Output reactors for blocksize format

Selection and ordering data

Rated power		PM240-2 Power Module Standard variant		Output reactor (The prefix **"JTA:"** is part of a Siemens internal order code which does not belong to the product number of the original equipment manufacturer Mdexx Magnetronic Devices s. r. o.)
kW	hp	Type 6SL3210-...	Frame size	Article No.
200 ... 240 V 1 AC/3 AC				
0.55	0.75	1PB13-0 . L0	FSA	**6SL3202-0AE16-1CA0**
0.75	1	1PB13-8 . L0		
1.1	1.5	1PB15-5 . L0	FSB	**6SL3202-0AE16-1CA0**
1.5	2	1PB17-4 . L0	FSB	**6SL3202-0AE18-8CA0**
2.2	3	1PB21-0 . L0	FSB	**6SL3202-0AE21-8CA0**
3	4	1PB21-4 . L0	FSC	**6SL3202-0AE21-8CA0**
4	5	1PB21-8 . L0		
200 ... 240 V 3 AC				
5.5	7.5	1PC22-2 . L0	FSC	**6SL3202-0AE23-8CA0**
7.5	10	1PC22-8 . L0		
11	15	1PC24-2UL0	FSD	**6SE6400-3TC07-5ED0**
15	20	1PC25-4UL0		
18.5	25	1PC26-8UL0		
22	30	1PC28-0UL0	FSE	**6SE6400-3TC14-5FD0**
30	40	1PC31-1UL0		
37	50	1PC31-3UL0	FSF	**6SE6400-3TC14-5FD0**
45	60	1PC31-6UL0		
55	75	1PC31-8UL0		
380 ... 480 V 3 AC				
0.55	0.75	1PE11-8 . L1	FSA	**6SL3202-0AE16-1CA0**
0.75	1	1PE12-3 . L1		
1.1	1.5	1PE13-2 . L1		
1.5	2	1PE14-3 . L1		
2.2	3	1PE16-1 . L1		
3	4	1PE18-0 . L1	FSA	**6SL3202-0AE18-8CA0**
4	5	1PE21-1 . L0	FSB	**6SL3202-0AE21-8CA0**
5.5	7.5	1PE21-4 . L0		
7.5	10	1PE21-8 . L0		
11	15	1PE22-7 . L0	FSC	**6SL3202-0AE23-8CA0**
15	20	1PE23-3 . L0		
18.5	25	1PE23-8 . L0	FSD	**6SE6400-3TC07-5ED0**
22	30	1PE24-5 . L0		
30	40	1PE26-0 . L0		
37	50	1PE27-5 . L0		
45	60	1PE28-8 . L0	FSE	**6SE6400-3TC14-5FD0**
55	75	1PE31-1 . L0		
75	100	1PE31-5 . L0	FSF	**6SE6400-3TC14-5FD0**
90	125	1PE31-8 . L0		
110	150	1PE32-1 . L0	FSF	**6SL3000-2BE32-1AA0**
132	200	1PE32-5 . L0	FSF	**6SL3000-2BE32-6AA0**
160	250	1PE33-0 . L0	FSG	**6SL3000-2BE33-2AA0**
200	300	1PE33-7 . L0	FSG	**6SL3000-2BE33-8AA0**
250	400	1PE34-8 . L0	FSG	**6SL3000-2BE35-0AA0**

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Selection and ordering data

Rated power		PM240-2 Power Module Standard variant		Output reactor (The prefix **"JTA:"** is part of a Siemens internal order code which does not belong to the product number of the original equipment manufacturer Mdexx Magnetronic Devices s. r. o.)
kW	hp	Type 6SL3210-...	Frame size	Article No.
500 ... 690 V 3 AC				
11	15	1PH21-4 . L0	FSD	**JTA:TEU2532-0FP00-4EA0**
15	20	1PH22-0 . L0		
18.5	25	1PH22-3 . L0		
22	30	1PH22-7 . L0	FSD	**JTA:TEU9932-0FP00-4EA0**
30	40	1PH23-5 . L0		
37	50	1PH24-2 . L0		
45	60	1PH25-2 . L0	FSE	**JTA:TEU9932-0FS00-0EA0**
55	75	1PH26-2 . L0		
75	75	1PH28-0 . L0	FSF	**JTA:TEU9932-1FC00-1BA0**
90	100	1PH31-0 . L0		
110	100	1PH31-2 . L0	FSF	**JTA:TEU9932-0FV00-1BA0**
132	125	1PH31-4 . L0		
160	150	1PH31-7CL0	FSG	**JTA:TEU4732-0FA00-0BA0**
200	200	1PH32-1CL0		
250	250	1PH32-5CL0		

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Output reactors for blocksize format

Technical specifications

Line voltage 200 ... 240 V 1 AC/3 AC or 380 ... 480 V 3 AC		Output reactor (for a 4 kHz pulse frequency)			
		6SL3202-0AE16-1CA0	6SL3202-0AE18-8CA0	6SL3202-0AE21-8CA0	6SL3202-0AE23-8CA0
Rated current	A	6.1	9	18.5	39
Power loss	kW	0.09	0.08	0.08	0.11
Connection to the Power Module/ motor connection		Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	4	4	10	16
PE connection		M4 screw stud	M4 screw stud	M5 screw stud	M5 screw stud
Cable length, max. between output reactor and motor					
• 200 -10 % ... 240 V +10 % 3 AC and 380 -10 % ... 415 V +10 % 3 AC					
- Shielded	m (ft)	150 (492)	150 (492)	150 (492)	150 (492)
- Unshielded	m (ft)	225 (738)	225 (738)	225 (738)	225 (738)
• 440 ... 480 V 3 AC +10 %					
- Shielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)
- Unshielded	m (ft)	150 (492)	150 (492)	150 (492)	150 (492)
Dimensions					
• Width	mm (in)	207 (8.15)	207 (8.15)	247 (9.72)	257 (10.12)
• Height	mm (in)	175 (6.89)	180 (7.09)	215 (8.46)	235 (9.25)
• Depth	mm (in)	72.5 (2.85)	72.5 (2.85)	100 (3.94)	114.7 (4.52)
Degree of protection		IP20	IP20	IP20	IP20
Weight, approx.	kg (lb)	3.4 (7.5)	3.9 (8.6)	10.1 (22.3)	11.2 (24.7)
Suitable for PM240-2 Power Module standard variant 200 ... 240 V 1 AC/3 AC	Type	6SL3210-1PB13-0 . L0 FSA 6SL3210-1PB13-8 . L0 FSA 6SL3210-1PB15-5 . L0 FSB	6SL3210-1PB17-4 . L0 FSB	6SL3210-1PB21-0 . L0 FSB 6SL3210-1PB21-4 . L0 FSC 6SL3210-1PB21-8 . L0 FSC	6SL3210-1PC22-2 . L0 FSC 6SL3210-1PC22-8 . L0 FSC
Suitable for PM240-2 Power Module standard variant 380 ... 480 V 3 AC	Type	6SL3210-1PE11-8 . L1 FSA 6SL3210-1PE12-3 . L1 FSA 6SL3210-1PE13-2 . L1 FSA 6SL3210-1PE14-3 . L1 FSA 6SL3210-1PE16-1 . L1 FSA	6SL3210-1PE18-0 . L1 FSA	6SL3210-1PE21-1 . L0 FSB 6SL3210-1PE21-4 . L0 FSB 6SL3210-1PE21-8 . L0 FSB	6SL3210-1PE22-7 . L0 FSC 6SL3210-1PE23-3 . L0 FSC

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Technical specifications

Line voltage 200 ... 240 V 3 AC or 380 ... 480 V 3 AC		**Output reactor (for a 4 kHz pulse frequency)**			
		6SE6400-3TC07-5ED0	6SE6400-3TC14-5FD0	6SL3000-2BE32-1AA0	6SL3000-2BE32-6AA0
Rated current	A	90	178	210	260
Power loss, max.	kW	0.27	0.47	0.49	0.5
Connection to the Power Module/ motor connection		Flat connector for M6 screw	Flat connector for M8 screw	Flat connector for M10 screw	Flat connector for M10 screw
PE connection		M6 screw	M8 screw	M8 screw	M8 screw
Cable length, max. between output reactor and motor					
• Shielded	m (ft)	200 (656)	200 (656)	300 (984)	300 (984)
• Unshielded	m (ft)	300 (984)	300 (984)	450 (1476)	450 (1476)
Dimensions					
• Width	mm (in)	270 (10.63)	350 (13.78)	300 (11.81)	300 (11.81)
• Height	mm (in)	248 (9.76)	321 (12.64)	285 (11.22)	315 (12.40)
• Depth	mm (in)	209 (8.23)	288 (11.34)	257 (10.12)	277 (10.91)
Degree of protection		IP00	IP00	IP00	IP00
Weight, approx.	kg (lb)	27 (59.5)	57 (126)	60 (132)	66 (146)
Suitable for PM240-2 Power Module standard variant 200 ... 240 V 3 AC	Type	6SL3210-1PC24-2UL0 6SL3210-1PC25-4UL0 6SL3210-1PC26-8UL0 FSD	6SL3210-1PC28-0UL0 6SL3210-1PC31-1UL0 FSE 6SL3210-1PC31-3UL0 6SL3210-1PC31-6UL0 6SL3210-1PC31-8UL0 FSF	–	–
Suitable for PM240-2 Power Module standard variant 380 ... 480 V 3 AC	Type	6SL3210-1PE23-8 . L0 6SL3210-1PE24-5 . L0 6SL3210-1PE26-0 . L0 6SL3210-1PE27-5 . L0 FSD	6SL3210-1PE28-8 . L0 6SL3210-1PE31-1 . L0 FSE 6SL3210-1PE31-5 . L0 6SL3210-1PE31-8 . L0 FSF	6SL3210-1PE32-1 . L0 FSF	6SL3210-1PE32-5 . L0 FSF

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Output reactors for blocksize format

Technical specifications

Line voltage 380 ... 480 V 3 AC		Output reactor (for a 4 kHz pulse frequency)		
		6SL3000-2BE33-2AA0	6SL30V00-2BE33-8AA0	6SL3000-2BE35-0AA0
Rated current	A	310	380	490
Power loss	kW	0.47	0.5	0.5
Connection to the Power Module		1 × hole for M10	1 × hole for M10	1 × hole for M12
PE connection		M6 screw	M6 screw	M6 screw
Cable length, max. between output reactor and motor				
• Shielded	m (ft)	300 (984)	300 (984)	300 (984)
• Unshielded	m (ft)	450 (1476)	450 (1476)	450 (1476)
Dimensions				
• Width	mm (in)	300 (11.81)	300 (11.81)	300 (11.81)
• Height	mm (in)	285 (11.22)	285 (11.22)	365 (14.37)
• Depth	mm (in)	257 (10.12)	277 (10.91)	277 (10.91)
Degree of protection		IP00	IP00	IP00
Weight, approx.	kg (lb)	66 (146)	73 (161)	100 (220)
Suitable for PM240-2 Power Module standard variant	Type	6SL3210-1PE33-0 . L0 FSG	6SL3210-1PE33-7 . L0 FSG	6SL3210-1PE34-8 . L0 FSG

Line voltage 500 ... 690 V 3 AC		Output reactor (for a 4 kHz pulse frequency)		
		JTA:TEU2532-0FP00-4EA0	JTA:TEU9932-0FP00-4EA0	JTA:TEU9932-0FS00-0EA0
Rated current	A	24	44	64
Power loss, max.	kW	0.13	0.3	0.4
Connection to the Power Module/ motor connection		Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	16	35	70
PE connection		Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	16	35	70
Cable length, max. between output reactor and motor				
• Shielded	m (ft)	350 (1148)	350 (1148)	350 (1148)
• Unshielded	m (ft)	525 (1723)	525 (1723)	525 (1723)
Dimensions				
• Width	mm (in)	264 (10.39)	264 (10.39)	310 (12.20)
• Height	mm (in)	255 (10.04)	270 (10.63)	370 (14.57)
• Depth	mm (in)	131 (5.16)	159 (6.26)	182 (7.17)
Degree of protection		IP00	IP00	IP00
Weight, approx.	kg (lb)	18 (39.7)	26 (57.3)	42 (92.6)
Suitable for PM240-2 Power Module standard variant	Type	6SL3210-1PH21-4 . L0 6SL3210-1PH22-0 . L0 6SL3210-1PH22-3 . L0 FSD	6SL3210-1PH22-7 . L0 6SL3210-1PH23-5 . L0 6SL3210-1PH24-2 . L0 FSD	6SL3210-1PH25-2 . L0 6SL3210-1PH26-2 . L0 FSE

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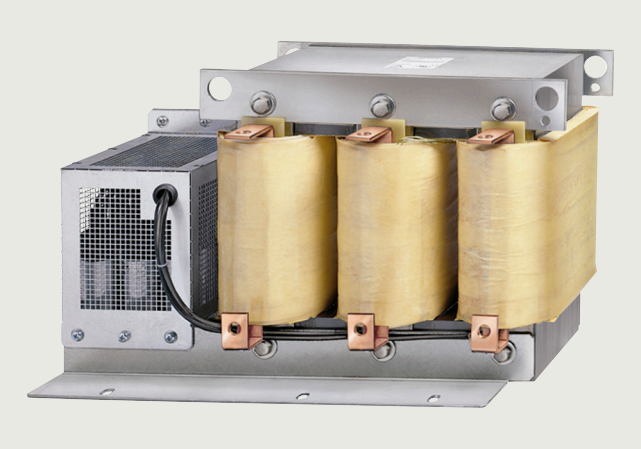
Technical specifications

Line voltage 500 ... 690 V 3 AC		Output reactor (for a 4 kHz pulse frequency)		
		JTA:TEU9932-1FC00-1BA0	JTA:TEU9932-0FV00-1BA0	JTA:TEU4732-0FA00-0BA0
Rated current	A	103	146	260
Power loss, max.	kW	0.42	0.52	0.86
Connection to the Power Module/ motor connection		Flat connector for M8 cable lug	Flat connector for M10 cable lug	Flat connector for M10 cable lug
• Conductor cross-section	mm^2	95	120	185 or 2 × 120
PE connection		Cable lug for M6 screw	Cable lug for M6 screw	Cable lug for M6 screw
• Conductor cross-section	mm^2	50	70	95
Cable length, max. between output reactor and motor				
• Shielded	m (ft)	525 (1723)	525 (1723)	525 (1723)
• Unshielded	m (ft)	800 (2625)	800 (2625)	800 (2625)
Dimensions				
• Width	mm (in)	400 (15.75)	400 (15.75)	460 (18.11)
• Height	mm (in)	320 (12.60)	355 (13.98)	430 (16.93)
• Depth	mm (in)	235 (9.25)	258 (10.16)	310 (12.20)
Degree of protection		IP00	IP00	IP00
Weight, approx.	kg (lb)	66 (146)	90 (198)	162 (357)
Suitable for PM240-2 Power Module standard variant	Type	6SL3210-1PH28-0 . L0 6SL3210-1PH31-0 . L0 FSF	6SL3210-1PH31-2 . L0 6SL3210-1PH31-4 . L0 FSF	6SL3210-1PH31-7 . L0 6SL3210-1PH32-1 . L0 6SL3210-1PH32-5 . L0 FSG

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Sine-wave filters for blocksize format

Overview



Sine-wave filter

Sine-wave filters limit the rate of voltage rise (*dv/dt*) and the peak voltages on the motor winding. Similar to an output reactor, they enable the connection of longer motor cables.

Bearing currents are also reduced significantly. Using these filters therefore allows standard motors with standard insulation and without insulated bearings to be operated on SINAMICS. As a result, the voltage load on the motor winding is virtually identical to the load on windings of directly mains-fed motors.

Owing to the very low rates of voltage rise on the motor cable, the sine-wave filter also has a positive impact in terms of electromagnetic compatibility which means that it is not absolutely essential to use shielded cables for short motor cables to achieve the required standard of EMC.

Since the voltage applied to the motor is not pulsed, the converter-related stray losses and additional noise in the motor are also reduced considerably and the noise level of the motor is similar to the level produced by directly mains-fed motors.

When using sine-wave filters, the following should be observed:

- Pulse frequencies of between 4 kHz and 8 kHz are permissible for rated outputs up to and including 90 kW
- The output frequency is limited to 150 Hz.
- Operation and commissioning may only be performed with the motor connected as the sine-wave filter is not no-load proof
- It must be ensured that the automatic pulse frequency reduction functions are also deactivated

Integration

Sine-wave filters that are optionally available depending on the Power Module used

	Frame size						
	FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**	**FSG**
PM240-2 Power Module with integrated braking chopper							
• 200 V versions	✓	✓	✓	✓	✓	✓	–
• 400 V versions	✓	✓	✓	✓	✓	✓	✓
• 690 V versions	–	–	–	✓	✓	✓	✓
Load-side power components							
Sine-wave filter (only for 400 V versions)	**S**	**S**	**S**	**S**	**S**	**S**	**S**

S = Lateral mounting
– = Not possible

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Selection and ordering data

Rated power		PM240-2 Power Module Standard variant		Sine-wave filter
kW	hp	Type 6SL3210-...	Frame size	Article No.
380 ... 480 V 3 AC				
0.55	0.75	1PE11-8 . L1	FSA	**6SL3202-0AE20-3SA0**
0.75	1	1PE12-3 . L1		
1.1	1.5	1PE13-2 . L1		
1.5	2	1PE14-3 . L1	FSA	**6SL3202-0AE20-6SA0**
2.2	3	1PE16-1 . L1		
3	4	1PE18-0 . L1	FSA	**6SL3202-0AE21-1SA0**
4	5	1PE21-1 . L0	FSB	**6SL3202-0AE21-4SA0**
5.5	7.5	1PE21-4 . L0		
7.5	10	1PE21-8 . L0	FSB	**6SL3202-0AE22-0SA0**
11	15	1PE22-7 . L0	FSC	**6SL3202-0AE23-3SA0**
15	20	1PE23-3 . L0		
18,5	25	1PE23-8 . L0	FSD	**6SL3202-0AE24-6SA0**
22	30	1PE24-5 . L0		
30	40	1PE26-0 . L0	FSD	**6SL3202-0AE26-2SA0**
37	50	1PE27-5 . L0	FSD	**6SL3202-0AE28-8SA0**
45	60	1PE28-8 . L0	FSE	**6SL3202-0AE28-8SA0**
55	75	1PE31-1 . L0	FSE	**6SL3202-0AE31-5SA0**
75	100	1PE31-5 . L0	FSF	**6SL3202-0AE31-5SA0**
90	125	1PE31-8 . L0	FSF	**6SL3202-0AE31-8SA0**
110	150	1PE32-1 . L0	FSF	**6SL3000-2CE32-3AA0**
132	200	1PE32-5 . L0		
160	250	1PE33-0 . L0	FSG	**6SL3000-2CE32-8AA0**
200	300	1PE33-7 . L0	FSG	**6SL3000-2CE33-3AA0**
250	400	1PE34-8 . L0	FSG	**6SL3000-2CE34-1AA0**

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Sine-wave filters for blocksize format

Technical specifications

Line voltage 380 ... 480 V 3 AC		Sine-wave filter		
		6SL3202-0AE20-3SA0	6SL3202-0AE20-6SA0	6SL3202-0AE21-1SA0
Rated current	A	3.5	6	9
Power loss	kW	–	–	–
Connection to the Power Module		Cable	Cable	Cable
• Conductor cross-section, max.	mm^2	6	6	6
• Length, approx.	m (ft)	0.5 (1.64)	0.5 (1.64)	0.5 (1.64)
Motor connection		Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section, max.	mm^2	6	6	6
PE connection		Screw studs	Screw studs	Screw studs
Cable length, max. between sine-wave filter and motor				
• Shielded	m (ft)	200 (656)	200 (656)	200 (656)
• Unshielded	m (ft)	300 (984)	300 (984)	300 (984)
Dimensions				
• Width	mm (in)	76.5 (3.01)	76.5 (3.01)	153 (6.02)
• Height	mm (in)	200 (7.87)	200 (7.87)	270 (10.63)
• Depth	mm (in)	110 (4.33)	110 (4.33)	100 (3.94)
Possible as base component		No	No	No
Degree of protection		IP00	IP00	IP00
Weight, approx.	kg (lb)	2.6 (5.73)	3 (6.62)	6 (13.2)
Suitable for PM240-2 Power Module	Type	6SL3210-1PE11-8 . L1 (FSA, 0.55 kW, 1.7 A) 6SL3210-1PE12-3 . L1 (FSA, 0.75 kW, 2.2 A) 6SL3210-1PE13-2 . L1 (FSA, 1.1 kW, 3.1 A)	6SL3210-1PE14-3 . L1 (FSA, 1.5 kW, 4.1 A) 6SL3210-1PE16-1 . L1 (FSA, 2.2 kW, 5.9 A)	6SL3210-1PE18-0 . L1 (FSA, 3 kW, 7.7 A)

Line voltage 380 ... 480 V 3 AC		Sine-wave filter		
		6SL3202-0AE21-4SA0	6SL3202-0AE22-0SA0	6SL3202-0AE23-3SA0
Rated current	A	14	20	33
Power loss	kW	–	0.099	0.151
Connection to the Power Module		Cable	Cable	Cable
• Conductor cross-section, max.	mm^2	6	10	10
• Length, approx.	m (ft)	0.5 (1.64)	0.5 (1.64)	0.5 (1.64)
Motor connection		Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section, max.	mm^2	6	10	10
PE connection		Screw studs	M5 screw stud	M5 screw stud
Cable length, max. between sine-wave filter and motor				
• Shielded	m (ft)	200 (656)	200 (656)	200 (656)
• Unshielded	m (ft)	300 (984)	300 (984)	300 (984)
Dimensions				
• Width	mm (in)	153 (6.02)	189 (7.44)	189 (7.44)
• Height	mm (in)	270 (10.63)	336 (13.23)	336 (13.23)
• Depth	mm (in)	100 (3.94)	140 (5.51)	140 (5.51)
Possible as base component		No	No	No
Degree of protection		IP00	IP00	IP00
Weight, approx.	kg (lb)	10 (22.1)	12 (26.5)	23 (50.7)
Suitable for PM240-2 Power Module	Type	6SL3210-1PE21-1 . L0 (FSB, 4 kW, 10.2 A) 6SL3210-1PE21-4 . L0 (FSB, 5.5 kW, 13.2 A)	6SL3210-1PE21-8 . L0 (FSB, 7.5 kW, 18 A)	6SL3210-1PE22-7 . L0 (FSC, 11 kW, 26 A) 6SL3210-1PE23-3 . L0 (FSC, 15 kW, 32 A)

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Technical specifications

Line voltage 380 ... 480 V 3 AC		Sine-wave filter		
		6SL3202-0AE24-6SA0	6SL3202-0AE26-2SA0	6SL3202-0AE28-8SA0
Rated current	A	47	61.8	92
Power loss	kW	0.185	0.152	0.251
Connection to the Power Module		Screw terminals	Screw terminals	Screw terminals
Conductor cross-section, max.	mm^2	50	50	95
Motor connection		Screw terminals	Screw terminals	Screw terminals
Conductor cross-section, max.	mm^2	50	50	95
PE connection		M6 screw	M6 screw	M8 screw
Cable length, max. between sine-wave filter and motor				
Shielded	m (ft)	200 (656)	200 (656)	200 (656)
Unshielded	m (ft)	300 (984)	300 (984)	300 (984)
Dimensions				
Width	mm (in)	250 (9.84)	250 (9.84)	275 (10.83)
Height	mm (in)	315 (12.40)	305 (12.01)	368 (14.49)
Depth	mm (in)	262 (10.31)	262 (10.31)	275 (10.83)
Degree of protection		IP00	IP00	IP00
Weight, approx.	kg (lb)	24 (52.9)	34 (75)	45 (99.2)
Suitable for PM240-2 Power Module	Type	6SL3224-1PE23-8 . L0 (FSD, 18.5 kW, 38 A) 6SL3224-1PE24-5 . L0 (FSD, 22 kW, 45 A)	6SL3224-1PE26-0 . L0 (FSD, 30 kW, 60 A)	6SL3224-1PE27-5 . L0 (FSE, 37 kW, 75 A) 6SL3224-1PE28-8 . L0 (FSE, 45 kW, 90 A)

Line voltage 380 ... 480 V 3 AC		Sine-wave filter (for pulse frequencies 4 ... 8 kHz, only 4 kHz permissible at 110 kW and above – note additional current derating as compared with rated pulse frequency of 2 kHz, see derating data)	
		6SL3202-0AE31-5SA0	6SL3202-0AE31-8SA0
Rated current	A	150	182
Power loss	kW	0.43	0.47
Connection to the Power Module		Screw terminals	Screw terminals
Conductor cross-section, max.	mm^2	150	150
Motor connection		Screw terminals	Screw terminals
Conductor cross-section, max.	mm^2	150	150
PE connection		M8 screw	M8 screw
Cable length, max. between sine-wave filter and motor			
Shielded	m (ft)	200 (656)	200 (656)
Unshielded	m (ft)	300 (984)	300 (984)
Dimensions			
Width	mm (in)	350 (13.78)	350 (13.78)
Height	mm (in)	440 (17.32)	468 (18.43)
Depth	mm (in)	305 (12.01)	305 (12.01)
Degree of protection		IP00	IP00
Weight, approx.	kg (lb)	63 (139)	80 (176)
Suitable for PM240-2 Power Module	Type	6SL3224-1PE31-1 . L0 (FSF, 55 kW, 110 A) 6SL3224-1PE31-5 . L0 (FSF, 75 kW, 145 A)	6SL3224-1PE31-8 . L0 (FSF, 90 kW, 178 A)

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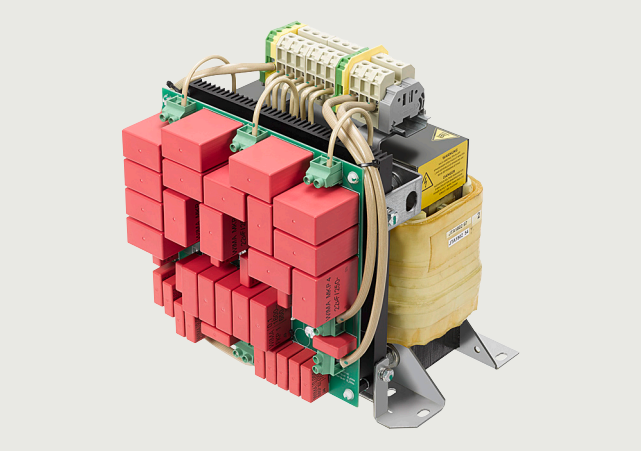
Sine-wave filters for blocksize format

Technical specifications

Line voltage 380 ... 480 V 3 AC		Sine-wave filter (for pulse frequencies 4 ... 8 kHz, only 4 kHz permissible at 110 kW and above – note additional current derating as compared with rated pulse frequency of 2 kHz, see derating data)			
		6SL3000-2CE32-3AA0	6SL3000-2CE32-8AA0	6SL3000-2CE33-3AA0	6SL3000-2CE34-1AA0
Rated current	A	225	276	333	408
Power loss	kW	0.6	0.69	0.53	0.7
Connections					
Load		1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M10
PE		1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M10
Cable length, max. between sine-wave filter and motor					
Shielded	m (ft)	300 (984)	300 (984)	300 (984)	300 (984)
Unshielded	m (ft)	450 (1476)	450 (1476)	450 (1476)	450 (1476)
Degree of protection		IP00	IP00	IP00	IP00
Dimensions					
Width	mm (in)	620 (24.41)	620 (24.41)	620 (24.41)	620 (24.41)
Height	mm (in)	300 (11.81)	300 (11.81)	370 (14.57)	370 (14.57)
Depth	mm (in)	320 (12.60)	320 (12.60)	360 (14.17)	360 (14.17)
Weight, approx.	kg (lb)	124 (273)	127 (280)	136 (300)	198 (437)
Certificates of suitability, according to		cURus	cURus	cURus	cURus
Suitable for PM240-2 Power Module	Type	6SL3224-1PE32-1 . L0 (FSF, 110 kW, 205 A) 6SL3224-1PE32-5 . L0 (FSF, 132 kW, 250 A)	6SL3224-1PE33-0 . L0 (FSG, 160 kW, 302 A)	6SL3224-1PE33-7 . L0 (FSG, 200 kW, 370 A)	6SL3224-1PE34-8 . L0 (FSG, 250 kW, 477 A)

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Overview



dv/dt filter plus VPL

dv/dt filters plus VPL (**V**oltage **P**eak **L**imiter) limit the voltage rate-of-rise *dv/dt* to values < 500 V/µs and the typical voltage peaks to the following values according to the limit value curve to IEC/TS 60034-17: 2006:

- < 1350 V phase/phase at the motor terminals with a nominal DC link voltage of 935 V
- < 1100 V phase/ground at the motor terminals with a nominal DC link voltage of 935 V

Standard motors with standard insulation and without insulated bearings can be used for converter operation if a dv/dt filter plus VPL is used.

JTA dv/dt filters can be operated with SINAMICS S120 blocksize firmware V4.7 SP10 or higher.

Design

In terms of function, the dv/dt filter plus VPL consists of two components:

- dv/dt reactor
- Voltage limiting network, which cuts off the voltage peaks and feeds the energy back into the DC link.

Integration

dv/dt filters plus VPL that are available depending on the Power Module used

	Frame size						
	FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**	**FSG**
PM240-2 Power Module with integrated braking chopper							
• 200 V versions	✓	✓	✓	✓	✓	✓	–
• 400 V versions	✓	✓	✓	✓	✓	✓	✓
• 690 V versions	–	–	–	✓	✓	✓	✓
Load-side power components							
dv/dt filters plus VPL [1] (for 400 V and 690 V versions only)	–	–	–	**S**	**S**	**S**	**S**

S = Lateral mounting
– = Not possible

[1] The 690 V versions of the PM240-2 Power Modules require motors with a suitable isolating system for 690 V converter operation (IVIC-C premium).

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dv/dt filters plus VPL for blocksize format

Selection and ordering data

Rated power		PM240-2 Power Module Standard variant		dv/dt filter plus VPL (The prefix **"JTA:"** is part of a Siemens internal order code which does not belong to the product number of the original equipment manufacturer Mdexx Magnetronic Devices s. r. o.)
kW	hp	Type 6SL3210-...	Frame size	Article No.
380 ... 480 V 3 AC				
18.5	25	1PE23-8 . L0	FSD	**JTA:TEF1203-0HB**
22	30	1PE24-5 . L0	FSD	**JTA:TEF1203-0JB**
30	40	1PE26-0 . L0		
37	50	1PE27-5 . L0	FSD	**JTA:TEF1203-0KB**
45	60	1PE28-8 . L0	FSE	
55	75	1PE31-1 . L0	FSE	**JTA:TEF1203-0LB**
75	100	1PE31-5 . L0	FSF	
90	125	1PE31-8 . L0	FSF	**JTA:TEF1203-0MB**
110	150	1PE32-1 . L0	FSF	
132	200	1PE32-5 . L0	FSF	
500 ... 690 V 3 AC				
11	10	1PH21-4 . L0	FSD	**JTA:TEF1203-0GB**
15	15	1PH22-0 . L0		
18.5	20	1PH22-3 . L0		
22	25	1PH22-7 . L0	FSD	**JTA:TEF1203-0HB**
30	30	1PH23-5 . L0		
37	40	1PH24-2 . L0		
45	50	1PH25-2 . L0	FSE	**JTA:TEF1203-0JB**
55	60	1PH26-2 . L0		
75	75	1PH28-0 . L0	FSF	**JTA:TEF1203-0KB**
90	100	1PH31-0 . L0		
110	100	1PH31-2 . L0	FSF	**JTA:TEF1203-0LB**
132	125	1PH31-4 . L0		
160	150	1PH31-7CL0	FSG	**JTA:TEF1203-0MB**
200	200	1PH32-1CL0		
250	250	1PH32-5CL0		

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Technical specifications

Line voltage 380 ... 480 V 3 AC or 500 ... 690 V 3 AC		**dv/dt filters plus VPL** (for rated pulse frequency 2 kHz – max. pulse frequency 4 kHz – max. output frequency 150 Hz)		
		JTA:TEF1203-0GB	JTA:TEF1203-0HB	JTA:TEF1203-0JB
Rated current	A	24	44	64
$I_{th\ max}$	A	38	70	104
Power loss at 150 Hz 690 V	kW	0.125	0.303	0.404
Power connection input and output side		Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section, max.	mm^2	16	35	50
DC link connection [1] DCPS, DCNS		Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section, max.	mm^2	16	16	16
PE connection		Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section, max.	mm^2	16	35	50
Motor cable length, max.				
• Shielded	m (ft)	350 (1148)	350 (1148)	350 (1148)
• Unshielded	m (ft)	525 (1723)	525 (1723)	525 (1723)
Cable length, max. between the dv/dt filter plus VPL and the Power Module	m (ft)	5 (16.4)	5 (16.4)	5 (16.4)
Ambient temperature	°C (°F)	-20 ... +40 (-4 ... +104) 40 ... 50 (104 ... 122) with current derating 1.5 % per 1 K 50 ... 60 (122 ... 140) with current derating 1.9 % per 1 K	-20 ... +40 (-4 ... +104) 40 ... 50 (104 ... 122) with current derating 1.5 % per 1 K 50 ... 60 (122 ... 140) with current derating 1.9 % per 1 K	-20 ... +40 (-4 ... +104) 40 ... 50 (104 ... 122) with current derating 1.5 % per 1 K 50 ... 60 (122 ... 140) with current derating 1.9 % per 1 K
Degree of protection		IP00	IP00	IP00
Dimensions				
• Width	mm (in)	264 (10.39)	264 (10.39)	310 (12.20)
• Height	mm (in)	260 (10.24)	275 (10.83)	375 (14.76)
• Depth	mm (in)	220 (8.66)	245 (9.65)	280 (11.02)
Weight, approx.	kg (lb)	20 (44.1)	29 (63.9)	46 (101)
Conformity		CE, UKCA	CE, UKCA	CE, UKCA
Certificates of suitability		cURus, EAC	cURus, EAC	cURus, EAC
Suitable for PM240-2 Power Module standard variant 380 ... 480 V 3 AC	Type	–	6SL3210-1PE23-8 . L0 FSD	6SL3210-1PE24-5 . L0 6SL3210-1PE26-0 . L0 FSD
Suitable for PM240-2 Power Module 500 ... 690 V 3 AC	Type	6SL3210-1PH21-4 . L0 6SL3210-1PH22-0 . L0 6SL3210-1PH22-3 . L0 FSD	6SL3210-1PH22-7 . L0 6SL3210-1PH23-5 . L0 6SL3210-1PH24-2 . L0 FSD	6SL3210-1PH25-2 . L0 6SL3210-1PH26-2 . L0 FSE

[1] Short-circuit-proof cables are required.

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dv/dt filters plus VPL for blocksize format

Technical specifications

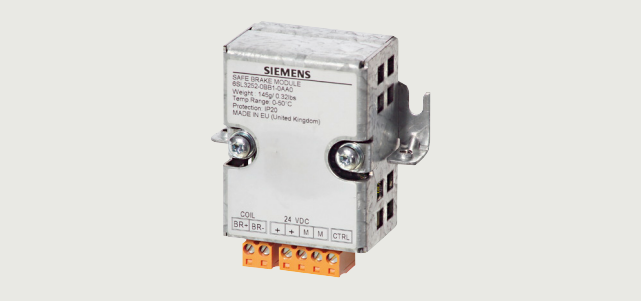
Line voltage 380 ... 480 V 3 AC or 500 ... 690 V 3 AC		**dv/dt filters plus VPL** (for rated pulse frequency 2 kHz – max. pulse frequency 4 kHz – max. output frequency 150 Hz)		
		JTA:TEF1203-0KB	JTA:TEF1203-0LB	JTA:TEF1203-0MB
Rated current	A	103	146	260
$I_{th\ max}$	A	160	230	416
Power loss at 150 Hz 690 V	kW	0.415	0.520	0.857
Power connection input and output side		Flat connector for M8 cable lug	Flat connector for M10 cable lug	Flat connector for M10 cable lug
• Conductor cross-section, max.	mm^2	95	120	2 × 120 or 1 × 185
DC link connection [1] DCPS, DCNS		M8 cable lug	M8 cable lug	M8 cable lug
• Conductor cross-section, max.	mm^2	25	25	50
PE connection		M6 screw studs	M6 screw studs	M6 screw studs
• Conductor cross-section, max.	mm^2	50	70	95
Motor cable length, max.				
• Shielded	m (ft)	450/525 (1476/1723) [2]	450/525 (1476/1723) [2]	450/525 (1476/1723) [2]
• Unshielded	m (ft)	650/800 (2133/2625) [2]	650/800 (2133/2625) [2]	650/800 (2133/2625) [2]
Cable length, max. between the dv/dt filter plus VPL and the Power Module	m (ft)	5 (16.4)	5 (16.4)	5 (16.4)
Ambient temperature	°C (°F)	-20 ... +40 (-4 ... +104) 40 ... 50 (104 ... 122) with current derating 1.5 % per 1 K 50 ... 60 (122 ... 140) with current derating 1.9 % per 1 K	-20 ... +40 (-4 ... +104) 40 ... 50 (104 ... 122) with current derating 1.5 % per 1 K 50 ... 60 (122 ... 140) with current derating 1.9 % per 1 K	-20 ... +40 (-4 ... +104) 40 ... 50 (104 ... 122) with current derating 1.5 % per 1 K 50 ... 60 (122 ... 140) with current derating 1.9 % per 1 K
Degree of protection		IP00	IP00	IP00
Dimensions				
• Width	mm (in)	400 (15.75)	400 (15.75)	460 (18.11)
• Height	mm (in)	325 (12.80)	360 (14.17)	435 (17.13)
• Depth	mm (in)	355 (13.98)	380 (14.96)	445 (17.52)
Weight, approx.	kg (lb)	77 (170)	97 (214)	172 (379)
Conformity		CE, UKCA	CE, UKCA	CE, UKCA
Certificates of suitability		cURus, EAC	cURus, EAC	cURus, EAC
Suitable for PM240-2 Power Module standard variant 380 ... 480 V 3 AC	Type	6SL3210-1PE27-5 . L0 FSD 6SL3210-1PE28-8 . L0 FSE	6SL3210-1PE31-1 . L0 FSE 6SL3210-1PE31-5 . L0 FSF	6SL3210-1PE31-8 . L0 6SL3210-1PE32-1 . L0 6SL3210-1PE32-5 . L0 FSF
Suitable for PM240-2 Power Module 500 ... 690 V 3 AC	Type	6SL3210-1PH28-0 . L0 6SL3210-1PH31-0 . L0 FSF	6SL3210-1PH31-2 . L0 6SL3210-1PH31-4 . L0 FSF	6SL3210-1PH31-7CL0 6SL3210-1PH32-1CL0 6SL3210-1PH32-5CL0 FSG

[1] Short-circuit-proof cables are required.

[2] Maximum overvoltage at the motor terminals <1350 V with cable lengths up to 450 m (1476 ft) shielded or 650 m (2133 ft) unshielded – maximum overvoltage at the motor terminals <1500 V with cable lengths up to 525 m (1723 ft) shielded or 800 m (2625 ft) unshielded.

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Overview



Safe Brake Relay

With the Safe Brake Relay, the brake is controlled in accordance with IEC 61508 SIL 2 and ISO 13849-1 PL d and Category 3.

Design

The Safe Brake Relay can be installed below the Power Module on the shield connection plate.

The Safe Brake Relay has the following connections and interfaces:

- 1 two-channel transistor output stage to control the motor brake solenoid
- 1 connection for the cable harness (CTRL) to the Power Module in blocksize format
- 1 connection for the 24 V DC power supply

The connection between the 24 V DC power supply and the Safe Brake Relay must be kept as short as possible.

The scope of supply of a Safe Brake Relay includes the following:

- 4 cable harnesses for connecting to the CTRL socket of the Power Module
  - Length 0.32 m (1.05 ft) for frame sizes FSA to FSC
  - Length 0.55 m (1.80 ft) for frame sizes FSD and FSE
  - Length 0.8 m (2.62 ft) for frame size FSF
  - Length 1.1 m (3.61 ft) for frame size FSG

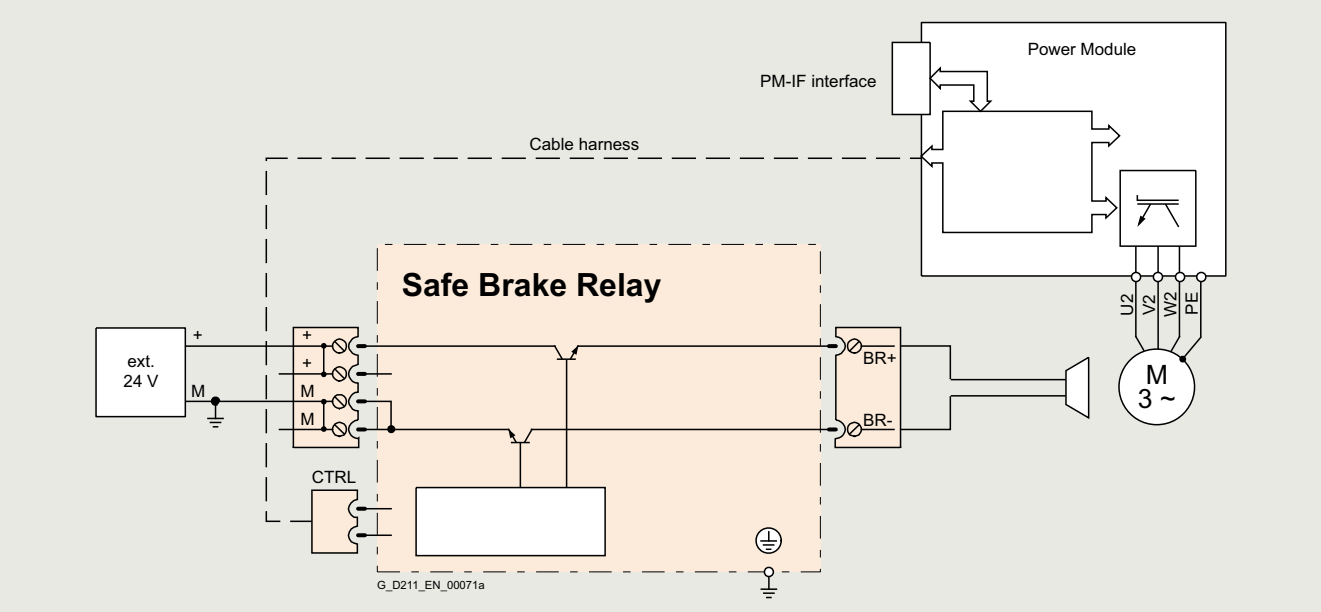
Selection and ordering data

Description	Article No.
Safe Brake Relay Including cable harness for connection to Power Module	**6SL3252-0BB01-0AA0**

Technical specifications

	Safe Brake Relay 6SL3252-0BB01-0AA0
Power supply	20.4 ... 28.8 V DC Recommended rated supply voltage 26 V DC (to compensate for voltage drop in feeder cable to 24 V DC motor brake solenoid)
Current requirement, max.	
• Motor brake	2.5 A
• At 24 V DC	0.05 A + the current requirement of motor brake
Conductor cross-section, max.	2.5 mm^2
Dimensions	
• Width	69 mm (2.72 in)
• Height	63 mm (2.48 in)
• Depth	33 mm (1.30 in)
Weight, approx.	0.17 kg (0.37 lb)

Integration



Connection example of a Safe Brake Relay

The 24 V DC solenoid of the motor brake is directly connected to the Safe Brake Relay. External overvoltage limiters are not required.

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Shield connection kits for blocksize format

Overview

The shield connection kit

- makes it easier to connect the shields of supply and control cables
- provides mechanical strain relief
- ensures optimum EMC performance
- is used to attach the Brake Relay

The shield connection kit includes

- a shield connection plate for the required Power Module
- connection elements and clamps for mounting
- mounting device for Brake Relay, frame sizes FSD to FSG

A shield connection kit is supplied as standard with PM240-2 Power Modules in frame sizes FSA to FSC.

A set of shield plates is included in the scope of delivery for the motor and signal cables corresponding to the frame size for the frame sizes FSD to FSG. For the electromagnetically compatible connection of an optionally connectable braking resistor, the corresponding shield connection kit is to be ordered for frame sizes FSD to FSG.

Selection and ordering data

Description	Article No.
Shield connection kit for PM240-2 Power Modules	
• Frame sizes FSA to FSC	Supplied with the Power Modules, available as a spare part
• Frame sizes FSD to FSG • A set of shield plates is included in the scope of delivery for the motor and signal cables corresponding to the frame size. For the electromagnetically compatible connection of an optionally connectable braking resistor, the corresponding shield connection kit is to be ordered.	
• Frame size FSD	**6SL3262-1AD01-0DA0**
• Frame size FSE	**6SL3262-1AE01-0DA0**
• Frame size FSF	**6SL3262-1AF01-0DA0**
• Frame size FSG	**6SL3262-1AG01-0DA0**

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Overview



BOP20 Basic Operator Panel

Parameters can be set, diagnostics information (e.g. alarm and fault messages) read out and faults acknowledged using the BOP20 Basic Operator Panel.

Design

The BOP20 Basic Operator Panel has a backlit two-line display area with six keys.

The integrated plug connector on the rear of the BOP20 Basic Operator Panel provides its power and establishes communication with the Control Unit.

Selection and ordering data

Description	Article No.
BOP20 Basic Operator Panel	**6SL3055-0AA00-4BA0**

Integration

The BOP20 Basic Operator Panel can be inserted on the following Control Units:

- SINAMICS S120
  - CU310-2
  - CU320-2



CU310-2 PN Control Unit with inserted BOP20 Basic Operator Panel

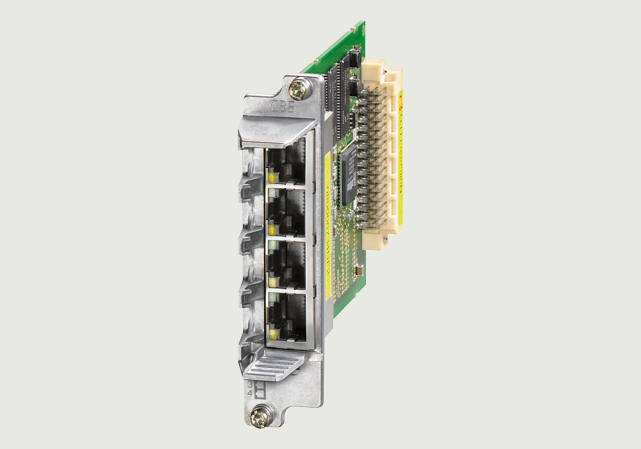


CU320-2 PN Control Unit with inserted BOP20 Basic Operator Panel

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CBE20 PROFINET Communication Board

Overview



CBE20 Communication Board

The CBE20 Communication Board can be used to connect to a PROFINET IO network via a CU320-2 Control Unit.

The SINAMICS S120 or SINAMICS S150 drive system then assumes the function of a PROFINET IO device and can perform the following functions:

- PROFINET IO device
- 100 Mbps full duplex
- Supports real-time classes of PROFINET IO:
  - RT (Real-Time)
  - IRT (Isochronous Real-Time), minimum send cycle 500 µs
- Connection to control systems as PROFINET IO devices in accordance with PROFIdrive, Specification V4
- Standard TCP/IP communication for engineering processes using the Startdrive or STARTER commissioning tools
- Integrated 4-port switch with four RJ45 sockets based on the PROFINET ASIC ERTEC400. The optimum topology (line, star, tree) can therefore be configured without additional external switches
- Supports the functions "media redundancy" and "shared device"

The CBE20 Communication Board is required if:

- a SINAMICS S120 or SINAMICS S150 converter with a CU320-2 DP Control Unit (PROFIBUS) should be connected to a PROFINET-IO network
- SINAMICS Link is to be used to directly exchange data between several CU320-2 DP (PROFIBUS) or CU320-2 PN (PROFINET) Control Units without using a higher-level control system
- EtherNet/IP in a CU320-2 DP should be used
- Modbus TCP in a CU320-2 DP should be supported

Selection and ordering data

Description	Article No.
CBE20 Communication Board	**6SL3055-0AA00-2EB0**
Accessories	
Industrial Ethernet FC	
• RJ45 Plug 180 (1 unit)	**6GK1901-1BB10-2AA0**
• RJ45 Plug 180 (10 units)	**6GK1901-1BB10-2AB0**
• Stripping tool	**6GK1901-1GA00**
• Standard cable GP 2x2	**6XV1840-2AH10**
• Flexible cable GP 2x2	**6XV1870-2B**
• Trailing cable GP 2x2	**6XV1870-2D**
• Trailing cable 2x2	**6XV1840-3AH10**
• Marine cable 2x2	**6XV1840-4AH10**

For the SINAMICS G150, SINAMICS S150 and SINAMICS S120 Cabinet Modules, the CBE20 Communication Board can be ordered as an option by specifying order code **G33**.

For information on connectors and cables refer to the section MOTION-CONNECT connection system and in the internet at:
www.siemens.com/motion-connect
https://sieportal.siemens.com

Technical specifications

	CBE20 Communication Board 6SL3055-0AA00-2EB0
Current requirement at 24 V DC	0.16 A
Power loss	2.4 W
Weight, approx.	0.1 kg (0.22 lb)
Certificate of suitability	cULus

Integration

The CBE20 Communication Board plugs into the option slot on the CU320-2 Control Unit.

SINAMICS Link

SINAMICS Link can be used to directly exchange data between several CU320-2 DP (PROFIBUS) or CU320-2 PN (PROFINET) Control Units without using a higher-level control system. In this case, the CBE20 Communication Board is required. Possible applications for the SINAMICS Link include:

- Torque distribution for several drives
- Setpoint cascading for several drives
- Load distribution for drives coupled through a material web
- Couplings between SINAMICS G or SINAMICS S with the CU320-2 Control Unit and SINAMICS DC Master with CUD Control Units.

Participants other than CU320-2 Control Units and/or CUD Control Units of the SINAMICS DC Master cannot be integrated into this communication.

SINAMICS Link is activated by appropriately parameterizing the Control Units of the participants.

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Overview



DMC20 DRIVE-CLiQ Hub Module

The DMC20 DRIVE-CLiQ Hub Module is used to implement a star-shaped topology of a DRIVE-CLiQ line. Two DMC20 DRIVE-CLiQ Hub Modules can be connected in series (cascaded).

Design

The DMC20 DRIVE-CLiQ Hub Module in degree of protection IP20 is designed for mounting in control cabinets.

The following are located on the DMC20 DRIVE-CLiQ Hub Module:

- 6 DRIVE-CLiQ sockets for connecting 5 DRIVE-CLiQ devices
- 1 connection for the electronics power supply via the 24 V DC supply connector

The status of the DMC20 DRIVE-CLiQ Hub Module is indicated via a multi-color LED.

The DMC20 DRIVE-CLiQ Hub Module can be snapped onto a TH 35 standard mounting rail according to EN 60715 (IEC 60715).

Selection and ordering data

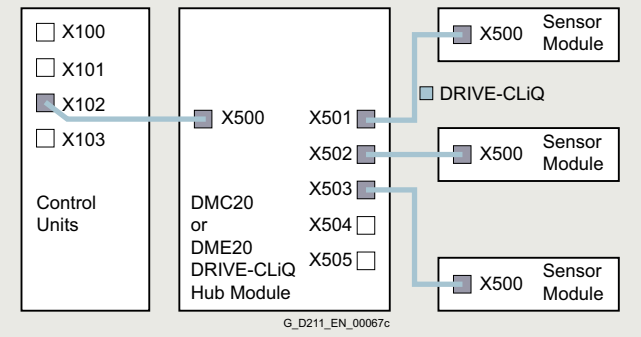
Description	Article No.
DMC20 DRIVE-CLiQ Hub Module Without DRIVE-CLiQ cable	**6SL3055-0AA00-6AA1**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

Technical specifications

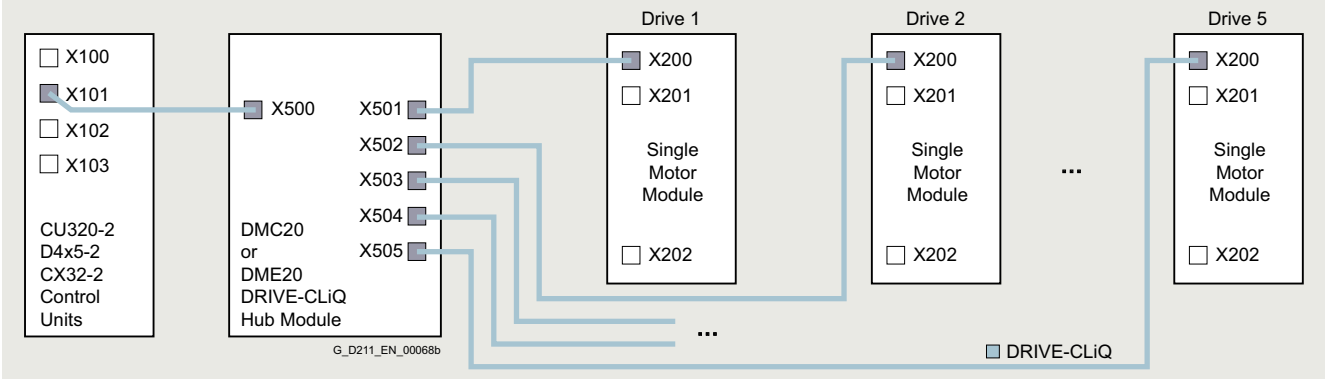
	DMC20 DRIVE-CLiQ Hub Module 6SL3055-0AA00-6AA1
Power requirement, max. at 24 V DC without DRIVE-CLiQ supply	0.15 A
• Conductor cross-section, max.	2.5 mm^2
Degree of protection	IP20
Dimensions	
• Width	30 mm (1.18 in)
• Height	151 mm (5.94 in)
• Depth	110 mm (4.33 in)
Weight, approx.	0.36 kg (0.79 lb)
Certificate of suitability	cULus

Integration

Signals from more than one encoder can be collected with one DRIVE-CLiQ Hub Module and forwarded to the Control Unit through a single DRIVE-CLiQ cable.



With a DRIVE-CLiQ Hub Module, individual DRIVE-CLiQ nodes can be removed without interrupting the data exchange with the remaining devices in the DRIVE-CLiQ line.



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DME20 DRIVE-CLiQ Hub Module

Overview



DME20 DRIVE-CLiQ Hub Module

The DME20 DRIVE-CLiQ Hub Module is used to implement a star-shaped topology of a DRIVE-CLiQ line. Two DME20 DRIVE-CLiQ Hub Modules can be connected in series (cascaded).

Design

The following are located on the DME20 DRIVE-CLiQ Hub Module:

- 6 DRIVE-CLiQ sockets for connecting 5 DRIVE-CLiQ devices
- 1 connection for the electronics power supply via the 24 V DC circular supply connector with conductor cross-section 4 × 0.75 mm^2 (pins 1+2 internally bridged; pins 3+4 internally bridged)

The scope of supply of the DME20 DRIVE-CLiQ Hub Modules includes:

- 6 blanking plugs for sealing unused DRIVE-CLiQ sockets

Selection and ordering data

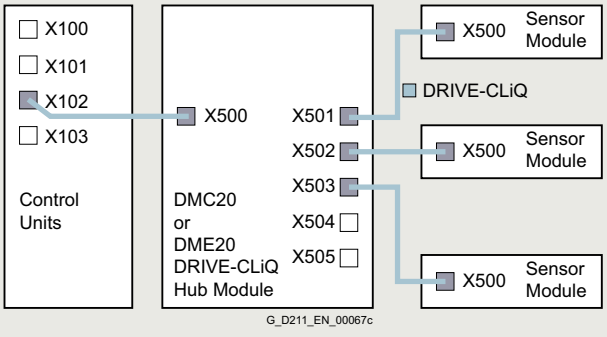
Description	Article No.
DME20 DRIVE-CLiQ Hub Module Without DRIVE-CLiQ cable; without electronics power supply cable and circular connector for 24 V DC	**6SL3055-0AA00-6AB0**
Accessories	
24 V DC power supply cable	Ordering and delivery Phoenix Contact www.phoenixcontact.de
• Shielded connector, 5-pole, can be assembled by the user	1508365
• Unshielded connector, 4-pole, can be assembled by the user, Speedcon rapid interlock	1521601
Accessories for re-ordering	
SINAMICS dust-proof blanking plugs IP67 (6 units) For DRIVE-CLiQ port	**6SL3066-4CA01-0AA0**

Technical specifications

	DME20 DRIVE-CLiQ Hub Module 6SL3055-0AA00-6AB0
Power requirement, max. at 24 V DC without DRIVE-CLiQ supply	0.15 A
• Conductor cross-section, max.	4 × 0.75 mm^2
Degree of protection	IP67
Dimensions	
• Width	99 mm (3.90 in)
• Height	149 mm (5.87 in)
• Depth	55.7 mm (2.19 in) (without connector)
Weight, approx.	0.8 kg (1.76 lb)
Certificate of suitability	cULus

Integration

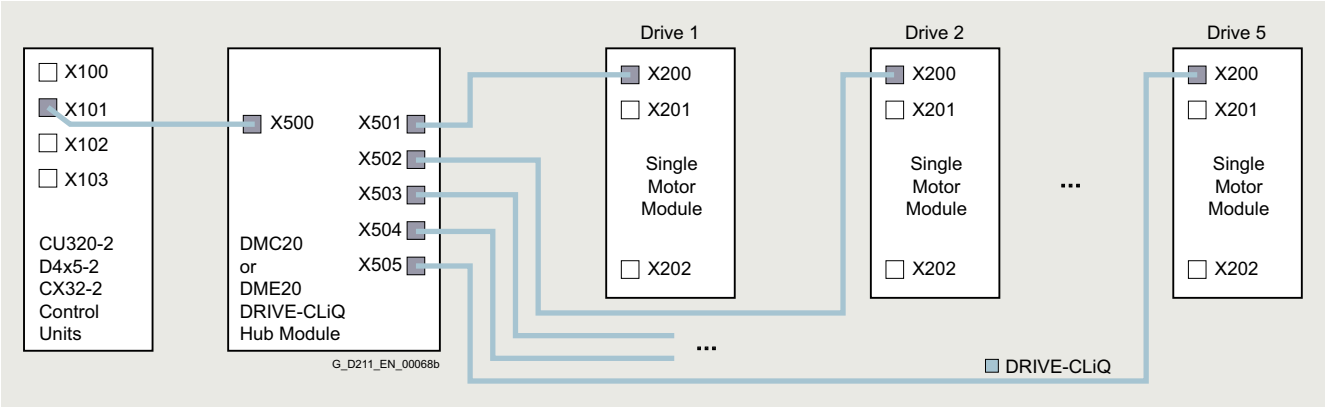
Signals from more than one encoder can be collected with one DRIVE-CLiQ Hub Module and forwarded to the Control Unit through a single DRIVE-CLiQ cable.



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Integration

With a DRIVE-CLiQ Hub Module, individual DRIVE-CLiQ nodes can be removed without interrupting the data exchange with the remaining devices in the DRIVE-CLiQ line.

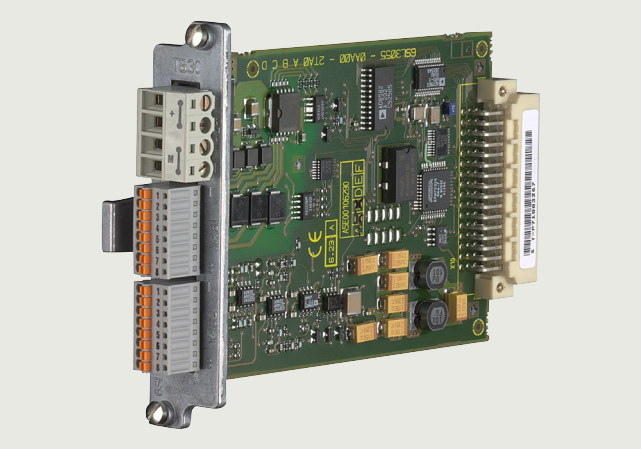


The DME20 DRIVE-CLiQ Hub Module in degree of protection IP67 is suitable for installation outside control cabinets.

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TB30 Terminal Board

Overview



TB30 Terminal Board

The TB30 Terminal Board supports the addition of digital inputs/digital outputs and analog inputs/analog outputs to a Control Unit.

Design

The following are located on the TB30 Terminal Board:

- Power supply for digital inputs/digital outputs
- 4 digital inputs
- 4 digital outputs
- 2 analog inputs
- 2 analog outputs

A shield connection for the signal cable shield is located on the Control Unit.

Selection and ordering data

Description	Article No.
TB30 Terminal Board	**6SL3055-0AA00-2TA0**

For the SINAMICS G150, SINAMICS S150 and SINAMICS S120 Cabinet Modules, the TB30 Terminal Board can be ordered as an option by specifying order code **G62**.

Technical specifications

	TB30 Terminal Board 6SL3055-0AA00-2TA0
Power requirement, max. at 24 V DC via Control Unit CU320-2 without taking account of digital outputs	0.05 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Digital inputs In accordance with IEC 61131-2 Type 1	
• Voltage	-3 ... +30 V
• Low level (an open digital input is interpreted as "low")	-3 ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC, typ.	6 mA
• Delay time of digital inputs [1], approx.	
- L → H	50 µs
- H → L	100 µs
• Conductor cross-section, max.	0.5 mm^2
Digital outputs (continuously short-circuit proof)	
• Voltage	24 V DC
• Load current per digital output, max.	500 mA
• Delay time of digital outputs [1], approx.	150 µs
• Conductor cross-section, max.	0.5 mm^2
Analog inputs (difference)	
• Voltage range (an open analog input is interpreted as 0 V)	-10 ... +10 V
• Internal resistance R_i	65 kΩ
• Resolution [2]	13s bits + sign
• Conductor cross-section, max.	0.5 mm^2
Analog outputs (continuously short-circuit proof)	
• Voltage range	-10 ... +10 V
• Max. load current	-3 ... +3 mA
• Resolution	11 bits + sign
• Settling time, approx.	200 µs
• Conductor cross-section, max.	0.5 mm^2
Power loss, max.	3 W
Weight, approx.	0.1 kg (0.22 lb)
Certificate of suitability	cULus

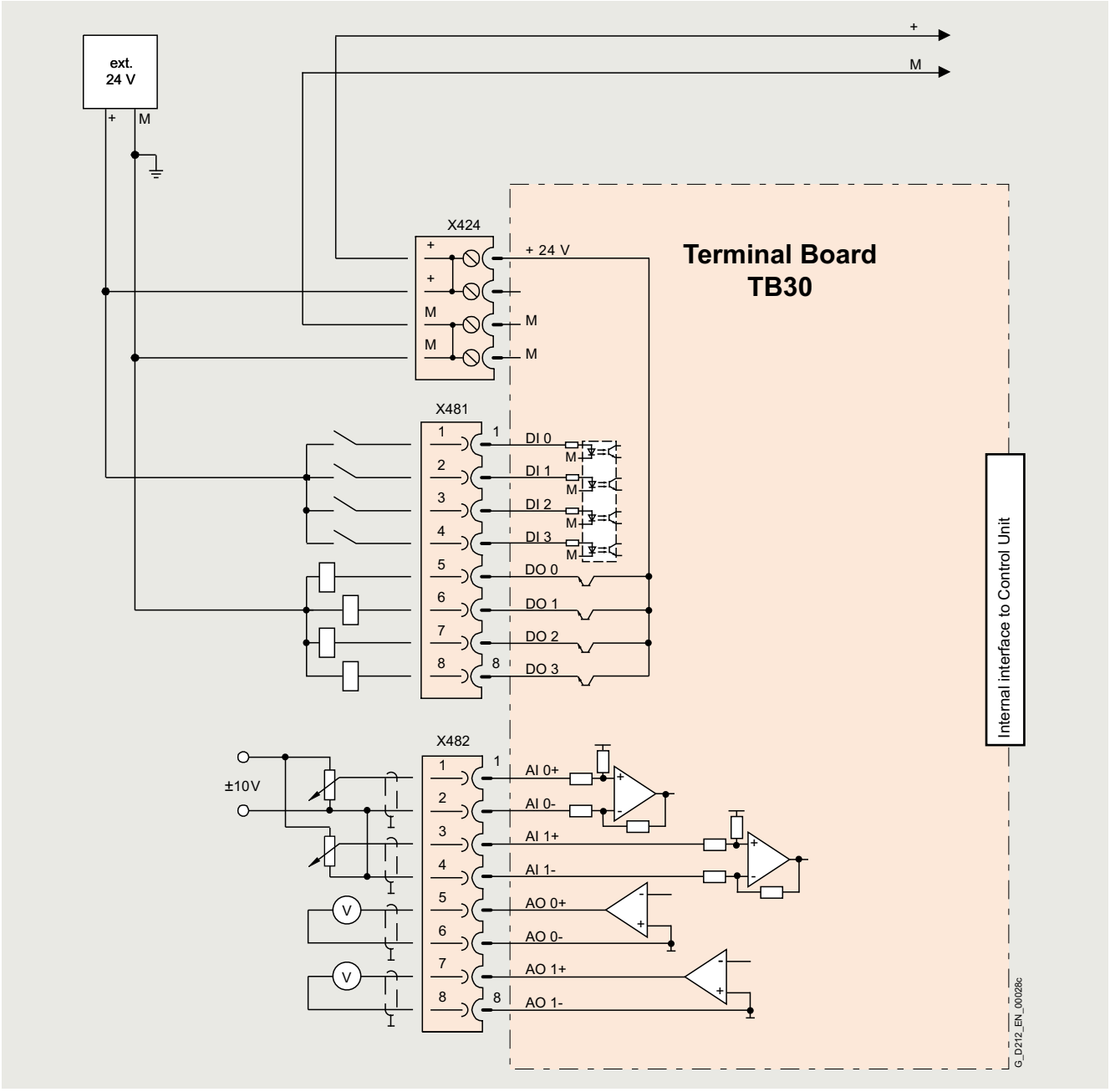
[1] The specified delay times refer to the hardware. The actual reaction time depends on the time slice in which the digital input/output is processed.

[2] If the analog input is to be operated in the signal processing sense with continuously variable input voltage, the sampling frequency $f_a = 1/t_{\text{time slice}}$ must be at least twice the value of the highest signal frequency f_{max}.

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Integration

The TB30 Terminal Board is inserted in the slot to optionally expand the CU320-2 Control Unit.



Connection example of a TB30 Terminal Board

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TM15 Terminal Module

Overview



TM15 Terminal Module

The number of available digital inputs and outputs within a drive system can be expanded with the TM15 Terminal Module.

Design

The TM15 Terminal Module is equipped with the following:

- 24 bidirectional digital inputs/outputs (galvanic isolation in 3 groups with 8 channels per group)
- 24 green status LEDs for indicating the logical signal state of the corresponding terminal
- 2 DRIVE-CLiQ sockets
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE/protective conductor connection

The status of the TM15 Terminal Module is indicated via a multi-color LED.

The TM15 Terminal Module can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

The signal cable shield can be connected to the TM15 Terminal Module by means of a shield connection terminal, e.g. Phoenix Contact type SK8 or Weidmüller type KLBÜ CO 1. The shield connection terminal must not be used as a strain relief mechanism.

Selection and ordering data

Description	Article No.
TM15 Terminal Module Without DRIVE-CLiQ cable	**6SL3055-0AA00-3FA0**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

Technical specifications

	TM15 Terminal Module 6SL3055-0AA00-3FA0
Power requirement, max. at 24 V DC without load	0.15 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Number of DRIVE-CLiQ sockets	2
I/O	
• Digital inputs/outputs	Parameterizable channel-by-channel as DI or DO
• Number of digital inputs/outputs	24
• Galvanic solation	Yes, in groups of 8
• Cables and connections	Plug-in screw-type terminals
• Conductor cross-section, max.	1.5 mm^2
Digital inputs	
• Voltage	-30 ... +30 V
• Low level (an open digital input is interpreted as "low")	-30 ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC	9 mA
• Delay times of digital inputs, typ. [1]	
- L → H	50 µs
- H → L	100 µs
Digital outputs (continuously short-circuit proof)	
• Voltage	24 V DC
• Load current per digital output, max.	0.5 A
• Delay times (resistive load) [1]	
- L → H, typ.	50 µs
- L → H, max.	100 µs
- H → L, typ.	150 µs
- H → L, max.	225 µs
• Total current of outputs (per group), max.	
- To 60 °C (140 °F)	2 A
- To 50 °C (122 °F)	3 A
- To 40 °C (104 °F)	4 A
Power loss, max.	3 W
PE connection	M4 screw
Dimensions	
• Width	50 mm (1.97 in)
• Height	150 mm (5.91 in)
• Depth	111 mm (4.37 in)
Weight, approx.	1 kg (2.20 lb)
Certificate of suitability	cULus

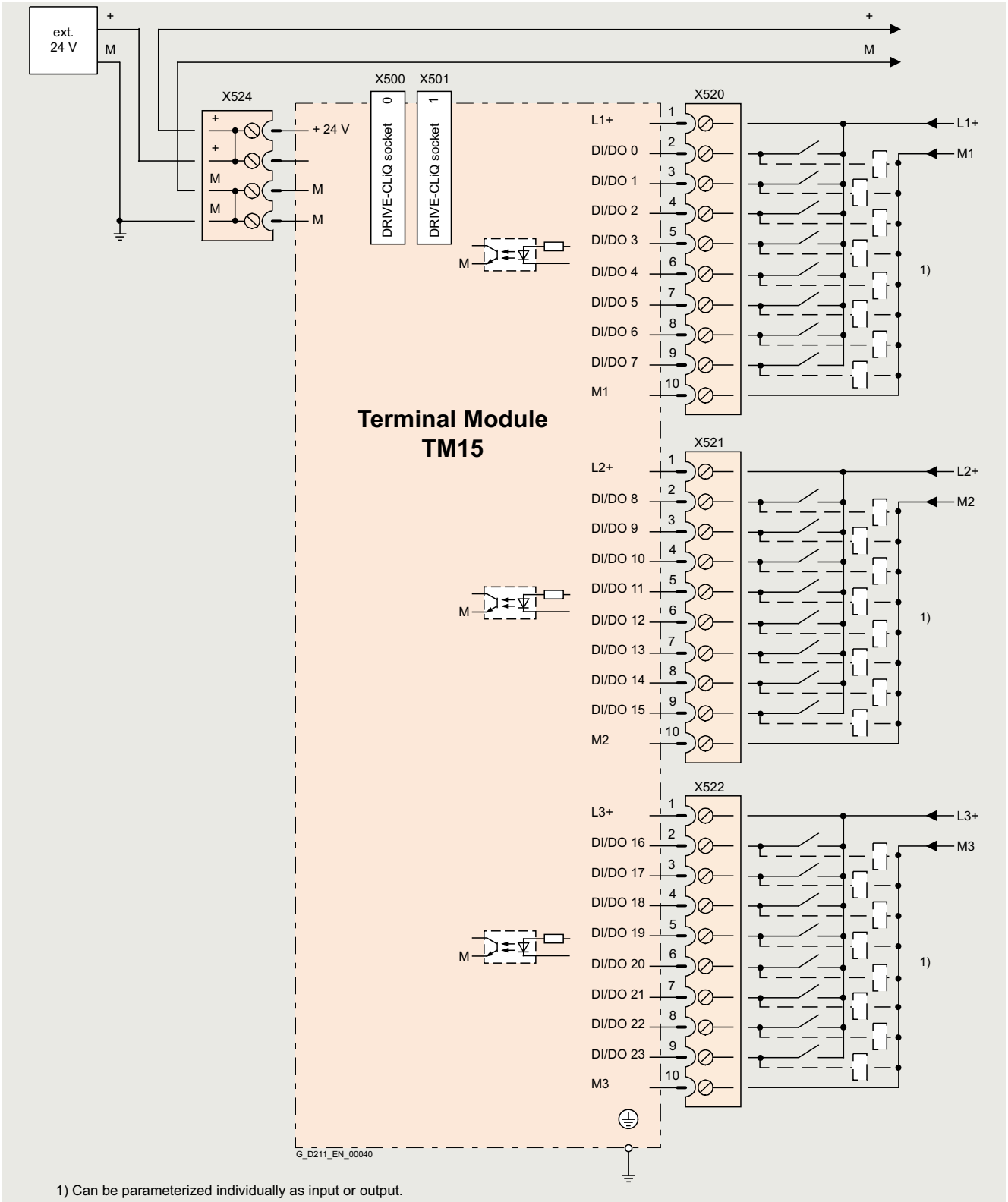
[1] The specified delay times refer to the hardware. The actual reaction time depends on the time slice in which the digital input/output is processed.

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Integration

The TM15 Terminal Module can communicate with the following Control Units via DRIVE-CLiQ:

- CU310-2 Control Unit
- CU320-2 Control Unit
- CU320-3 Control Unit
- SINUMERIK Control Unit
- SINAMICS DCM Advanced CUD



1) Can be parameterized individually as input or output.

Connection example of TM15 Terminal Module

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TM31 Terminal Module

Overview



TM31 Terminal Module

With the TM31 Terminal Module, the number of available digital inputs and outputs and the number of analog input and outputs within a drive can be expanded.

The TM31 Terminal Module also features relay outputs with changeover contact and a temperature sensor input.

Design

The following are located on the TM31 Terminal Module:

- 8 digital inputs
- 4 bidirectional digital inputs/outputs
- 2 relay outputs with changeover contact
- 2 analog inputs
- 2 analog outputs
- 1 temperature sensor input for KTY84-130, Pt1000 or PTC (Pt1000 can be used from firmware V4.7 HF17 and higher)
- 2 DRIVE-CLiQ sockets
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE/protective conductor connection

The status of the TM31 Terminal Module is indicated via a multi-color LED.

The TM31 Terminal Module can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

The signal cable shield can be attached to the TM31 Terminal Module via a shield connection terminal, e.g. type SK8 supplied by Phoenix Contact or type KLBÜ CO 1 supplied by Weidmüller. The shield connection terminal must not be used as a strain relief mechanism.

Selection and ordering data

Description	Article No.
TM31 Terminal Module Without DRIVE-CLiQ cable	**6SL3055-0AA00-3AA1**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

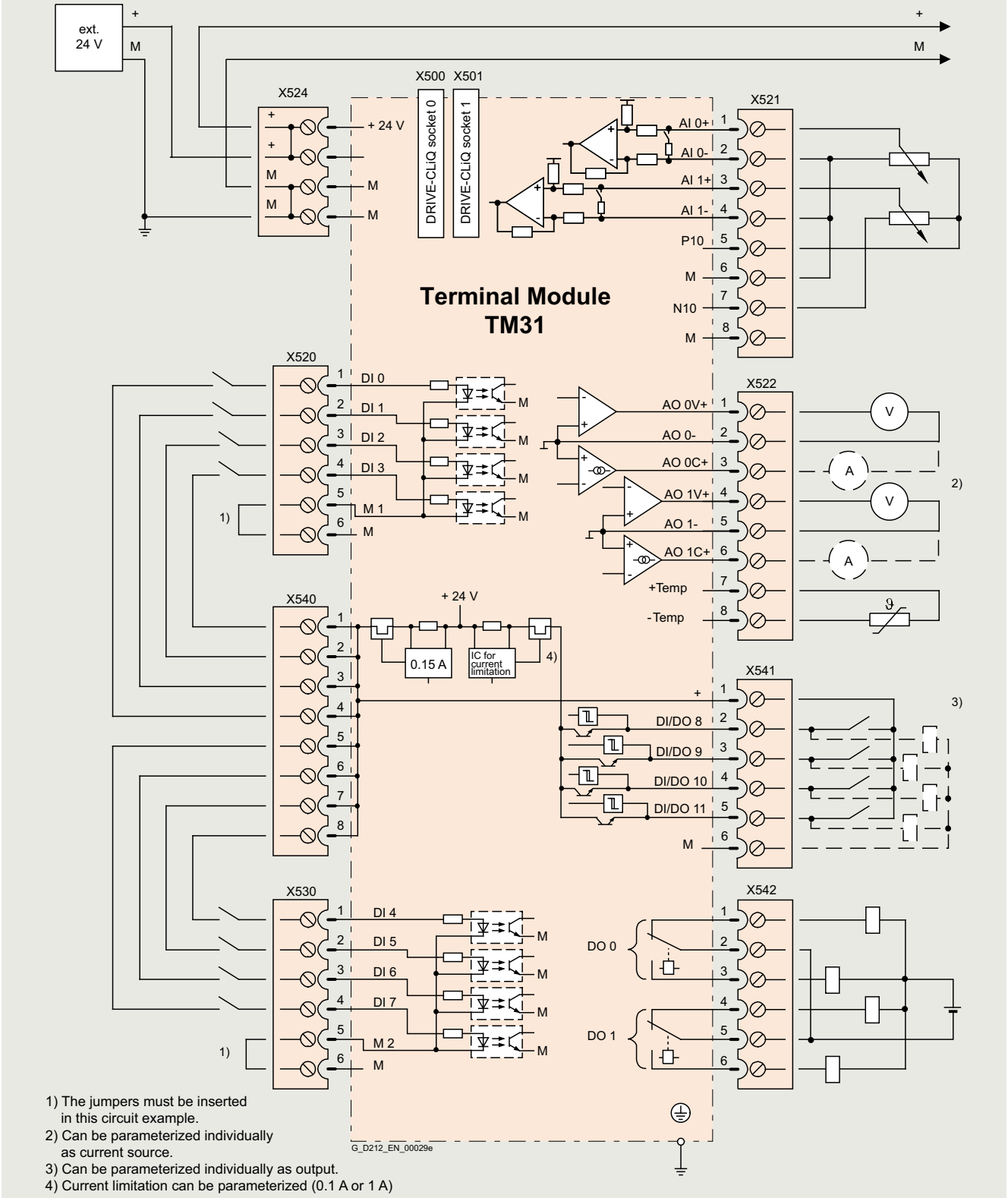
For the SINAMICS G150, SINAMICS S150 and SINAMICS S120 Cabinet Modules, the TM31 Terminal Module can be ordered as an option by specifying order code **G60** or **G61** and for SINAMICS S220 Cabinet Modules as an option by specifying order code **K24** or **K24** to **K27**.

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Integration

The TM31 Terminal Module can communicate via DRIVE-CLiQ with the following Control Units.

- CU310-2 Control Unit
- CU320-2 Control Unit
- CU320-3 Control Unit
- SINUMERIK Control Unit
- SINAMICS DCM Advanced CUD



1) The jumpers must be inserted in this circuit example.
2) Can be parameterized individually as current source.
3) Can be parameterized individually as output.
4) Current limitation can be parameterized (0.1 A or 1 A)

Connection example of TM31 Terminal Module

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Technical specifications

	TM31 Terminal Module 6SL3055-0AA00-3AA1
Power requirement, max. At 24 V DC without taking account of the digital outputs and DRIVE-CLiQ supply	0.5 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Digital inputs In accordance with IEC 61131-2 Type 1	
• Voltage	-3 ... +30 V
• Low level (an open digital input is interpreted as "low")	-3 ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC, typ.	9 mA
• Delay times of digital inputs [1], approx.	
- L → H	50 µs
- H → L	100 µs
• Conductor cross-section, max.	1.5 mm^2
Digital outputs (continuously short-circuit proof)	
• Voltage	24 V DC
• Load current per digital output, max.	100 mA
• Total current of digital outputs, max.	400 mA
• Delay times of digital outputs [1]	
- Typ.	150 µs with 0.5 A resistive load
- Max.	500 µs
• Conductor cross-section, max.	1.5 mm^2
Analog inputs a switch is used to toggle between voltage and current input	
• As voltage input	
- Voltage range	-10 ... +10 V
- Internal resistance R_i	100 kΩ
- Resolution [2]	11 bits + sign
• As current input	
- Current ranges	4 ... 20 mA, -20 ... +20 mA, 0 ... 20 mA
- Internal resistance R_i	250 Ω
- Resolution [2]	10 bits + sign
• Conductor cross-section, max.	1.5 mm^2

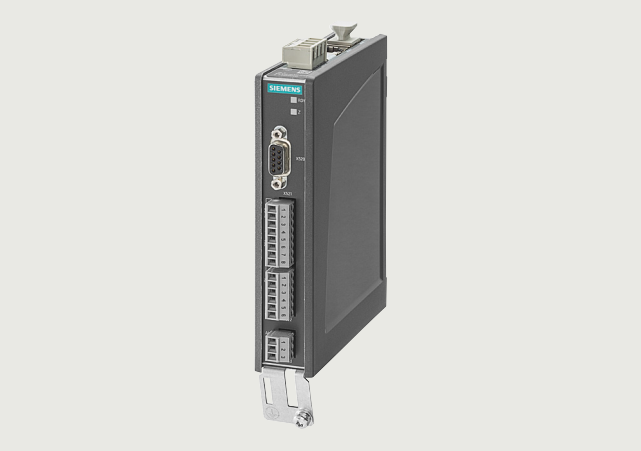
	TM31 Terminal Module 6SL3055-0AA00-3AA1
Analog outputs (continuously short-circuit proof)	
• Voltage range	-10 ... +10 V
• Max. load current	-3 ... +3 mA
• Current ranges	4 ... 20 mA, -20 ... +20 mA, 0 ... 20 mA
• Load resistance, max.	500 Ω in the range -20 ... +20 mA
• Resolution	11 bits + sign
• Conductor cross-section, max.	1.5 mm^2
Relay outputs CO contacts	
• Max. load current	8 A
• Operational voltage, max.	250 V AC, 30 V DC
• Switching capacity, max.	
- At 250 V AC	2000 VA (cos φ = 1) 750 VA (cos φ = 0.4)
- At 30 V DC	240 W (resistive load)
• Required minimum current	100 mA
• Conductor cross-section, max.	2.5 mm^2
Power loss, max.	10 W
PE connection	M4 screw
Dimensions	
• Width	50 mm (1.97 in)
• Height	150 mm (5.91 in)
• Depth	111 mm (4.37 in)
Weight, approx.	0.49 kg (1.08 lb)
Certificate of suitability	cULus

[1] The specified delay times refer to the hardware. The actual reaction time depends on the time slice in which the digital input/output is processed.

[2] If the analog input is to be operated in the signal processing sense with continuously variable input voltage, the sampling frequency $f_a = 1/t_{time\ slice}$ must be at least twice the value of the highest signal frequency f_{max}.

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Overview



TM41 Terminal Module

The TM41 Terminal Module supplies TTL signals which emulate an incremental encoder, e.g. to a higher-level control. The encoder interface (incremental encoder emulation) can be linked to an encoder signal from the Control Unit, e.g. incremental encoder sin/cos, by parameter assignment.

The TM41 Terminal Module increases the number of digital inputs/outputs and analog inputs that are available in the drive system.

Design

The following are located on the TM41 Terminal Module:

- 4 bidirectional digital inputs/outputs
- 4 digital inputs (with galvanic isolation)
- 1 analog input
- 1 interface for emulation of TTL incremental encoder (RS422)
- 1 LED for signaling zero mark detection for encoder interface
- 2 DRIVE-CLiQ sockets
- 1 connection for the electronics power supply and to supply the digital outputs via the 24 V DC supply connector
- 1 PE/protective conductor connection

The status of the TM41 Terminal Module is indicated via a multi-color LED.
An LED next to the interface for TTL pulse encoder emulation is illuminated as soon as a zero mark is detected.

The TM41 Terminal Module can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

The signal cable shield can be attached to the TM41 Terminal Module via a shield connection terminal, e.g. type SK8 supplied by Phoenix Contact or type KLBÜ CO 1 supplied by Weidmüller. The shield connection terminal must not be used as a strain relief mechanism.

Selection and ordering data

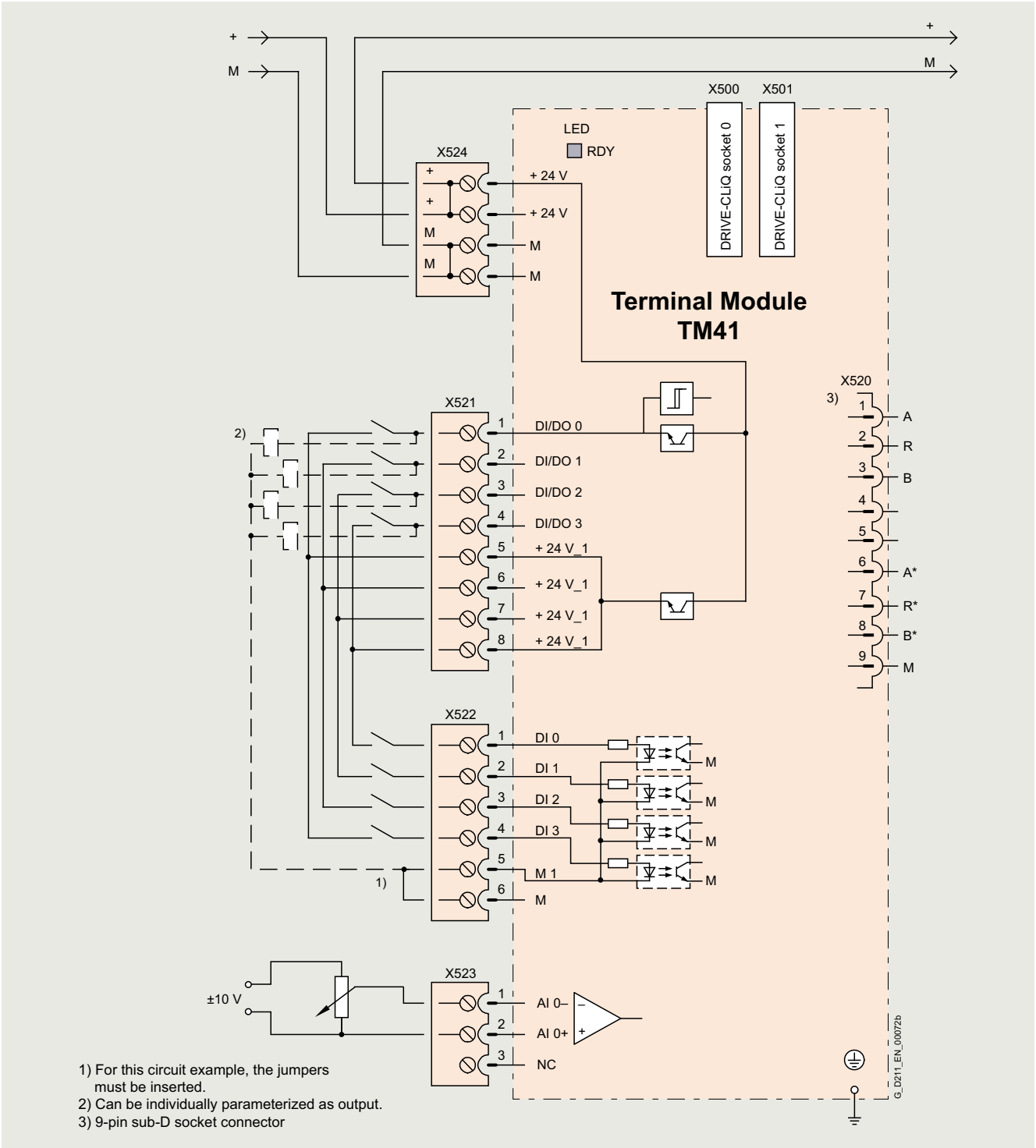
Description	Article No.
TM41 Terminal Module Without DRIVE-CLiQ cable	**6SL3055-0AA00-3PA1**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

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Integration

The TM41 Terminal Module can communicate via DRIVE-CLiQ with the following Control Units.

- CU310-2 Control Unit
- CU320-2 Control Unit
- SINUMERIK Control Unit



Connection example of TM41 Terminal Module

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Technical specifications

	TM41 Terminal Module 6SL3055-0AA00-3PA1
Current requirement (X524 at 24 V DC) without DRIVE-CLiQ supply or digital outputs (X514)	0.5 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
I/O	
• Digital inputs/outputs	Individually parameterizable as DI or DO
• Number of digital inputs/outputs	4
• Number of digital input/outputs (with galvanic isolation)	4
• Cables and connections	Plug-in screw-type terminals
• Conductor cross-section, max.	1.5 mm^2
Digital inputs	
• Voltage	
- Without galvanic isolation	-3 ... +30 V
- With galvanic isolation	-30 ... +30 V
• Low level (an open digital input is interpreted as "low")	
- Without galvanic isolation	-3 ... +5 V
- With galvanic isolation	-30 ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC, typ.	<9 mA
• Delay times of digital inputs, max. [1]	
- L → H	3 ms
- H → L	3 ms
Digital outputs (continuously short-circuit proof)	
• Voltage	24 V DC
• Load current per digital output, max.	0.5 A
• Delay times (resistive load) [1]	
- L → H, typ.	50 µs
- L → H, max.	100 µs
- H → L, typ.	75 µs
- H → L, max.	150 µs

	TM41 Terminal Module 6SL3055-0AA00-3PA1
Analog input (difference)	
• Voltage range	-10 ... +10 V
• Internal resistance	≥100 kΩ
• Resolution [2]	12 bits + sign
Pulse encoder emulation	
• Level	TTL (RS422), A+, A-, B+, B-, zero track N+, N-
• Limit frequency $f_{max.}$	512 kHz
• Ratio Encoder pulses: Encoder emulation	Any number of ratio/ reduction ratio of pulses
Power loss, max.	12 W
PE connection	M4 screw
Dimensions	
• Width	30 mm (1.18 in)
• Height	151 mm (5.94 in)
• Depth	110 mm (4.33 in)
Weight, approx.	0.32 kg (0.71 lb)
Certificate of suitability	cULus

[1] The specified delay times refer to the hardware. The actual reaction time depends on the time slice in which the digital input/output is processed.

[2] If the analog input is to be operated in the signal processing sense with continuously variable input voltage, the sampling frequency $f_a = 1/t_{time\ slice}$ must be at least twice the value of the highest signal frequency f_{max}.

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TM54F Terminal Module

Overview



TM54F Terminal Module

The TM54F Terminal Module is a dual-processor I/O interface with four fail-safe digital outputs and ten fail-safe digital inputs for utilization of the Safety Integrated functions of the SINAMICS drive system via external actuators and sensors.

Every available safety function integrated in the drive can be controlled via the fail-safe digital inputs on the TM54F Terminal Module. In the event that the parameterized safety functions of several drives operated together on a Control Unit are to be executed together, then these drives can be grouped in the TM54F Terminal Module. The advantage of this approach is that only one fail-safe digital input needs to be connected for these drives.

The fail-safe digital inputs and outputs have two channels and are redundantly configured with an internal data cross-check using the two processors. A fail-safe digital output consists of one P-switching and one M-switching output as well as one digital input to read back the switching state. A fail-safe digital input consists of two digital inputs.

Safety sensors can be connected over two switchable 24 V sensor supplies and can be evaluated over the fail-safe digital inputs. The switchable 24 V sensor supply ensures that the fail-safe digital inputs can be dynamized to detect dormant errors (this dynamization is used to check the shutdown paths). An unswitchable 24 V sensor supply is additionally provided by the TM54F Terminal Module for connecting undynamizable safety sensors.

The TM54F Terminal Module must be directly connected to a Control Unit via a DRIVE-CLiQ cable. Only one TM54F Terminal Module can be assigned to each Control Unit. It is not permissible to make the TM54F connection via another DRIVE-CLiQ device, e.g. a Power Module, a Motor Module or a Line Module.

Design

The following are located on the TM54F Terminal Module:

- 4 fail-safe digital outputs
- 10 fail-safe digital inputs
- 4 LEDs, single color for indicating the status of the read back channel of the fail-safe digital outputs
- 4 LEDs, dual-color for indicating the status of the fail-safe digital outputs
- 20 LEDs, dual-color for indicating the status of the fail-safe digital inputs
- 3 LEDs, single color for indicating the status of the 24 V sensor supplies
- 2 DRIVE-CLiQ sockets
- 2 connections for 24 V sensor supply, switchable
- 1 connection for 24 V sensor supply, not switchable
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 connection for the 24 V power supply to digital outputs and sensors
- 1 PE/protective conductor connection

The status of the TM54F Terminal Module is indicated via a multi-color LED.

The TM54F Terminal Module can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

The signal cable shield can be attached to the TM54F Terminal Module via a shield connection terminal, e.g. type SK8 supplied by Phoenix Contact or type KLBÜ CO 1 supplied by Weidmüller. The shield connection terminal must not be used as a strain relief mechanism.

Pins for connector coding are included in the TM54F Terminal Module scope of supply.

Selection and ordering data

Description	Article No.
TM54F Terminal Module Without DRIVE-CLiQ cable	**6SL3055-0AA00-3BA0**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

For the SINAMICS G150, SINAMICS S150 and SINAMICS S120 Cabinet Modules, the TM54F Terminal Module can be ordered as an option by specifying order code **K87**.

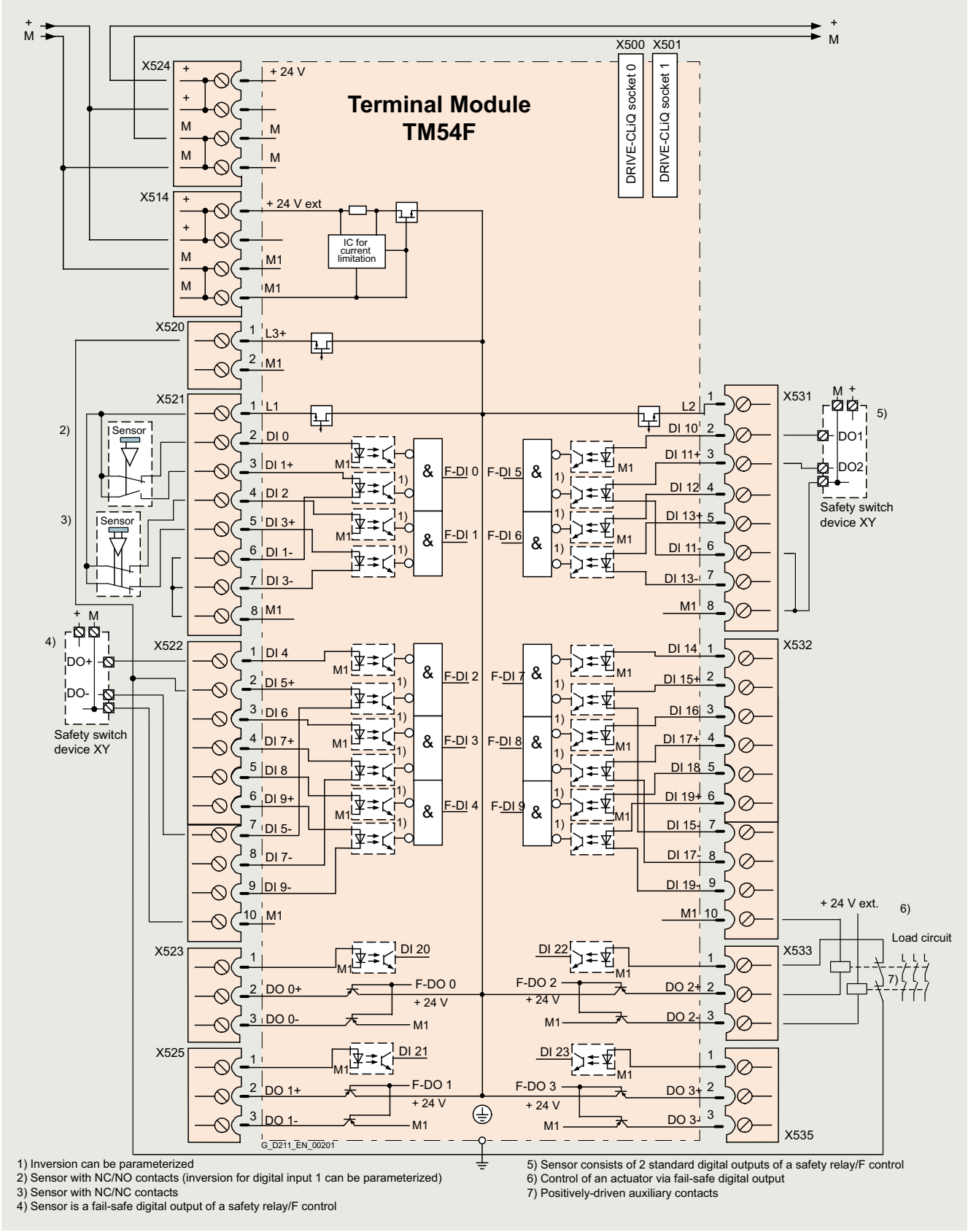
Integration

The TM54F Terminal Module can communicate via DRIVE-CLiQ with the following Control Units.

- CU310-2 Control Unit
- CU320-2 Control Unit
- SINUMERIK 828D
  - Numeric Control Extensions NX10.3
  - Numeric Control Extensions NX15.3

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Integration



1) Inversion can be parameterized
2) Sensor with NC/NO contacts (inversion for digital input 1 can be parameterized)
3) Sensor with NC/NC contacts
4) Sensor is a fail-safe digital output of a safety relay/F control
5) Sensor consists of 2 standard digital outputs of a safety relay/F control
6) Control of an actuator via fail-safe digital output
7) Positively-driven auxiliary contacts

Connection example of TM54F Terminal Module

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TM54F Terminal Module

Technical specifications

	TM54F Terminal Module 6SL3055-0AA00-3BA0
Current requirement (X524 at 24 V DC) without DRIVE-CLiQ supply	0.2 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Max. current requirement ext. 24 V for supplying the digital outputs and 24 V sensor supply (X514 at 24 V DC)	4 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
I/O	
• Number of fail-safe digital inputs	10
• Number of fail-safe digital outputs	4
• 24 V sensor supply	3, of which 2 can be temporarily shut down using an internal test routine for dynamizing fail-safe digital inputs, current carrying capacity 0.5 A each
• Cables and connections	Plug-in screw-type terminals
• Conductor cross-section, max.	1.5 mm^2
Digital inputs in accordance with IEC 61131-2 Type 1, with galvanic isolation	
• Voltage	-3 ... +30 V
• Low level (an open digital input is interpreted as "low")	-3 ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC, typ.	>3.2 mA
• Delay time of digital inputs, approx. [1]	
- L → H, typ.	30 µs
- H → L, typ.	60 µs
• Safe state	Low level (for inputs that can be inverted: without inversion)

	TM54F Terminal Module 6SL3055-0AA00-3BA0
Digital outputs (continuously short-circuit proof)	
• Voltage	24 V DC
• Load current per fail-safe digital output, max. [2]	0.5 A
• Delay times (resistive load) [1]	
- L → H, typ.	300 µs
- H → L, typ.	350 µs
• Safe state	Output switched off
Scanning cycle t_{SI} for fail-safe digital inputs or fail-safe digital outputs	4 ... 25 ms (adjustable)
Power loss, max. At 24 V	4.5 W
PE connection	M4 screw
Dimensions	
• Width	50 mm (1.97 in)
• Height	151 mm (5.94 in)
• Depth	110 mm (4.33 in)
Weight, approx.	0.9 kg (1.98 lb)
Certificate of suitability	cULus
Safety Integrated	Acc. to IEC 61508 SIL 2 and ISO 13849-1 PL d and Category 3

[1] The specified delay times refer to the hardware. The actual reaction time depends on the time slice in which the digital input/output is processed.

[2] The total current of all fail-safe digital outputs must not exceed 5.33 A.

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Overview



TM120 Terminal Module

Four temperature sensors can be evaluated via the TM120 Terminal Module. The temperature sensor inputs are safely electrically isolated from the evaluation electronics in the TM120 Terminal Module and are suitable for evaluating the temperature of special motors, e.g. SIMOTICS L-1FN linear motors and SIMOTICS T-1FW6 built-in torque motors.

Design

The following are located on the TM120 Terminal Module:

- 4 temperature sensor inputs for KTY84-130, Pt1000 or PTC (Pt1000 can be used from firmware V4.7 HF17 and higher)
- 2 DRIVE-CLiQ sockets
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE/protective conductor connection

The status of the TM120 Terminal Module is indicated using a multi-color LED.

The TM120 Terminal Module can be snapped onto a TH 35 standar mounting rail in accordance with EN 60715 (IEC 60715).

Selection and ordering data

Description	Article No.
TM120 Terminal Module Without DRIVE-CLiQ cable	**6SL3055-0AA00-3KA0**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

Technical specifications

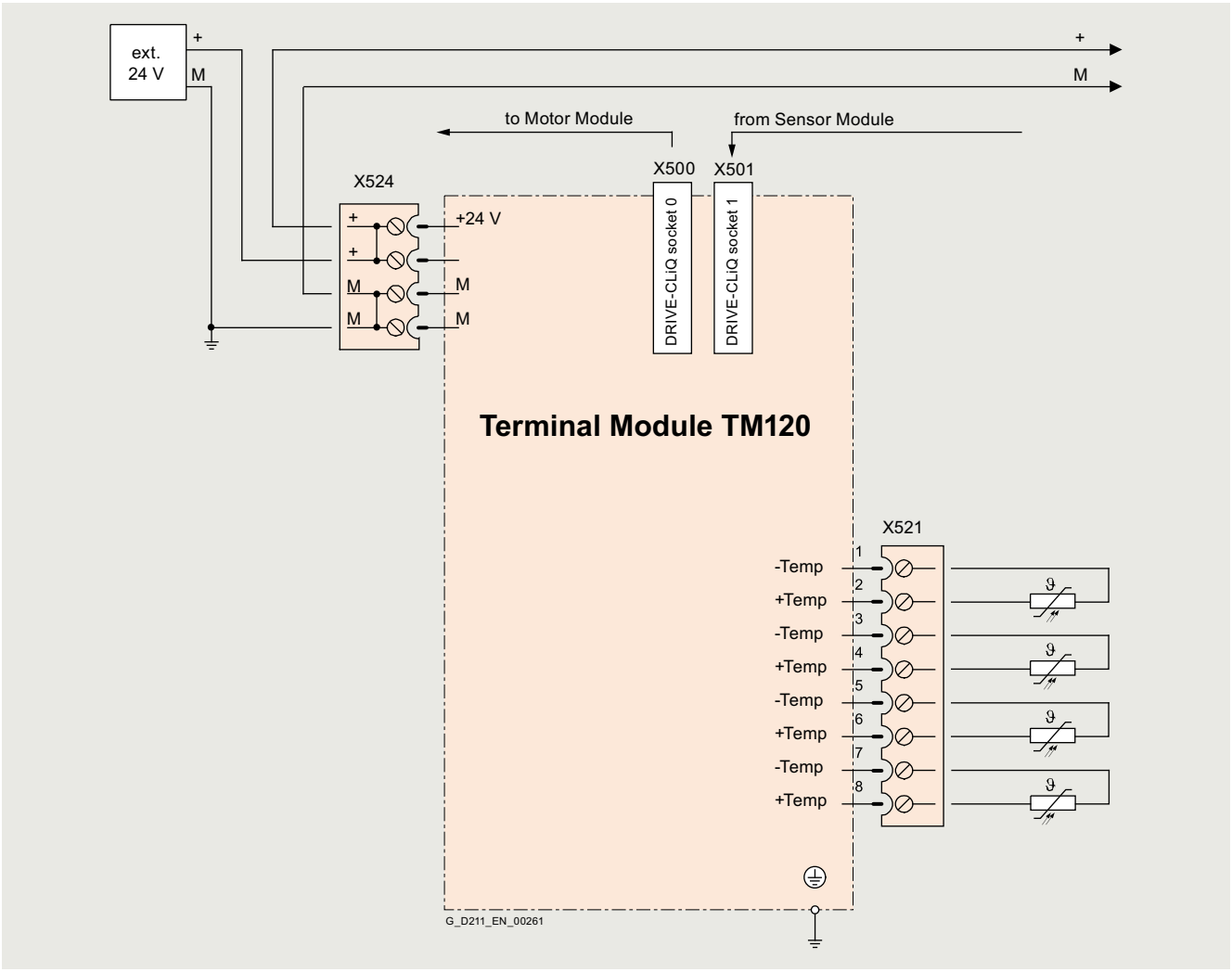
	TM120 Terminal Module 6SL3055-0AA00-3KA0
Power requirement, max. at 24 V DC	0.5 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Temperature sensor inputs The inputs can be individually parameterized to evaluate sensors of type KTY84-130, Pt1000, PTC or temperature switches	
• Conductor cross-section	0.2 ... 6 mm^2
• Constant current per sensor, approx.	2 mA
• Safe electrical separation up to line voltage, max.	480 V AC
Power loss, typically	2.4 W
PE connection	M4 screw
Dimensions	
• Width	30 mm (1.18 in)
• Height	150 mm (5.91 in)
• Depth	111 mm (4.37 in)
Weight, approx.	0.41 kg (0.90 lb)

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Integration

The TM120 Terminal Module can communicate via DRIVE-CLiQ with the following Control Units with SINAMICS firmware version V4.3 and higher:

- CU310-2 Control Unit
- CU320-2 Control Unit
- CU320-3 Control Unit
- SINUMERIK Control Unit



Example connection of a TM120 Terminal Module

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Overview



TM150 Terminal Module

The TM150 Terminal Module is a DRIVE-CLiQ component for temperature evaluation. The temperature is measured in a temperature range from -99 °C to +250 °C for the following temperature sensors:

- Pt100 (with monitoring for wire breaks and short-circuits)
- Pt1000 (with monitoring for wire breaks and short-circuits)
- KTY84 (with monitoring for wire breaks and short-circuits)
- PTC (with monitoring for short-circuit)
- Bimetallic NC contact (without monitoring)

For the temperature sensor inputs, for each terminal block the evaluation can be parameterized for 1×2-wire, 2×2-wire, 3-wire or 4-wire. There is no galvanic isolation in the TM150 Terminal Module.

The temperature channels of a TM150 can be subdivided into 3 groups and evaluated together.

Design

The following are located on the TM150 Terminal Module:

- 6 ... 12 temperature sensor inputs
- 2 DRIVE-CLiQ sockets
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE/protective conductor connection

The status of the TM150 Terminal Module is indicated via a multi-color LED.

The TM150 Terminal Module can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

Selection and ordering data

Description	Article No.
TM150 Terminal Module Without DRIVE-CLiQ cable	**6SL3055-0AA00-3LA0**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

For the SINAMICS G150, SINAMICS S150 and SINAMICS S120 Cabinet Modules, the TM150 Terminal Module can be ordered as an option by specifying order code **G51** or **G51** to **G54** and for SINAMICS S220 Cabinet Modules as an option by specifying order code **K36** or **K36** to **K39**.

Technical specifications

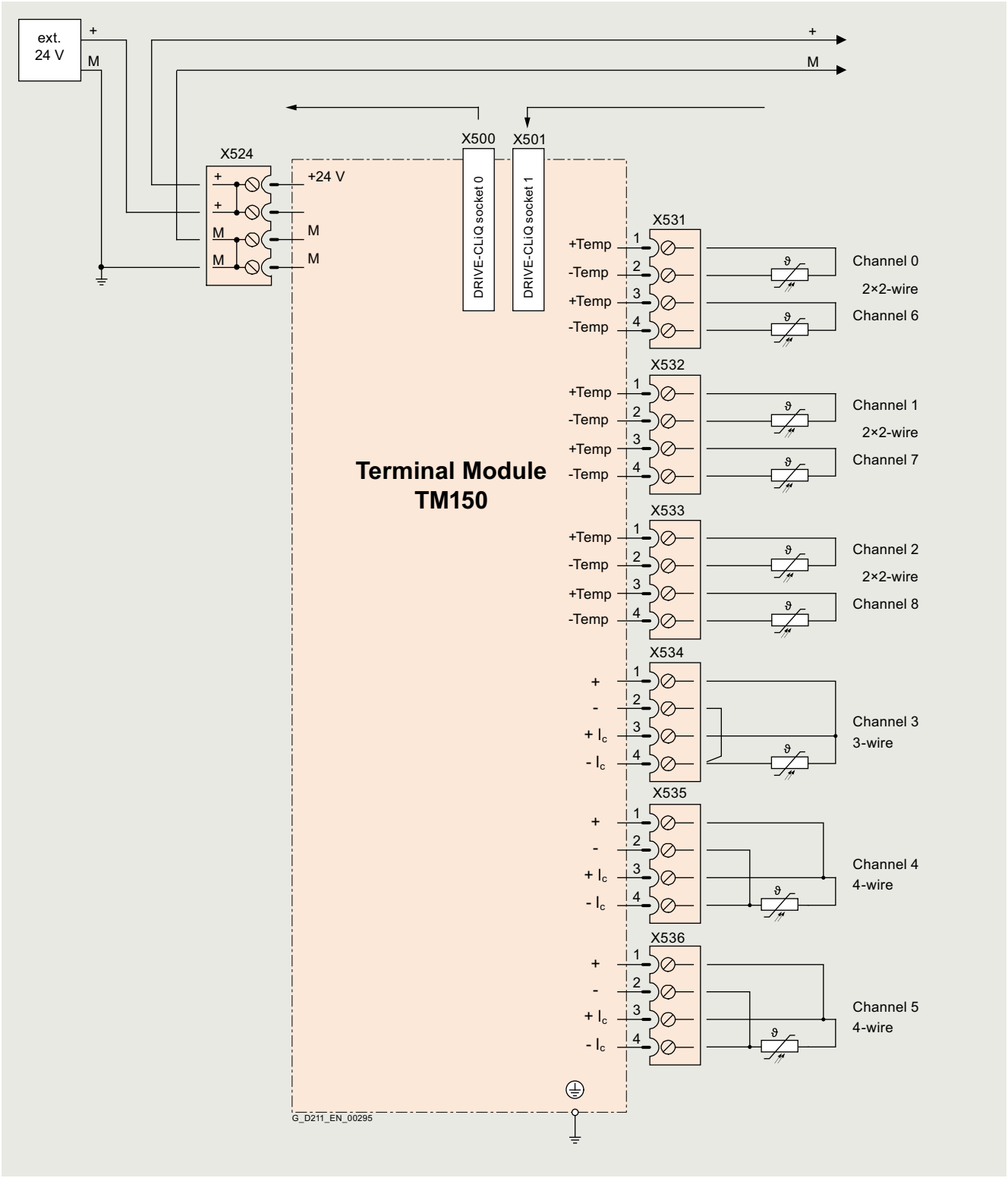
	TM150 Terminal Module 6SL3055-0AA00-3LA0
Power requirement, max. at 24 V DC	0.5 A
• Conductor cross section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Temperature sensor inputs The inputs can be parameterized individually for the evaluation of sensors	
• Conductor cross section, max.	1.5 mm^2
• Measuring current per sensor, approx.	0.8 mA
Power loss	1.6 W
PE connection	M4 screw
Dimensions	
• Width	30 mm (1.18 in)
• Height	150 mm (5.91 in)
• Depth	111 mm (4.37 in)
Weight, approx.	0.41 kg (0.90 lb)
Certificate of suitability	cULus

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Integration

The TM150 Terminal Module can communicate via DRIVE-CLiQ with the following Control Units.

- CU310-2 Control Unit
- CU320-2 Control Unit
- CU320-3 Control Unit
- SINAMICS DCM Advanced CUD



Connection example of a TM150 Terminal Module

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Overview



VSM10 Voltage Sensing Module

The VSM10 Voltage Sensing Module is capable of measuring the line or motor voltage waveform precisely and helps Line Modules to continue functioning properly under difficult supply conditions, for example, in the case of extreme voltage fluctuations or brief supply interruptions.

The phase differential voltage can be measured, either grounded (in the delivery state with jumper plugged in) or isolated.

The VSM10 Voltage Sensing Module is integrated in Active Interface Modules in chassis format and Smart Line Modules in chassis format. It can be optionally deployed for all Active Line Modules in booksize format and for 16 kW, 24 kW, 36 kW and 55 kW Smart Line Modules in booksize format.

In addition, the VSM10 Voltage Sensing Module is used to connect to rotating synchronous motors – or for a "quick flying restart" of rotating induction motors.

Design

The VSM10 Voltage Sensing Module has the following connections and interfaces:

- 1 connection for direct voltage sensing up to 690 V
- 1 connection for voltage sensing via voltage transformers; maximum voltage 100 V
- 2 analog inputs (reserved for monitoring of resonance in the Active Interface Module in chassis format)
- 1 temperature sensor input for KTY84-130, Pt1000 or PTC (Pt1000 can be used from firmware V4.7 HF17)
- 1 DRIVE-CLiQ socket
- 1 connection for the electronics power supply via the 24 V DC power supply connector
- 1 plug-in jumper for either grounded (delivery state) or isolated measurement
- 1 PE (protective earth) connection

The status of the VSM10 Voltage Sensing Modules is indicated via a multi-color LED.

The VSM10 Voltage Sensing Module can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

Selection and ordering data

Description	Article No.
VSM10 Voltage Sensing Module Without DRIVE-CLiQ cable	**6SL3053-0AA00-3AA1**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

For the SINAMICS G150, SINAMICS S150 and SINAMICS S120 Cabinet Modules, the VSM10 Voltage Sensing Module can be ordered as an option by specifying order code **K51** in order to implement the flying restart function and for SINAMICS S220 Cabinet Modules as an option by specifying order code **K53**.

Technical specifications

	VSM10 **Voltage Sensing Module** 6SL3053-0AA00-3AA1
Current requirement, max. at 24 V DC	0.2 A
• Conductor cross-section, max.	2.5 mm^2
Power loss, max.	10 W
Line voltage detection	
• Insulation resistance neutral point – ground when jumper is not inserted	>10 MΩ
• Input resistance	
- Terminal X521	>362 kΩ/phase
- Terminal X522	>2.5 MΩ/phase
Analog inputs (reserved for monitoring an Active Interface Module in chassis format)	
• Internal resistance, approx. (between differential inputs)	100 kΩ
• Resolution	12 bits + sign
PE connection	M4 screw
Dimensions	
• Width	50 mm (1.97 in)
• Height	151 mm (5.94 in)
• Depth	110 mm (4.33 in)
Weight, approx.	1 kg (2.21 lb)
Certificate of suitability	cULus

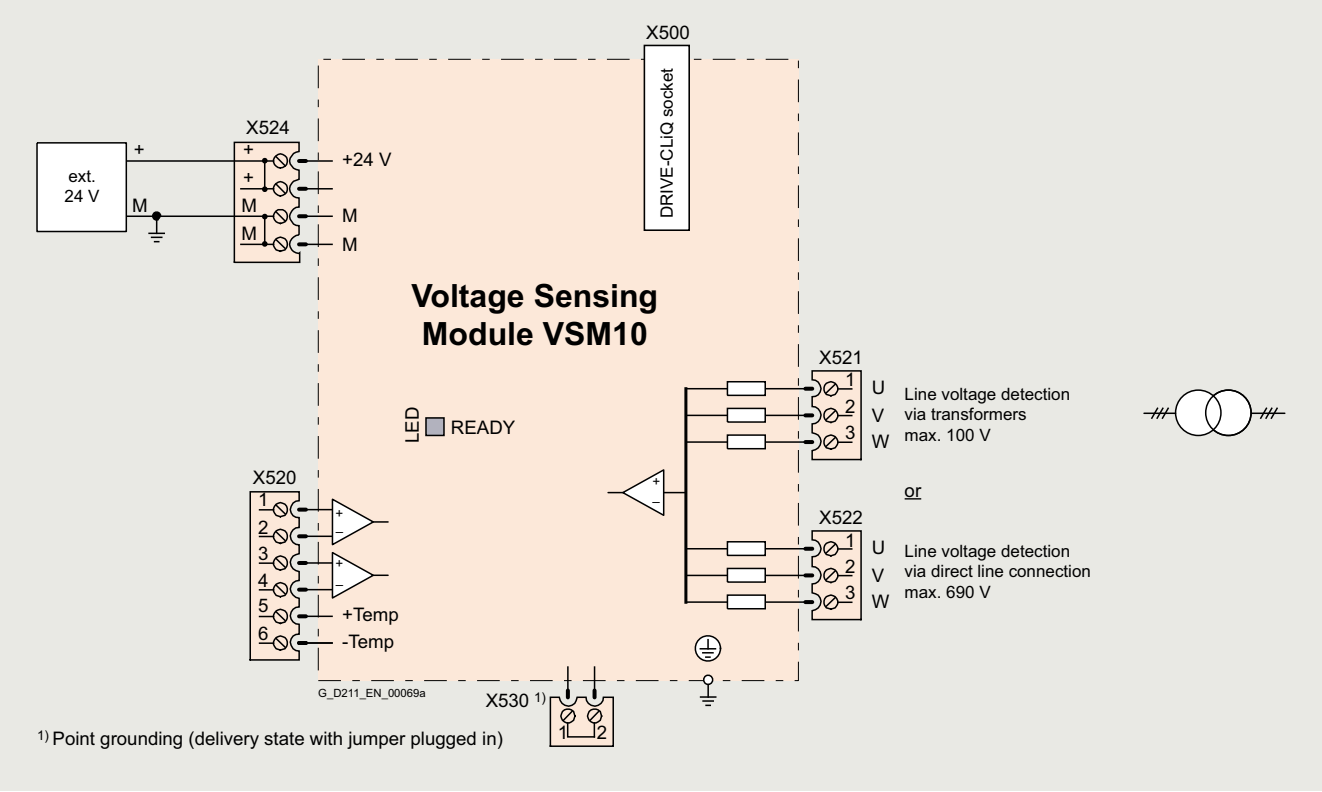
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Integration

The VSM10 Voltage Sensing Module can communicate with the following Control Units via DRIVE-CLiQ:

- CU310-2 Control Unit
- CU320-2 Control Unit
- SINUMERIK Control Unit

On the SINAMICS S120 and SINAMICS S220 chassis format, the VSM10 Voltage Sensing Module is integrated in the Active Interface Modules and Smart Line Modules.



Connection example of VSM10 Voltage Sensing Module

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Overview



SBA Safe Brake Adapter

The SBA Safe Brake Adapter is needed for the implementation of a safe brake control (Safety Integrated function SBC) in accordance with IEC 61800-5-2.

The Safe Brake Adapter is available for a 230 V AC brake control voltage.

Note:
The SBA is approved for the IEC area. Safe Brake Adapter with UL approval are available on request. The UL approval is valid for a maximum permissible current consumption of 1.5 A (inductive).

Design

The Safe Brake Adapter SBA has the following connections and interfaces:

- 1 connection for the connecting cable to the Power Module/Motor Module
- 1 connection for the external 230 V AC supply
- 1 connection for motor holding brake
- 1 connection for fast de-excitation

The SBA Safe Brake Adapter is designed for attachment to a support rail in accordance with EN 60715.

Selection and ordering data

Description	Article No.
SBA Safe Brake Adapter 230 V AC/2 A	**6SL3355-2DX00-1AA0**
Accessories	
Connecting cable Pre-assembled interface cable to connect the SBA to the electronics module Control Interface Module in the Motor Module/Power Module (4 m)	**6SL3060-4DX04-0AA0**

Technical specifications

	SBA Safe Brake Adapter 6SL3355-2DX00-1AA0
Electronics power supply	
• Supply voltage (via the Control Interface Module)	24 V DC (20.4 … 28.8 V DC)
Supply voltage of the motor holding brake	230 V AC
Current consumption, max. permitted [1]	
• Motor holding brake	2 A
• Fast de-excitation	2 A
Cable length, max.	
• to the Control Interface Module	10 m (32.8 ft)
• to the brake	300 m (984 ft)
Conductor cross-section, max., respectively	2.5 mm^2
Dimensions	
• Width	75 mm (2.95 in)
• Height	111 mm (4.37 in)
• Depth	89 mm (3.50 in)
Weight, approx.	0.25 kg (0.55 lb)
Safety Integrated	According to IEC 61508 SIL2 and ISO 13849-1 PLd and Category 3

[1] The UL approval is valid for a maximum permissible current consumption of 1.5 A (inductive).

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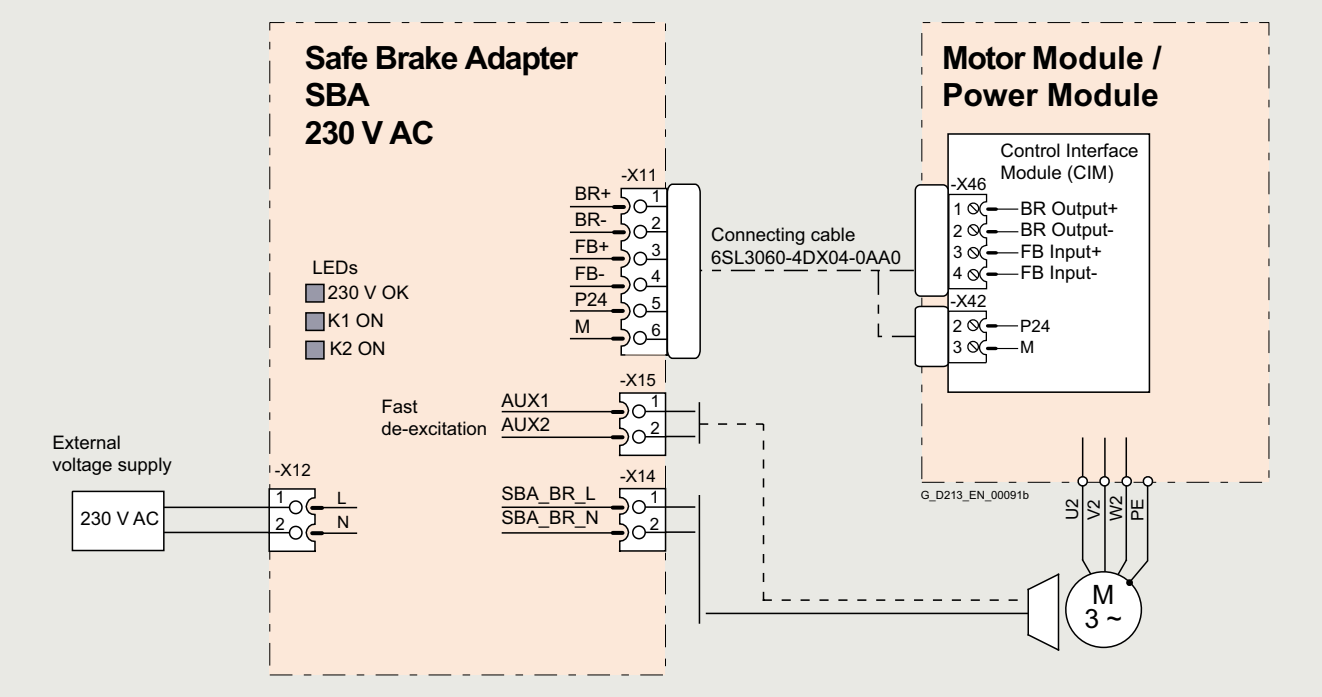
Integration

The control and feedback signal regarding the switching state of the SBA relay is realized via terminals of the Control Interface Module (CIM) in the Motor Module/Power Module. The excitation coil of the holding brake is connected directly at the SBA.

The SBA can be ordered as an additional component for SINAMICS S120 built-in units in chassis format.

It is available as option (**K88**) for SINAMICS S150 and S120 Cabinet Modules.

For the SINAMICS S120 units, chassis format, the brake supply voltage must be connected externally at the SBA.

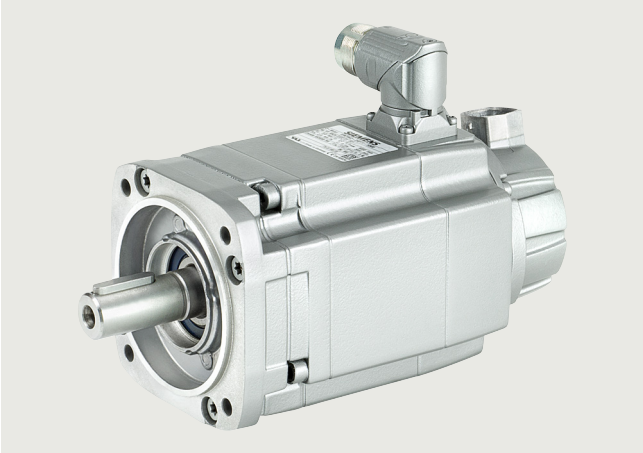


Connection example for the SBA Safe Brake Adapter

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Overview

Motors with DRIVE-CLiQ interface



DRIVE-CLiQ is the preferred method for connecting the encoder systems to SINAMICS S120 or SINAMICS S220.

Motors with DRIVE-CLiQ interface are available for this purpose, e.g.

- SIMOTICS M-1PH8 and SIMOTICS S-1FT7/1FT2 synchronous motors
- SIMOTICS M-1PH8 asynchronous motors (induction motors)
- SIMOTICS T-1FW3 torque motors

Motors with a DRIVE-CLiQ interface can be directly connected to the SINAMICS S120 and SINAMICS S220 drive systems to the associated Motor Module using MOTION-CONNECT DRIVE-CLiQ cables. The MOTION-CONNECT DRIVE-CLiQ cable connection at the motor has degree of protection IP67.

The DRIVE-CLiQ interface supplies the motor encoder via the integrated 24 V DC supply and transfers the motor encoder and temperature signals and the electronic rating plate data, e.g. a unique identification number and rated data (voltage, current, torque) to the Control Unit. This means that for the various encoder types different encoder cables with varying permissible lengths are no longer required; just one cable type, MOTION-CONNECT DRIVE-CLiQ with varying permissible lengths, can be used for all encoders.

These motors simplify commissioning and diagnostics, as the motor and encoder type are identified automatically.

Motors without DRIVE-CLiQ interface

The encoder and temperature signals of motors without DRIVE-CLiQ interface, as well as those of external encoders, must be connected via Sensor Modules. Sensor Modules Cabinet-Mounted are available in degree of protection IP20 for control cabinet installation, as well as Sensor Modules External-Mounted in degree of protection IP67.

Only one encoder system can be connected to each Sensor Module.

More information

Motor encoder and temperature signals must be connected when possible to the corresponding Motor Module or Power Module and external encoders to the Control Unit. However, the DRIVE-CLiQ connections can also be bundled via DRIVE-CLiQ Hub Modules.

Safety Integrated

The Safety Integrated extended functions of the SINAMICS drive system require suitable encoders (see SIMOTICS servomotors section).

Motors driving a load via a belt

Unfavorable material combinations generate static electricity between the belt pulley and the belt. Electrostatic charging must be prevented, since this can discharge via the motor shaft and the encoder, thereby causing disturbances in the encoder signals. One countermeasure is to manufacture belts out of an antistatic material, for example.

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Overview



SMC10 Sensor Module Cabinet-Mounted

The SMC10 Sensor Module Cabinet-Mounted is required to evaluate the encoder signals of motors without a DRIVE-CLiQ interface. External encoders can also be connected via the SMC10.

The following encoder signals can be evaluated:

- 2-pole resolver
- Multi-pole resolver

Design

The SMC10 Sensor Module Cabinet-Mounted features the following connections and interfaces as standard:

- 1 encoder connection including motor temperature sensing (KTY84-130, Pt1000 or PTC) via SUB-D connector
- 1 DRIVE-CLiQ interface
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE/protective conductor connection

The status of the SMC10 Sensor Module Cabinet-Mounted is indicated via a multi-color LED.

The SMC10 Sensor Module Cabinet-Mounted can be snapped onto a TH 35 standard mounting rail according to EN 60715 (IEC 60715).

The signal cable shield is connected via the encoder system connector and can also be connected to the SMC10 Sensor Module Cabinet-Mounted via a shield connection terminal, e.g. Phoenix Contact type SK8 or Weidmüller type KLBÜ CO 1. The shield connection terminal must not be used as a strain relief mechanism.

Integration

SMC10 Sensor Modules Cabinet-Mounted communicate via DRIVE-CLiQ with selected devices e.g.
SINAMICS S120/S150/S220 Control Units and SINAMICS G220 converters (from firmware V6.4) with OM-DQ Option Module DRIVE-CLiQ.

Selection and ordering data

Description	Article No.
SMC10 Sensor Module Cabinet-Mounted Without DRIVE-CLiQ cable	**6SL3055-0AA00-5AA3**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

For the SINAMICS S150, SINAMICS S120 and SINAMICS S220 Cabinet Modules, the SMC10 Sensor Module Cabinet-Mounted can be ordered as an option by specifying order code **K46**.

Technical specifications

	SMC10 Sensor Module Cabinet-Mounted 6SL3055-0AA00-5AA3
Current requirement, max. at 24 V DC, without taking encoder into account	0.2 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Power loss, max.	10 W
Encoders which can be evaluated	• 2-pole resolver • Multi-pole resolver
• Excitation voltage, rms	4.1 V
• Excitation frequency	5 ... 16 kHz depending on the current controller clock cycle of the Motor Module or Power Module
• Transformation ratio	0.5
• Encoder frequency, max.	2 kHz (120000 r/min) depending on the number of resolver pole pairs and current controller clock cycle of the Motor Module or Power Module
• Signal subdivision (interpolation), max.	16384 times (14 bits)
• Cable length to encoder, max.	130 m (427 ft)
PE connection	M4 screw
Dimensions	
• Width	30 mm (1.18 in)
• Height	150 mm (5.91 in)
• Depth	111 mm (4.37 in)
Weight, approx.	0.45 kg (0.99 lb)
Certificate of suitability	cULus

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Overview



SMC20 Sensor Module Cabinet-Mounted

The SMC20 Sensor Module Cabinet-Mounted is required to evaluate the encoder signals of motors without a DRIVE-CLiQ interface. External encoders can also be connected via the SMC20.

The following encoder signals can be evaluated:

- Incremental encoder sin/cos 1 V_{pp}
- Absolute encoder EnDat 2.1
- SSI encoder with incremental signals sin/cos 1 V_{pp} (firmware version 2.4 and later)

The motor temperature can also be sensed using a PTC thermistor KTY84-130, Pt1000 or PTC.

Design

The SMC20 Sensor Module Cabinet-Mounted features the following connections and interfaces as standard:

- 1 encoder connection including motor temperature sensing (KTY84-130, Pt1000 or PTC) via SUB-D connector
- 1 DRIVE-CLiQ interface
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE/protective conductor connection

The status of the SMC20 Sensor Module Cabinet-Mounted is indicated via a multi-color LED.

The SMC20 Sensor Module Cabinet-Mounted can be snapped onto a TH 35 standard mounting rail according to EN 60715 (IEC 60715).

The signal cable shield is connected via the encoder system connector and can also be connected to the SMC20 Sensor Module Cabinet-Mounted via a shield connection terminal, e.g. Phoenix Contact type SK8 or Weidmüller type KLBÜ CO 1. The shield connection terminal must not be used as a strain relief mechanism.

Integration

SMC20 Sensor Modules Cabinet-Mounted communicate via DRIVE-CLiQ with selected devices e.g. SINAMICS S120/S150/S220 Control Units and SINAMICS G220 converters with OM-DQ Option Module DRIVE-CLiQ.

Selection and ordering data

Description	Article No.
SMC20 Sensor Module Cabinet-Mounted Without DRIVE-CLiQ cable	**6SL3055-0AA00-5BA3**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

For the SINAMICS S150, SINAMICS S120 and SINAMICS S220 Cabinet Modules, the SMC20 Sensor Module Cabinet-Mounted can be ordered as an option by specifying order code **K48**.

Technical specifications

	SMC20 Sensor Module Cabinet-Mounted 6SL3055-0AA00-5BA3
Power requirement, max. at 24 V DC, without taking encoder into account	0.2 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Power loss, max.	10 W
Encoders which can be evaluated	• Incremental encoder sin/cos 1 V_{pp} • Absolute encoder EnDat 2.1 • SSI encoder with incremental signals sin/cos 1 V_{pp} (firmware version 2.4 and ater)
• Encoder supply	5 V DC/0.35 A
• Encoder frequency incremental signals, max.	500 kHz
• Signal subdivision (interpolation), max.	16384 times (14 bits)
• SSI baud rate	100 ... 1000 kBaud
• Cable length to encoder, max.	100 m (328 ft)
PE connection	M4 screw
Dimensions	
• Width	30 mm (1.18 in)
• Height	150 mm (5.91 in)
• Depth	111 mm (4.37 in)
Weight, approx.	0.45 kg (0.99 lb)
Certificate of suitability	cULus

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Overview



SMC30 Sensor Module Cabinet-Mounted

The SMC30 Sensor Module Cabinet-Mounted is required to evaluate the encoder signals of motors without a DRIVE-CLiQ interface. External encoders can also be connected via the SMC30.

The following encoder signals can be evaluated:

- Incremental encoders TTL/HTL with/without open-circuit detection (open-circuit detection is only available with bipolar signals)
- SSI encoder with TTL/HTL incremental signals
- SSI encoder without incremental signals

The motor temperature can also be sensed using a PTC thermistor KTY84-130, Pt1000 or PTC.

Design

The SMC30 Sensor Module Cabinet-Mounted features the following connections and interfaces as standard:

- 1 encoder connection including motor temperature sensing (KTY84-130, Pt1000 or PTC) either via SUB-D connector or via terminals
- 1 DRIVE-CLiQ interface
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE/protective conductor connection

The status of the SMC30 Sensor Module Cabinet-Mounted is indicated via a multi-color LED.

The SMC30 Sensor Module Cabinet-Mounted can be snapped onto a TH 35 standard mounting rail in according to EN 60715 (IEC 60715).

The maximum encoder cable length between SMC30 modules and encoders is 100 m. For HTL encoders, this length can be increased to 300 m if the A+/A- and B+/B- signals are evaluated and the power supply cable has a minimum cross-section of 0.5 mm^2.

The signal cable shield can be connected to the SMC30 Sensor Module Cabinet-Mounted via a shield connection terminal, e.g., Phoenix Contact type SK8 or Weidmüller type KLBÜ CO 1. The shield connection terminal must not be used as a strain relief mechanism.

Integration

SMC30 Sensor Modules Cabinet-Mounted communicate via DRIVE-CLiQ with selected devices e.g.
SINAMICS S120/S150/S220 Control Units and SINAMICS G220 converters with OM-DQ Option Module DRIVE-CLiQ.

Selection and ordering data

Description	Article No.
SMC30 Sensor Module Cabinet-Mounted Without DRIVE-CLiQ cable	**6SL3055-0AA00-5CA2**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

For the SINAMICS S150, SINAMICS S120 and SINAMICS S220 Cabinet Modules, the SMC30 Sensor Module Cabinet-Mounted can be ordered as an option by specifying order code **K50** or for SINAMICS S220 Cabinet Module as an option with the order code **K51**.

A second SMC30 can be ordered as an option with the order code **K52** for reliable actual value acquisition when using the Safety Integrated Extended Functions.

Technical specifications

	SMC30 Sensor Module Cabinet-Mounted 6SL3055-0AA00-5CA2
Current requirement, max. at 24 V DC, without taking encoder into account	0.2 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Power loss, max.	10 W
Encoders which can be evaluated	• Incremental encoder TTL/HTL • SSI encoder with TTL/HTL incremental signals • SSI encoder without incremental signals
• Input current range TTL/HTL	4 ... 20 mA (typ. 10 mA)
• Encoder supply	24 V DC/0.35 A or 5 V DC/0.35 A
• Encoder frequency, max.	500 kHz
• SSI baud rate	100 ... 1000 kBaud
• Resolution absolute position SSI	30 bits
• Cable length, max.	
- TTL encoder	100 m (328 ft) (only bipolar signals permitted)[2]
- HTL encoder	100 m (328 ft) for unipolar signals 300 m (984 ft) for bipolar signals[2]
- SSI encoder	100 m (328 ft)
PE connection	M4 screw
Dimensions	
• Width	30 mm (1.18 in)
• Height	150 mm (5.91 in)
• Depth	111 mm (4.37 in)
Weight, approx.	0.45 kg (0.99 lb)
Certificate of suitability	cULus

[1] Signal cables twisted in pairs and shielded.

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Overview



SME20/SME25 Sensor Module External

SME20/SME25 Sensor Modules External are encoder evaluation units for machine encoders (direct measuring systems).
The devices are designed with IP67 degree of protection. This means that the units can be installed outside the control cabinet near the machine encoder.

The following encoder signals can be evaluated:

- Incremental encoder sin/cos 1 V_{pp} without rotor position track (C and D tracks)
- Absolute encoder EnDat 2.1
- SSI absolute encoder [1] with incremental signals sin/cos 1 V_{pp} (firmware V2.4 and later)

Using adapter cable 6FX8002-2CA88-..., it is possible to connect a motor with a 17-pole circular encoder connector to the 12-pole circular connector of the SME20.

- KTY/Pt1000/PTC temperature sensors can be used to evaluate the motor temperature (only possible with SME20).
- The Sensor Module is only suitable for motors without absolute track signals (C and D tracks), e.g.:
  - Synchronous motors with pole position identification (SIMOTICS L-1FN/T-1FW/M-1FE)
  - Asynchronous motors (induction motors) (SIMOTICS M-1PH)

SME20/SME25 Sensor Modules External evaluate the encoder signals and convert the information obtained to DRIVE-CLiQ. Neither motor nor encoder data are saved in the SME20/SME25.

Design

SME20/SME25 Sensor Modules External feature the following connections and interfaces as standard:

- 1 encoder connector via circular plug
- 1 DRIVE-CLiQ interface with integrated 24 V DC electronics power supply from the Control Unit or Motor Module
- 1 PE (protective earth) connection

Integration

SME20/SME25 Sensor Modules External communicate with a Control Unit via DRIVE-CLiQ.

Selection and ordering data

Description	Article No.
SME20 Sensor Module External For incremental measuring systems Without DRIVE-CLiQ cable	**6SL3055-0AA00-5EA3**
SME25 Sensor Module External For absolute measuring systems Without DRIVE-CLiQ cable	**6SL3055-0AA00-5HA3**
Accessories	
Adapter cable [2] For SME20, for connecting motors with 17-pole encoder connector, with encoders, without C and D tracks	**6FX8002-2CA88-....**

[1] For SME25, only encoders with 5 V supply voltage.

[2] For length code, see section MOTION-CONNECT connection systems.

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Technical specifications

		SME20 Sensor Module External 6SL3055-0AA00-5EA3	SME25 Sensor Module External 6SL3055-0AA00-5HA3
Encoder		• Incremental encoder sin/cos 1 V_{pp} with 5 V power supply 0.35 A	• Absolute encoder EnDat 2.1 with 5 V voltage supply 0.35 A • Absolute encoder SSI with incremental signals sin/cos 1 V_{pp} with 5 V voltage supply 0.35 A
Signal subdivision (interpolation)		≤16384 × (14 bits)	≤16384 × (14 bits)
Max. encoder frequency that can be evaluated	kHz	≤500	≤500
SSI/EnDat 2.1 baud rate	kHz	–	100
Measuring system interface		12-pin M23 circular connector	17-pin M23 circular connector
Outlet		IP67 DRIVE-CLiQ connector	IP67 DRIVE-CLiQ connector
Current requirement, max. At 24 V DC, not taking encoder into account	A	0.11	0.11
• Conductor cross-section		Acc. to connector contacts	Acc. to connector contacts
• Protection		Via DRIVE-CLiQ power supply source	Via DRIVE-CLiQ power supply source
Power loss, max.	W	4	4
PE connection		M4 screw/1.8 Nm	M4 screw/1.8 Nm
Cable length, max.			
• To measuring system [1]	m (ft)	3 (9.84)	3 (9.84)
• To automatic speed control	m (ft)	100 (328)	100 (328)
Degree of protection		IP67	IP67
Dimensions			
• Width	mm (in)	58 (2.28)	58 (2.28)
• Height	mm (in)	44 (1.73)	44 (1.73)
• Depth	mm (in)	112 (4.41)	112 (4.41)
Weight, approx.	kg (lb)	0.31 (0.68)	0.31 (0.68)
Certificate of suitability		cULus	cULus

[1] The maximum cable length at the encoder system interface depends on the current drawn by the encoder system and the cross-section of the supply conductors in the cable, however, a maximum of 30 m (98.4 ft) (for detailed information, see Manual SINAMICS S120/S220 Control Units).

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Overview



SME120/SME125 Sensor Module External

The SME120/SME125 Sensor Modules External are encoder evaluation units with degree of protection IP67, especially suitable for use in linear and torque motor applications. They can be installed close to the motor systems and encoders in the machine.

Sensor Modules External evaluate the encoder signals and motor temperature sensors specifically and convert the information obtained for DRIVE-CLiQ. The motor temperature signals are safely electrically separated.

Neither motor nor encoder data are saved in the SME120/SME125.

The SME120 and SME125 can be operated on Control Units with firmware release V2.4 and later.

The following encoder signals can be evaluated depending on the type of Sensor Module:

- Incremental encoder sin/cos 1 V_{pp}
- Absolute encoder EnDat 2.1
- SSI absolute encoder [1] with sin/cos 1 V_{pp} incremental signals, but without reference signal

The motor temperature can also be sensed using a PTC thermistor KTY84-130, Pt1000 or PTC.

Design

SME120/SME125 Sensor Modules External feature the following connections and interfaces as standard:

- 1 encoder connection via circular connector
- 1 temperature sensor connection via circular connector
- 1 Hall-effect sensor connection via circular connector (SME120 only)
- 1 DRIVE-CLiQ interface with integrated 24 V DC electronics power supply from the Control Unit or Motor Module
- 1 PE (protective earth) connection

Selection and ordering data

Description	Article No.
SME120 Sensor Module External For incremental measuring systems Without DRIVE-CLiQ cable	**6SL3055-0AA00-5JA3**
SME125 Sensor Module External For absolute measuring systems Without DRIVE-CLiQ cable	**6SL3055-0AA00-5KA3**
Accessories	
Connector for temperature sensor input (connector kits, 6+1-pole)	**6FX2003-0SU07**
Connector for Hall sensor input (connector kits, 9-pole)	**6FX2003-0SU01**
Connector for SME120 encoder system interface (connector kits, 12-pole)	**6FX2003-0SA12**
Connector for SME125 encoder system interface (connector kits, 17-pole)	**6FX2003-0SA17**

[1] For SME125, only SSI encoders with 5 V supply voltage.

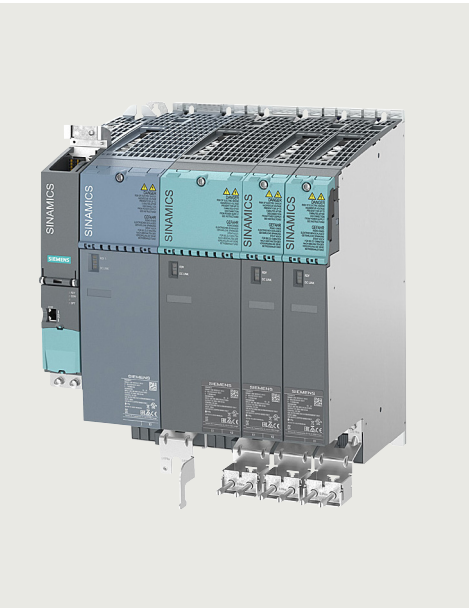
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Technical specifications

		SME120 Sensor Module External 6SL3055-0AA00-5JA3	SME125 Sensor Module External 6SL3055-0AA00-5KA3
Encoder		• Incremental encoder sin/cos 1 V_{pp} with 5 V power supply	• Absolute encoder EnDat 2.1 with 5 V voltage supply • Absolute encoder SSI with incremental signals sin/cos 1 V_{pp} with 5-V voltage supply
Signal subdivision (interpolation)		≤16384 × (14 bits)	≤16384 × (14 bits)
Max. encoder frequency that can be evaluated	kHz	≤500	≤500
SSI/EnDat 2.1 baud rate	kHz	–	100
Measuring system interface		12-pin M23 circular connector	17-pin M23 circular connector
Temperature sensor input		6-pin M17 circular connector	6-pin M17 circular connector
Hall-effect sensor input		9-pin M23 circular connector	–
Output		IP67 DRIVE-CLiQ connector	IP67 DRIVE-CLiQ connector
Current requirement, max. at 24 V DC, without taking encoder into account	A	0.16	0.16
• Current carrying capacity of the encoder supply, for measuring system (at 5 V DC)	A	0.35	0.35
• Conductor cross-section		Acc. to connector contacts	Acc. to connector contacts
• Protection		Via DRIVE-CLiQ power supply source	Via DRIVE-CLiQ power supply source
Power loss, max.	W	4.5	4.5
PE connection		M4 screw/1.8 Nm	M4 screw/1.8 Nm
Cable length, max.			
• To measuring system [1]/temperature sensor	m (ft)	3 (9.84)	3 (9.84)
• To automatic speed control	m (ft)	100 (328)	100 (328)
Degree of protection		IP67	IP67
Dimensions			
• Width	mm (in)	117.6 (4.63)	117.6 (4.63)
• Height	mm (in)	43.1 (1.70)	43.1 (1.70)
• Depth	mm (in)	127 (5.00)	127 (5.00)
Weight, approx.	kg (lb)	0.7 (1.54)	0.7 (1.54)
Certificate of suitability		cULus	cULus

[1] The maximum cable length at the encoder system interface depends on the current drawn by the encoder system and the cross-section of the supply conductors in the cable, however, a maximum of 30 m (98.4 ft) (for detailed information, see Manual SINAMICS S120/S220 Control Units).

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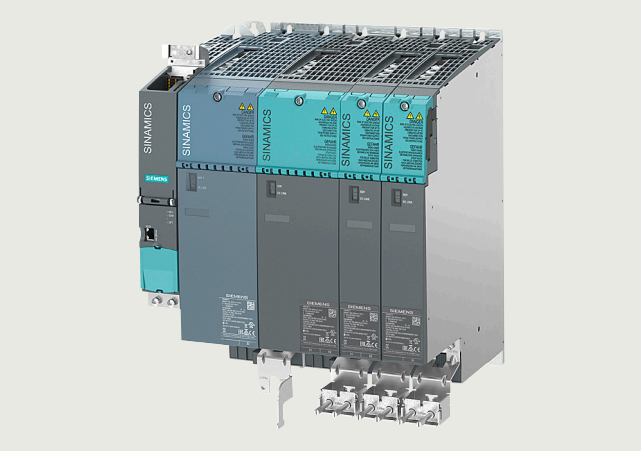


7.2/2 Booksize format
7.2/2 Introduction
7.2/4 Smart Line Modules in booksize format
7.2/11 Line reactors for Smart Line Modules
7.2/13 Line filters for Smart Line Modules
7.2/14 Recommended line-side components for Smart Line Modules
7.2/15 Single Motor Modules in booksize format
7.2/30 Double Motor Modules in booksize format
7.2/39 Motor reactors for booksize format

Compatible components SINAMICS S120 drive system
7.1/96 Braking Module in booksize format
7.1/98 Braking resistors for booksize format
7.1/100 Capacitor Module in booksize format
7.1/101 Control Supply Module in booksize format
7.1/103 DC link adapters for booksize and booksize compact formats

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Overview



SINAMICS S220 Smart Line Module between Control Unit CU320-2 and SINAMICS S220 Motor Modules, in booksize format

With SINAMICS S120 booksize format, Siemens is one of the world's leading suppliers of drive solutions for machine tools/production machines and General Motion Control applications. Used in a wide variety of areas, industries and applications, Siemens delivers outstanding customer benefits and industry know-how with SINAMICS S120.

The requirements that drive solutions need to meet are continually changing and increasing. Machine solutions need to be perfectly tailored to one another, offer the highest level of functionality and quality, while being economic and simple to implement across the board.

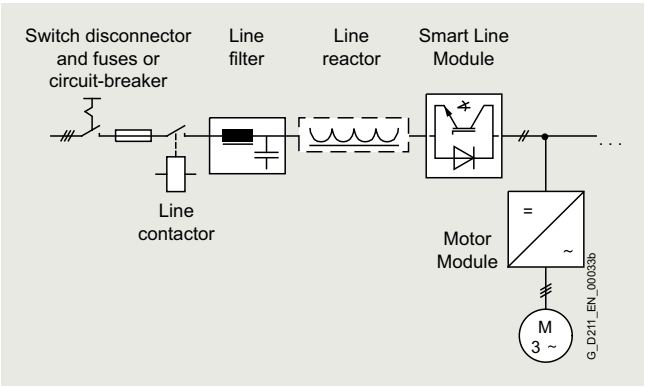
With SINAMICS S220 booksize format, Siemens is enhancing the proven SINAMICS S120 series with considerably more powerful functions and exceptionally compact modules and is providing answers to future requirements.
SINAMICS S220 is the reliable, robust, and innovative high-performance solution that meets all the requirements for IoT and industrial security.

SINAMICS S220 Smart Line Modules and Motor Modules are the first steps in innovating the proven SINAMICS S120 range. Smart Line Modules and Motor Modules are an integral part of the SINAMICS S220 in booksize format and are characterized by the highest level of performance, maximum flexibility, high degree of user-friendliness and being fit for digitalization. They are available in two versions (C and D type). Their higher power density, greater overload capability, and precise dimensioning mean that economical machine solutions can be implemented. SINAMICS S220 Motor Modules are distinguished by their extremely compact design. The module width has been reduced by up to 50 %, significantly reducing the space required in the control cabinet and in turn reducing costs. Extra slim Motor Modules are also available and allow users to select the exact modules for their application.
Thanks to their innovative mechanical design, Smart Line Modules and Motor Modules are simple and reliable to install and extremely robust.

Operation of SINAMICS S220 Smart Line Modules and Motor Modules is possible with a CU320-2 Control Unit (as of SINAMICS firmware V5.2 SP3 HF10).

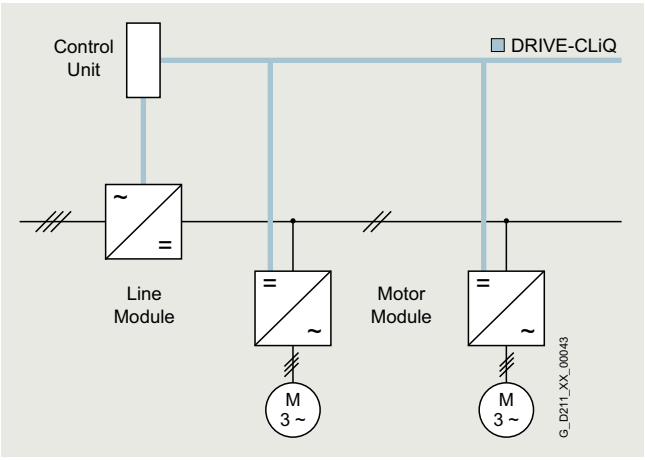
Smart Line Modules

Smart Line Modules can supply energy and return regenerative energy to the supply system. A Braking Module and braking resistor are required only if the drives need to be decelerated in a controlled manner after a power failure (i.e. when energy cannot be recovered to the supply). When a Smart Line Module is used as the infeed, the matching line reactor must be installed. A line filter can be optionally installed in order to ensure compliance with the limits stipulated for Category C2 in EN 61800-3.



Motor Modules

A voltage DC link and an inverter for supplying a motor are integrated in the Motor Module.



A Motor Module (available as a Single Motor Module and Double Motor Module) is a power unit (inverter). It generates a variable voltage with variable frequency from the DC link voltage that feeds the connected motor(s).

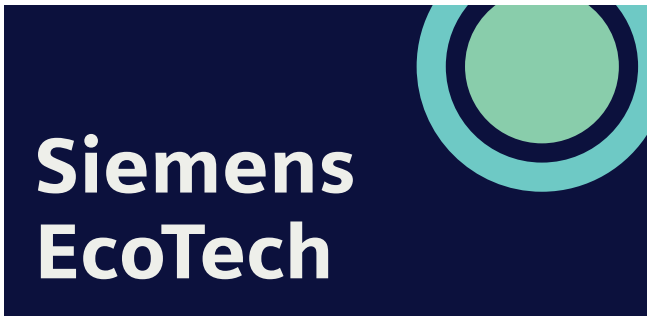
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Overview

Siemens EcoTech Profile (SEP) for SINAMICS S220 Booksize Motor Modules

Siemens introduces a new label: Siemens EcoTech. It is an environmental declaration for products based on product-specific evaluations of sustainability relevant KPIs.
To provide maximum transparency, the Siemens EcoTech Profile (SEP) were created for all Siemens EcoTech products.
It is a Siemens-created, standardized product data sheet which gives insight about the product performance in environmental relevant criteria as well as about interpretation and comparison of data against an existing norm, standard or predecessor product.

You can find more information on the internet at:
https://sieportal.siemens.com/su/blQ8i
www.siemens.com/SiemensEcoTech



Drive dimensioning in the TIA Selection Tool

Application-specific requirements can be determined using drive technology dimensioning in the TIA Selection Tool. This can include motors, gearboxes and converters. The tool supports the configuration and dimensioning of control functions with an open and closed control loop. The technical documentation with features of the technical drive system, as well as a product list for ordering via SiePortal can also be compiled.

You can find more information about the TIA Selection Tool at
www.siemens.com/tia-selection-tool

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Smart Line Modules in booksize format

Overview



SINAMICS S220 Smart Line Module, in booksize format

Smart Line Modules are stall-protected, line-commutated infeed/regenerative feedback units (diode bridge for incoming supply; stall-protected, line-commutated regenerative feedback via IGBTs) with 100 % continuous regenerative feedback power. The regenerative capability of the modules can be deactivated by means of parameterization. Smart Line Modules are designed for connection to grounded TN/TT and non-grounded IT supply systems.

- C type: Optimized for continuous load with up to 200 % overload (continuous motion)
- D type: Optimized for highly dynamic, intermittent duty cycles with up to 300 % overload (discontinuous motion)

The DC link is pre-charged via integrated precharging resistors.

The associated line reactor is mandatory required for operating a Smart Line Module.

Design

The Smart Line Modules in booksize format feature the following connections and interfaces as standard:

- 1 power connection via screw-type or push-in terminals (not included in the scope of supply for Smart Line Modules 16 kW to 24 kW)
  The power connection of 36 kW and 55 kW Smart Line Modules is made via screw studs.
- 1 connection for the 24V DC electronics power supply via the 24 V terminal adapter included in the scope of supply
- 1 DC link connection via integrated DC link busbars
- 2 PE (protective earth) connections
- 3 DRIVE-CLiQ sockets
- 1 temperature sensor input for KTY84-130, Pt1000 or PTC (Pt1000 can be used from firmware V4.7 HF17)

The status of the Smart Line Modules is indicated via two multi-color LEDs.

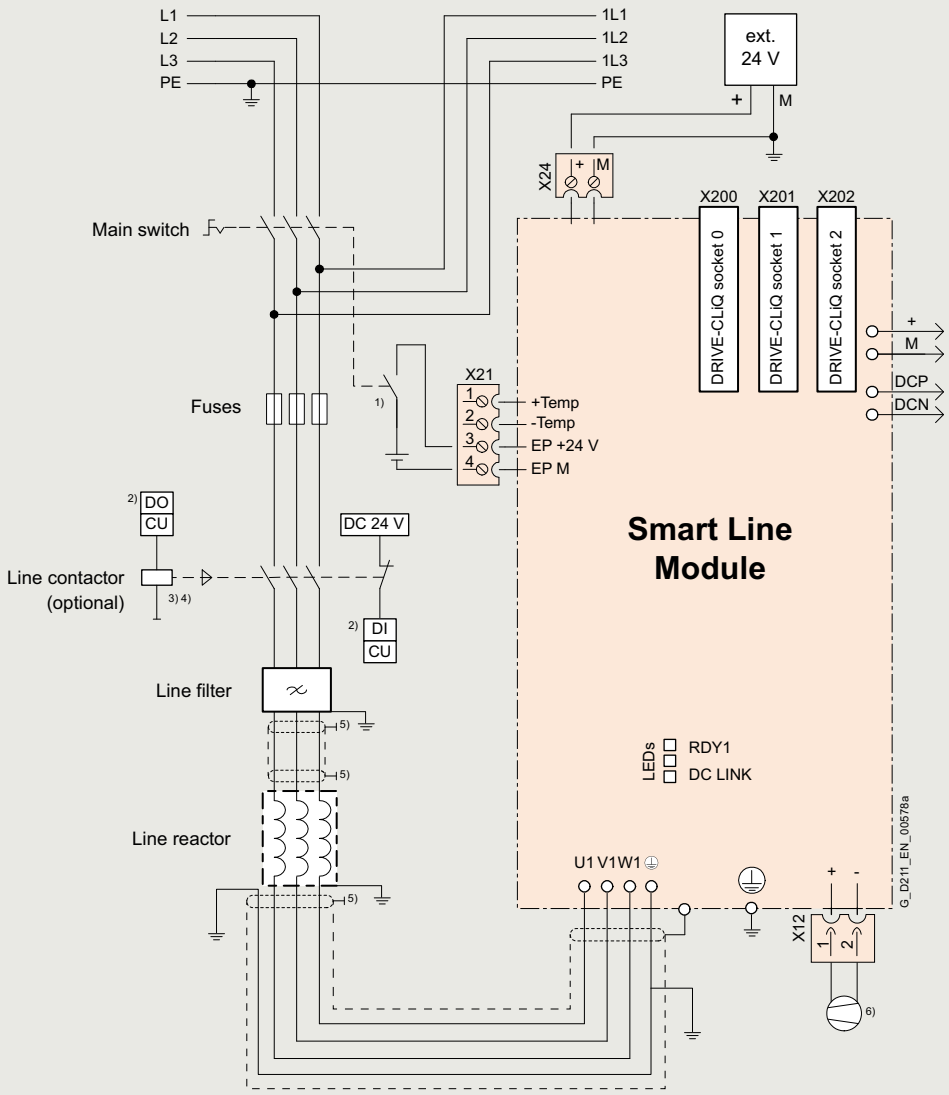
The signal cable shield can be connected to the Line Module by means of a shield terminal, e.g. Weidmüller type KLBÜ 3-8 SC.

The scope of supply of the Smart Line Modules includes:

- DRIVE-CLiQ cable for connection to the adjacent Control Unit on the left for drive control, length 0.11 m
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- DRIVE-CLiQ cable (length depends on Smart Line Module width) for connection to the adjacent Motor Module, length = width of Smart Line Module + 0.11 m
- Jumper plug for connecting the 24 V DC busbar to the adjacent Motor Module
- 24 V terminal adapter (X24)
- Connector X21 for digital inputs and outputs
- 1 set of warning labels in 36 languages

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Integration



[1] Leading NC contact *t* >10 ms. When using a VSM10, the leading NC contact can be omitted.
[2] DI/DO, controlled by the Control Unit.
[3] No additional load permitted downstream of the line contactor.
[4] The current carrying capacity of the digital output must be taken into account. An output interface element may have to be used.
[5] Contacting via rear panel or shield panels according to EMC Installation Guidelines.
[6] Fan connection for Smart Line Modules 36 kW and 55 kW.

Connection example of Smart Line Modules in booksize format

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Smart Line Modules in booksize format

Selection and ordering data

Rated power at 380 V kW	Maximum power at 380 V kW	C/D type	**Smart Line Module in booksize format** Article No.
Line voltage 380 ... 480 V 3 AC			
16	35	C type	**6SL5130-6UE21-6AC1**
	48	D type	**6SL5130-6UE21-6AD1**
24	48	C type	**6SL5130-6UE22-4AC1**
	72	D type	**6SL5130-6UE22-4AD1**
36	72	C type	**6SL5130-6UE23-6AC1**
	108	D type	**6SL5130-6UE23-6AD1**
55	110	C type	**6SL5130-6UE25-5AC1**
	165	D type	**6SL5130-6UE25-5AD1**

Description	Article No.
Accessories	
Shield connection plate For Smart Line Modules in booksize format with a width of	
• 100 mm (3.94 in)	**6SL5166-1BD00-0AA0**
• 150 mm (5.91 in)	**6SL5166-1AF00-0AA0**
Shield terminal For shield connection on the shield connection plate	
• Diameter 3 ... 20 mm (0.12 ... 0.79 in)	**8WH9130-0NA00**
• Diameter 20 ... 35 mm (0.79 ... 1.38 in)	**8WH9130-0PA00**
DC link rectifier adapter For direct infeed of DC link voltage	
• Screw-type terminals 0.5 ... 10 mm^2 For Line Modules and Motor Modules in booksize format with a width of 50 mm, 75 mm and 100 mm (1.97 in, 2.95 in and 3.94 in)	**6SL3162-2BD00-0AA0**
• Screw-type terminals 10 ... 35 mm^2 For Line Modules and Motor Modules in booksize format with a width of 100 mm, 150 mm, 200 mm and 300 mm (3.94 in, 5.91 in, 7.87 in and 11.81 in)	**6SL3162-2BE00-0AA0**
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 120 mm^2 For all Line Modules and Motor Modules in booksize format	**6SL3162-2BM01-0AA0**
Connector with screw-type terminal For 16 kW and 24 kW Smart Line Modules in booksize format Screw-type terminals 6 ... 16 mm^2	**6SL5166-2NA00-0AA0**
Connector with push-in connection For 16 kW and 24 kW Smart Line Modules in booksize format Push-in type terminals 6 ... 16 mm^2	**6SL5166-2NB00-0AA0**

Description	Article No.
Accessories for re-ordering	
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
24 V jumper plug For connection of the 24 V busbars (for booksize format)	**6SL3162-2AA01-0AA0**
Terminal Kit (Plug-in terminals, DRIVE-CLiQ jumper (length = module width + 110 mm (4.33 in)), dust protection blanking plugs) For DRIVE-CLiQ port For Smart Line Modules in booksize format with a width of	
• 100 mm (3.94 in)	**6SL5166-8AD03-0AA1**
• 150 mm (5.91 in)	**6SL5166-8AF01-0AA1**
Warning labels in 36 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, CN, ID, IL, IR, JP, KR, SA, TH, TW	**6SL3166-3AB00-0AA0**
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

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Technical specifications

	Smart Line Module in booksize format 6SL5130-...
Line voltage (up to 4000 m (13124 ft) above sea level)	380 ... 480 V 3 AC ±10 % (in operation -15 % <1 min)
Line frequency	50/60 Hz (47 ... 63 Hz)
SCCR (short-circuit current rating)	100 kA in conjunction with the recommended Class J fuse, or circuit breaker according to UL489 / CSA 22.2 No. 5-02 see recommended line-side components
Line power factor at rated power • Fundamental (cos φ_1) • Total (λ)	 >0.98 0.65 ... 0.9
Overvoltage category according to EN 60664-1	Class III
DC link voltage, approx.	495 ... 720 V (typ. 1.35 × line voltage) [1]
Electronics power supply	24 V DC -15 %/+20 %
Radio interference suppression • Standard • With line filter	 No radio interference suppression Category C2 to EN 61800-3 Total cable length up to 750 m (2460 ft) (shielded)
Cooling method	Internal air cooling (power units with increased air cooling by built-in fan)
Permissible ambient and coolant temperature (air) during operation for line-side components, Line Modules and Motor Modules	-10 ... +40 °C (14 ... 104 °F) without derating, >40 ... 55 °C (104 ... 131 °F), see derating characteristics
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, > 1000 ... 4000 m (3281 ... 13124 ft) above sea level, see derating characteristics
Declarations of Conformity	CE (Low-Voltage and EMC Directives)
Certificate of suitability	cULus

[1] The DC link voltage is maintained at the mean value of the rectified line voltage.
For further information, see section Configuration notes.

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Smart Line Modules in booksize format

Technical specifications

Line voltage 380 ... 480 V 3 AC		Smart Line Module in booksize format			
Internal air cooling		6SL5130-6UE21-6AC1	6SL5130-6UE21-6AD1	6SL5130-6UE22-4AC1	6SL5130-6UE22-4AD1
Power data		C type	D type	C type	D type
• Rated power P_N					
- At 380 V 3 AC	kW	**16.0**	**16.0**	**24**	**24**
- At 400 V 3 AC	kW	**16.8**	**16.8**	**25.3**	**25.3**
- At 480 V 3 AC	kW	**20.2**	**20.2**	**30**	**30**
• Maximum power P_{max}					
- At 380 V 3 AC	kW	35	48	48	72
- At 400 V 3 AC	kW	37	51	51	76
- At 480 V 3 AC	kW	51	61	61	91
Input data					
• Rated current	A	29	29	43	43
• Maximum current	A	62	86	86	129
Output data					
• Rated DC current	A	33	33	49	49
• Maximum DC current	A	71	97	97	146
Current demand 24 V DC electronics power supply, max.	A	0.7	0.7	0.7	0.7
Current carrying capacity					
• 24 V DC busbars	A	20	20	20	20
• DC link busbars	A	200	200	200	200
DC link capacitance					
• Smart Line Module	µF	820	820	940	940
• Drive line-up, max.	µF	20000	20000	20000	20000
Power loss [1]	kW	0.15	0.15	0.2	0.2
Cooling air requirement	m^3/h (ft^3/h)	77 (2719)	77 (2719)	77 (2719)	77 (2719)
Sound pressure level L_{pA} (1 m)	dB	<70	<70	<70	<70
Line connection U1, V1, W1		Screw-type terminals or push-in type terminals (X1)	Screw-type terminals or push-in type terminals (X1)	Screw-type terminals or push-in type terminals (X1)	Screw-type terminals or push-in type terminals (X1)
• Conductor cross-section	mm^2	6 ... 16	6 ... 16	6 ... 16	6 ... 16
Shield connection		6SL5166-1BD00-0AA0	6SL5166-1BD00-0AA0	6SL5166-1BD00-0AA0	6SL5166-1BD00-0AA0
PE connection		M5 screw	M5 screw	M5 screw	M5 screw
Cable length, max. (total of all motor power cables and DC link)					
• Shielded	m (ft)	1000 (3281)	1000 (3281)	1000 (3281)	1000 (3281)
• Unshielded	m (ft)	1200 (3937)	1200 (3937)	1200 (3937)	1200 (3937)
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	100 (3.94)	100 (3.94)	100 (3.94)	100 (3.94)
• Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
• Depth	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
Weight, approx.	kg (lb)	8.2 (18.1)	8.2 (18.1)	8.2 (18.1)	8.2 (18.1)

[1] Power loss of Smart Line Module at rated output including losses of 24 V DC electronics power supply.

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Technical specifications

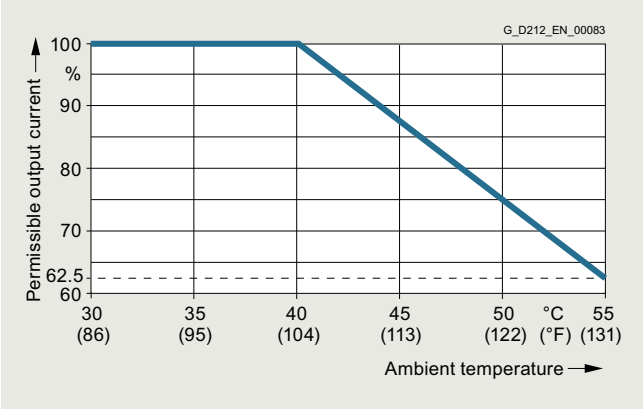
Line voltage 380 ... 480 V 3 AC		**Smart Line Module in booksize format**			
Internal air cooling		6SL5130-6UE23-6AC1	6SL5130-6UE23-6AD1	6SL5130-6UE25-5AC1	6SL5130-6UE25-5AD1
Power data		C type	D type	C type	D type
• Rated power P_N					
- At 380 V 3 AC	kW	**36**	**36**	**55**	**55**
- At 400 V 3 AC	kW	**38**	**38**	**58**	**58**
- At 480 V 3 AC	kW	**45**	**45**	**69**	**69**
• Maximum power P_{max}					
- At 380 V 3 AC	kW	72	108	110	164
- At 400 V 3 AC	kW	76	114	116	174
- At 480 V 3 AC	kW	91	136	139	208
Input data					
• Rated current	A	64	64	98	98
• Maximum current	A	128	192	196	294
Output data					
• Rated DC current	A	72	72	111	111
• Maximum DC current	A	145	218	222	334
Current demand 24 V DC electronics power supply, max.	A	2.3	2.3	2.3	2.3
Current carrying capacity					
• 24 V DC busbars	A	20	20	20	20
• DC link busbars	A	250	250	250	250
DC link capacitance					
• Smart Line Module	µF	1410	1410	2115	2115
• Drive line-up, max.	µF	20000	20000	20000	20000
Power loss [1]	kW	0.4	0.4	0.65	0.65
Cooling air requirement	m^3/h (ft^3/h)	155 (5474)	155 (5474)	155 (5474)	155 (5474)
Sound pressure level L_{pA} (1 m)	dB	<75	<75	<75	<75
Line connection U1, V1, W1		M8 screw studs (X1)	M8 screw studs (X1)	M8 screw studs (X1)	M8 screw studs (X1)
• Conductor cross-section	mm^2	10 ... 50	10 ... 50	25 ... 70	25 ... 70
Shield connection		6SL5166-1AF00-0AA0	6SL5166-1AF00-0AA0	6SL5166-1AF00-0AA0	6SL5166-1AF00-0AA0
PE connection		M8 screw	M8 screw	M8 screw	M8 screw
Cable length, max. (total of all motor power cables and DC link)					
• Shielded	m (ft)	1000 (3281)	1000 (3281)	1200 (3937)	1200 (3937)
• Unshielded	m (ft)	1200 (3937)	1200 (3937)	1200 (3937)	1200 (3937)
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	150 (5.91)	150 (5.91)	150 (5.91)	150 (5.91)
• Height	mm (in)	422 (16.61)	422 (16.61)	422 (16.61)	422 (16.61)
• Depth	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
Weight, approx.	kg (lb)	14.9 (32.85)	14.9 (32.85)	15.4 (33.96)	15.4 (33.96)

[1] Power loss of Smart Line Module at rated output including losses of 24 V DC electronics power supply.

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Characteristic curves

Derating characteristics



Output power as a function of ambient temperature

Installation altitude

- 0 ... 1000 m (0 ... 3281 ft) above sea level without derating
- > 1000 ... 2000 m (3281 ... 6562 ft)
  - Reduction of the output current by 10 % per 1000 meters (3281 feet), or
  - reduction in the ambient temperature by 5 °C (41 °F) per 1000 meters (3281 ft)
- > 2000 ... 4000 m (6562 ... 13124 ft)
  - Reduction of the output current by 10 % per 1000 meters (3281 feet), or
  - reduction in the ambient temperature by 5 °C (41 °F) per 1000 meters (3281 ft)
  - Operation on line supply systems with grounded neutral point, or
  - operation with an isolating transformer with secondary grounded neutral point

More information

Identification link according to IEC 61406 for SINAMICS S220

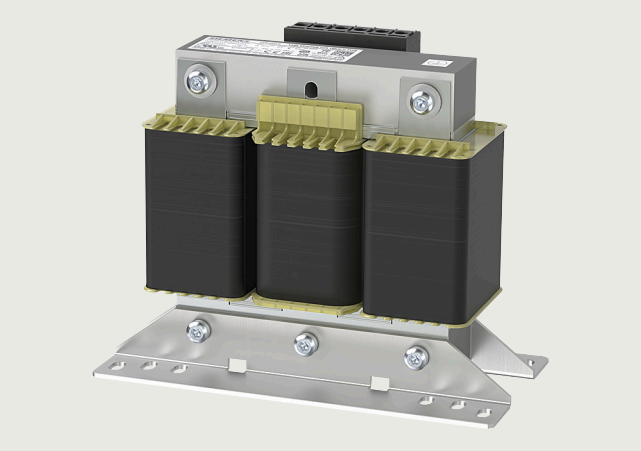
The ID link contains the article and serial number of the product. As a QR code, it replaces the previous data matrix code on the nameplate and takes you with the URL directly to a product information page on the internet with access to the technical documentation, data sheet, certificates, FAQs, product notifications, and catalogs. Paper package inserts become superfluous since the information is available electronically directly via the QR code, even years later. In this way, we are making a valuable contribution to the preservation of our environment. You don't need an additional app. Simply scan the QR code with your smartphone or tablet. According to IEC 61406, the QR code of an ID link is marked with a frame and a triangle at the bottom right.
With their globally unique identifiers, Siemens products are ready for Industry 4.0.
The ID serves as a connection to the administration shell with which modules of the digital twin can be provided.

The latest technical documentation as well as further technical specifications are available on the internet at:
www.siemens.com/sinamics-s220/documentation

and in the Siemens Product Configurator:
www.siemens.com/sinamics-s220/configuration

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Overview



Line reactors are always to be provided for operation of Smart Line Modules, as line harmonics can occur on converters that damage/disturb other loads connected to the same line supply. Line reactors limit the line harmonics to permissible values. Line reactors that are not permissible can damage the Smart Line Modules.

Selection and ordering data

Rated power of the Smart Line Module kW	Suitable for Smart Line Module in booksize format	**Line reactor** Article No.
Line voltage 380 ... 480 V 3 AC		
16	6SL5130-6UE21-6AC1	**6SL3100-0EE21-6AA0**
	6SL5130-6UE21-6AD1	**6SL5100-0EE21-6AD0**
24	6SL5130-6UE22-4AC1	**6SL5100-0EE22-4AC0**
	6SL5130-6UE22-4AD1	**6SL5100-0EE22-4AD0**
36	6SL5130-6UE23-6AC1	**6SL5100-0EE23-6AC0**
	6SL5130-6UE23-6AD1	**6SL5100-0EE23-6AD0**
55	6SL5130-6UE25-5AC1	**6SL5100-0EE25-5AC0**
	6SL5130-6UE25-5AD1	**6SL5100-0EE25-5AD0**

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Line reactors for Smart Line Modules

Technical specifications

Line voltage 380 ... 480 V 3 AC		Line reactor			
		6SL3100-0EE21-6AA0	6SL5100-0EE21-6AD0	6SL5100-0EE22-4AC0	6SL5100-0EE22-4AD0
Power loss	W	90	90	92	92
Line/load connection 1U1, 1V1, 1W1 / 1U2, 1V2, 1W2		Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	2.5 ... 10	2.5 ... 16	2.5 ... 16	2.5 ... 16
PE connection		M6 screw	M6 screw	M6 screw	M6 screw
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	219 (8.62)	219 (8.62)	219 (8.62)	219 (8.62)
• Height	mm (in)	176 (6.93)	176 (6.93)	195 (7.68)	195 (7.68)
• Depth	mm (in)	110.5 (4.35)	110.5 (4.35)	126 (4.96)	126 (4.96)
Weight, approx.	kg (lb)	9.0 (19.9)	9.0 (19.9)	15.5 (34.2)	15.5 (34.2)
Certificate of suitability		cURus	cURus	cURus	cURus
Suitable for Smart Line Module in booksize format	Type	6SL5130-6UE21-6AC1	6SL5130-6UE21-6AD1	6SL5130-6UE22-4AC1	6SL5130-6UE22-4AD1
• Rated power of the Smart Line Module	kW	16 C type	16 D type	24 C type	24 D type

Line voltage 380 ... 480 V 3 AC		Line reactor			
		6SL3100-0EE23-6AC0	6SL5100-0EE23-6AD0	6SL5100-0EE25-5AC0	6SL5100-0EE25-5AD0
Power loss	W	90	90	190	190
Line/load connection 1U1, 1V1, 1W1 / 1U2, 1V2, 1W2		Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	10 ... 50	10 ... 50	25 ... 70	25 ... 70
PE connection		M8 screw	M8 screw	M8 screw	M8 screw
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	225 (8.68)	225 (8.68)	300 (11.81)	300 (11.81)
• Height	mm (in)	235 (9.25)	235 (9.25)	280 (11.02)	280 (11.02)
• Depth	mm (in)	114 (4.49)	114 (4.49)	153 (6.02)	153 (6.02)
Weight, approx.	kg (lb)	18.0 (39.7)	18.0 (39.7)	35.5 (78.26)	35.5 (78.26)
Certificate of suitability		cURus	cURus	cURus	cURus
Suitable for Smart Line Module in booksize format	Type	6SL5130-6UE23-6AC1	6SL5130-6UE23-6AD1	6SL5130-6UE25-5AC1	6SL5130-6UE25-5AD1
• Rated power of the Smart Line Module	kW	36 C type	36 D type	55 C type	55 D type

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Overview



In conjunction with line reactors and a consistent EMC-compliant system design, line filters limit the conducted electromagnetic emissions generated by the Smart Line Modules to the limit values according to IEC 61800-3. Line filters are only suitable for direct connection to TN line systems.

Selection and ordering data

Rated power of the Smart Line Module kW	Suitable for Smart Line Module in booksize format	**Line filter** Article No.
Line voltage 380 ... 480 V 3 AC		
16	6SL5130-6UE21-6AC1 6SL5130-6UE21-6AD1	**6SL5100-0HE21-6DD0**
24	6SL5130-6UE22-4AC1 6SL5130-6UE22-4AD1	**6SL5100-0HE22-4DD0**
36	6SL5130-6UE23-6AC1 6SL5130-6UE23-6AD1	**6SL5100-0HE23-6DD0**
55	6SL5130-6UE25-5AC1 6SL5130-6UE25-5AD1	**6SL5100-0HE25-5DD0**

Technical specifications

Line voltage 380 ... 480 V 3 AC		**Line filter**			
		6SL5100-0HE21-6DD0	6SL5100-0HE22-4DD0	6SL5100-0HE23-6DD0	6SL5100-0HE25-5DD0
Rated current	A	30	44	73	105
Power loss	W	12.0	22.0	28	38
Line/load connection L1, L2, L3 / U, V, W		Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	6 ... 16	6 ... 16	16 ... 50	16 ... 50
PE connection		M8 screw studs	M8 screw studs	M8 screw studs	M8 screw studs
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	50 (1.97)	50 (1.97)	74 (2.91)	74 (2.91)
• Height	mm (in)	398 (15.67)	398 (15.67)	409 (16.10)	409 (16.10)
• Depth	mm (in)	205 (8.07)	205 (8.07)	225 (8.86)	225 (8.86)
Weight, approx.	kg (lb)	5 (11.0)	5 (11.0)	7.2 (15.87)	7.8 (17.20)
Certificate of suitability		cURus	cURus	cURus	cURus
Suitable for Smart Line Module in booksize format	Type	6SL5130-6UE21-6AC1 6SL5130-6UE21-6AD1	6SL5130-6UE22-4AC1 6SL5130-6UE22-4AD1	6SL5130-6UE23-6AC1 6SL5130-6UE23-6AD1	6SL5130-6UE25-5AC1 6SL5130-6UE25-5AD1
• Rated power of the Smart Line Module	kW	16	24	36	55

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Recommended line-side components for Smart Line Modules

Selection and ordering data

Suitable line-side power components are assigned depending on the power rating of the Smart Line Modules.

Additional information about the line-side power components can be found in Catalogs LV 10 and IC 10 as well as SiePortal.

The tables below list recommended components.

Assignment of line-side power components to Smart Line Modules in booksize format

Rated power	Suitable for Smart Line Module in booksize format	**LV HRC fuse (gL/gG)**			**UL/CSA fuse, Class J** [1] Available from: Mersen www.ep.mersen.com		
		Rated current	Size		Rated current	Size	
kW	Type	A		Article No.	A	mm (in)	Reference No.
Line voltage 380 ... 480 V 3 AC							
16	6SL5130-6UE21-6AC1 6SL5130-6UE21-6AD1	40	000	**3NA3817**	40	27 × 60 (1.06 × 2.36)	AJT40
24	6SL5130-6UE22-4AC1 6SL5130-6UE22-4AD1	65	000	**3NA3824**	80	27 × 117 (1.06 × 4.61)	AJT80
36	6SL5130-6UE23-6AC1 6SL5130-6UE23-6AD1	80	000	**3NA3824**	80	27 × 117 (1.06 × 4.61)	AJT80
55	6SL5130-6UE25-5AC1 6SL5130-6UE25-5AD1	115	000	**3NA3132**	125	41 × 146 (1.61 × 5.75)	AJT125

Recommendations on further overcurrent protection devices are available at:
https://support.industry.siemens.com/cs/document/109804134

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[1] Not suitable for 3NP and 3KL switch disconnectors.

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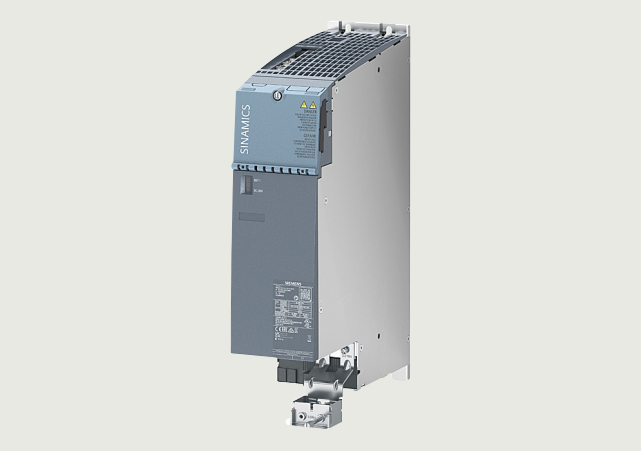
Overview



Single Motor Module in booksize format C/D types, 3 A to 24 A and 30 A slim



Single Motor Module in booksize format C/D types, 85 A and 132 A



Single Motor Module in booksize format C/D types, 30 A



Single Motor Module in booksize format C/D types 200 A



Single Motor Module in booksize format C type, 45 A and 60 A

A Motor Module is a power unit (inverter). It generates a variable voltage with variable frequency from the DC link voltage that feeds the connected motor(s).

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Single Motor Modules in booksize format

Overview

Motor Modules in booksize format C/D types, 3 A to 200 A

Rated current	3 A	5 A	9 A	18 A	24 A	30 A	45 A	60 A	85 A	132 A	200 A
	D types										
Single Motor Modules	**3 A / 9 A** 50 mm (1.97 in)	**5 A / 15 A** 50 mm (1.97 in)	**9 A / 27 A** 50 mm (1.97 in)	**18 A / 54 A** 50 mm (1.97 in)	**24 A / 72 A** 50 mm (1.97 in)	**30 A / 90 A** 50 mm (1.97 in)[1] 100 mm (3.94 in)	–	–	**85 A / 170 A** 150 mm (5.90 in)	**132 A / 264 A** 150 mm (5.90 in)	**200 A / 400 A** 200 mm (87.9 in)
Double Motor Modules	2 x 3 A / 2 x 9 A 50 mm (1.97 in)	2 x 5 A / 2 x 15 A 50 mm (1.97 in)	2 x 9 A / 2 x 27 A 50 mm (1.97 in)	2 x 18 A / 2 x 54 A 50 mm (1.97 in)[1] 100 mm (3.94 in)	–	–	–	–	–	–	–
Rated current / maximum current in A			C types								
Single Motor Modules			**18 A / 36 A** 50 mm (1.97 in)	**24 A / 48 A** 50 mm (1.97 in)	**30 A / 56 A** 50 mm (1.97 in)[1] 100 mm (3.94 in)	**45 A / 90 A** 100 mm (3.94 in)	**60 A / 120 A** 100 mm (3.94 in)	**85 A / 141 A** 150 mm (5.90 in)	**132 A / 210 A** 150 mm (5.90 in)	**200 A / 282 A** 200 mm (87.9 in)	
Double Motor Module			2 x 18 A / 2 x 54 A [1] 2 x 36 A 50 mm (1.97 in)[1] 100 mm (3.94 in)	–	–	–	–	–	–	–	

[1] (slim)

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Overview of Single Motor Modules in booksize format C/D types

- C type: Optimized for continuous load with up to 200 % overload (continuous motion)
- D type: Optimized for highly dynamic, intermittent duty cycles (discontinuous motion):
  - with 300 % overload for Motor Modules up to 30 A (discontinuous motion)
  - with 200 % overload for the Motor Modules 85 A, 132 A, and 200 A

Devices in booksize format C/D types are optimized for multi-axis applications and are mounted next to one another. The connection for the common DC link is an integral feature. The device is internally air cooled.

The Motor Modules in booksize format C/D types are a further development of the booksize series and offer the following advantages:

- The portfolio is extended by more compact Single Motor Modules 85 A, 132 A and 200 A (C/D types) as well as very narrow (slim) 50 mm (1.97 in) wide Single Motor Modules 30 A and Double Motor Modules 18 A.
- The amount of space required beneath the Motor Modules has been reduced thanks to improvements in the design.
- In the motor plug connector, the brake conductors and the PE connection are integrated directly in the plug connector.
- The motor connections on the Double Motor Module are located side by side, resulting in a significantly improved level of accessibility.
- The fan can be simply replaced without having to remove the Motor Module.

The signal cable shield can be connected to the Motor Module by means of a shield connection clamp, e.g. Weidmüller type KLBUE 3-8 SC.

Design

The Single Motor Modules in booksize format feature the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 1 electronics power supply connection via integrated 24 V DC bars
- 3 DRIVE-CLiQ sockets
- 1 motor connection via connector X1 for C/D type 3 A to 30 A (not included in the scope of delivery)
- 1 safe stop input
- 1 safe motor brake control
- 1 temperature sensor input for KTY84-130, Pt1000 or PTC
- 2 PE (protective earth) connections – a PE connection is integrated in the connector for C/D types 3 A to 30 A

The status of the Motor Modules is indicated via two multi-color LEDs.

The scope of supply of the Motor Modules includes:

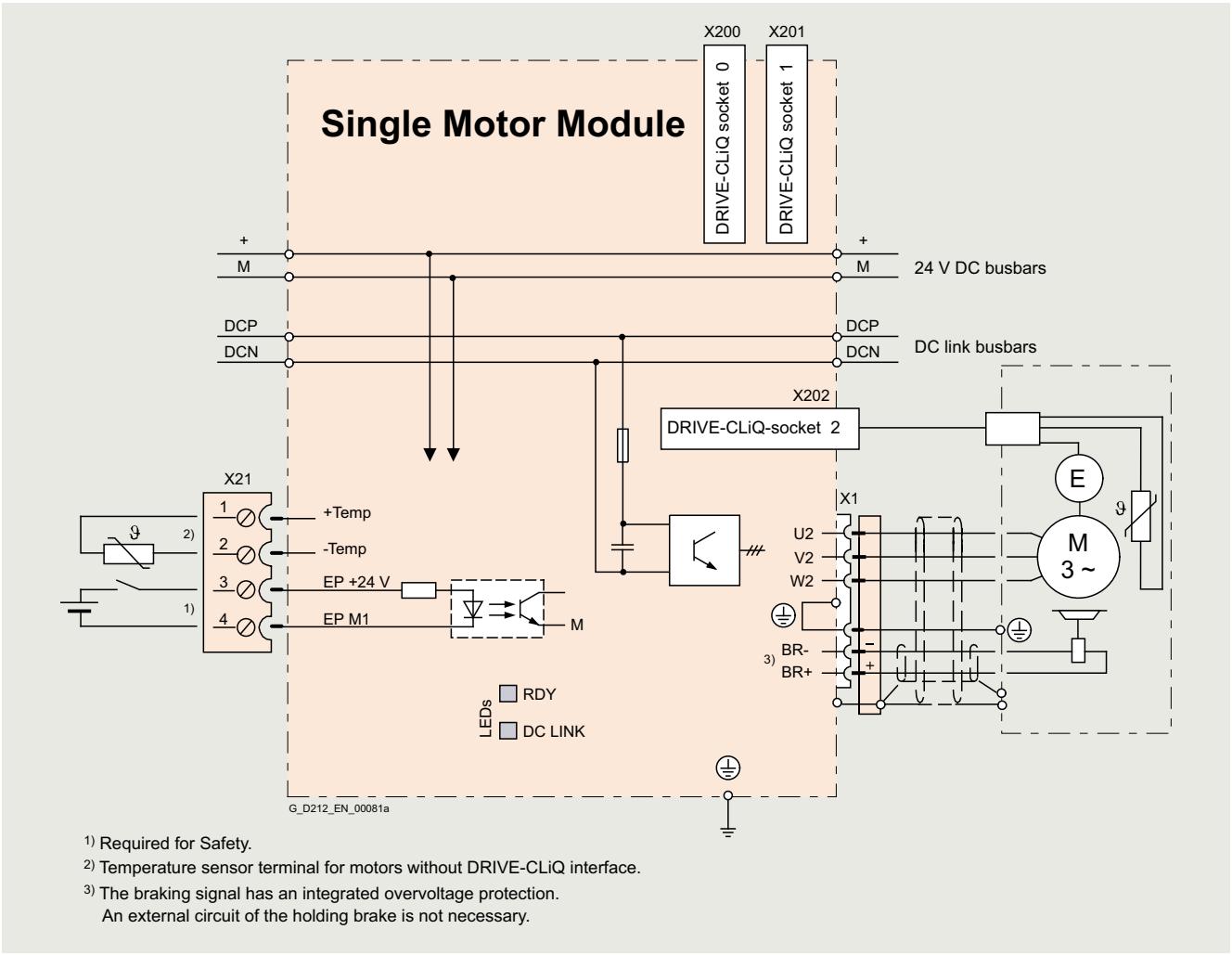
- DRIVE-CLiQ cable appropriate to the width of the Motor Module for connection to the adjacent Motor Module, length = width of Motor Module + 0.06 m (2.36 in)
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- Connector X21
- Connector X11 for the motor brake connection (for Motor Modules 45 A to 200 A)
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- Fan insert for the 85 A, 132 A, and 200 A Motor Modules (the voltage for the fan insert is supplied by the Motor Module)
- 1 shield connection plate with shield connection clamp (for Motor Modules 3 A to 30 A)
- 1 set of warning labels in 36 languages

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Integration

The Single Motor Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit (as of SINAMICS firmware V5.2 SP3 HF10)
- SIMATIC Drive Controller (as of firmware V2.9)
- SINUMERIK ONE (as of SINUMERIK firmware V6.15 SP1)
- SINUMERIK 828D (as of SINUMERIK firmware V4.95 SP1)

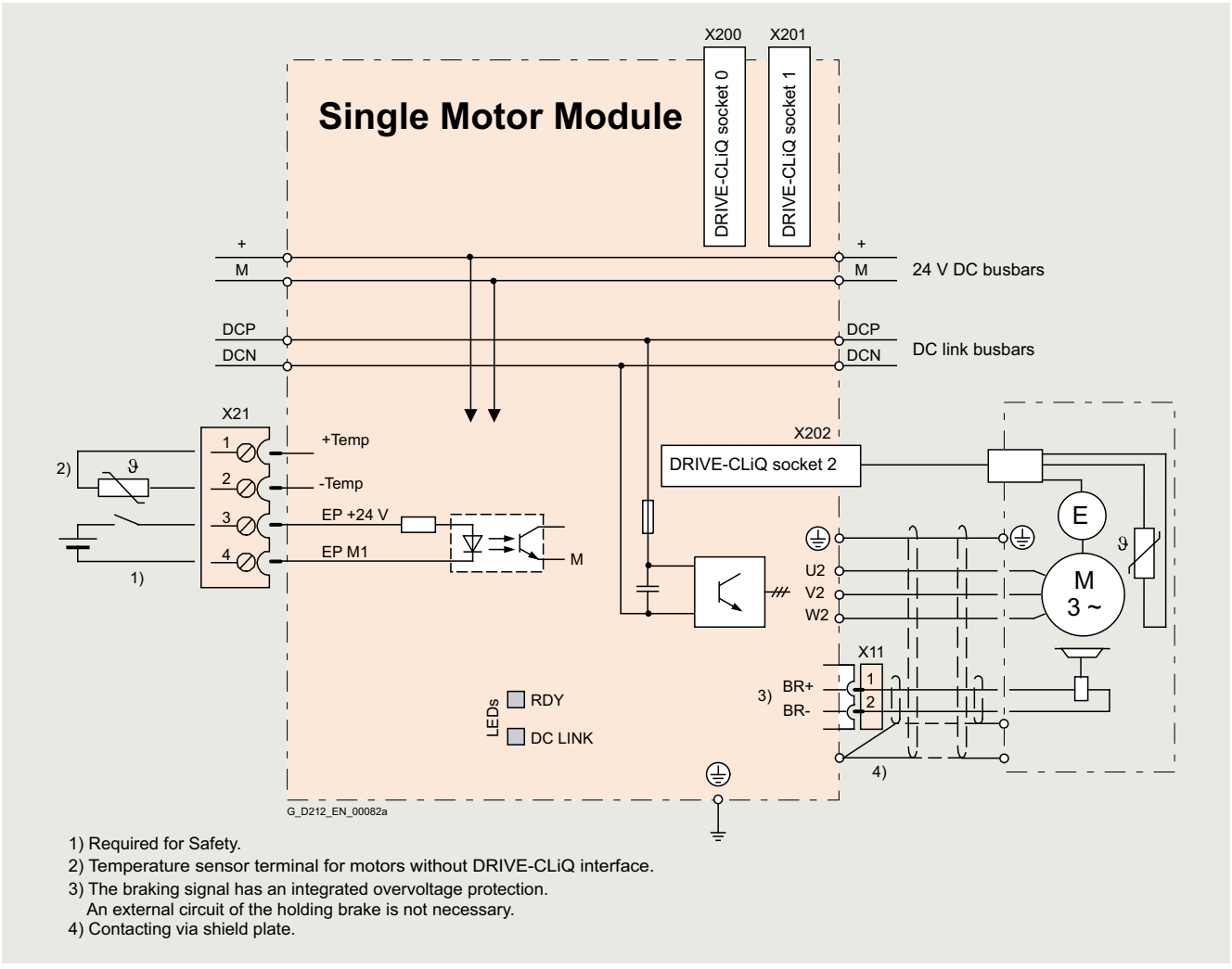


1) Required for Safety.
2) Temperature sensor terminal for motors without DRIVE-CLiQ interface.
3) The braking signal has an integrated overvoltage protection.
An external circuit of the holding brake is not necessary.

Connection example of Single Motor Modules in booksize format C/D types, 3 A to 30 A

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Integration

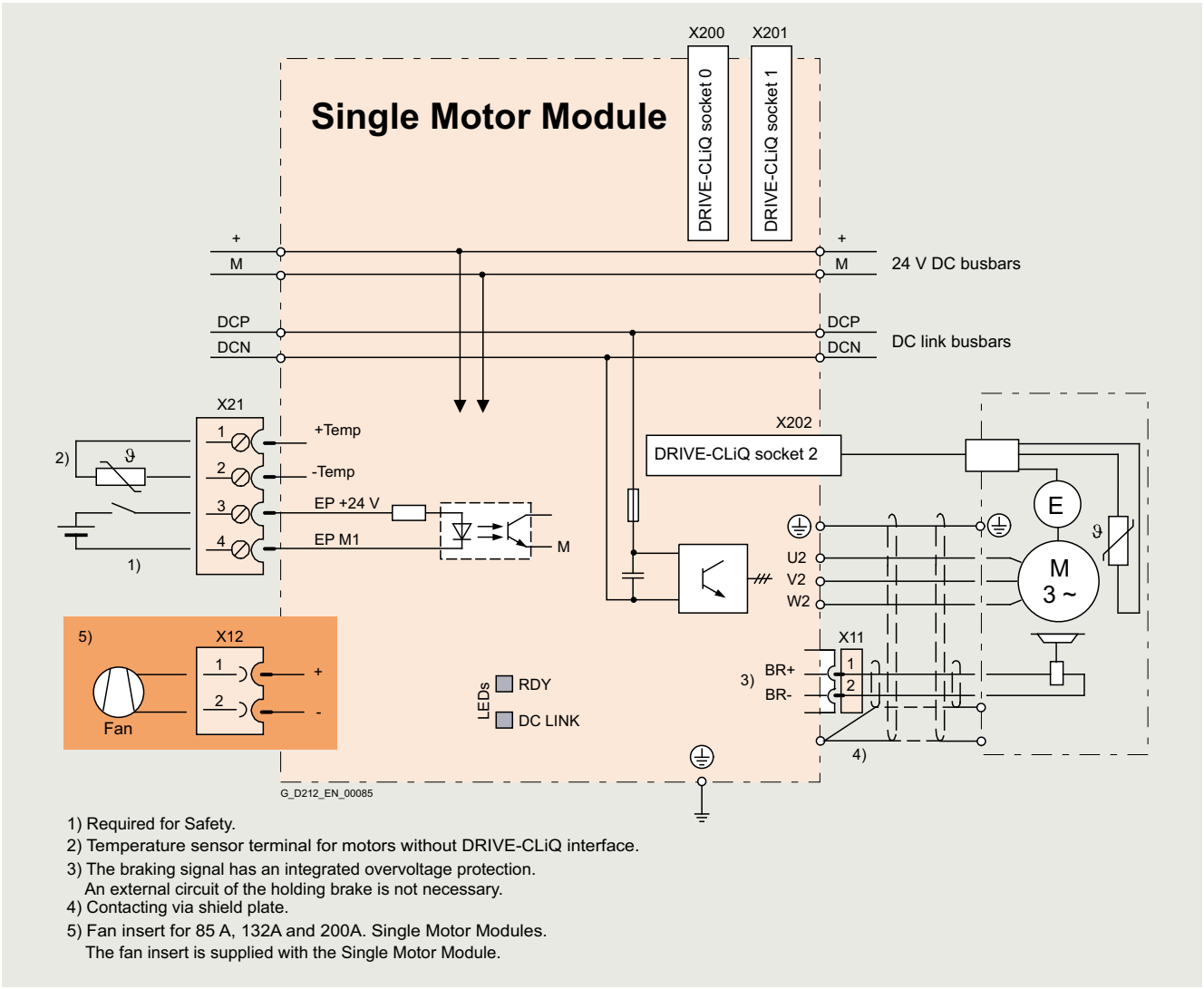


1) Required for Safety.
2) Temperature sensor terminal for motors without DRIVE-CLiQ interface.
3) The braking signal has an integrated overvoltage protection.
An external circuit of the holding brake is not necessary.
4) Contacting via shield plate.

Connection example of Single Motor Module in booksize format C type, 45 A and 60 A

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Integration



1) Required for Safety.
2) Temperature sensor terminal for motors without DRIVE-CLiQ interface.
3) The braking signal has an integrated overvoltage protection.
An external circuit of the holding brake is not necessary.
4) Contacting via shield plate.
5) Fan insert for 85 A, 132A and 200A. Single Motor Modules.
The fan insert is supplied with the Single Motor Module.

Connection example of Single Motor Module in booksize format C/D types, 85 A to 200 A

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Single Motor Modules in booksize format

Selection and ordering data

Rated output current	Rated power (IEC)	Single Motor Module in booksize format			
		C type	C type slim	D type	D type slim
A	kW (hp)	Article No.	Article No.	Article No.	Article No.
DC link voltage 495 ... 720 V DC					
3	1.1 (1.5)	–		**6SL5120-1UE13-0AD1**	
5	2.2 (3)	–		**6SL5120-1UE15-0AD1**	
9	4 (5)	–		**6SL5120-1UE21-0AD1**	
18	7.5 (10)	**6SL5120-1UE21-8AC1**		**6SL5120-1UE21-8AD1**	
24	11 (15)	**6SL5120-1UE22-4AC1**		**6SL5120-1UE22-4AD1**	
30	15 (20)	**6SL5120-1UE23-0AC1**		**6SL5120-1UE23-0AD1**	
			6SL5120-1UE23-0SC1		**6SL5120-1UE23-0SD1**
45	22 (30)	**6SL5120-1UE24-5AC1**		–	
60	30 (40)	**6SL5120-1UE26-0AC1**		–	
85	45 (60)	**6SL5120-1UE28-5AC1**		**6SL5120-1UE28-5AD1**	
132	75 (100)	**6SL5120-1UE31-3AC1**		**6SL5120-1UE31-3AD1**	
200	110 (150)	**6SL5120-1UE32-0AC1**		**6SL5120-1UE32-0AD1**	

Description	Article No.
Accessories	
Power connector (X1) with screw-type terminal At Motor Module end, with screw-type terminals 1.5 ... 6 mm^2 For Motor Modules in booksize format C/D types with rated output current of 3 ... 30 A	**6SL3162-2MA00-0AC0**
Power connector (X1) with push-in connection with snap-in actuators At Motor Module end, with spring-loaded terminals 1.5 ... 6 mm^2 For Motor Modules in booksize format C/D types with rated output current of 3 ... 30 A	**6SL3162-2MB00-0AC0**
Shield connection plate For Motor Modules in booksize format with a width of	
• 100 mm (3.94 in) (Motor Modules in booksize format C type 45 A/60 A)	**6SL3162-1AD00-0AA0**
• 150 mm (5.91 in) (Motor Modules in booksize format C/D type 85 A/132 A)	**6SL5166-1AF00-0AA0**
• 200 mm (7.87 in) (Motor Modules in booksize format C/D type 200 A)	**6SL5166-1AH00-0AA0**
Shield connection clamp For Motor Modules in booksize format C type with rated output current of 45 A/60 A	
• Diameter 3 ... 14 mm (0.12 ... 0.55 in)	**8WH9130-0MA00**
• Diameter 20 ... 35 mm (0.79 ... 1.38 in)	**8WH9130-0PA00**

Description	Article No.
DC link rectifier adapter For direct infeed of DC link voltage	
• Screw-type terminals 0.5 ... 10 mm^2 For Motor Modules in booksize format with a width of 50 mm (1.97 in) and 100 mm (3.94 in) [1] up to max. 30 A	**6SL3162-2BD00-0AA0**
• Screw-type terminals 10 ... 35 mm^2 For Motor Modules in booksize format with a width of 100 mm (3.94 in) [1]; 45 A/60 A	**6SL3162-2BE00-0AA0**
• Screw-type terminals 35 ... 95 mm^2 For Motor Modules in booksize format with a width of 150 mm (5.91 in) and 200 mm (7.87 in)	**6SL3162-2BM00-0AA0**
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 95 mm^2 For all Line Modules and Motor Modules in booksize format	**6SL3162-2BM01-0AA0**
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
Reinforced DC link bridge 6 mm (0.24 in) For replacement of the DC link bridge in Single Motor Modules 3 A ... 24 A, 30 A slim Double Motor Modules 2 x 3 A ... 2 x 9 A	**6SL3162-2BB00-0AA0**

[1] [1]**NOTICE**: The DC link rectifier adapter must **not** be used for Motor Modules C type, 45 A and 60 A.

[1] **NOTICE**: The DC link rectifier adapter must **not** be used for Motor Modules C type, 45 A and 60 A.

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Selection and ordering data

Description	Article No.
Accessories for re-ordering	
24 V jumper5t0z For connection of the 24 V busbars (for booksize format)	**6SL3162-2AA01-0AA0**
Terminal Kit for Motor Modules in booksize format C/D types, 3 A to 30 A (24 V jumper, plug-in terminals, DRIVE-CLiQ jumper (length = module width + 60 mm (2.36 in)), shield connection clamp with pressure plate, dust protection blanking plugs, coding plug for X1) For Motor Modules with a width of	
• 50 mm (1.97 in), Single Motor Module (30 A slim)	**6SL5166-8AB00-0AA1**
• 100 mm (3.94 in), Single Motor Module 30 A	**6SL5166-8AD00-0AA1**
Terminal Kit for Motor Modules 45 A to 200 A (24 V jumper, plug-in terminals, DRIVE-CLiQ jumper (length = module width + 60 mm (2.36 in)), dust protection blanking plugs) For Motor Modules with a width of	
• 100 mm (3.94 in), 45 A/60 A	**6SL5166-8AD01-0AA1**
• 150 mm (5.91 in), 85 A/132 A	**6SL5166-8AF00-0AA1**
• 200 mm (7.87 in), 200 A	**6SL5166-8AH00-0AA1**
Shield connection clamp For Single Motor Modules in booksize format C/D types with rated output current of 3 A to 30 A	**6SL3162-0AQ00-0AA0**
Warning labels in 36 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, ID, IE, IL, IR, IS, IT, JP, KR, LT, LV, MT, NL, NO, PL, PT, RO, RU, SA, SE, SI, SK, TH, TR, TW	**6SL5166-3BW00-0AA0**
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**
Replacement fan For Motor Modules with a width of	
• 50 mm (1.97 in), C/D type (3 A ... 24 A, 30 A slim)	**6SL3162-0AS00-0AA0**
• 100 mm (3.94 in), C/D type (30 A)	**6SL5166-0AD00-0AA0**
• 100 mm (3.94 in), C type (45 A and 60 A)	**6SL3162-0AT00-0AA0**
• 150 mm (5.91 in), C/D type (85 A and 132 A)	**6SL5166-0AF00-0AA0**
• 200 mm (7.87 in), C/D type (200 A)	**6SL5166-0AH00-0AA0**

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Technical specifications

	Single Motor Module in booksize format 6SL5120-1UE...
DC link voltage (up to 2000 m (6562 ft) above sea level)	495 ... 720 V DC (line voltage 380 ... 480 V 3 AC)
Output frequency	
• Control type Servo	0 ... 650 Hz [1) 2) 3)]
• Control type Vector	0 ... 300 Hz [2)]
• Control mode V/f	0 ... 600 Hz [2) 3)]
Electronic power supply	24 V DC -15%/+20%
Type of cooling	Internal air cooling (power units with increased air cooling by built-in fan)
Permissible ambient and coolant temperature (air) during operation for line-side components, Line Modules and Motor Modules	-10 ... 40 °C (14 ... 104 °F) without derating, >40 ... 55 °C (104 ... 131 °F), see derating characteristics
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, > 1000 ... 4000 m (3281 ... 13124 ft) above sea level, see derating characteristics
Declarations of Conformity	CE (Low-Voltage and EMC Directives)
Certificate of suitability	cULus
Safety Integrated	Safety Integrity Level 2 (SIL 2) according to IEC 61508, Performance Level d (PL d) and Category 3 according to EN ISO 13849-1 For further information, see section Safety Integrated.

[1)] At rated output current (max. output frequency 1300 Hz for 62.5 µs current control cycle, 8 kHz pulse frequency, 60% permissible output current).

[2)] Note the correlation between max. output frequency, pulse frequency and current derating.
For further information, see section Configuration notes.

[3)] The output frequency is currently limited to 550 Hz. The specified values apply to systems with license for high output frequency.
For further information, see section Control Units and https://support.industry.siemens.com/cs/document/104020669

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Technical specifications

DC link voltage 495 ... 720 V DC		Single Motor Module in booksize format			
Internal air cooling C type	6SL5120-...	–	–	–	1UE21-8AC01
Internal air cooling D type	6SL5120-...	1UE13-0AD01	1UE15-0AD01	1UE21-0AD01	1UE21-8AD1
Output current					
• Rated current I_N	A	**3**	**5**	**9**	**18**
• For S6 duty (40%) I_{S6}	A	4	6.7	12	24
• I_{max}					
- C type	A	–	–	–	36
- D type	A	9	15	27	54
Rated power [1]					
• Based on IEC[2]	kW	1.1	2.2	4	7.5
• Based on NEC[3]	hp	1.5	3	5	10
Rated pulse frequency	kHz	4	4	4	4
DC link current I_d [4]	A	3.7	6.2	11.2	22.5
Current carrying capacity					
• DC link busbars	A	100 [5]	100 [5]	100 [5]	100 [5]
• 24 V DC busbars [6]	A	20	20	20	20
DC link capacitance	µF	110	110	110	220
Current requirement At 24 V DC, max.	A	0.7	0.75	0.8	1
Power loss [8] typ. [6]/max.	kW	0.03/0.05	0.04/0.07	0.06/0.1	0.14/0.19
Cooling air requirement	m^3/h (ft^3/h)	18 (636)	20 (706)	22 (777)	33 (1165)
Motor connection U2, V2, W2		Plug-in connector (X1) [9], 1.5 ... 6 mm^2	Plug-in connector (X1) [9], 1.5 ... 6 mm^2	Plug-in connector (X1) [9], 1.5 ... 6 mm^2	Plug-in connector (X1) [9], 1.5 ... 6 mm^2
PE connection		M5 screw	M5 screw	M5 screw	M5 screw
Motor brake connection		Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1), 24 V DC, 2 A
Motor cable length, max.					
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	70 (230)
• Unshielded	m (ft)	75 (246)	75 (246)	75 (246)	100 (328)
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	50 (1.97)	50 (1.97)	50 (1.97)	50 (1.97)
• Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
• Depth	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
Weight, approx.	kg (lb)	4.6 (10.1)	4.6 (10.1)	4.6 (10.1)	4.6 (10.1)

[1] Rated power of a typical standard asynchronous motor at 400 V 3 AC.

[2] Rated power of a typical standard asynchronous motor at 400 V 3 AC according to IEC 60947-4-1:2018 Annex G Table G.1.

[3] Rated power of a standard asynchronous motor at 460 V 3 AC according to NEC Table 430.250.

[4] Rated DC link current for dimensioning an external DC connection.

[5] With reinforced DC link bridges, (Article No. 6SL3162-2BB00-0AA0) 200 A is possible (Accessories).

[6] If, due to a number of Line Modules and Motor Modules being mounted side by side, the current carrying capacity exceeds 20 A, an additional 24 V DC connection using a 24 V terminal adapter is required (max. cross-section 6 mm^2, max. fuse protection 20 A).

[7] Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.

[8] At max. motor cable length 30 m (98.4 ft), pulse frequency 4 kHz and DC link voltage 540 ... 600 V.

[9] Connector not included in scope of delivery, see Accessories.

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Single Motor Modules in booksize format

Technical specifications

DC link voltage 495 ... 720 V DC		Single Motor Module in booksize format				
Internal air cooling C type	6SL5120 -...	1UE22-4AC1	1UE23-0SC1	1UE23-0AC1	1UE24-5AC1	1UE26-0AC1
Internal air cooling D type	6SL5120 -...	1UE22-4AD1	1UE23-0SD1	1UE23-0AD1	–	–
Output current						
• Rated current I_N	A	**24**	**30**	**30**	**45**	**60**
• For S6 duty (40%) I_{S6}	A	32	40	40	60	80
• I_{max}						
- C type	A	48	56	56	90	120
- D type	A	72	90	90	–	–
Rated power [1]						
• Based on IEC [2]	kW	11	15	15	22	30
• Based on NEC [3]	hp	15	20	20	30	40
Rated pulse frequency	kHz	4	4	4	4	4
DC link current I_d [4]	A	30	37	37	56	75
Current carrying capacity						
• DC link busbars	A	100 [5]	100 [5]	200	200	200
• 24 V DC busbars [6]	A	20	20	20	20	20
DC link capacitance	µF	390	705	705	1230	1410
Current requirement At 24 V DC, max.	A	1.0	1.2	0.75	1.0	01.0
Power loss [7] typ. [8]/max.	kW	0.19/0.20	0.27/0.31	0.26/0.31	0.34/0.36	0.46/0.48
Cooling air requirement	m^3/h (ft^3/h)	33 (1165)	33 (1165)	58 (2048)	64 (2260)	64 (2260)
Motor connection U2, V2, W2		Plug-in connector (X1) [9], 1.5 ... 6 mm^2	Plug-in connector (X1) [9], 1.5 ... 6 mm^2	Plug-in connector (X1) [9], 1.5 ... 6 mm^2	M6 screw studs (X1)	M6 screw studs (X1)
Shield support		At the shield connection plate of the Motor Modules	At the shield connection plate of the Motor Modules	At the shield connection plate of the Motor Modules	See Accessories	See Accessories
PE connection		M5 screw	M5 screw	M5 screw	M5 screw	M5 screw
Motor brake connection		Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A
Motor cable length, max.						
• Shielded	m (ft)	70 (230)	100 (328)	100 (328)	100 (328)	100 (328)
• Unshielded	m (ft)	100 (328)	150 (492)	150 (492)	150 (492)	150 (492)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	50 (1.97)	50 (1.97)	100 (3.94)	100 (3.94)	100 (3.94)
• Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
• Depth	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
Weight, approx.	kg (lb)	4.7 (10.4)	4.6 (10.1)	7.9 (17.4)	8.5 (18.7)	8.6 (19)

[1] Rated power of a typical standard asynchronous motor at 400 V 3 AC.

[2] Rated power of a typical standard asynchronous motor at 400 V 3 AC according to IEC 60947-4-1:2018 Annex G Table G.1.

[3] Rated power of a standard asynchronous motor at 460 V 3 AC according to NEC Table 430.250.

[4] Rated DC link current for dimensioning an external DC connection.

[5] With reinforced DC link bridges, (Article No. 6SL3162-2BB00-0AA0) 200 A is possible (Accessories).

[6] If, due to a number of Line Modules and Motor Modules being mounted side by side, the current carrying capacity exceeds 20 A, an additional 24 V DC connection using a 24 V terminal adapter is required (max. cross-section 6 mm^2, max. fuse protection 20 A).

[7] Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.

[8] At max. motor cable length 30 m (98.4 ft), pulse frequency 4 kHz and DC link voltage 540 ... 600 V.

[9] Connector not included in scope of delivery, see Accessories.

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Technical specifications

DC link voltage 495 ... 720 V DC		Single Motor Module in booksize format		
Internal air cooling C type	6SL5120-...	1UE28-5AC1	1UE31-3AC1	1UE32-0AC1
Internal air cooling D type	6SL5120-...	1UE28-5AD1	1UE31-3AD1	1UE32-0AD1
Output current				
• Rated current I_N	A	**85**	**132**	**200**
• For S6 duty (40%) I_{S6}	A	110	150	230
• I_{max}				
- C type	A	141	210	282
- D type	A	170	264	400
Rated power [1]				
• Based on IEC [2]	kW	45	75	110
• Based on NEC [3]	hp	60	100	150
Rated pulse frequency	kHz	4	4	4
DC link current I_d [2]	A	106	165	250
Current carrying capacity				
• DC link busbars	A	200	200	200
• 24 V DC busbars [3]	A	20	20	20
DC link capacitance	µF	1880	2820	3995
Current requirement At 24 V DC, max.	A	1.5	1.5	1.5
Power loss [4] typ. [5]/max.	kW	0.77/0.79	1.26/1.29	2.03/2.09
Cooling air requirement	m^3/h (ft^3/h)	290 (10241)	290 (10241)	340 (12007)
Motor connection U2, V2, W2		M8 screw studs (X1)	M8 screw studs (X1)	M8 screw studs (X1)
• Conductor cross-section, max.	mm^2	2.5 ... 95, 2 × 35	2.5 ... 120, 2 × 50	2.5 ... 120, 2 × 50
Shield support		See Accessories	See Accessories	See Accessories
PE connection		M6 screw	M8 screw	M8 screw
Motor brake connection		Plug-in connector (X11), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A
Motor cable length, max.				
• Shielded	m (ft)	100 (328)	100 (328)	100 (328)
• Unshielded	m (ft)	150 (492)	150 (492)	150 (492)
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	150 (5.91)	150 (5.91)	200 (7.87)
• Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)
• Depth	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)
Weight, approx.	kg (lb)	15 (33.1)	17.2 (37.9)	20 (44.1)

1) Rated power of a typical standard asynchronous motor at 400 V 3 AC.

2) Rated power of a typical standard asynchronous motor at 400 V 3 AC according to IEC 60947-4-1:2018 Annex G Table G.1.

3) Rated power of a standard asynchronous motor at 460 V 3 AC according to NEC Table 430.250.

4) Rated DC link current for dimensioning an external DC connection.

5) If, due to a number of Line Modules and Motor Modules being mounted side by side, the current carrying capacity exceeds 20 A, an additional 24 V DC connection using a 24 V terminal adapter is required (max. cross-section 6 mm^2, max. fuse protection 20 A).

6) Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.

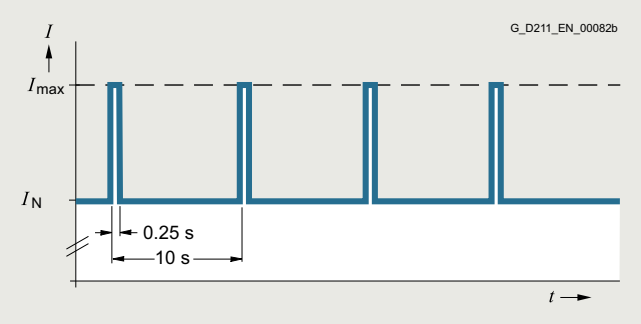
7) At max. motor cable length 30 m (98.4 ft), pulse frequency 4 kHz and DC link voltage 540 ... 600 V.

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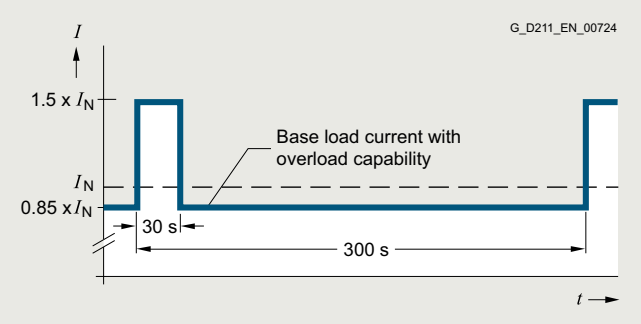
Characteristic curves

Overload capability

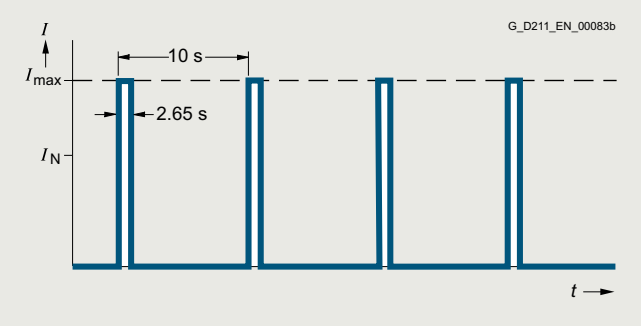
Motor Modules in booksize format C type, 3 A to 200 A



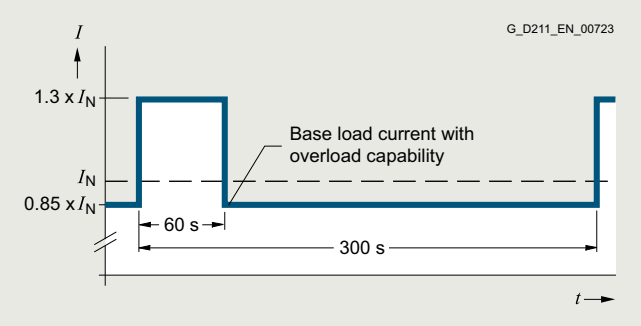
Duty cycle with previous load



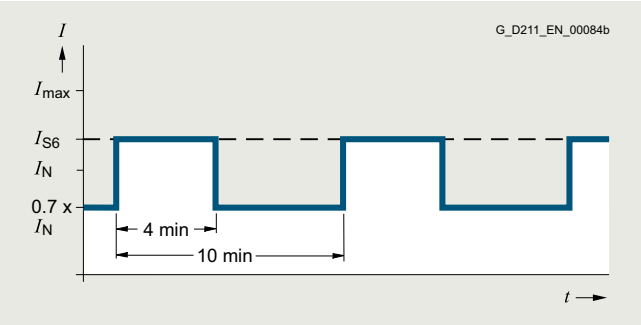
Duty cycle with 30 s overload with a duty cycle duration of 300 s



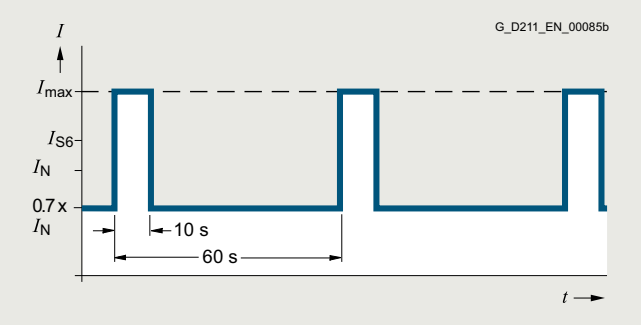
Duty cycle without initial load



Duty cycle with 60 s overload with a duty cycle duration of 300 s



S6 duty cycle with previous load with a duty cycle duration of 600 s

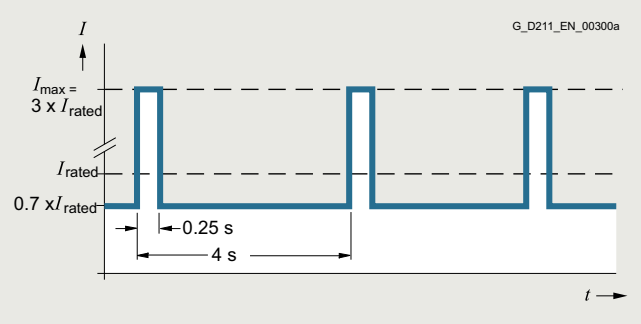


S6 duty cycle with previous load with a duty cycle duration of 60 s

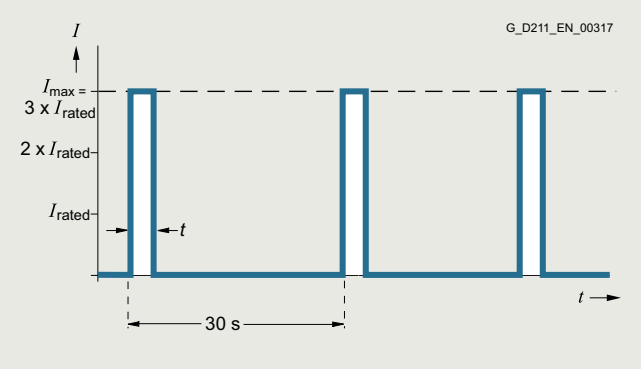
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Characteristic curves

Motor Modules in booksize format D type, 3 A to 30 A



Peak current duty cycle with previous load (300% overload)

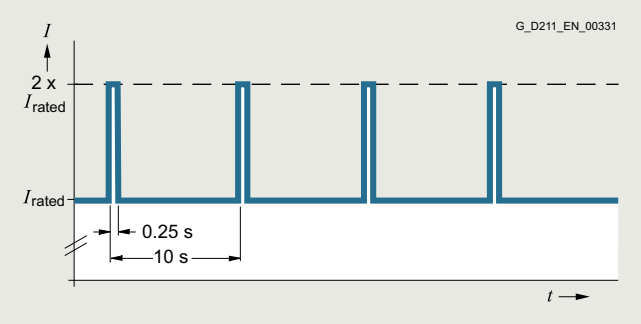


Peak current duty cycle without previous load (300% overload)

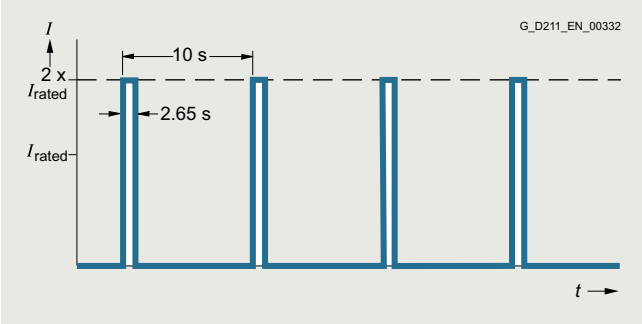
Single Motor Module	Time t at I_{max}
3 A	0.5 s
5 A	0.5 s
9 A	0.5 s
18 A	1.25 s
24 A	1.25 s
30 A	3 s

Note:

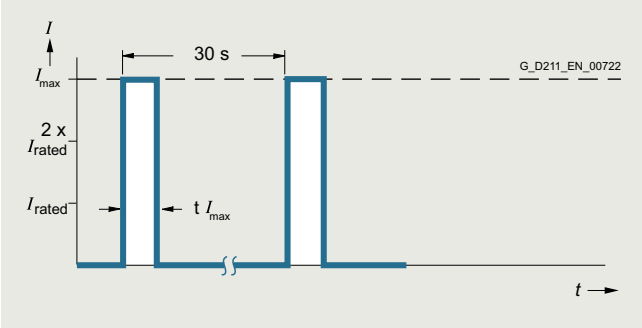
The duty cycle shown above is not permissible for a pulse frequency of 16 kHz. The current must be derated for a pulse frequency of 8 kHz.



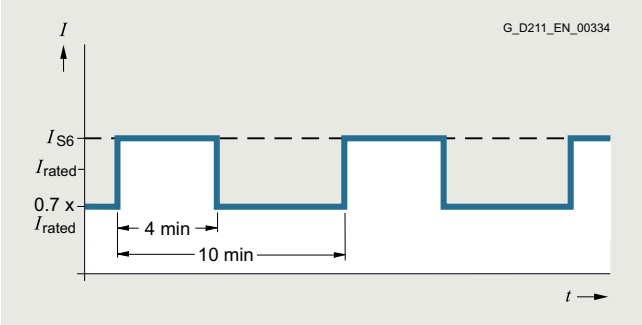
Duty cycle with previous load



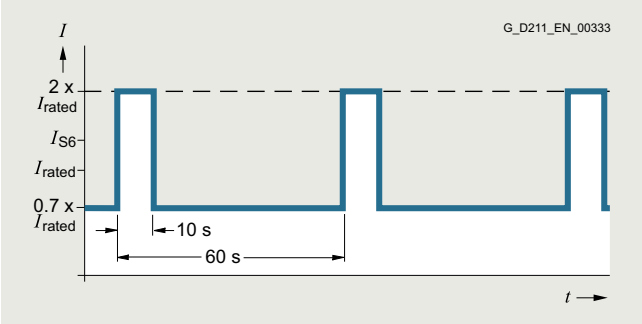
Duty cycle without previous load for a duty cycle duration of 10 s



Duty cycle without previous load for a duty cycle duration of 30 s



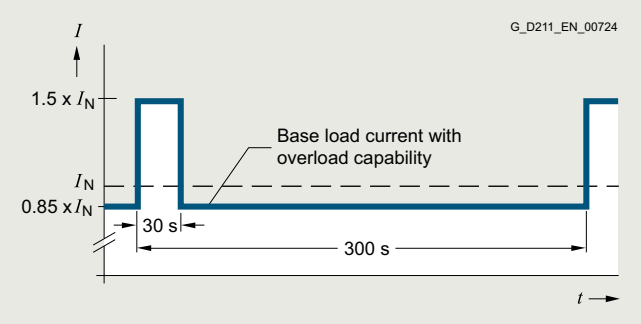
S6 duty cycle with previous load with a duty cycle duration of 600 s



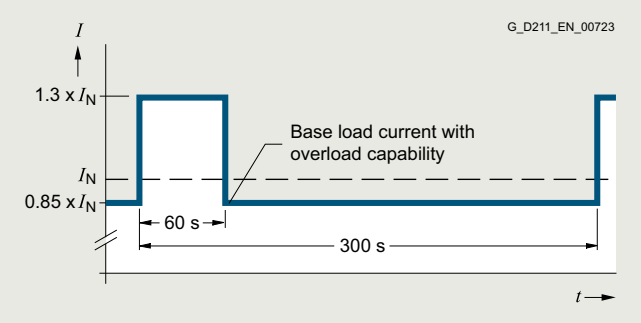
S6 duty cycle with previous load with a duty cycle duration of 60 s

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Characteristic curves

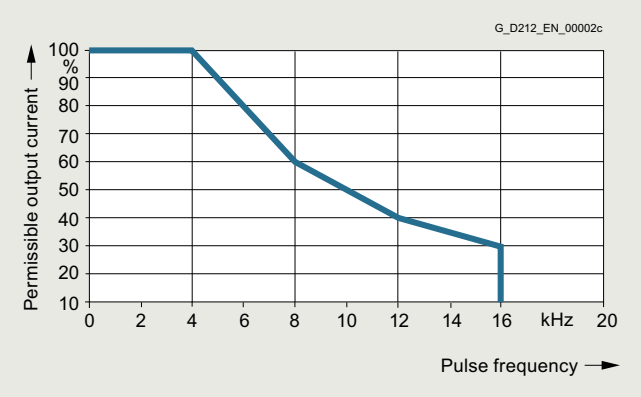


Duty cycle with 30 s overload with a duty cycle duration of 300 s

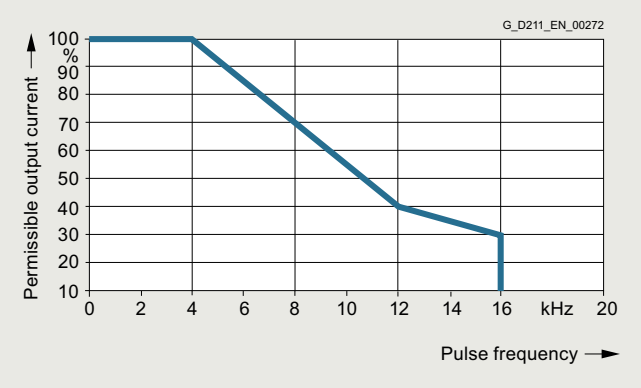


Duty cycle with 60 s overload with a duty cycle duration of 300 s

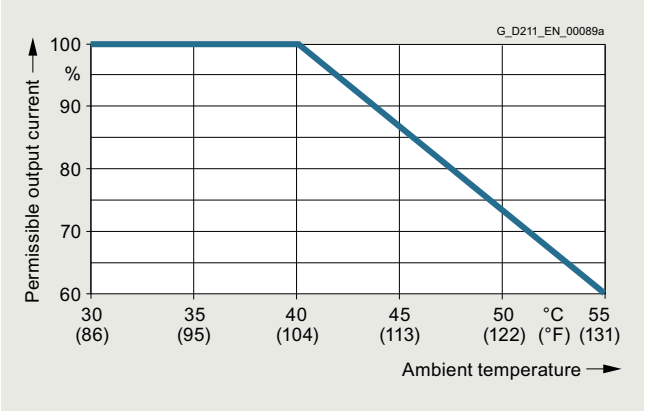
Derating characteristics



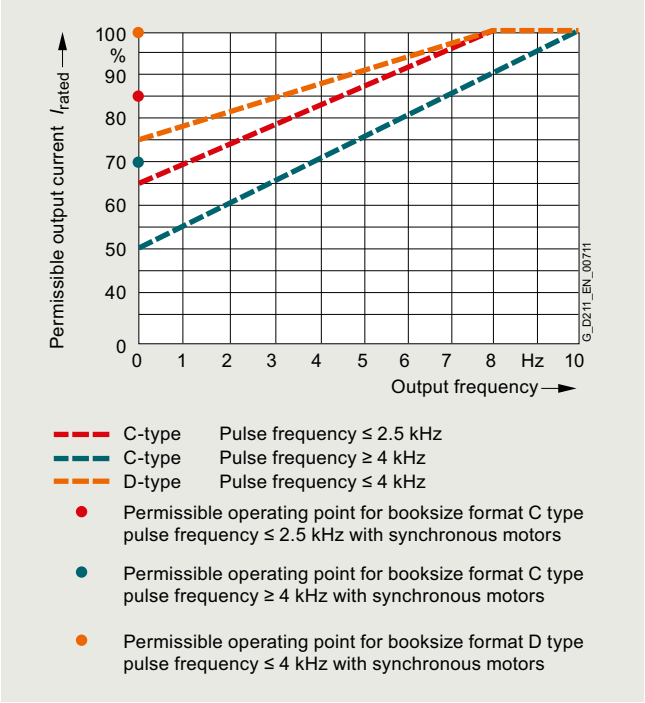
Output current depending on pulse frequency (Single Motor Modules, 3 A to 30 A)



Output current depending on pulse frequency (Single Motor Modules, 45 A to 200 A)



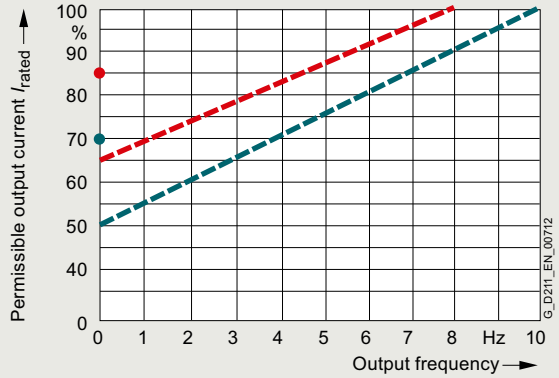
Output current dependent on ambient temperature



Output current at low output frequencies (Single Motor Modules in booksize format C/D types, 3 A to 30 A and 85 A to 200 A)

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Characteristic curves



C-type Pulse frequency ≤ 2,5 kHz
C-type Pulse frequency ≥ 4 kHz

Permissible operating point for booksize format C type pulse frequency ≤ 2,5 kHz with synchronous motors

Permissible operating point for booksize format C type pulse frequency ≥ 4 kHz with synchronous motors

Output current at low output frequencies (Single Motor Modules in booksize format C type, 45 A, and 60 A)

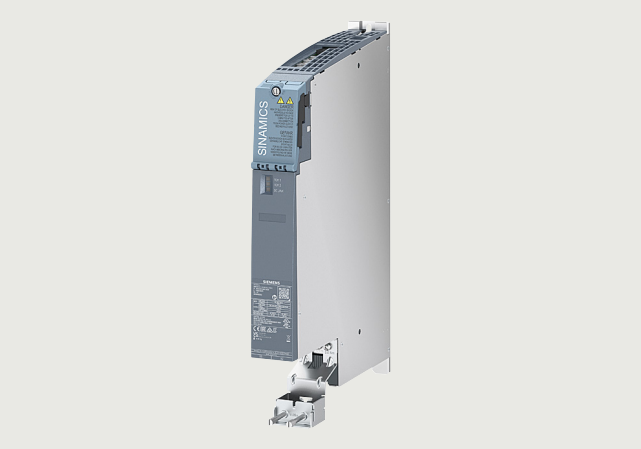
Installation altitude

- >1000 ... 4000 m (3281 ... 13124 ft) above sea level
  - Reduction of the output current by 10% per 1000 m (3281 ft), or
  - Reduction of the ambient temperature by 5 °C (41 °F) per 1000 m (3281 ft)
- >2000 ... 4000 m (6562 ... 13124 ft) above sea level
  - Operation on line supply systems with grounded neutral point, or
  - operation with an isolating transformer with secondary grounded neutral point

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Double Motor Modules in booksize format

Overview



Double Motor Module in booksize format C/D types

A Motor Module is a power unit (inverter). It generates a variable voltage with variable frequency from the DC link voltage that feeds the connected motor(s).

Motor Modules in booksize format C/D types, 2 × 3 A to 2 × 18 A

Rated current	3 A	5 A	9 A	18 A	24 A	30 A	45 A	60 A	85 A	132 A	200 A
	D types										
Single Motor Modules	**3 A / 9 A** 50 mm (1.97 in)	**5 A / 15 A** 50 mm (1.97 in)	**9 A / 27 A** 50 mm (1.97 in)	**18 A / 54 A** 50 mm (1.97 in)	**24 A / 72 A** 50 mm (1.97 in)	**30 A / 90 A** 50 mm (1.97 in)[1] 100 mm (3.94 in)	–	–	**85 A / 170 A** 150 mm (5.90 in)	**132 A / 264 A** 150 mm (5.90 in)	**200 A / 400 A** 200 mm (87.9 in)
Double Motor Modules	**2 x 3 A / 2 x 9 A** 50 mm (1.97 in)	**2 x 5 A / 2 x 15 A** 50 mm (1.97 in)	**2 x 9 A / 2 x 27 A** 50 mm (1.97 in)	**2 x 18 A / 2 x 54 A** 50 mm (1.97 in)[1] 100 mm (3.94 in)	–	–	–	–	–	–	–
Rated current / maximum current in A				**C types**							
Single Motor Modules				**18 A / 36 A** 50 mm (1.97 in)	**24 A / 48 A** 50 mm (1.97 in)	**30 A / 56 A** 50 mm (1.97 in)[1] 100 mm (3.94 in)	**45 A / 90 A** 100 mm (3.94 in)	**60 A / 120 A** 100 mm (3.94 in)	**85 A / 141 A** 150 mm (5.90 in)	**132 A / 210 A** 150 mm (5.90 in)	**200 A / 282 A** 200 mm (87.9 in)
Double Motor Module				**2 x 18 A / 2 x 54 A [1] 2 x 36 A** 50 mm (1.97 in)[1] 100 mm (3.94 in)	–	–	–	–	–	–	–

[1] (slim)

G_PM21_EN_00713

Overview of Double Motor Module in booksize format C/D types

- C type: Optimized for continuous load with up to 200 % overload (continuous motion)
- D type: Optimized for highly dynamic, intermittent duty cycles with up to 300 % overload (discontinuous motion)

Devices in booksize format C/D types are optimized for multi-axis applications and are mounted next to one another. The connection for the common DC link is an integral feature. The device is internally air cooled.

The Motor Modules in booksize format C/D types are a further development of the booksize series and offer the following advantages:

- The amount of space required beneath the Motor Modules has been reduced thanks to improvements in the design.
- In the motor plug connector, the brake conductors and the PE connection are integrated directly in the plug connector.
- The motor connections on the Double Motor Module are located side by side, resulting in a significantly improved level of accessibility.
- The fan can be simply replaced without having to remove the Motor Module.
- The Double Motor Module 2 x 18 A is available with double and treble overload as well as in an extra slim variant with a width of 50 mm (1.97 in).

The signal cable shield can be connected to the Motor Module by means of a shield connection clamp, e.g. Weidmüller type KLBUE 3-8 SC.

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Design

Double Motor Modules feature the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 2 electronics power supply connections via integrated 24 V DC busbars
- 4 DRIVE-CLiQ sockets
- 2 motor connections via connectors X1 and X2 (are not included in the scope of delivery)
- 2 Safe Stop inputs (1 input per axis)
- 2 safe motor brake controls
- 2 temperature sensor inputs for KTY84-130, Pt1000 or PTC
- 1 PE/protective conductor connection

The status of the Motor Modules is indicated via two multi-color LEDs.

The Motor Modules are supplied with a mounted shield connection plate. The associated shield connection clamp can be found in the Terminal Kit supplied.

The scope of supply of the Motor Modules includes:

- DRIVE-CLiQ cable appropriate to the width of the Motor Module for connection to the adjacent Motor Module, length = width of Motor Module + 0.06 m (2.36 in)
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- Connectors X21 and X22
- Device fans supplied from the internal voltage levels for cooling the power unit
- 1 shield connection plate with shield connection clamp
- 1 set of warning labels in 36 languages

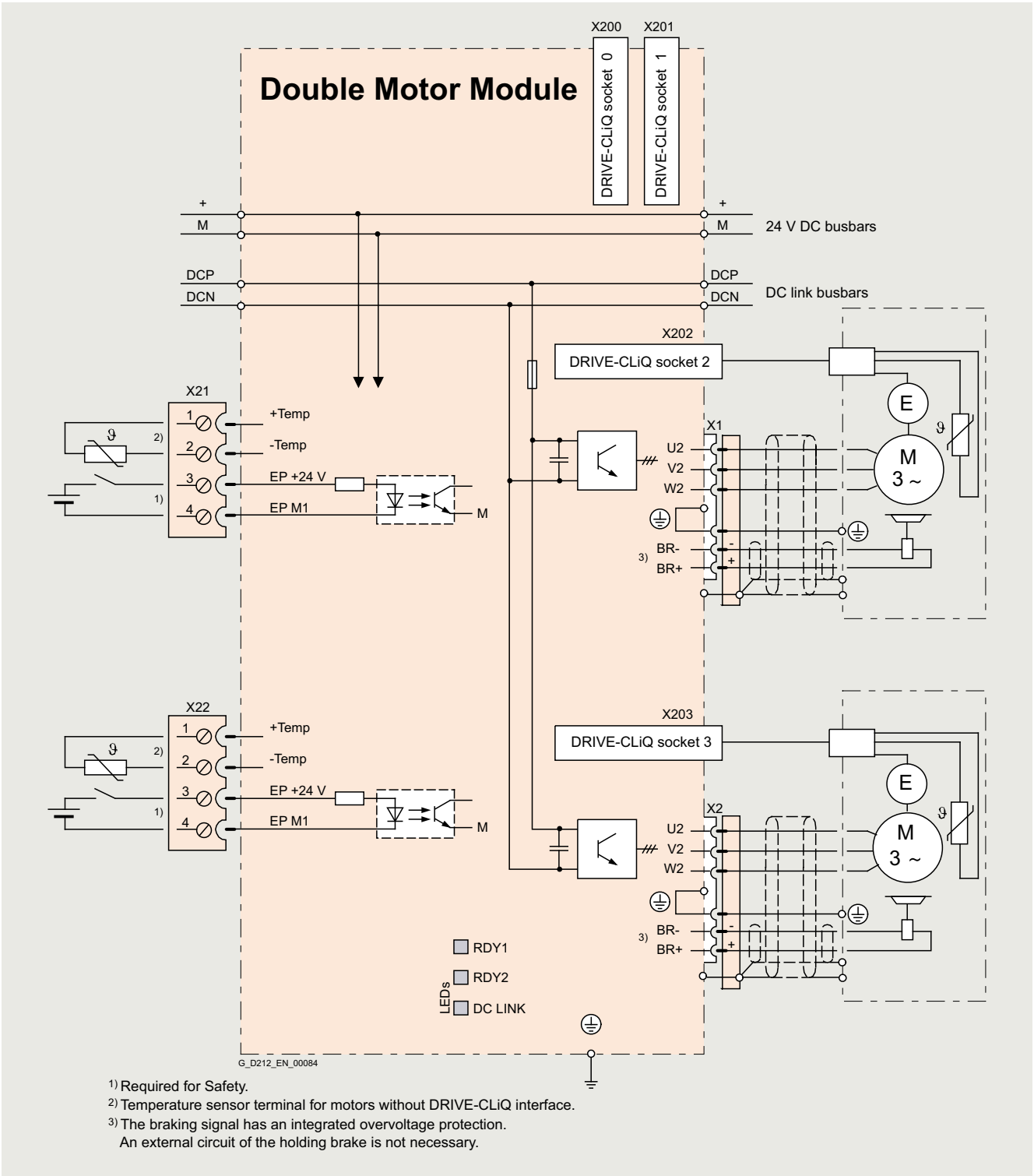
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Double Motor Modules in booksize format

Integration

The Double Motor Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit (as of SINAMICS firmware V5.2 SP3 HF10)
- SIMATIC Drive Controller (as of firmware V2.9)
- SINUMERIK ONE (as of SINUMERIK firmware V6.15 SP1)
- SINUMERIK 828D (as of SINUMERIK firmware V4.95 SP1)



Connection example of Double Motor Modules in booksize format C/D types, 2 × 3 A to 2 × 18 A

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Selection and ordering data

Rated output current	Rated power (IEC)	Double Motor Module in booksize format			
		C type	C type slim	D type	D type slim
A	kW (hp)	Article No.	Article No.	Article No.	Article No.
DC link voltage 495 ... 720 V DC					
2 × 3	2 × 1.1 (2 × 1.5)	–		**6SL5120-2UE13-0AD1**	
2 × 5	2 × 2.2 (2 × 3)	–		**6SL5120-2UE15-0AD1**	
2 × 9	2 × 4 (2 × 5)	–		**6SL5120-2UE21-0AD1**	
2 × 18	2 × 7.5 (2 × 10)	**6SL5120-2UE21-8AC1** 1)		**6SL5120-2UE21-8AD1** 1)	
			6SL5120-2UE21-8SC1		**6SL5120-2UE21-8SD1**

Description	Article No.
Accessories	
Power connector (X1/X2) with screw-type terminal At Motor Module end, with screw-type terminals 0.75 ... 6 mm^2 For Motor Modules in booksize format C/D types with rated output current of 3 ... 30 A	**6SL3162-2MA00-0AC0**
Power connector (X1/X2) with push-in connection with snap-in actuators At Motor Module end, with spring-loaded terminals 0.75 ... 6 mm^2 For Motor Modules in booksize format C/D types with rated output current of 3 ... 30 A	**6SL3162-2MB00-0AC0**
DC link rectifier adapter For direct infeed of DC link voltage Screw-type terminals 0.5 ... 10 mm^2 for Motor Modules in booksize format with a width of 50 mm (1.97 in) or 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 95 mm^2 For all Line Modules and Motor Modules in booksize format	**6SL3162-2BM01-0AA0**
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
Reinforced DC link bridge 6 mm (0.24 in) For replacement of the DC link bridge in Single Motor Modules 3 A ... 24 A Double Motor Modules 2 x 3 A ... 2 x 9 A	**6SL3162-2BB00-0AA0**

Description	Article No.
Accessories for re-ordering	
24 V jumper For connection of the 24 V busbars (for booksize format)	**6SL3162-2AA01-0AA0**
Terminal Kit (24 V jumper, plug-in terminals, DRIVE-CLiQ jumper (length = module width + 60 mm (2.36 in)), shield connection clamp with pressure plate, dust protection blanking plugs, coding plug for X1 and X2) For Motor Modules with a width of	
• 50 mm (1.97 in), Double Motor Module	**6SL5166-8AB01-0AA1**
• 100 mm (3.94 in), Double Motor Module	**6SL5166-8AD02-0AA1**
Shield connection clamp For Double Motor Modules in booksize format C/D types	**6SL3162-0AR00-0AA0**
Warning labels in 36 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, ID, IE, IL, IR, IS, IT, JP, KR, LT, LV, MT, NL, NO, PL, PT, RO, RU, SA, SE, SI, SK, TH, TR, TW	**6SL3166-3AB00-0AA0**
Dust protection blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**
Replacement fan For Motor Modules with a width of	
• 50 mm (1.97 in), C/D type (3 A ... 24 A, 30 A slim)	**6SL3162-0AS00-0AA0**
• 100 mm (3.94 in), C/D type (30 A)	**6SL5166-0AD00-0AA0**

1) Available soon

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Double Motor Modules in booksize format

Technical specifications

	Double Motor Module in booksize format 6SL5120-2UE...
DC link voltage (up to 2000 m (6562 ft) above sea level)	495 ... 720 V DC (line voltage 380 ... 480 V 3 AC)
Output frequency	
• Control type Servo	0 ... 650 Hz [1) 2) 3)]
• Control type Vector	0 ... 300 Hz [2)]
• Control mode V/f	0 ... 600 Hz [2) 3)]
Electronic power supply	24 V DC -15%/+20%
Type of cooling	Internal air cooling (power units with increased air cooling by built-in fan)
Permissible ambient and coolant temperature (air) during operation for line-side components, Line Modules and Motor Modules	-10 ... +40 °C (14 ... 104 °F) without derating, >40 ... 55 °C (104 ... 131 °F), see derating characteristics
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, > 1000 ... 4000 m (3281 ... 13124 ft) above sea level, see derating characteristics
Declarations of Conformity	CE (Low-Voltage and EMC Directives)
Certificate of suitability	cULus
Safety Integrated	Safety Integrity Level 2 (SIL 2) according to IEC 61508, Performance Level d (PL d) and Category 3 according to EN ISO 13849-1 For further information, see section Safety Integrated.

1) At rated output current (max. output frequency 1300 Hz for 62.5 µs current control cycle, 8 kHz pulse frequency, 60% permissible output current).

2) Note the correlation between max. output frequency, pulse frequency and current derating.
For further information, see section Configuration notes.

3) The output frequency is currently limited to 550 Hz. The specified values apply to systems with license for high output frequency.
For further information, see section Control Units and https://support.industry.siemens.com/cs/document/104020669

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Technical specifications

DC link voltage 495 ... 720 V DC		Double Motor Module in booksize format				
Internal air cooling C type	6SL5120 -...	–	–	–	2UE21-8AC1[10]	2UE21-8SC1
Internal air cooling D type	6SL5120 -...	2UE13-0AD1	2UE15-0AD1	2UE21-0AD1	2UE21-8AD1[10]	2UE21-8SD1
Output current						
• Rated current I_N	A	2 × 3	2 × 5	2 × 9	2 × 18	2 × 18
• For S6 duty (40%) I_{S6}						
- C type	A	–	–	–	2 × 24	2 × 24
- D type	A	2 × 4	2 × 6.7	2 × 12	2 × 24	2 × 24
• I_{max}						
- C type	A	–	–	–	2 × 36	2 × 54
- D type	A	2 × 9	2 × 15	2 × 27	2 × 54	2 × 54
Rated power [1]						
• Based on IEC [2]	kW	2 × 1.1	2 × 2.2	2 × 4	2 × 7.5	2 × 7.5
• Based on NEC [3]	hp	2 × 1.5	2 × 3	2 × 5	2 × 10	2 × 10
DC link current I_d [4]	A	7.5	12.5	22.5	45	45
Current carrying capacity						
• DC link busbars	A	100	100	100	200	100 [5]
• 24 V DC busbars [6]	A	20	20	20	20	20
DC link capacitance	µF	235	235	235	705	705
Current requirement At 24 V DC, max.	A	1	1.1	1.1	0.95	1.3
Power loss [7] typ. [8]/max.	kW	0.05/0.1	0.08/0.13	0.15/0.19	0.28/0.35	0.29
Cooling air requirement	m^3/h (ft^3/h)	22 (777)	25 (883)	27 (954)	62 (2190)	33 (1165)
Sound pressure level L_{pA} (1 m)	dB	<60	<60	<60	<60	
Motor connection U2, V2, W2		2 × plug connector (X1, X2) [9], 2 × (0.75 ... 6 mm^2)	2 × plug connector (X1, X2) [9], 2 × (0.75 ... 6 mm^2)	2 × plug connector (X1, X2) [9], 2 × (0.75 ... 6 mm^2)	2 × plug connector (X1, X2) [9], 2 × (0.75 ... 6 mm^2)	2 × plug connector (X1, X2) [9], 2 × (0.75 ... 6 mm^2)
PE connection		M5 screw	M5 screw	M5 screw	M5 screw	M5 screw
Motor brake connection		Integrated into the plug-in motor connector (X1, X2), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1, X2), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1, X2), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1, X2), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1, X2), 24 V DC, 2 A
Motor cable length, max.						
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	70 (230)	70 (230)
• Unshielded	m (ft)	75 (246)	75 (246)	75 (246)	100 (328)	100 (328)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	50 (1.97)	50 (1.97)	50 (1.97)	100 (3.94)	50 (1.97)
• Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
• Depth	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
Weight, approx.	kg (lb)	4.7 (10.4)	4.7 (10.4)	4.7 (10.4)	8.1 (17.9)	5.1 (11.2)

[1] Rated power of a typical standard asynchronous motor at 400 V 3 AC.

[2] Rated power of a typical standard asynchronous motor at 400 V 3 AC according to IEC 60947-4-1:2018 Annex G Table G.1.

[3] Rated power of a standard asynchronous motor at 460 V 3 AC according to NEC Table 430.250.

[4] Rated DC link current for dimensioning an external DC connection. For DC link current calculation for dimensioning the Line Module, see section Configuration notes.

[5] With reinforced DC link bridges, (Article No. 6SL3162-2BB00-0AA0) 200 A is possible (Accessories).

[6] If, due to a number of Line Modules and Motor Modules being mounted side by side, the current carrying capacity exceeds 20 A, an additional 24 V DC connection using a 24 V terminal adapter is required (max. cross-section 6 mm^2, max. fuse protection 20 A).

[7] Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.

[8] At max. motor cable length 30 m (98.4 ft), pulse frequency 4 kHz and DC link voltage 540 ... 600 V.

[9] Connector not included in scope of delivery, see Accessories.

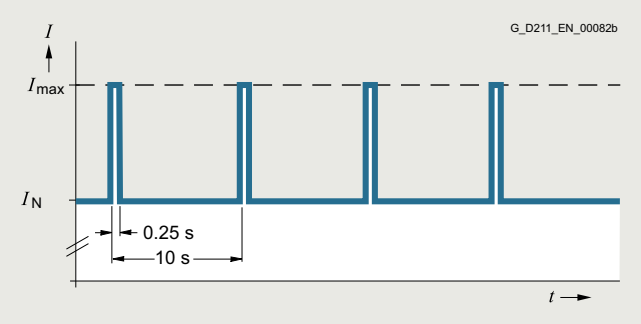
[10] Available soon

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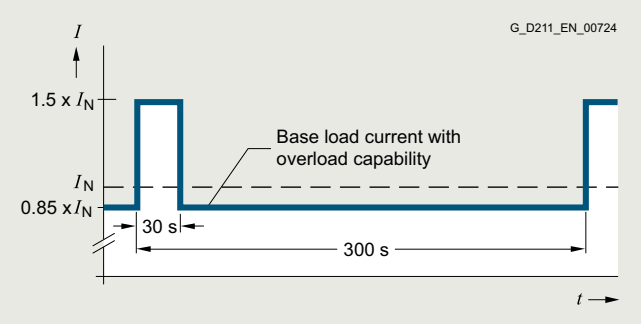
Characteristic curves

Overload capability

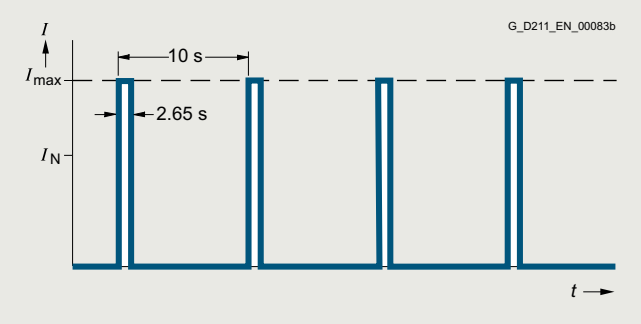
Motor Modules in booksize format C type



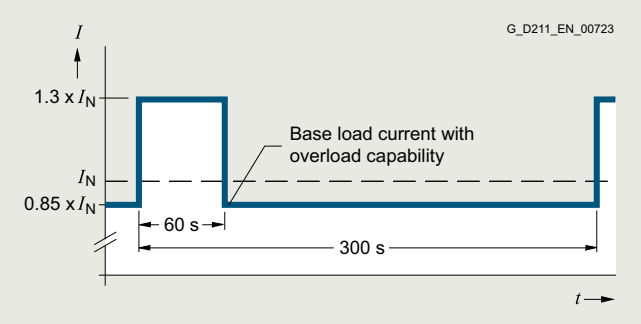
Duty cycle with previous load



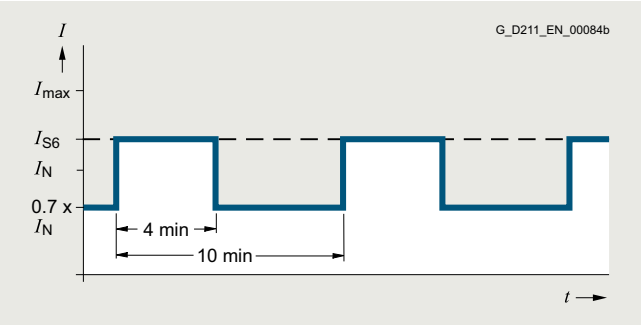
Duty cycle with 30 s overload with a duty cycle duration of 300 s



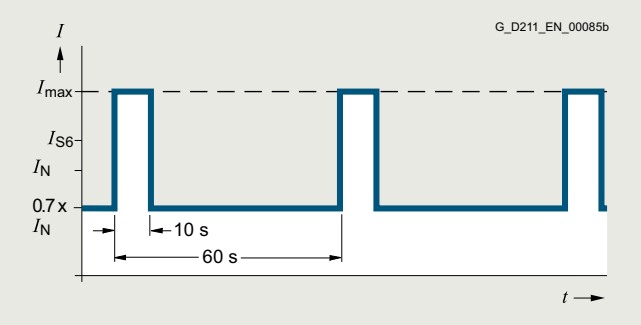
Duty cycle without initial load



Duty cycle with 60 s overload with a duty cycle duration of 300 s



S6 duty cycle with previous load with a duty cycle duration of 600 s

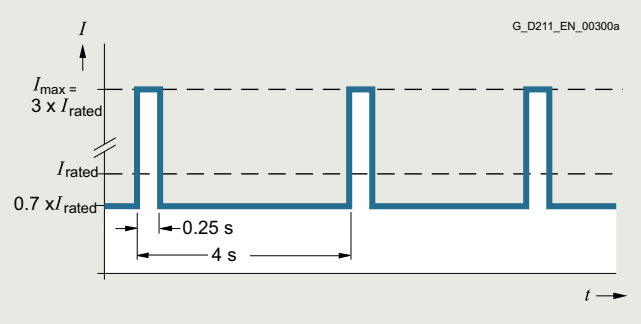


S6 duty cycle with previous load with a duty cycle duration of 60 s

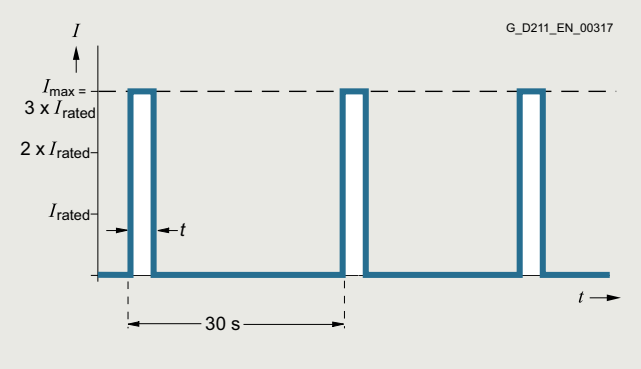
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Characteristic curves

Motor Modules in booksize format D type



Peak current duty cycle with previous load (300% overload)

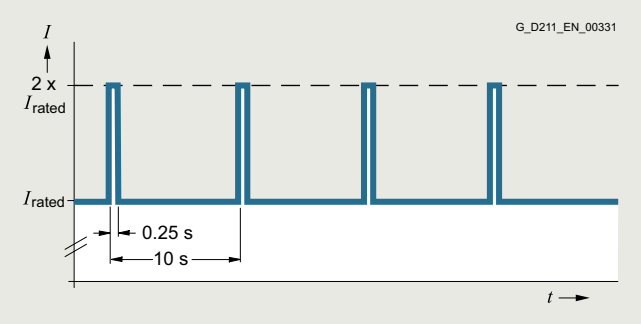


Peak current duty cycle without previous load (300% overload)

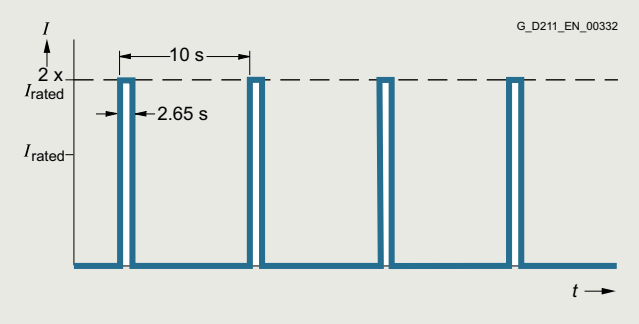
Double Motor Module	Time t at I_{max}
2 × 3 A	0.5 s
2 × 5 A	0.5 s
2 × 9 A	0.5 s
2 × 18 A	1.25 s

Note:

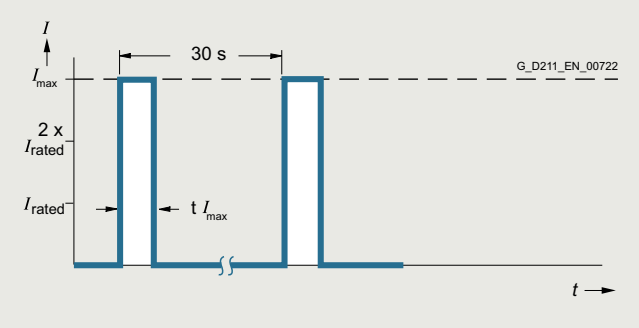
The duty cycle shown above is not permissible for a pulse frequency of 16 kHz. The current must be derated for a pulse frequency of 8 kHz.



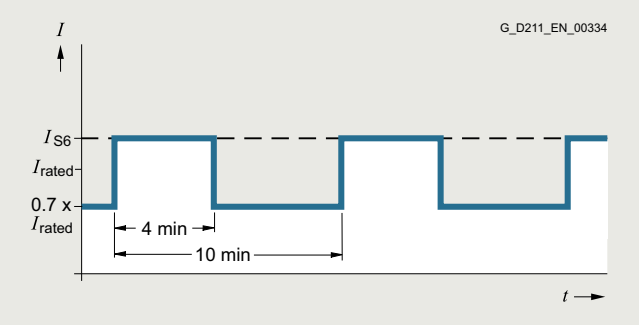
Duty cycle with previous load



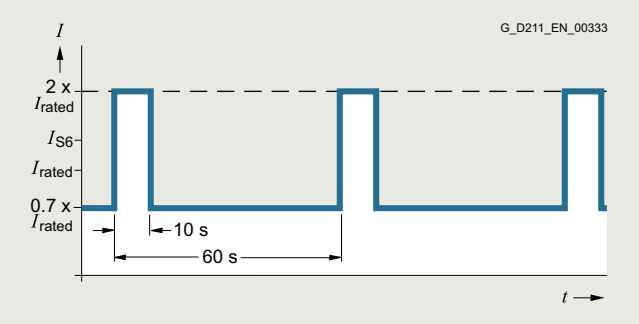
Duty cycle without previous load for a duty cycle duration of 10 s



Duty cycle without previous load for a duty cycle duration of 30 s



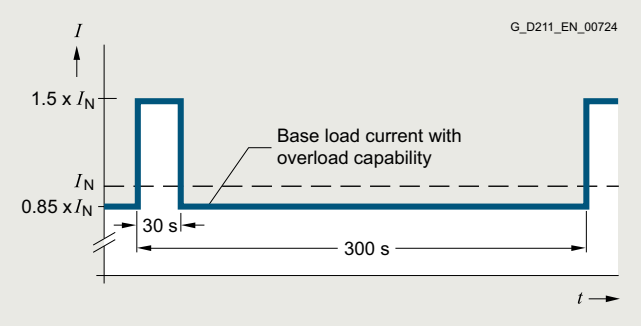
S6 duty cycle with previous load with a duty cycle duration of 600 s



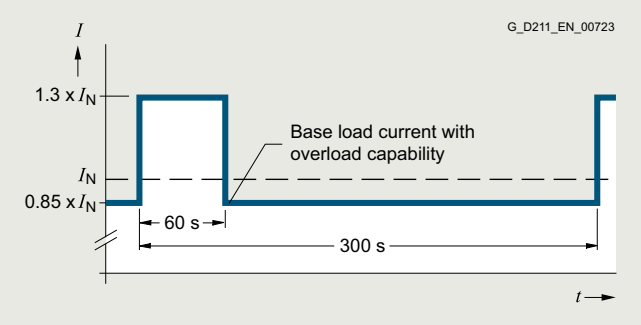
S6 duty cycle with previous load with a duty cycle duration of 60 s

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Characteristic curves

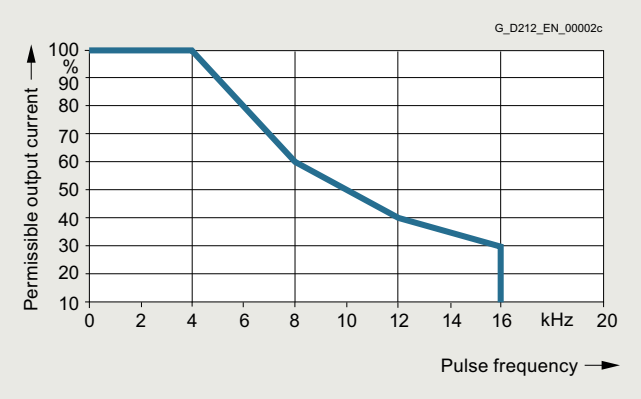


Duty cycle with 30 s overload with a duty cycle duration of 300 s

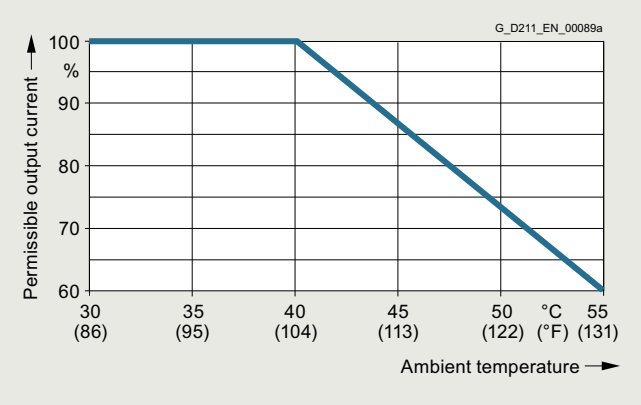


Duty cycle with 60 s overload with a duty cycle duration of 300 s

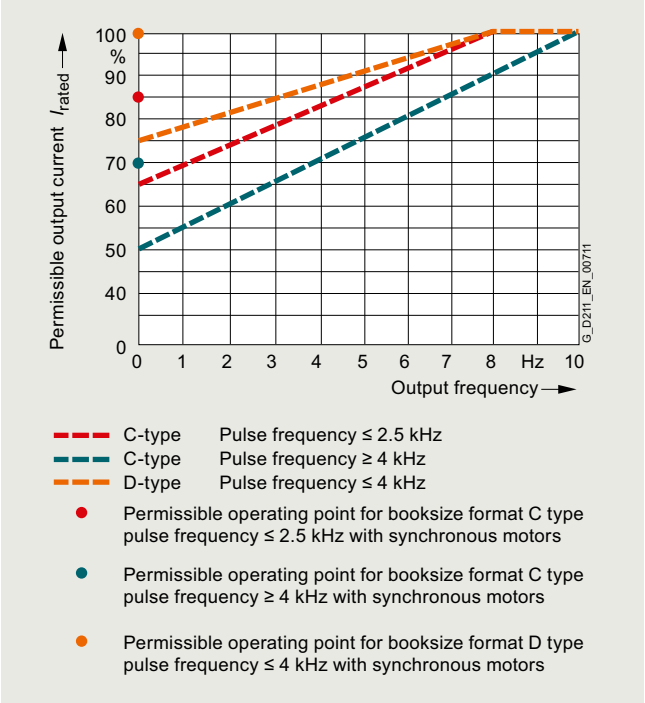
Derating characteristics



Output current dependent on pulse frequency



Output current dependent on ambient temperature



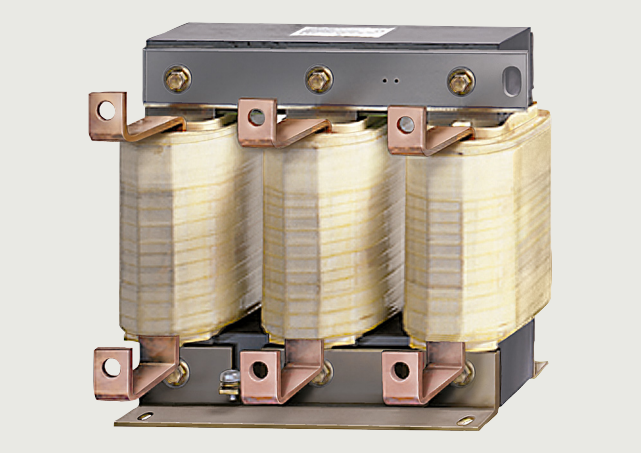
Output current at low output frequencies

Installation altitude

- >1000 ... 4000 m (3281 ... 13124 ft) above sea level
  - Reduction of the output current by 10% per 1000 m (3281 ft), or
  - Reduction of the ambient temperature by 5 °C (41 °F) per 1000 m (3281 ft)
- >2000 ... 4000 m (6562 ... 13124 ft) above sea level
  - Operation on line supply systems with grounded neutral point, or
  - operation with an isolating transformer with secondary grounded neutral point

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Overview



Motor reactors reduce the voltage load on the motor windings. At the same time, the capacitive charge/discharge currents that place an additional load on the power unit when using long motor cables, are reduced. The maximum permissible output frequency when a motor reactor is used is 120 Hz.

The motor reactors are designed for a pulse frequency of 4 kHz. Higher pulse frequencies are not permissible.

The motor reactor must be installed as close as possible to the Motor Module.

Selection and ordering data

Rated output current of Motor Module	Suitable for Motor Module in booksize format	**Motor reactor** Article No.
3 A and 2 × 3 A	6SL5120-1UE13-0AD1 6SL5120-2UE13-0AD1	**6SE7021-0ES87-1FE0**
5 A and 2 × 5 A	6SL5120-1UE15-0AD1 6SL5120-2UE15-0AD1	**6SE7021-0ES87-1FE0**
9 A and 2 × 9 A	6SL5120-1UE21-0AD1 6SL5120-2UE21-0AD1	**6SL3000-2BE21-0AA0**
18 A and 2 × 18 A	6SL5120-1UE21-8AC1 6SL5120-1UE21-8AD1 6SL5120-2UE21-8AC1 6SL5120-2UE21-8SC1 6SL5120-2UE21-8AD1 6SL5120-2UE21-8SD1	**6SE7022-6ES87-1FE0**
24 A	6SL5120-1UE22-4AC1 6SL5120-1UE22-4AD1	**6SE7024-7ES87-1FE0**
30 A	6SL5120-1UE23-0AC1 6SL5120-1UE23-0SC1 6SL5120-1UE23-0AD1 6SL5120-1UE23-0SD1	**6SE7024-7ES87-1FE0**
45 A	6SL5120-1UE24-5AC1	**6SE7027-2ES87-1FE0**
60 A	6SL5120-1UE26-0AC1	**6SL3000-2BE26-0AA0**
85 A	6SL5120-1UE28-5AC1 6SL5120-1UE28-5AD1	**6SE7031-5ES87-1FE0**
132 A	6SL5120-1UE31-3AC1 6SL5120-1UE31-3AD1	**6SE7031-8ES87-1FE0**
200 A	6SL5120-1UE32-0AC1 6SL5120-1UE32-0AD1	**6SE7032-6ES87-1FE0**

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Motor reactors for booksize format

Technical specifications

DC link voltage 510 ... 720 V DC or Line voltage 380 ... 480 V 3 AC		Motor reactor (for a 4 kHz pulse frequency)									
		6SE7021-0ES87-1FE0				6SL3000-2BE21-0AA0			6SE7022-6ES87-1FE0		
Rated current	A	5				9			18		
Maximum current	A	10				18			36		
Rated inductance	µH	1243				1000			332		
Power loss	kW	0.08				0.09			0.11		
Connection Motor Module/Motor		Screw-type terminals 4 mm^2				Screw-type terminals 16 mm^2			Screw-type terminals 16 mm^2		
PE connection		M6 screw studs				M6 screw studs			M6 screw studs		
Cable length between motor reactor and motor, max.											
(number of reactors in series)		(1)				(1)			(1)	(2)	
• Shielded	m (ft)	100 (328)				135 (443)			160 (525)	320 (1050)	
• Unshielded	m (ft)	150 (492)				200 (656)			240 (787)	480 (1575)	
Degree of protection		IP00				IP00			IP00		
Dimensions											
• Width	mm (in)	178 (7.01)				178 (7.01)			219 (8.62)		
• Height	mm (in)	153 (6.02)				159 (6.26)			180 (7.09)		
• Depth	mm (in)	88 (3.46)				111 (4.37)			119 (4.69)		
Weight, approx.	kg (lb)	5.5 (12.1)				4.8 (10.6)			7.8 (17.2)		
Certificate of suitability		cURus				cURus			cURus		
Suitable for Motor Module in booksize format	Type	6SL5120-1UE13-0AD1 6SL5120-2UE13-0AD1		6SL5120-1UE15-0AD1 6SL5120-2UE15-0AD1		6SL5120-1UE21-0AD1 6SL5120-2UE21-0AD1			6SL5120-1UE21-8AC1 6SL5120-1UE21-8AD1 6SL5120-2UE21-8AC1 6SL5120-2UE21-8SC1 6SL5120-2UE21-8AD1 6SL5120-2UE21-8SD1		
• Rated current of the Motor Module	A	3		5		9			18		

DC link voltage 510 ... 720 V DC or Line voltage 380 ... 480 V 3 AC		Motor reactor (for a 4 kHz pulse frequency)									
		6SE7024-7ES87-1FE0				6SE7027-2ES87-1FE0			6SL3000-2BE26-0AA0		
Rated current	A	30				45			60		
Maximum current	A	60				90			120		
Rated inductance	µH	180				59			62		
Power loss	kW	0.165		0.19		0.2			0.1		
Connection Motor Module/Motor		Flat connector for M8 screw				Flat connector for M8 screw			Flat connector for M8 screw		
PE connection		M6 screw studs				M6 screw studs			M6 screw studs		
Cable length between motor reactor and motor, max.											
(number of reactors in series)		(1)	(2)	(1)	(2)	(1)	(2)	(3)	(1)	(2)	(3)
• Shielded	m (ft)	190 (623)	375 (1230)	190 (623)	375 (1230)	200 (656)	400 (1312)	600 (1969)	200 (656)	400 (1312)	600 (1969)
• Unshielded	m (ft)	280 (919)	560 (1837)	280 (919)	560 (1837)	300 (984)	600 (1969)	900 (2953)	300 (984)	600 (1969)	900 (2953)
Degree of protection		IP00				IP00			IP00		
Dimensions											
• Width	mm (in)	197 (7.76)				267 (10.51)			267 (10.51)		
• Height	mm (in)	220 (8.66)				221 (8.70)			220 (8.66)		
• Depth	mm (in)	104 (4.09)				107 (4.21)			126 (4.96)		
Weight, approx.	kg (lb)	13 (28.7)				11 (24.3)			10.5 (23.2)		
Certificate of suitability		cURus				cURus			cURus		
Suitable for Motor Module in booksize format	Type	6SL5120-1UE22-4AC1 6SL5120-1UE22-4AD1		6SL5120-1UE23-0AC1 6SL5120-1UE23-0SC1 6SL5120-1UE23-0AD1 6SL5120-1UE23-0SD1		6SL5120-1UE24-5AC1			6SL5120-1UE26-0AC1		
• Rated current of the Motor Module	A	24		30		45			60		

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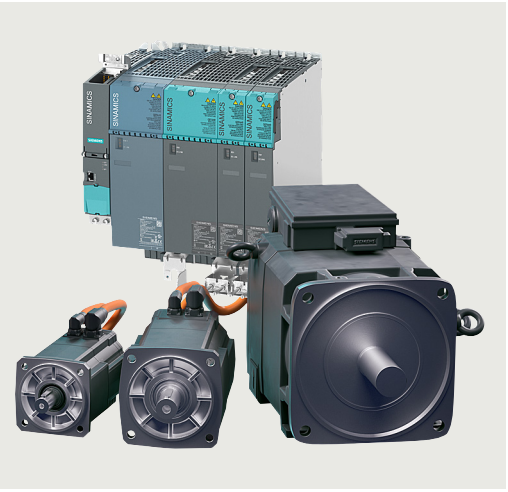
Technical specifications

DC link voltage 510 ... 720 V DC or Line voltage 380 ... 480 V 3 AC		**Motor reactor (for a 4 kHz pulse frequency)**								
		6SE7031-5ES87-1FE0			6SE7031-8ES87-1FE0			6SE7032-6ES87-1FE0		
Rated current	A	85			132			200		
Rated inductance	µH	29			23			16		
Power loss	kW	0.22			0.29			0.29		
Connection Motor Module/Motor		Flat connector for M8 screw			Flat connector for M10 screw			Flat connector for M10 screw		
PE connection		M6 screw			M6 screw			M6 screw		
Cable length between motor reactor and motor, max.										
(number of reactors in series)		(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
• Shielded	m (ft)	200 (656)	400 (1312)	600 (1969)	200 (656)	400 (1312)	600 (1969)	200 (656)	400 (1312)	600 (1969)
• Unshielded	m (ft)	300 (984)	600 (1969)	900 (2953)	300 (984)	600 (1969)	900 (2953)	300 (984)	600 (1969)	900 (2953)
Degree of protection		IP00			IP00			IP00		
Dimensions										
• Width	mm (in)	197 (7.76)			281 (11.06)			281 (11.06)		
• Height	mm (in)	220 (8.66)			250 (9.84)			250 (9.84)		
• Depth	mm (in)	128 (5.04)			146 (5.75)			146 (5.75)		
Weight, approx.	kg (lb)	20.5 (45.2)			27.2 (60)			30.6 (67.5)		
Certificate of suitability		cURus			cURus			cURus		
Suitable for Motor Module in booksize format	Type	6SL5120-1UE28-5AC1 6SL5120-1UE28-5AD1			6SL5120-1UE31-3AC1 6SL5120-1UE31-3AD1			6SL5120-1UE32-0AC1 6SL5120-1UE32-0AD1		
• Rated current of the Motor Module	A	85			132			200		

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Notes

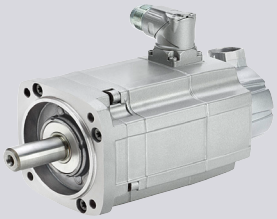
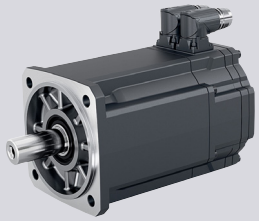
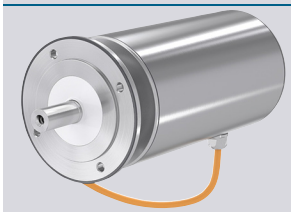
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8/2 **Overview**
8/8 Technical information for main, linear and torque motors
8/18 Suitable SINAMICS S120/ SINAMICS S220 Motor Modules in booksize format
8.1/1 SIMOTICS S servomotors
8.2/1 SIMOTICS M main motors
8.3/1 SIMOTICS L linear motors
8.4/1 SIMOTICS T torque motors

In addition, the Siemens Product Configurator can be used on the internet at the following address:
www.siemens.com/spc

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Motor type		Features	Degree of protection	Cooling method
SIMOTICS S servomotors				
	**SIMOTICS S-1FT7** Compact	Very high overload, maximum accuracy, highest degree of protection, suitability for high rotational speeds	IP64 [1] (optional IP65, IP67)	Natural cooling Forced ventilation Water cooling
	SIMOTICS S-1FT7 High Dynamic	Low moment of inertia for highest dynamic response	IP64 (optional IP65, IP67)	Forced ventilation Water cooling
	**SIMOTICS S-1FK2 and S-1FT2** Compact	Compact design, high power density Broad range of gearbox variants and options	IP64 (optional IP65, IP67)	Natural cooling Forced ventilation
	SIMOTICS S-1FK2 and S-1FT2 High Dynamic	Low moment of inertia for highest dynamic response	IP64 (optional IP65, IP67)	Natural cooling Forced ventilation
	SIMOTICS S-1FK2 High Inertia	High inertia for robust control under very high and variable load inertia	IP64 (optional IP65)	Natural cooling
	**SIMOTICS S-1FS2** Compact/High Dynamic	For maximum hygiene, purity and IP rating requirements	IP66, IP67 IP69K (does not apply to the shaft outlet)	Natural cooling

Servomotors

SIMOTICS S-1FT7/S-1FT2/1FK2 motors can be used in a wide range of applications.

In machine tools, they are mainly referred to and used as feed motors.

On production machines, e.g. printing, packaging and textile machines, they are designated as synchronous servomotors.

In addition, servomotors are used in a wide variety of industrial applications where a high dynamic response and precise motion control are required, e.g. in printing, packaging, textile and handling machines.

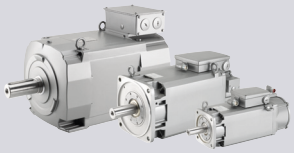
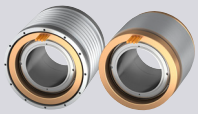
[1] Core type: IP65.

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Shaft height	Static torque M_0 Nm	Rated speed n_M r/min	Selection and ordering data
	0.01 0.1 1 10 100 1000 10000		Page
SH 36 ... SH 132	2 – 170	1500 … 6000	8.1/10
SH 80 ... SH 132	27 – 280	1500 … 4500	8.1/20
SH 63 ... SH 100	10 – 125	3000 … 6000	8.1/22
SH 63/SH 80	14 – 48	3000 … 4500	8.1/26
SH 63/SH 80	19 – 61	3000 … 4500	8.1/26
SH 30 ... SH 100	0,64 – 50	1500 … 6000	8.1/64
SH 63 ... SH 100	14.5 – 65	1500 … 4500	8.1/67
SH 30 ... SH 80	0.16 – 37.5	1500 … 6000	8.1/63
SH 63/SH 80	11.5 – 50	1500 … 3000	8.1/67
SH 63/SH 80	6 – 22	1500 … 2000	8.1/66
SH 40 ... SH80	3.1 – 23.5	2000 … 3000	8.1/70

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Motor type		Features	Degree of protection	Cooling method
SIMOTICS M main motors				
	**SIMOTICS M-1PH8** Asynchronous motor	Three-phase squirrel-cage motor without housing High power density with low construction volume	IP55	Forced ventilation
			IP23	Forced ventilation
			IP65/IP55 [1]	Water cooling
	SIMOTICS M-1PH8 Synchronous reluctance motor	High power density High efficiency	IP55	Forced ventilation
			IP65	Water cooling
	SIMOTICS M-1PH8 Synchronous motor	Permanent-magnet excited Excellent performance properties Extremely high power density with low construction volume	IP55	Forced ventilation
			IP65/IP55 [1]	Water cooling
	**SIMOTICS M-1FE1** Synchronous built-in motor	Built-in spindle motor Permanent-magnet excited High Torque	IP00	Water cooling
		Built-in spindle motor Permanent-magnet excited High Speed	IP00	Water cooling
	**SIMOTICS M-1FE2** Synchronous built-in motor	Built-in spindle motor Permanent-magnet excited High Torque	IP00	Water cooling
	**SIMOTICS M-1FE2** Asynchronous built-in motor	Built-in spindle motor Permanent-magnet excited High Torque (AL rotor, CU rotor)	IP00	Water cooling

Main motors

SIMOTICS M-1PH8/M-1FE1/M-1FE2 motors can be used in a wide range of applications.

In machine tools, they are usually designated and used as main spindle motors.

In production machines, such as printing, packaging, and re-forming machines, they are used as high-output main motors.

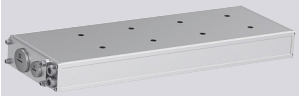
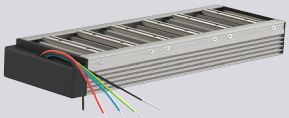
The selection and ordering data for SINAMICS S120/S220 Motor Modules are based on the booksize format by way of example. Blocksize and chassis formats are also possible. The TIA Selection Tool is used to carry out detailed configuration.

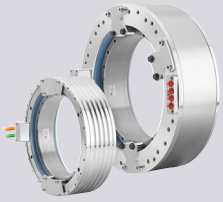
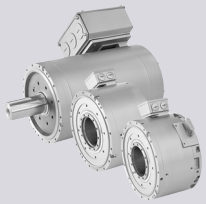
[1] From SH 180: IP55.

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Shaft height / diameter mm	Rated power P_N for S1 duty kW	Rated torque M_N	Selection and ordering data
	0.1 1 10 100 1000 10000		Page
SH 80/SH 100/ SH 132/SH 160/ SH 132/SH 180/ SH 225/SH 280	2.5 – 385	13 … 2481 Nm	8.2/6
SH 180/ SH 225/SH 280	24.5 – 630	317 … 3711 Nm	8.2/24
SH 80/ SH 100/SH 132/ SH 160/SH 180/ SH 225/SH 280	3.5 – 460	20 … 2610 Nm	8.2/34
SH 132/SH 160	21 – 101	200 … 420 Nm	8.2/50
SH 132/SH 160	32 – 121	200 … 500 Nm	8.2/56
SH 132/SH 160/ SH 180/SH 225	15.7 – 196	95 … 1086 Nm	8.2/60
SH 132/SH 160/ SH 180/SH 225	17.6 – 310	107 … 1651 Nm	8.2/66
Overall outer diameter 95/115/130/190/ 205/250/310	4 – 104	4.5 … 820 Nm	8.2/100
Overall outer diameter 120/155/180/205/ 230/270	6.5 – 94	5 … 300 Nm	8.2/104
Overall outer diameter 400	34 – 159	640 … 1530 Nm	8.2/108
Stator outer diameter 180/280	7.5 – 48	17 … 611 Nm	8.2/112

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Motor type		Features	Degree of protection	Cooling method
SIMOTICS L linear motors				
	**SIMOTICS L-1FN3** Water cooling	Synchronous linear motor Permanent-magnet excited	IP65	Water cooling
	**SIMOTICS L-1FN3** Natural cooling	Synchronous linear motor Permanent-magnet excited	IP23 [1]	Natural cooling

Motor type		Features	Degree of protection	Cooling method
SIMOTICS T torque motors				
	**SIMOTICS T-1FW6** Built-in torque motor Internal rotor - Standard	Synchronous torque motor Permanent-magnet excited Hollow shaft Individual components	IP23 [1]	Natural cooling Water cooling
	SIMOTICS T-1FW6 Built-in torque motor Internal rotor - High Speed	Synchronous torque motor Permanent-magnet excited Hollow shaft Individual components	IP23 [1]	Water cooling
	SIMOTICS T-1FW6 Built-in torque motor Internal rotor - High Torque	Synchronous torque motor Permanent-magnet excited Hollow shaft Individual components	IP23 [1]	Water cooling
	SIMOTICS T-1FW6 Built-in torque motor External rotor, Standard	Synchronous torque motor Permanent-magnet excited Hollow shaft Individual components	IP23 [1]	Water cooling
	**SIMOTICS T-1FW3** Complete torque motor	Synchronous torque motor Permanent-magnet excited Hollow shaft Plug-on shaft (for 1FW328 IP54) Solid shaft (for 1FW328 IP54)	 IP54 IP55 IP55	Water cooling

Linear and torque motors

SIMOTICS L-1FN3/T-1FW6/T-1FW3 motors can be used in a wide range of applications.

On machine tools, they are designated and used as feed motors.

On production machines, e.g. printing, packaging and textile machines, they are designated as synchronous servomotors.

The selection and ordering data for SINAMICS S120/S220 Motor Modules are based on the booksize format by way of example. Other formats are also possible. The TIA Selection Tool is available for detailed configuration.

[1] The final degree of protection (minimum degree of protection is IP54) for the installed motor is determined by the machine manufacturer.

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Primary section width mm	Feedrate force F_N N	Velocity v_{max} at F_N	Selection and ordering data
	0.1 1 10 100 1000 10000		Page
Precision cooling without with 67/96 76/105 126/141 135/150 188/248 197/257 342 351	Peak load 200 8100 Continuous load 151 10400	98.9 … 984 m/min 59 … 715 m/min	8.3/4 8.3/8
58/86/115.5	133 994	377 … 477 m/min	8.3/12

Shaft height / outer diameter mm	Rated torque M_N Nm	Rated speed n_N	Selection and ordering data
	0.1 1 10 100 1000 10000		Page
159/184	9.91 38.9	400 … 600 r/min	8.4/6
159/184/230/310/385/440/502/576/730	23.2 5760	37.2 … 1040 r/min	8.4/8
230/310/385/502/576	150 4310	92 … 1060 r/min	8.4/20
385	367 1260	112 … 436 r/min	8.4/24
436	1150 2240	44 … 116 r/min	8.4/28
SH 150/SH 200/SH 280	100 7000	150 … 1200 r/min	8.4/32

More information:

When a plant or system is down, some motor types can be delivered as replacement motors through a quick delivery service, which has the advantage that replacement parts are supplied faster.

Siemens provides comprehensive support when selecting the optimum motor solution. If you have any questions relating to SIMOTICS linear and torque motors, contact us by email at the following address:

motor.support.motioncontrol@siemens.com

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Technical specifications

Regulations, standards, and specifications

SIMOTICS M-1PH8 motors (without brake), SIMOTICS M-1FE, SIMOTICS L-1FN3 and SIMOTICS T-1FW3 conform with the relevant standards and regulations.

For technical explanations of servomotors, see Section SIMOTICS S servomotors.

As a result of the fact that in many countries the national regulations have been completely harmonized with the international IEC 60034-1 recommendation, there are no longer any differences with respect to coolant temperatures, temperature classes and temperature rise limits.

General specifications for rotating electrical machines	IEC 60034-1
Terminal designations and direction of rotation for electrical machines	IEC 60034-8
Types of construction of rotating electrical machines	IEC 60034-7
Noise limit values for rotating electrical machines	IEC 60034-9
Cooling methods of rotating electrical machines	IEC 60034-6
Sound pressure level	EN ISO1680
Degrees of protection of rotating electrical machines	IEC 60034-5
Vibration severity of rotating electrical machines	IEC 60034-14
Thermal motor protection	DIN 44081/DIN 44082
Temperature monitoring or thermal motor protection	EN 60034-111 EN 60034-11 (IEC 60034-11)
Shaft and flange accuracy	DIN 42955 (IEC 60072-1)
Cylindrical shaft ends for electrical machines	DIN 748 Part 3/ DIN IEC 60072

The guidelines relevant for SIMOTICS motors can be found in the individual Configuration Manuals. Certificates for SIMOTICS motors are available in SiePortal Support under Certificates:
https://sieportal.siemens.com/en-ww/support
The marking is made on the nameplate or on a second nameplate.

Degrees of protection for three-phase motors

A suitable degree of protection must be selected depending on the operating and environmental conditions to protect the machine against:

- Ingress of water, dust, and solid foreign objects
- Contact with rotating parts inside a motor
- Contact with live parts

Degrees of protection of electric motors are specified by a code. This comprises two identification letters, two digits and, if required, an additional identification letter.

IP (International Protection)
Identification letter designating the degree of protection against contact and the ingress of foreign bodies and water

0 to **6**
1st digit designating the degree of touch protection and protection against ingress of solid foreign objects

0 to **8**
2nd digit designating the degree of protection against the ingress of water (no oil protection)

[1] DIN VDE 0530 Part 5 or EN 60034 Part 5 specifies that there are only 5 degrees of protection for the first digit code and 8 degrees of protection for the second digit code in relation to rotating electrical machinery. However, IP6 is included in DIN 40050, which generally applies to electrical equipment.

W, S and **M**
Additional identification letters for special degrees of protection

Most motors are supplied with the following degrees of protection:

Motor	Degree of protection	1st digit: touch protection	Protection against foreign objects	2nd digit: protection against water
Internally cooled	**IP23**	Protection against finger contact	Protection against medium-sized, solid foreign objects with diameter above 12 mm (0.47 in)	Protection against spray water up to 60° from the vertical
Surface-cooled	**IP54**	Complete protection against accidental contact	Protection against damaging dust deposits	Splash water from any direction
	IP55			Jet water from any direction
	IP64	Complete protection against accidental contact	Protection against dust ingress	Splash water from any direction
	IP65 [1]			Jet water from any direction
	IP67 [1]			Motor under specified pressure and time conditions under water

Recommended degrees of protection for three-phase motors

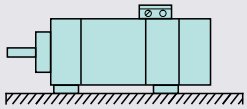
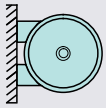
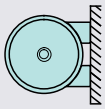
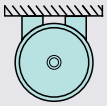
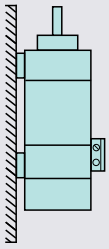
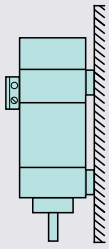
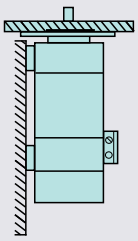
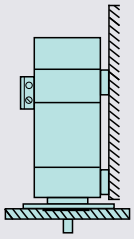
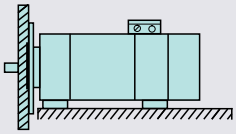
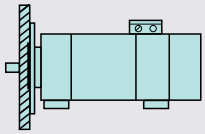
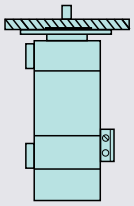
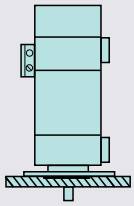
When cooling lubricants are used, protection against water alone is inadequate. The IP rating should only be considered as a guideline in this case. The motors may have to be protected by suitable covers. When selecting the motor degree of protection, the motor shaft must be equipped with a suitable seal.

The table can serve as a decision aid for selecting the required degree of protection for motors. It must be avoided that liquid accumulates on the flange when the motor is mounted with the shaft end facing upwards IM V3/IM V19/IM V6/IM V35.

Effect / Liquids	General workshop environment	Water; gen. cooling lubricant (95 % water, 5 % oil)
Dry	IP64	–
Humid/moist environment	–	IP64
Mist	–	IP65
Spray	–	IP65
Jet	–	IP67
Splash/ brief immersion/ constant immersion	–	IP67

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Technical specifications

Types of construction/mounting positions	Types of construction/mounting positions
IM B3	**IM B6**
	
IM B7	**IM B8**
	
IM V6	**IM V5**
	
IM V35 [1]	**IM V15** [1]
	
IM B35 [1]	**IM B5, IM B14**
	
IM V3, IM V19	**IM V1, IM V18**
	

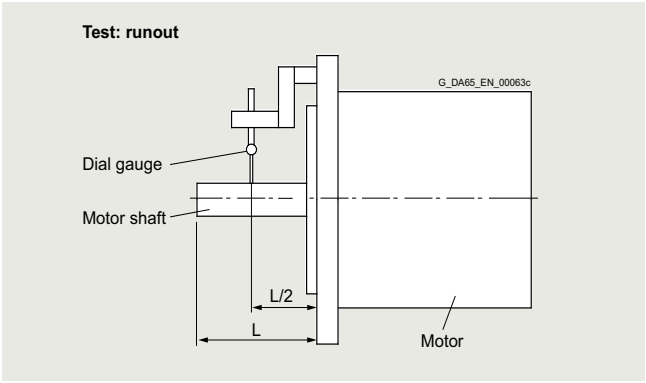
[1] Fixing on the flange and feet is necessary.

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Technical specifications

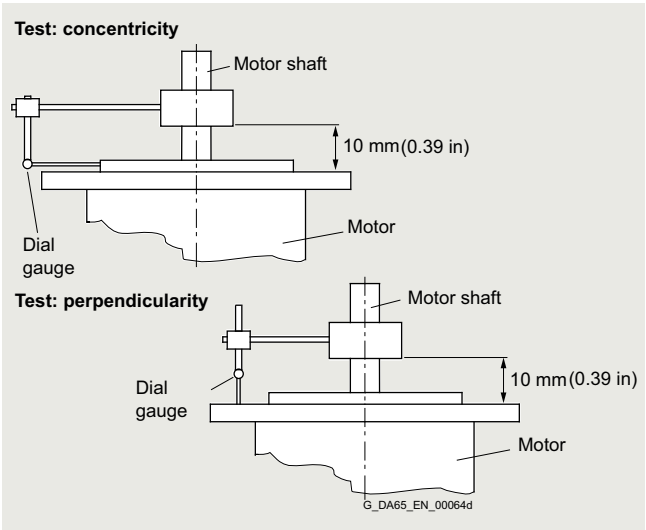
Radial eccentricity tolerance of the shaft to the housing axis for SIMOTICS M-1PH8 main motors
(referred to cylindrical shaft ends)

Shaft height	Tolerance N	Tolerance R	Tolerance SPECIAL
SH	mm (in)	mm (in)	mm (in)
80/100/132	0.05 (0.0020)	0.025 (0.0010)	0.01 (0.0004)
160/180/225	0.06 (0.0024)	0.03 (0.0012)	0.01/–/– (0.0004/–/–)
280	0.07 (0.0028)	0.035 (0.0014)	–



Concentricity and axial eccentricity tolerance of the flange surface with respect to the shaft axis of SIMOTICS M-1PH8 main motors
(based on the centering diameter of the mounting flange)

Shaft height	Tolerance N	Tolerance R	Tolerance SPECIAL
SH	mm (in)	mm (in)	mm (in)
80/100	0.1 (0.0039)	0.05 (0.0020)	0.03/0.04 (0.0012/0.0016)
132/160/180/225	0.125 (0.0049)	0.063 (0.0025)	0.04/0.04/–/– (0.0016/0.0016/–/–)
280	0.16 (0.0063)	0.08 (0.0031)	–

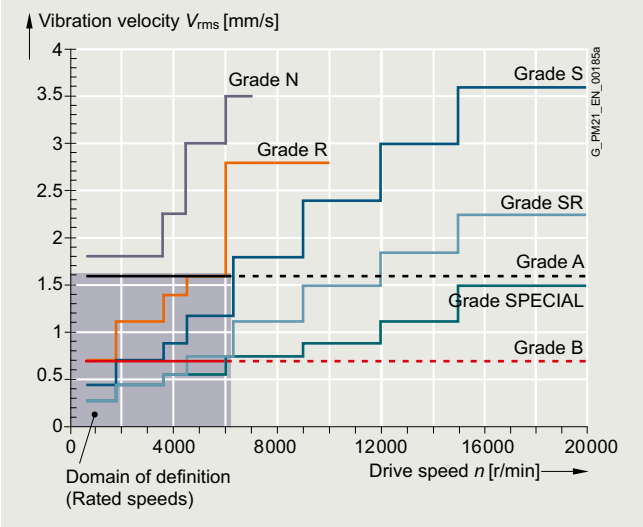


Vibration severity grades and vibration severity grade A according to IEC 60034-14 for SIMOTICS M-1PH8 main motors

SIMOTICS M-1PH8 motors comply with vibration severity grade A according to EN 60034-14 (IEC 600-34-14) as standard. The specified values refer only to the motor. The system vibration response depends on the conditions at the installation location and can result in higher vibration values at the motor.

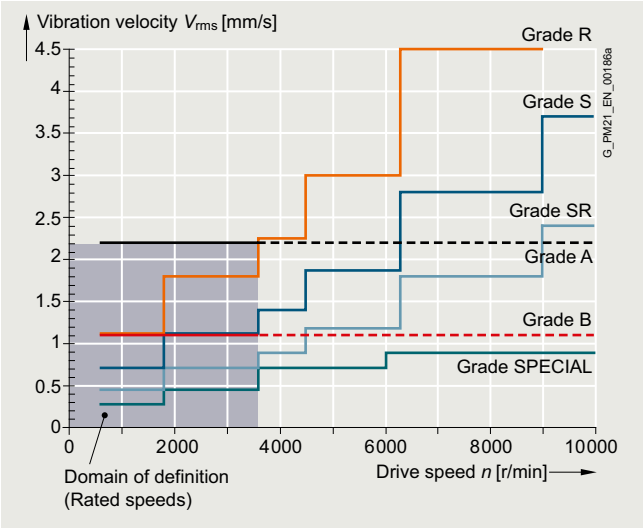
As a general rule, high radial force load capacity is not compatible with high speed and high vibration quality. The reason for this is that the different applications require different bearings.

For SIMOTICS M-1PH8 motors, an acceptance test certificate with the actual measured vibration velocities can be ordered by specifying option B35.



Vibration severity limit values for shaft heights 20 to 132

The motors maintain vibration severity grade A up to rated speed.



Vibration severity limit values for shaft heights 160 to 355

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Technical specifications

Balancing according to ISO 8821 for SIMOTICS M-1PH8 main motors

In addition to the balance quality of the motor, the vibration quality of motors with mounted belt pulleys and coupling is essentially determined by the balance quality of the mounted component.

If the motor and the mounted component are balanced separately before being assembled together, the balancing process of the belt pulley should be adapted to the balancing type of the motor. The following different balancing methods are used on motors of types SIMOTICS M-1PH8:

- Half-key balancing (an H is stamped on the shaft face)
- Full-key balancing (an F is stamped on the shaft face)
- Plain shaft end

In general, motors with a plain shaft are recommended for systems with the most stringent vibrational quality requirements. For full-key balanced motors, we recommend belt pulleys with two opposite keyways, but only one feather key in the shaft end.

Vibration stress, immitted vibration values for SIMOTICS M-1PH8 main motors and SIMOTICS T-1FW3 complete torque motors

The following maximum permissible limit value for vibration stress, but still retaining full functionality only applies to SIMOTICS T complete torque motors.

Vibration stress according to ISO 10816:

Vibration velocity V_{rms} in accordance with ISO 10816	max. 4.5 mm/s (0.18 in/s)
Vibration acceleration a_{peak} axial [1]	25 m/s² (82 ft/s²)
Vibration acceleration a_{peak} radial [1]	50 m/s² (164 ft/s²)

The following limits apply to all SIMOTICS M-1PH8 main motors for (immitted) vibration values introduced into the motor from outside:

Vibration frequency	Vibration values for shaft height 80 to shaft height 160	
< 6.3 Hz	Vibration displacement *s*	≤0.16 mm (0.006 in)
6.3 ... 250 Hz	Vibration velocity V_{rms}	≤4.5 mm/s (0.18 in/s)
> 250 Hz	Vibration acceleration *a*	≤10 m/s² (32.8 ft/s²)

Vibration frequency	Vibration values for shaft height 180 to shaft height 280	
< 6.3 Hz	Vibration displacement *s*	≤0.25 mm (0.099 in)
6.3 ... 63 Hz	Vibration velocity V_{rms}	≤7.1 mm/s (0.28 in/s)
> 63 Hz	Vibration acceleration *a*	≤4.0 m/s² (13.1 ft/s²)

The following maximum permissible radial vibration values apply to the SIMOTICS T-1FW3 torque motors in accordance with ISO 10816 [2]

Vibration frequency	Vibration values for 1FW3	
< 6.3 Hz	Vibration displacement *s*	≤0.16 mm (0.006 in)
6.3 ... 250 Hz	Vibration velocity V_{rms}	≤4.5 mm/s (0.18 in/s)
> 250 Hz	Vibration acceleration *a*	≤10 m/s² (32.8 ft/s²)

In addition, the following maximum permissible axial vibration values apply [2]

Vibration velocity	Vibration acceleration
V_{rms} = 4.5 mm/s (0.18 in/s)	a_{peak} = 2.25 m/s² (7.42 ft/s²)

Environmental conditions and installation height for naturally cooled and force-ventilated SIMOTICS M-1PH8 main motors

Operation without restriction: -15 °C to +40 °C (5 to 104 °F)

The rated power (rated torque) is applicable to continuous duty (S1) in accordance with EN 60034-1 at rated frequency, a coolant temperature of 40 °C (104 °F) and an installation altitude of up to 1000 m (3281 ft) above sea level.

SIMOTICS M-1FE./L-1FN3/T-1FW. motors have temperature class 155 (F) and are utilized to temperature class 155 (F).
SIMOTICS M-1PH8 motors are designed for temperature class 180 (H). [3]
For deviating conditions (ambient temperature > 40 °C (104 °F) or installation altitude > 1000 m (3281 ft) above sea level), you must define the permissible torque/power reduction from the following table.
Ambient temperature and installation altitude are rounded off to 5 °C and/or 500 m.

Coolant temperature for naturally cooled motors SIMOTICS T-1FW6 from -5 °C to +35 °C (23 °F to 95 °F).

Installation altitude above sea level	Coolant temperature (ambient temperature in °C)			
m (ft)	30 ... 40 °C (86 ... 104 °F)	45 °C (113 °F)	50 °C (122 °F)	55 °C [4] (131 °F)
1000 (3281)	1.00	0.96	0.92	0.87
1500 (4922)	0.97	0.93	0.89	0.84
2000 (6562)	0.94	0.90	0.86	0.82
2500 (8203)	0.90	0.86	0.83	0.78
3000 (9843)	0.86	0.82	0.79	0.75
3500 (11484)	0.82	0.79	0.75	0.71
4000 (13124)	0.77	0.74	0.71	0.67

[1] For motors with forced ventilation, the limit values for axial and radial acceleration are limited to 10 m/s² (32.8 ft/s²).

[2] Both values (vibration velocity and vibration acceleration) must be maintained at the same time.

[3] As a result of the design/version, the following motors have temperature class 155 (F):
1PH8107-1.F2/1PH8138-2/1PH8107-1.M2/1PH8164/1PH8166/1PH8168

[4] Only permissible when the flows from NDE → DE.

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Technical specifications

Note:

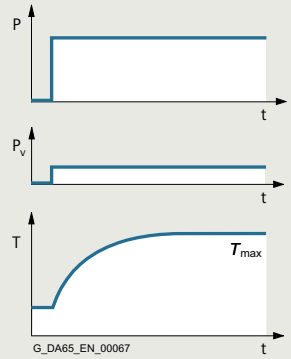
SIMOTICS motors are designed for operation with frequency converters and non-periodic load and speed changes.

Typical applications include machine tools or production machines with non-periodic speed and load cycles. This corresponds to IEC 60034-1 operating mode S9.

In operating mode S9, a correspondingly selected constant load, similar to operating mode S1, is used as a reference value.

Duty types S1 and S6 in accordance with EN 60034-1

S1: Continuous duty

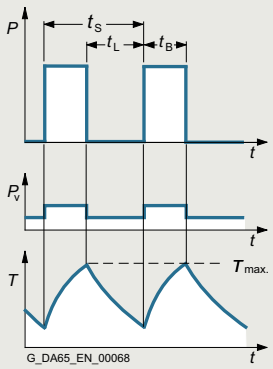


Duty cycle under constant load condition of sufficient duration to establish thermal equilibrium.

Designation: S1

Output specification (torque).

S6: Continuous duty with intermittent loading



Duty cycle comprising a sequence of identical duty cycles, each of which consists of a period of constant load followed by an interval at no load. There are no de-energized intervals.

Designation:

e.g.: S6 - 40 %, 85 kW (114 HP)

$t_r = \frac{t_B}{t_B + t_L}$

t_s = 10 min

Rated torque

The torque supplied on the shaft is indicated in Nm (lb_f-ft) in the selection and ordering data.

$$M_N = 9.55 \times P_N \times \frac{1000}{n_N}$$

P_N Rated power in kW
n_N Rated speed in r/min
M_N Rated torque in Nm

$$M_N = P_N \times \frac{5250}{n_N}$$

P_N Rated power in hp
n_N Rated speed in r/min
M_N Rated torque in lb_f-ft

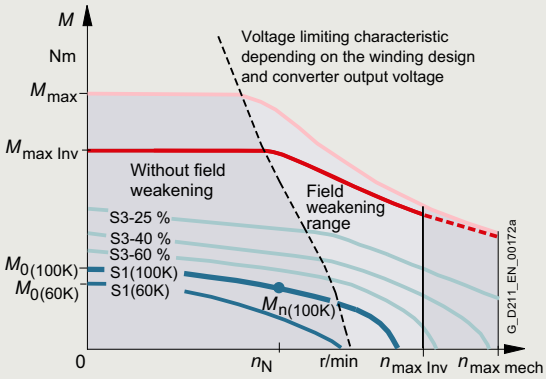
DURIGNIT IR 2000 insulation

The DURIGNIT IR 2000 insulation system consists of high-quality enamel wires and insulating materials in conjunction with solvent-free resin impregnation.

The insulating material system ensures that these motors will have a high mechanical and electrical stability, high service value, and a long service life.

The insulation system protects the winding to a large degree against aggressive gases, vapors, dust, oil, and increased air humidity. It can withstand the usual vibration stressing.

Characteristic curves



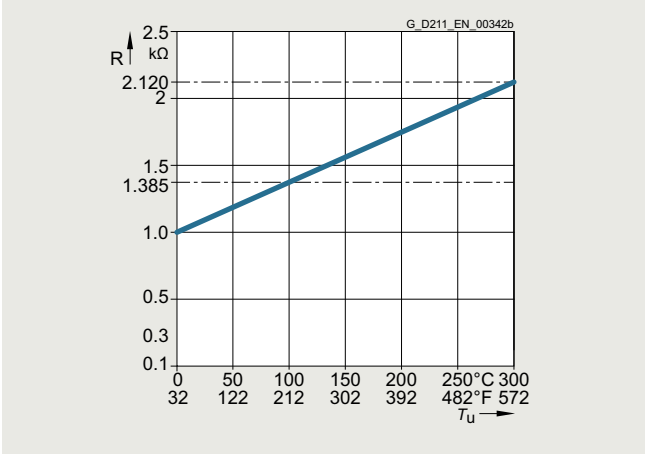
Torque characteristic of a synchronous motor operating on a converter with field weakening (example)

	Explanations
n_n	Rated speed
$n_{max\ Inv}$	Maximum permissible electric speed limit
$n_{max\ mech}$	Maximum permissible mechanical speed limit
M_0	Static torque
M_n	Rated torque at rated speed
$M_{max\ Inv}$	Achievable maximum torque with the recommended Motor Module
M_{max}	Maximum permissible torque

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Technical specifications

Motor protection



Motor protection for Pt1000 temperature sensor

The motor temperature is monitored using a Pt1000 temperature sensor integrated in the stator winding.

The Pt1000 has a linear thermal resistance characteristic. In addition, the Pt1000 has a low thermal capacity and good thermal contact with the motor winding (see characteristic).

Siemens converters calculate the motor temperature from the resistance of the temperature sensor.

The temperatures required for alarm and shutdown can be parameterized.

As standard, temperature sensors are evaluated in the SINAMICS S120 drive system.

Sensor Modules are used to evaluate the signals for SIMOTICS L-1FN3 and SIMOTICS T-1FW3:
SME120/SME125/TM120
(see SINAMICS S120 Equipment Manual).

If the motors are operated with converters that do not have a temperature sensor evaluation function, then the temperature can be evaluated using the external 3RS2600 temperature monitoring relay.

More information is provided in SiePortal:
www.siemens.com/sieportal

Paint finish for SIMOTICS M-1PH8 main motors

Motors without a paint finish have an impregnated resin coating. Motors with primer have corrosion protection.

All motors can be painted over with commercially available paints. Up to 2 additional paint coats are permissible.

SIMOTICS L-1FN3/T-1FW6 motors have no paint finish, no coating and should also not be painted over.

Version	Suitability of paint finish for climate group according to IEC 60721, Part2 – 1	
Paint finish	**Moderate** (expanded) for indoor and outdoor installation with roof protection	
	briefly	up to 150 °C (302 °F)
	continuously	up to 120 °C (248 °F)
Special paint finish	**Worldwide** (expanded) for outdoor installation	
	briefly	up to 150 °C (302 °F)
	continuously	up to 120 °C (248 °F)
	also	up to 1 % acid and alkali concentration in aggressive atmospheres or permanent wetness in protected rooms

Built-in encoder

The encoder system is not included in the scope of supply of the SIMOTICS motor series M-1FE, M-1PH2, L-1FN and T-1FW6.

SIMOTICS M-1PH8 main motors and T-1FW3 complete torque motors can be ordered without encoders or with built-in encoders. For integrated encoder systems, a distinction can be made between an encoder with and without a DRIVE-CLiQ interface.

Built-in encoder systems without DRIVE-CLiQ interface

For motors without an integrated DRIVE-CLiQ interface, the analog encoder signal in the drive system is converted into a digital signal. For these motors and external encoders, the encoder signals must be connected to SINAMICS S120 via Sensor Modules.

Built-in encoder systems with DRIVE-CLiQ interface

For motors with integrated DRIVE-CLiQ interface, the analog encoder signal is internally converted into a digital signal. No further conversion of the encoder signal in the drive system is required. The motor-internal encoders are the same encoders that are used for motors without a DRIVE-CLiQ interface. Motors with a DRIVE-CLiQ interface simplify commissioning and diagnostics, for example, as the encoder system is identified automatically.

The different encoder types, incremental, absolute or resolver, are uniformly connected with one type of MOTION-CONNECT DRIVE-CLiQ cable.

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Technical specifications

Short designations for the encoder systems

The first letters of the short designation define the encoder type. This is followed by the resolution in signals per revolution if S/R is specified (for encoders without DRIVE-CLiQ interface) or in bits if DQ or DQI is specified (for encoders with DRIVE-CLiQ interface).

Type	Resolution/interface	
AM AS IC IN HTL	xxxxS/R	Encoder without DRIVE-CLiQ interface Resolution = xxxx signals per revolution
AM AS IC IN R	xxDQ, xxDQI or xxDQC	Encoder with DRIVE-CLiQ interface Resolution = xx bits
AM	Multi-turn absolute encoder	
AS	Single-turn absolute encoder	
IC	Incremental encoder sin/cos with commutation position C and D tracks	
IN	Incremental encoder sin/cos without commutation position	
HTL	Incremental encoder with HTL signal	
R	Resolver	

Overview of motor encoder systems

Encoder without DRIVE-CLiQ interface			Encoder with DRIVE-CLiQ interface			Absolute position within one revolution (single-turn)	Absolute position over 4096 revolutions (multi-turn)	For use in safety applications
	Identification letter in the motor article number			Identification letter in the motor article number				
Encoder	1FW3	1PH8	Encoder	1FW3	1PH8			
AM2048S/R	E [1]	E	AM22DQ	F	F	Yes	Yes	Yes
AS2048S/R	N	–	AS22DQ	P	–	Yes	No	No
IC2048S/R	A	M	IC22DQ	D	D	No	No	Yes [1]
IN 512S/R	T	T	IN 20DQ	U	U	No	No	Yes
IN 256S/R	C	C	IN 19DQ	S	S	No	No	Yes
HTL1024S/R	–	H	–	–	–	No	No	No
HTL2048S/R	–	J	–	–	–	No	No	No
Resolver p=3	S	–	R15DQ	U	–	No	No	No
Resolver p=4	S	–	R15DQ	U	–	No	No	No

Not every encoder is available for every motor frame size.

– Not possible

[1] Not for 1FW3 motors

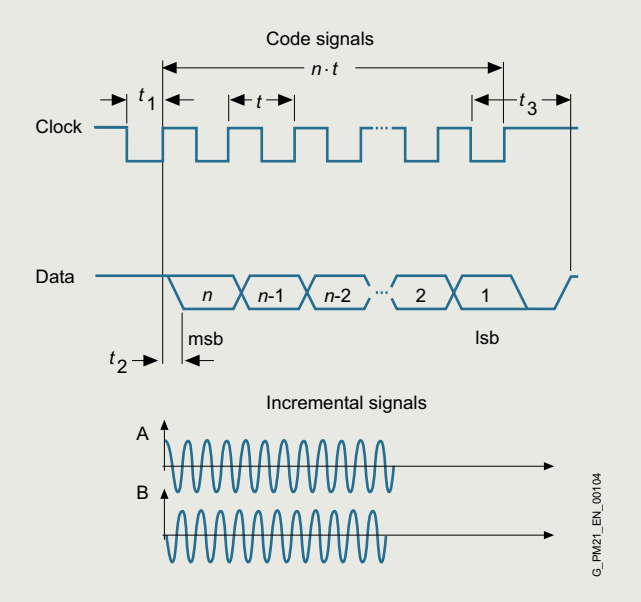
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Technical specifications

Multi-turn absolute encoder

This encoder outputs an absolute angular position between 0° and 360° in the specified resolution. An internal measuring gearbox enables it to differentiate 4096 revolutions.

For a ball screw, for example, the absolute position of the slide can be determined over a longer distance.



Multi-turn absolute encoder

Single-turn absolute encoder

This encoder outputs an absolute angular position between 0° and 360° in the specified resolution. In contrast to the multi-turn absolute encoder, it has no measuring gearbox and can therefore only supply the position value within one revolution. It does not have a traversing range.

Absolute encoders without DRIVE-CLiQ interface	
AM2048S/R encoder	Absolute encoder 2048 S/R, 4096 revolutions, multi-turn, with EnDat interface
AS2048S/R encoder	Absolute encoder 2048 S/R, single-turn
Absolute encoders with DRIVE-CLiQ interface	
AM22DQ encoder	Absolute encoder, 22-bit (resolution 4194304, encoder-internal 2048 S/R) + 12-bit multi-turn (traversing range 4096 revolutions)
AS22DQ encoder	Absolute encoder 22-bit single-turn (resolution 4194304)

Absolute encoders without DRIVE-CLiQ interface	
Supply voltage	5 V
Absolute position interface via EnDat 2.1	
• Traversing range (multi-turn) [1]	4096 revolutions
Incremental signals (sinusoidal, 1 V_{pp})	
• Signals per revolution	2048/512/32/16
Absolute encoders with DRIVE-CLiQ interface	
Supply voltage	24 V
Absolute position via DRIVE-CLiQ	
• Resolution within one revolution	$2^{24}/2^{22}/2^{20}/2^{16}/2^{15}$
• Traversing range (multi-turn) [1]	4096 revolutions

[1] Not for absolute encoder, single-turn AS.

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Technical specifications

Incremental encoder

This encoder senses relative movements and does not supply absolute position information. In combination with evaluation logic, a zero point can be determined using the integrated reference mark, which can be used to calculate the absolute position.

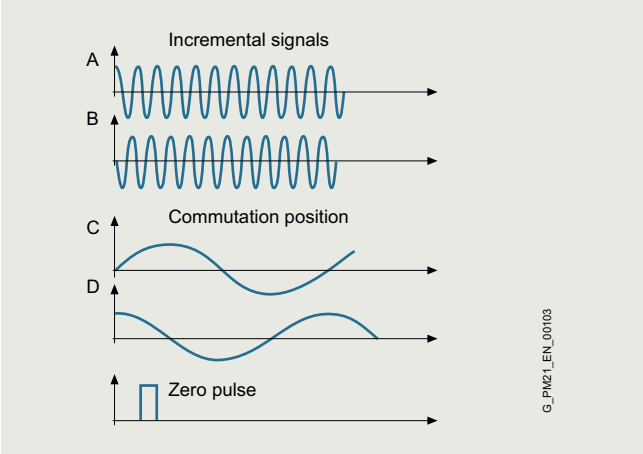
IC/IN incremental encoder (sin/cos)

The encoder outputs sine and cosine signals. These can be interpolated using evaluation logic (usually 2048 points) and the direction of rotation can be determined.

In the version with DRIVE-CLiQ interface, this evaluation logic is already integrated in the encoder.

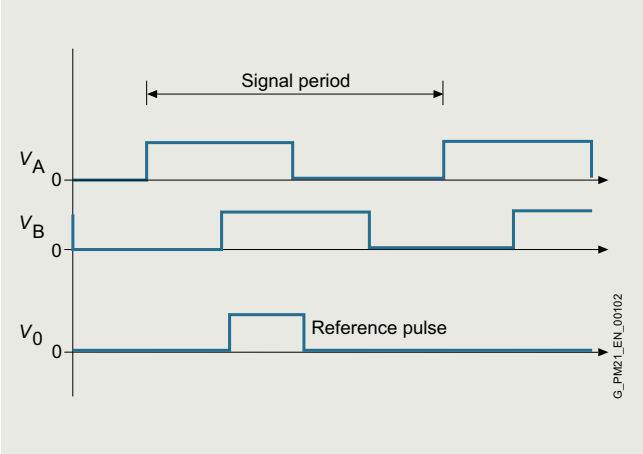
Commutation position

The position of the rotor is required for commutation of a synchronous motor. Encoders with commutation position (also called C and D tracks) detect the angular position of the rotor.



IC/IN incremental encoder (sin/cos), commutation position only for IC

HTL incremental encoder



HTL incremental encoder

Incremental encoders without DRIVE-CLiQ interface	
IC2048S/R encoder	Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks
IN512S/R encoder	Incremental encoder sin/cos 1 V_{pp} 512 S/R without C and D tracks
IN256S/R encoder	Incremental encoder sin/cos 1 V_{pp} 256 S/R without C and D tracks
HTL IC2048S/R encoder	HTL 2048 S/R incremental encoder
HTL IN1024S/R encoder	HTL 1024 S/R incremental encoder
Incremental encoders with DRIVE-CLiQ interface [1]	
IC22DQ encoder	Incremental encoder 22-bit (resolution 4194304, encoder-internal 2048 S/R) + commutation position 11-bit

IC/IN incremental encoder (sin/cos) without DRIVE-CLiQ interface	
Supply voltage	5 V
Incremental signals per revolution	
• Resolution (sin/cos)	2048
• Commutation position (for IC only)	1 sin/cos
• Reference signal	1
IC/IN incremental encoder (sin/cos) with DRIVE-CLiQ interface	
Supply voltage	24 V
Incremental signals per revolution	
• Resolution	2^{22}
• Commutation position in bit (for IC only)	11
• Reference signal	1
HTL incremental encoder without DRIVE-CLiQ interface	
Supply voltage	10 ... 30 V
Incremental signals per revolution	
• Resolution (HTL)	2048/1024
• Reference signal	1

[1] Instead of the IC22DQ incremental encoder, the SIMOTICS S-1FT7 is equipped with the single-turn AS24DQI absolute encoder.

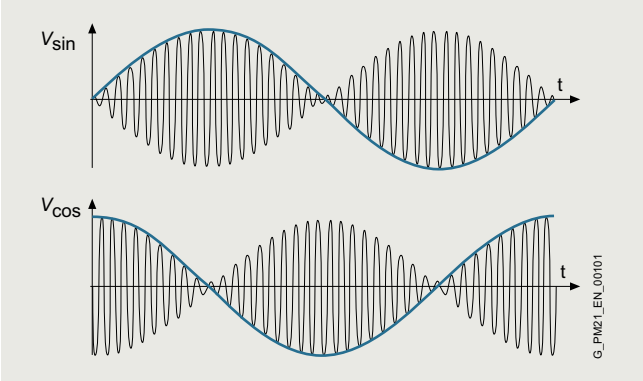
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Technical specifications

Resolver

The number of sine and cosine periods per revolution corresponds to the number of pole pairs of the resolver. In the case of a 2-pole resolver, the evaluation electronics may output an additional zero pulse per encoder revolution. This zero pulse ensures a unique assignment of the position information in relation to an encoder revolution. A 2-pole resolver can therefore be used as a single-turn encoder.

2-pole resolvers can be used for motors with any number of poles. For multi-pole resolvers, the number of motor pole pairs and the resolver are always identical. so that the resolution is correspondingly higher than with 2-pole resolvers.



Resolvers without DRIVE-CLiQ interface [1]	
Resolver p = 1	2-pole resolver
Resolver p = 3	6-pole resolver
Resolver p = 4	8-pole resolver
Resolvers with DRIVE-CLiQ interface	
R15DQ	Resolver 15-bit (resolution 32768, internal, multi-pole)

Resolvers without DRIVE-CLiQ interface	
Excitation voltage, rms	2 ... 8 V
Excitation frequency	5 ... 10 kHz
Output signals	$U_{\text{sine track}} = r \times U_{\text{excitation}} \times \sin \alpha$ $U_{\text{cosine track}} = r \times U_{\text{excitation}} \times \cos \alpha$ $\alpha = \arctan (U_{\text{sine track}}/U_{\text{cosine track}})$
Transmission ratio	$r = 0.5 \pm 5\%$
Resolvers with DRIVE-CLiQ interface	
Supply voltage	24 V
• Resolution	$2^{15}/2^{14}$

[1] Output signals:
2-pole resolver: 1 sin/cos signal per revolution
6-pole resolver: 3 sin/cos signals per revolution
8-pole resolver: 4 sin/cos signals per revolution

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Overview

SINAMICS S220 Booksize Motor Modules can replace the previously used SINAMICS S120 Booksize Motor Modules. Mixed operation of SINAMICS S120 and SINAMICS S220 Booksize components is supported.

The table below provides a comparison of SINAMICS S120 Motor Modules and their corresponding SINAMICS S220 Motor Modules to support the selection of a suitable replacement module.

Integration

Mixed operation for SINAMICS S220 and SINAMICS S120 Motor Modules is possible with:

- One Control Unit CU320-2 (from SINAMICS firmware V5.2 SP3 HF10)
- One SINUMERIK 828D (from SINUMERIK firmware V4.95 SP1)
- One SINUMERIK ONE (from SINUMERIK firmware V6.15 SP1)
- One SIMOTION (from SIMOTION firmware V5.5)
- One SIMATIC Drive Controller (from firmware V2.9).

SINAMICS S120 Motor Module Booksize format				SINAMICS S220 Motor Module Booksize format			
Article No.	Type	Rated current/ Rated power	Width mm (in)	**Article No.**	Type	Rated current/ Rated power	Width mm (in)
Double Motor Modules							
6SL3120-2TE13-0AD0	D type	2 × 3 A / 2 × 1.6 kW	50 (1.97)	**6SL5120-2UE13-0AD1**	D type	2 × 3 A / 2 × 1,1 kW	50 (1.97)
6SL3120-2TE15-0AD0	D type	2 × 5 A / 2 × 2.7 kW	50 (1.97)	**6SL5120-2UE15-0AD1**	D type	2 × 5 A / 2 × 2,2 kW	50 (1.97)
6SL3120-2TE21-0AD0	D type	2 × 9 A / 2 × 4.8 kW	50 (1.97)	**6SL5120-2UE21-0AD1**	D type	2 × 9 A / 2 × 4 kW	50 (1.97)
6SL3120-2TE21-8AC0	C type	2 × 18 A / 2 × 9.7 kW	100 (3.94)	**6SL5120-2UE21-8SC1**	C type (slim)	2 × 18 A / 2 × 7.5 kW	50 (1.97)
				6SL5120-2UE21-8AC1 *)	C type	2 × 18 A / 2 × 7.5 kW	100 (3.94)
6SL3120-2TE21-8AD0	D type	2 × 18 A / 2 × 9.7 kW	100 (3.94)	**6SL5120-2UE21-8SD1**	D type (slim)	2 × 18 A / 2 × 7.5 kW	50 (1.97)
				6SL5120-2UE21-8AD1 *)	D type	2 × 18 A / 2 × 7.5 kW	100 (3.94)
Single Motor Modules							
6SL3120-1TE13-0AD0	D type	3 A / 1.6 kW	50 (1.97)	**6SL5120-1UE13-0AD1**	D type	3 A / 1.1 kW	50 (1.97)
6SL3120-1TE15-0AD0	D type	5 A / 2.7 kW	50 (1.97)	**6SL5120-1UE15-0AD1**	D type	5 A / 2.2 kW	50 (1.97)
6SL3120-1TE21-0AD0	D type	9 A / 4.8 kW	50 (1.97)	**6SL5120-1UE21-0AD1**	D type	9 A / 4 kW	50 (1.97)
6SL3120-1TE21-8AC0	C type	18 A / 9.7 kW	50 (1.97)	**6SL5120-1UE21-8AC1**	C type	18 A / 7.5 kW	50 (1.97)
6SL3120-1TE21-8AD0	D type	18 A / 9.7 kW	50 (1.97)	**6SL5120-1UE21-8AD1**	D type	18 A / 7.5 kW	50 (1.97)
6SL3120-1TE22-4AC0	C type	24 A / 12.9 kW	50 (1.97)	**6SL5120-1UE22-4AC1**	C type	24 A / 11 kW	50 (1.97)
6SL3120-1TE22-4AD0	D type	24 A / 12.9 kW	50 (1.97)	**6SL5120-1UE22-4AD1**	D type	24 A / 11 kW	50 (1.97)
–				**6SL5120-1UE23-0SC1**	C type (slim)	30 A / 15 kW	50 (1.97)
–				**6SL5120-1UE23-0SD1**	D type (slim)	30 A / 15 kW	50 (1.97)
6SL3120-1TE23-0AC0	C type	30 A / 16 kW	100 (3.94)	**6SL5120-1UE23-0AC1**	C type	30 A / 15 kW	100 (3.94)
6SL3120-1TE23-0AD0	D type	30 A / 16 kW	100 (3.94)	**6SL5120-1UE23-0AD1**	D type	30 A / 15 kW	100 (3.94)
6SL3120-1TE24-5AC0	C type	45 A / 24 kW	100 (3.94)	**6SL5120-1UE24-5AC1**	C type	45 A / 22 kW	100 (3.94)
6SL3120-1TE26-0AC0	C type	60 A / 32 kW	100 (3.94)	**6SL5120-1UE26-0AC1**	C type	60 A / 30 kW	100 (3.94)
6SL3120-1TE28-5AA3	–	85 A / 46 kW	200 (7.87)	**6SL5120-1UE28-5AC1**	C type	85 A / 45 kW	150 (5.91)
–				**6SL5120-1UE28-5AD1**	D type	85 A / 45 kW	150 (5.91)
6SL3120-1TE31-3AA3	–	132 A / 71 kW	300 (11.81)	**6SL5120-1UE31-3AC1**	C type	132 A / 75 kW	150 (5.91)
–				**6SL5120-1UE31-3AD1**	D type	132 A / 75 kW	150 (5.91)
6SL3120-1TE32-0AA4	–	200 A / 107 kW	300 (11.81)	**6SL5120-1UE32-0AC1**	C type	200 A / 110 kW	200 (7.87)
–				**6SL5120-1UE32-0AD1**	D type	200 A / 110 kW	200 (7.87)

More information

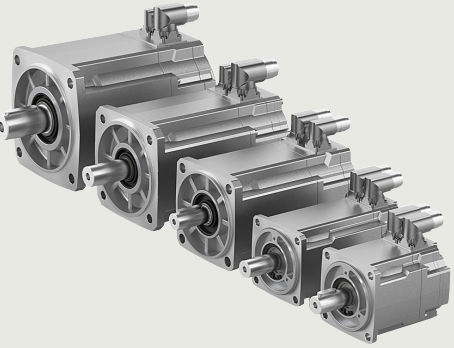
When using SINAMICS S220 Motor Modules in booksize format, please refer to the corresponding manuals:
sieportal.siemens.com/su/bkxtq

The compatibility list, including further technical details and notes for SINAMICS S120/S220 modules in booksize format is available at:
support.industry.siemens.com/cs/document/109806050

The Equipment Manual for SINAMICS S220 booksize power units with the Motor Modules is available at:
support.industry.siemens.com/cs/document/109803552

* Available soon.

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In addition, the Siemens Product Configurator can be used on the internet at the following address:
www.siemens.com/spc
See under:
Motors →
Motors for Motion Control →
SIMOTICS S servomotors

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Technical specifications

Regulations, standards, and specifications

The motors comply with the appropriate standards and regulations, see table below.

General specifications for rotating electrical machines	IEC 60034-1
Terminal designations and direction of rotation for electrical machines	IEC 60034-8
Types of construction of rotating electrical machines	IEC 60034-7
Cooling methods of rotating electrical machines	EN 60034-6
Degrees of protection of rotating electrical machines	IEC 60034-5
Vibration severity of rotating electrical machines	IEC 60034-14
Noise limit values for rotating electrical machines	IEC 60034-9
Cylindrical shaft ends for electrical machines	DIN 748-3/IEC 60072-1

SIMOTICS S motors are UL approved by Underwriters Laboratories Inc. and have the "UL Recognized Component" test mark. This is used for components that are part of a larger product or system. This confirms compliance with the corresponding American and Canadian regulations, and allows the North American market to be accessed.

SIMOTICS S motors are certified to comply with the relevant EC guidelines 2006/95/EC and 2014/35/EU as well as the relevant standards EN 60034-1:2010, EN 60204-1:2006. By applying the CE mark to the product, Siemens AG confirms this for the product, and secures the free movement of goods within the European Union.

The SIMOTICS S servomotors are usually identified using a second nameplate.

Degree of protection acc. to IEC 60034-5

A suitable degree of protection must be selected according to the operating and environmental conditions to protect the motor against damage caused by the ingress of liquids, as well as dust and foreign bodies.

The protection class designation according to IEC 60034-5 is derived from the abbreviation IP (for International Protection) and two code numbers:

First code number

6: Protection against dust ingress and complete protection against touching

Second code number

4: Protection against splashwater from any direction

5: Protection against jet water from any direction

7: Protection against short-term immersion in water

Recommended degrees of protection for three-phase motors

When cooling lubricants are used, protection against water alone is inadequate. The IP rating should only be considered as a guideline in this case. The motors may have to be protected by suitable covers. When selecting the motor degree of protection, the motor shaft must be equipped with a suitable seal. It must be avoided that liquid accumulates on the flange when the motor is mounted with the shaft end facing upwards (IM V3).

The following table provides support when selecting the appropriate degree of protection for motors.

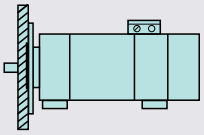
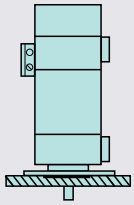
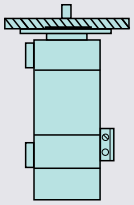
Effect	General workshop environment	Water/ general cooling lubricant (95 % water, 5 % oil)
Dry	IP64	–
Humid/moist environment	–	IP64
Mist	–	IP65
Spray	–	IP65
Jet	–	IP67
Splash/ brief immersion/ constant immersion	–	IP67

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Technical specifications

Type of construction, installation position acc. to IEC 60034-7

SIMOTICS S-1FT7, S-1FT2 and S-1FK2 motors have an IM B5 type of construction. They may also be used in mounting positions IM V1 and IM V3.

Code 1	IM B5	IM V1	IM V3
Code 2	IM 3001	IM 3011	IM 3031
			
	Horizontal flange mounting	Flange mounting, output shaft pointing vertically downwards	Flange mounting, output shaft pointing vertically upwards

Shaft and flange accuracy acc. to IEC 60072-1 or DIN 429955

Radial eccentricity tolerance of shaft in relation to housing axis

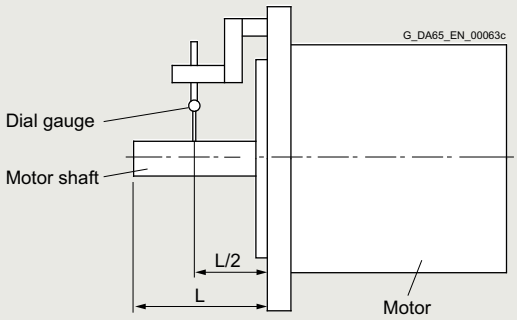
(referred to cylindrical shaft ends)

Shaft end ØD x L mm (in)	acc. to IEC 60072-1 or Tolerance "N" acc. to DIN 429955 µm	Tolerance "R" acc. to DIN 429955 µm
8 × 25 (0.31 × 0.98)	30	15
11 × 23 (0.43 × 0.91)	35	18
14 × 30 (0.55 × 1.18)		
19 × 40 (0.75 × 1.57)	40	21
24 × 50 (0.94 × 1.97)		
32 × 58 (1.26 × 2.28)	50	25
38 × 80 (1.50 × 3.15)		
48 × 82 (1.89 × 3.23)		

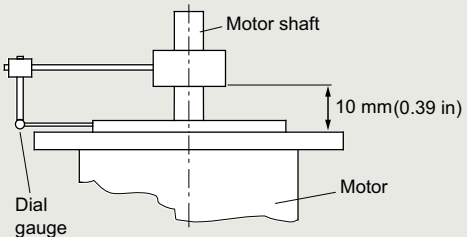
Concentricity tolerance of the centering ring and axial eccentricity tolerance of the flange surface referred to the motor shaft

Centering diameter mm (in)	acc. to IEC 60072-1 or Tolerance "N" acc. to DIN 429955 µm	Tolerance "R" acc. to DIN 429955 µm
30 (1.18)	60	30
40 (1.57)	80	40
50 (1.97)		
60 (2.36)		
70 (2.76)		
80 (3.15)		
95 (3.74)		
110 (4.33)	100	50
130 (5.12)		
180 (7.09)		
250 (9.84)	125	63

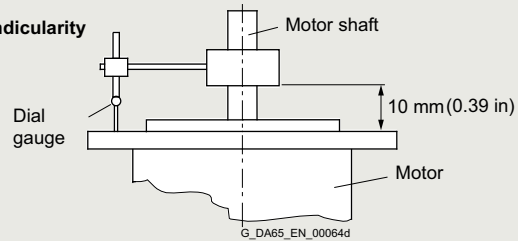
Test: runout



Test: concentricity



Test: perpendicularity



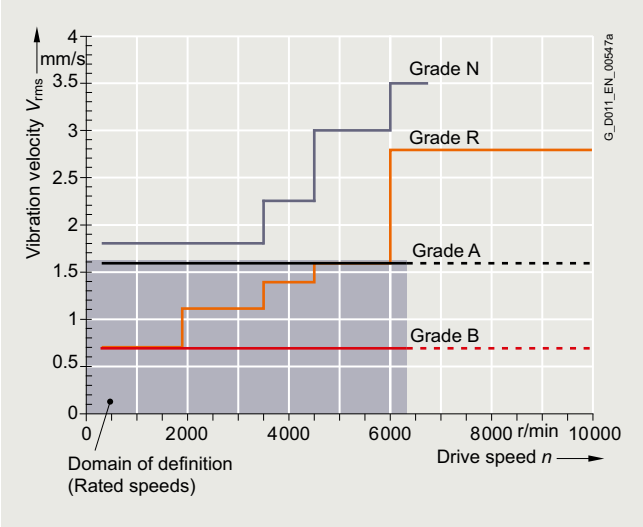
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Technical specifications

Vibration severity grades and vibration severity grades A and B according to EN 60034-14

The vibration severity is the root-mean square value (rms value) of the vibration velocity (frequency range from 10 Hz to 1000 Hz). The vibration severity is measured using electrical measuring devices according to DIN 45666.

The specified values refer only to the motor. The system vibration behavior as a result of the installation can increase these values.



Vibration severity limit values

The speeds of 1800 r/min and 3600 r/min and the corresponding limits are specified in accordance with IEC 60034-14.
The speeds of 4500 r/min and 6000 r/min and the specified values have been determined by the motor manufacturer.

The motors maintain vibration severity grade A up to the rated speed.

Balancing in accordance with ISO 21940-32

Apart from the balance quality of the motor, the vibrational quality of motors with attached belt pulleys is mainly determined by the balance state of the mounted component. If the motor and the mounted component are balanced separately before being assembled together, the balancing process of the belt pulley should be adapted to the balancing type of the motor.

The motors with feather key are always half-key balanced. In general, motors with a plain shaft are recommended for systems with the most stringent vibrational quality requirements.

Vibration stress, immitted vibration values

To function correctly and to ensure the bearing lifetime, the requirements of environmental class 3M8 (according to EN 60721-3-3 Table 6) must be complied with. The following limits are valid:

- Vibration velocity V_{rms} in accordance with ISO 10816, max. 4.5 mm/s (0.18 in/s)
- Vibration acceleration a_{peak}:

Permissible vibration acceleration a_{peak}:		
Motors with natural cooling	Axial m/s² (ft/s²)	Radial m/s² (ft/s²)
1F□7	25 (82 ft/s²)	50 (164 ft/s²)
1F□2□02	50 (164 ft/s²)	50 (164 ft/s²)
1F□2□03		
1F□2□04		
1F□2□05		
1F□2□06		
1F□2□08	25 (82 ft/s²)	50 (164 ft/s²)
1F□2□10		
Motors with forced ventilation	Axial m/s² (ft/s²)	Radial m/s² (ft/s²)
1F□7	10 (32.8 ft/s²)	10 (32.8 ft/s²)
1F□2	25 (82 ft/s²)	25 (82 ft/s²)

During transport, the motors withstand single shocks (6 ms) of up to 250 m/s². Different values may apply to motors with mounted planetary gearboxes. More information is provided in the Configuration Manual of the particular product.

Ambient temperature and installation altitude

Operating range without restrictions:

Temperature range from -15 °C to +40 °C (5.0 °F to 104 °F), installation altitude up to 1000 m (3281 ft).

If deviating conditions are encountered, the S1 characteristic of the motor must be adapted with regard to speed and torque.

The reduced S1 characteristic should be calculated according to the following formula:
$S1_{red}(n) = x_D \times S1_{40°C;\ 1000m}\,(n / x_D)$

Factors x_D for derating depending on installation altitude and ambient temperature. (intermediate values should be interpolated)

Motor	Installation altitude above sea level	Ambient temperature in °C (°F)				
	m (ft)	30 (86)	40 (104)	45 (113)	50 (122)	55 (131)
1F□7	1000 (3281)	1.05	1	0.97	0.95	0.92
	2000 (6562)	1	0.95	0.92	0.89	0.87
	3000 (9843)	0.95	0.89	0.87	0.84	0.81
	4000 (13124)	0.89	0.84	0.81	0.77	0.74
1F□2	1000 (3281)	1.05	1	0.95	0.89	0.84
	2000 (6562)	1	0.95	0.86	0.8	0.73
	3000 (9843)	0.95	0.89	0.76	0.69	0.62
	4000 (13124)	0.89	0.84	0.65	0.57	0.47

Factors for derating depending on installation altitude and ambient temperature

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Technical specifications

Encoder systems

For motors with integrated DRIVE-CLiQ interface, the encoder signal is already digitally processed in the motor, and then transferred quickly and without loss to the drive system. Motors with DRIVE-CLiQ interface simplify commissioning and diagnostics by automatically identifying the motor parameters and the encoder system.
Motors without DRIVE-CLiQ interface are intended for converters with analog encoder evaluation (e.g. from third-party manufacturers).

Single-turn absolute encoder

This encoder outputs an absolute angular position between 0° and 360° in the specified resolution. In contrast to the multi-turn absolute encoder, it does not have a revolution counter, and can therefore only supply the position value within one revolution. It does not have a traversing range.

Multi-turn absolute encoder

This encoder outputs an absolute angular position between 0° and 360° in the specified resolution. It can also count 4096 revolutions. For a ball screw, for example, the absolute position of the slide can be determined over a longer distance.

Incremental encoder

This encoder senses relative movements and does not supply absolute position information. In combination with evaluation logic, a zero point can be determined using the integrated reference mark, which can be used to calculate the absolute position.

Resolver

A resolver provides sin/cos signal periods per motor revolution according to its number of pole pairs. 2-pole resolvers can be used for motors with any number of poles. For multi-pole resolvers, the number of motor pole pairs and the resolver are always identical.

Short designation of the encoder systems

The first letters of the short designation define the encoder type. This is followed by the encoder resolution.

In the case of DRIVE-CLiQ encoders, the information is given in bits with the trailing identifier "DQ", "DQI" or "DQC".

For encoders without a DRIVE-CLiQ interface, the analog resolution follows in signals per revolution with the identifier "S/R".

Encoder type	
AM	Multi-turn absolute encoder
AS	Single-turn absolute encoder
IC	Incremental encoder sin/cos with commutation position (C/D track)
R	Resolver
Encoder resolution	
□□DQ, □□DQI, □□DQC	For encoders with DRIVE-CLiQ interface Resolution = □□ bit $=2^{□□}$ signals per revolution
□□□□S/R	For encoders without DRIVE-CLiQ interface Resolution = □□□□ signals per revolution

Paint finish

All motors can be painted over with commercially available paints. Up to 2 additional paint coats are permissible.

Holding brake

Many drives require a holding brake with an EMERGENCY STOP function for safety-related reasons or to comply with process requirements.

The brakes that are used operate according to the closed-circuit principle. A spring or permanent magnet exerts a tensile force on the brake armature disk, i.e. in a zero current state, the brake is closed and the motor shaft is held.

An electric current that flows through a coil generates an opposing field that counteracts the force effect of the spring or permanent magnet and releases or holds open the brake.

Only a limited number of braking operations can be performed for an EMERGENCY STOP or voltage failure without causing excessive wear on the holding brake.

The holding brake is not an operational brake.

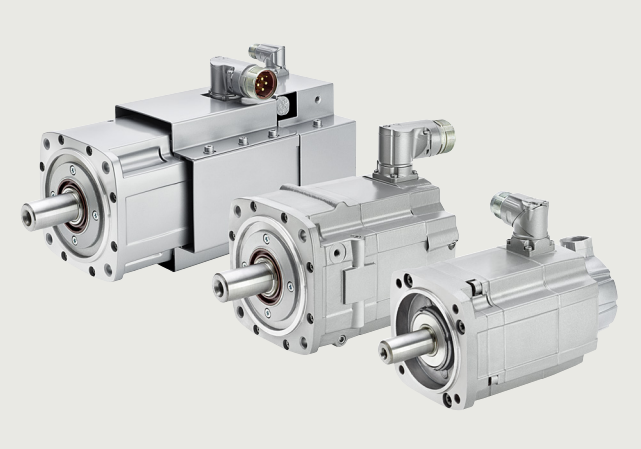
Regular dynamic braking leads to increased wear and premature brake failure. In order to ensure the functionality and specification of the brake, neither the total operating energy nor the maximum operating energy per braking operation may be exceeded.

The brake control is already fully integrated into the SINAMICS S120/S220 converter system, so that an external circuit is not necessary.

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SIMOTICS S-1FT7

Overview



SIMOTICS S-1FT7 motors, forced ventilation, water cooling and natural cooling

SIMOTICS S-1FT7 servomotors are permanent-magnet synchronous motors with very compact dimensions and an optically attractive design.

S-1FT7 motors fulfill the highest standards in terms of dynamic response, speed control range, shaft and flange accuracy. They are equipped with state-of-the-art encoder technology and optimized for operation with our fully digital drive and control systems.

Natural cooling, forced ventilation or water cooling are available as cooling methods. For natural cooling, heat is dissipated through the surface of the motor, while for forced ventilation, heat is dissipated using mounted fans.

Configuration

You can find the Configuration Manual for SIMOTICS S-1FT7 for SINAMICS S120 at:

https://support.industry.siemens.com/cs/ww/en/view/109482538

The compatibility list for SINAMICS S120/S220 Booksize Modules can be found at:

https://support.industry.siemens.com/cs/ww/en/view/109806050

The SINAMICS S220 Booksize power units along with the Motor Modules are available at:

https://support.industry.siemens.com/cs/ww/en/view/109803552

Characteristic curves

Characteristics for the SIMOTICS motors are available in the manual or via selectors through to the exact article number with the Siemens Product Configurator.

The Siemens Product Configurator can be accessed without having to register or log in:

www.siemens.com/spc

→ SIMOTICS S-1FT7 in the SPC

Dimensional drawings

Dimensional drawings for SIMOTICS motors are provided in the Siemens Product Configurator.

The Siemens Product Configurator can be accessed without having to register or log in:

www.siemens.com/spc

→ SIMOTICS S-1FT7 in the SPC

Benefits

- Excellent dynamic response over a wide speed range thanks to high overload capability ~ 4 × M_0 with natural cooling
- Wide speed control range
- High degree of ruggedness with respect to vibration and shock loads thanks to vibration-isolated encoder mounting
- High degree of protection – permits operation even under challenging ambient conditions
- Quick and easy mounting due to cross-profile (up to SH 100) and rotatable connectors with quick-release locks
- Zero-backlash holding brake

SIMOTICS S-1FT7 Compact motors

S-1FT7 Compact motors have a low torque ripple so that they are ideal for use in machine tool applications that require extremely high surface quality and optimum machining results. Their compact dimensions permit mounting in areas where space is restricted.

SIMOTICS S-1FT7 High Dynamic motors

S-1FT7 High Dynamic motors have very low rotor moments of inertia to achieve extremely good dynamic response and very short cycle times. The motors are available with forced ventilation or water cooling as cooling methods and have high continuous output ratings as a result.

Application

- High performance machine tools
- Machines with high requirements regarding dynamic response and precision, e.g.:
  - Packaging machines
  - Foil drawing systems
  - Printing machines
  - Handling equipment

More information

Some SIMOTICS S-1FT7 Compact motors are available as core types. These core types can be express-delivered as replacement motors in the event of plant outages and offer the advantage of a quicker spare parts supply. This is the reason that core types should be used whenever possible when configuring.

The selection and ordering data for SINAMICS S120 Motor Modules are based on the booksize format by way of example. Other formats are also possible. The SIZER engineering tool is available in the TIA Selection Tool for detailed configuration.

More information and download:

www.siemens.com/tst

Environmental Product Declaration (EPD)

Environmental Product Declarations (EPD) are available as PDFs for this product.

The EPD PDF provides brief and concise information about the ecological properties of a product.

You can find more information on the internet at:
https://support.industry.siemens.com/cs/ww/en/ps/13350/cert?ci=5690

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Technical specifications

General technical specifications

SIMOTICS S-1FT7 Compact/S-1FT7 High Dynamic	
Motor type	Permanent-magnet synchronous motor
Cooling	Natural cooling, forced ventilation, water cooling
Temperature monitoring	Temperature sensor in the stator winding
Type of construction according to EN 60034-7 (IEC 60034-7)	IM B5 (IM V1, IM V3)
Degree of protection according to EN 60034-5 (IEC 60034-5)	IP64, optional IP65, optional IP67
Shaft end according to DIN 748-3 (IEC 60072-1)	Plain shaft, optional feather key and keyway (half-key balancing)
Shaft and flange accuracy according to DIN 42955 (IEC 60072-1)	Tolerance N optional tolerance R in each case for radial eccentricity of the shaft end, concentricity of the centering ring, and axial eccentricity of the mounting flange to the axis of the shaft end
Vibration severity grade according to EN 60034-14 (IEC 60034-14)	Grade A, optional, Grade R is maintained up to the rated speed
Sound pressure level L_{pA} (1 m), max. according to EN ISO 1680 tolerance + 3 dB(A)	
Natural cooling/water cooling	
1FT703 ... 1FT706	65 dB(A)
1FT708 ... 1FT713	70 dB(A)
Forced ventilation	
1FT708 ... 1FT713	73 dB(A)
Connection	Connectors for signals and power, rotatable
Color of the paint finish	Pearl dark grey, similar to RAL 9023
Holding brake	optional integrated holding brake
Certificate of suitability	cURus, CE, EAC, CEL
Encoder system with DRIVE-CLiQ	
AS24DQI	Absolute encoder single-turn, 24-bit
AM24DQI	Absolute encoder 24-bit + 12-bit multi-turn
Encoder system without DRIVE-CLiQ	
IC2048S/R	Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks
AM2048S/R	Absolute encoder 2048 S/R, 4096 revolutions multi-turn

S/R = signals/revolution

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Options

Order code	Description
J..	Mounting SP+ planetary gearbox (See SIMOTICS geared motors)
K20	Reinforced bearing (information about validity and specifications can be found in the latest Configuration Manual)
L03	Version for increased vibration stress (information about validity and specification can be found in the latest Configuration Manual)
N05	Alternative shaft geometry
N16	Version for increased chemical resistance
N40	Stainless steel shaft and coating for increased chemical resistance (information about validity and specification can be found in the latest Configuration Manual)
Q12	Sealing air connection (Only in conjunction with IP67 degree of protection. Not in conjunction with terminal box.)
Q13	Customer-specific additional seal, encoder flange, An encoder cannot be replaced in the field (information regarding the validity and specification in the current Configuration Manual)
Y84	Customer specifications on rating plate (max. 30 characters) [1]
	Paint finish
K23	Special paint finish for "Worldwide" climate group: Primer and paint finish in pearl dark grey, similar to RAL 9023
K23+X..	Special paint finish for "Worldwide" climate group: Primer and paint finish can be selected from X01 to X09
K24	Primer (unpainted)
X01	Paint finish jet black, matt RAL 9005
X02	Paint finish cream white RAL 9001
X03	Paint finish reseda green RAL 6011
X04	Paint finish pebble gray RAL 7032
X05	Paint finish sky blue RAL 5015
X06	Paint finish light ivory RAL 1015
X08	Paint finish white aluminum
X09	Paint finish anthracite, similar to RAL 7016

The paint finish in standard and special colors meets the requirements for environmental conditions of climate class 3K4 according to IEC 60721-3-3 with the exception of the influencing variables "low air temperature", "condensation" and "low air pressure".

-Z must be added to the article number to order a motor with options.

[1] Additional plain text required.

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Options

N05
Alternative shaft geometry

The following versions are delivered for shaft ends with smaller dimensions:

- 1FT7034-5A.71-.... /1FT7042-5A.71-....
- 1FT7062-5A.71-.... /1FT7064-5A.71-....
- 1FT7082-5A.71-.... /1FT7084-5A.71-.... /1FT7086-5A.71-....
- 1FT7102-5A.71-.... /1FT7105-5A.71-.... /1FT7108-5A.71-....

Shaft dimensions (diameter × length) according to shaft height (SH):

- SH 36: 11 × 23 mm (0.43 × 0.91 in)
- SH 48: 14 × 30 mm (0.55 × 1.18 in)
- SH 63: 19 × 40 mm (0.75 × 1.57 in)
- SH 80: 24 × 50 mm (0.94 × 1.97 in)
- SH 100: 32 × 58 mm (1.26 × 2.28 in)

N16
Version for increased chemical resistance

Additional information is provided in the current Configuration Manual.

Option N16 is available only for naturally cooled and water-cooled SIMOTICS S-1FT7 motors with the following encoders:

- Encoder AS24DQI (DRIVE-CLiQ absolute encoder 24 bit single-turn)
- Encoder AM24DQI (DRIVE-CLiQ absolute encoder 24 bit + 12 bit multi-turn)
- Encoder AM2048S/R (absolute encoder 2048 S/R, 4096 revolutions multi-turn, with EnDat interface)

Option N16 is only available for motors with rotatable connector (connector sizes 1 and 1.5).

Option N16 is not available for SIMOTICS S-1FT7 motors SH 132.

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Selection and ordering data

Shaft height	Rated speed	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 synchronous motors Compact**	Number of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
SH	n_N	P_N at ΔT=100 K	M_0 at ΔT=100 K	M_N at ΔT=100 K	I_N at ΔT=100 K	Core type	p	J	m
	r/min	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
SIMOTICS S-1FT7 Compact for DC link voltages 510 ... 720 V DC – natural cooling									
36	6000	0.88 (1.18)	2 (1.48)	1.4 (1.0)	2.1	**1FT7034-1AK7■-1 ■ ■ 1**	3	0.85 (0.75)	3.8 (8.4)
48	3000	1.35 (1.81)	5 (3.69)	4.3 (3.2)	2.6	**1FT7044-1AF7■-1 ■ ■ 1**	3	5.43 (4.81)	7.2 (15.9)
63	3000	1.7 (2.3)	6 (4.43)	5.4 (4.0)	3.9	**1FT7062-1AF7■-1 ■ ■ 1**	5	7.36 (6.51)	7.1 (15.7)
		2.39 (3.20)	9 (6.64)	7.6 (5.6)	5.2	**1FT7064-1AF7■-1 ■ ■ 1**	5	11.9 (10.5)	9.7 (21.4)
	6000	2.13 (1.57) [2]	6 (4.43)	3.7 (2.73) [2]	5.9 [2]	**1FT7062-1AK7■-1 ■ ■ 1**	5	7.36 (6.51)	7.1 (15.7)
		2.59 (1.91) [3]	9 (6.64)	5.5 (4.06) [3]	6.1 [3]	**1FT7064-1AK7■-1 ■ ■ 1**	5	11.9 (10.5)	9.7 (21.4)
80	3000	3.24 (4.34)	13 (9.59)	10.3 (7.6)	6.6	**1FT7082-1AF7■-1 ■ ■ 1**	5	26.5 (23.5)	14 (30.9)
		4.56 (6.11)	20 (14.8)	14.5 (10.7)	8.5	**1FT7084-1AF7■-1 ■ ■ 1**	5	45.1 (39.9)	20.8 (45.9)
		5.65 (7.58)	28 (20.7)	18 (13.3)	11	**1FT7086-1AF7■-1 ■ ■ 1**	5	63.6 (56.3)	27.5 (60.6)
	4500	4.82 (3.56) [1]	20 (14.8)	11.5 (8.48) [1]	10.1 [1]	**1FT7084-1AH7■-1 ■ ■ 1**	5	45.1 (39.9)	20.8 (45.9)
		4.71 (6.32)	28 (20.7)	10 (7.38)	10	**1FT7086-1AH7■-1 ■ ■ 1**	5	63.6 (56.3)	27.5 (60.6)
100	2000	5.03 (6.75)	30 (22.1)	24 (17.7)	10	**1FT7102-1AC7■-1 ■ ■ 1**	5	91.4 (80.9)	26.1 (57.6)
		7.96 (10.67)	50 (36.9)	38 (28.0)	15	**1FT7105-1AC7■-1 ■ ■ 1**	5	178 (158)	44.2 (97.5)

Article No. supplements

With DRIVE-CLiQ interface:							
	Flange:	Classic (compatible with 1FT6/1FK7)		1			
		Recessed (more compact)		0			
	Encoder:	AS24DQI encoder	RJ45 signal port		B		
			M17 signal port		K		
		AM24DQI encoder	RJ45 signal port		C		
			M17 signal port		L		
Without DRIVE-CLiQ interface:							
	Flange:	Classic (compatible with 1FT6/1FK7)		4			
		Recessed (more compact)		5			
	Encoder:	IC2048S/R encoder	M23 signal port		N		
		AM2048S/R encoder	M23 signal port		M		
Shaft end:		**Shaft and flange accuracy:**	**Holding brake:**				
Plain shaft		Tolerance N	Without			G	
Plain shaft		Tolerance N	With			H	
Vibration severities:		**Degree of protection:**					
Grade A		IP65					1

For footnotes, see next page.

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Motor type (repeated)	Efficiency [4]	Stall current	Calculated power [8]	SINAMICS S120 Motor Module		Power cable with complete shield		
				Rated output current [5]	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system	Motor connection (and brake connection) via power connector		
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_N		Power connectors	Cable cross-section [6]	Pre-assembled cable
	%	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
1FT7034-1AK7...	90	2.7	1.26 (1.69)	3	**6SL3120-■TE13-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7044-1AF7...	92	2.8	1.57 (2.11)	3	**6SL3120-■TE13-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7062-1AF7...	91	3.9	1.88 (2.52)	5	**6SL3120-■TE15-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7064-1AF7...	93	5.7	2.83 (3.80)	9	**6SL3120-■TE21-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7062-1AK7...	90	8.4	3.77 (5.06)	9	**6SL3120-■TE21-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7064-1AK7...	91	9	5.65 (7.58)	9	**6SL3120-■TE21-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7082-1AF7...	93	7.6	4.08 (5.47)	9	**6SL3120-■TE21-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7084-1AF7...	93	11	6.28 (8.42)	18	**6SL3120-■TE21-8AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7086-1AF7...	93	15.5	8.8 (11.8)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7084-1AH7...	93	15.6	9.42 (12.63)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7086-1AH7...	91	24	13.19 (17.69)	24	**6SL3120-1 TE22-4AD0**	1.5	4 × 4	**6FX■002-5■N46-....**
1FT7102-1AC7...	93	12.5	6.28 (8.42)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 1.5	**6FX■002-5■N26-....**
1FT7105-1AC7...	93	18	10.47 (14.04)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800PLUS	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake cores [7]	**D**
Length code	**....**

For more information about cables, see MOTION-CONNECT connection systems

8 1

1) These values refer to n = 4000 r/min.
2) These values refer to n = 5500 r/min.
3) These values refer to n = 4500 r/min.
4) Optimum efficiency in continuous duty.
5) With default setting of the pulse frequency.
6) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).
7) Cable cross-section for brake connection 2 × 1.5 mm^2.
8)

$$P_{calc}[kW] = \frac{M_0[Nm] \times n_N}{9550} \qquad P_{calc}[hp] = \frac{M_0[lb_f\text{-}ft] \times n_N}{5250}$$

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SIMOTICS S-1FT7 Compact – natural cooling

Selection and ordering data

Shaft height	Rated speed	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 synchronous motors Compact**	Number of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
SH	n_N	P_N at ΔT=100 K	M_0 at ΔT=100 K	M_N at ΔT=100 K	I_N at ΔT=100 K		p	J	m
	r/min	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
SIMOTICS S-1FT7 Compact for DC link voltages 510 ... 720 V DC – natural cooling									
36	6000	0.88 (1.18)	2	1.4 (1.0)	2.1	**1FT7034-5AK7■-1 ■■■**	3	0.85 (0.75)	3.8 (8.4)
		1.07 (1.43)	3	1.7 (1.3)	2.4	**1FT7036-5AK7■-1 ■■■**	3	1.33 (1.18)	5.0 (11.0)
48	3000	0.85 (1.14)	3	2.7 (2.0)	2.1	**1FT7042-5AF7■-1 ■■■**	3	2.81 (2.49)	4.6 (10.1)
		1.35 (1.81)	5	4.3 (3.2)	2.6	**1FT7044-5AF7■-1 ■■■**	3	5.43 (4.81)	7.2 (15.9)
		1.76 (2.36)	7	5.6 (4.1)	3.5	**1FT7046-5AF7■-1 ■■■**	3	7.52 (6.66)	9.3 (20.5)
	4500	1.32 (1.77) [1]	7	3.6 (2.66) [1]	4.7 [1]	**1FT7046-5AH7■-1 ■■■**	3	7.52 (6.66)	9.3 (20.5)
	6000	1.26 (1.69)	3	2 (1.48)	3	**1FT7042-5AK7■-1 ■■■**	3	2.81 (2.49)	4.6 (10.1)
		1.41 (1.89) [3]	5	3 (2.21) [3]	3.6 [3]	**1FT7044-5AK7■-1 ■■■**	3	5.43 (4.81)	7.2 (15.9)
63	3000	1.7 (2.3)	6	5.4 (4.0)	3.9	**1FT7062-5AF7■-1 ■■■**	5	7.36 (6.51)	7.1 (15.7)
		2.39 (3.20)	9	7.6 (5.6)	5.2	**1FT7064-5AF7■-1 ■■■**	5	11.9 (10.5)	9.7 (21.4)
		2.92 (3.92)	12	9.3 (6.9)	7.2	**1FT7066-5AF7■-1 ■■■**	5	16.4 (14.5)	12.3 (27.1)
		3.42 (4.59)	15	10.9 (8.0)	6.7	**1FT7068-5AF7■-1 ■■■**	5	23.2 (20.5)	16.3 (35.9)
	4500	2.55 (3.42) [2]	12	6.1 (4.50) [2]	7.5 [2]	**1FT7066-5AH7■-1 ■■■**	5	16.4 (14.5)	12.3 (27.1)
	6000	2.13 (2.86) [4]	6	3.7 (2.73) [4]	5.9 [4]	**1FT7062-5AK7■-1 ■■■**	5	7.36 (6.51)	7.1 (15.7)
		2.59 (3.47) [3]	9	5.5 (4.06) [3]	6.1 [3]	**1FT7064-5AK7■-1 ■■■**	5	11.9 (10.5)	9.7 (21.4)

Article No. supplements

| | | | | | | | | |

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Motor type (repeated)	Effi-ciency [5]	Stall current	Calculated power [9]	**SINAMICS S120 Motor Module**		**Power cable with complete shield** Motor connection (and brake connection) via power connector		
				Rated output current [6]	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system	Power connec-tors	Cable cross-section [7]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_N				
	%	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
1FT7034-5AK7...	90	2.7	1.26 (1.69)	3	**6SL3120-■TE13-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7036-5AK7...	90	4.0	1.88 (2.52)	5	**6SL3120-■TE15-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7042-5AF7...	92	2.1	0.94 (1.26)	3	**6SL3120-■TE13-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7044-5AF7...	92	2.8	1.57 (2.11)	3	**6SL3120-■TE13-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7046-5AF7...	92	4	2.2 (3.0)	5	**6SL3120-■TE15-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7046-5AH7...	90	8.1	3.3 (4.4)	9	**6SL3120-■TE21-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7042-5AK7...	91	3.9	1.88 (2.52)	5	**6SL3120-■TE15-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7044-5AK7...	91	5.7	3.14 (4.21)	9	**6SL3120-■TE21-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7062-5AF7...	91	3.9	1.88 (2.52)	5	**6SL3120-■TE15-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7064-5AF7...	93	5.7	2.83 (3.80)	9	**6SL3120-■TE21-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7066-5AF7...	92	8.4	3.77 (5.06)	9	**6SL3120-■TE21-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7068-5AF7...	92	8.3	4.71 (6.32)	9	**6SL3120-■TE21-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7066-5AH7...	90	13.6	5.65 (7.58)	18	**6SL3120-■TE21-8AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7062-5AK7...	90	8.4	3.77 (5.06)	9	**6SL3120-■TE21-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7064-5AK7...	91	9	5.65 (7.58)	9	**6SL3120-■TE21-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:		
MOTION-CONNECT 800PLUS	**8**	
MOTION-CONNECT 500	**5**	
Without brake cores		**C**
With brake cores [8]		**D**
Length code		**....**

For more information about cables, see MOTION-CONNECT connection systems

1) These values refer to n = 3500 r/min.
2) These values refer to n = 4000 r/min.
3) These values refer to n = 4500 r/min.
4) These values refer to n = 5500 r/min.
5) Optimum efficiency in continuous duty.
6) With default setting of the pulse frequency.
7) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).
8) Cable cross-section for brake connection 2 × 1.5 mm^2.
9) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_N}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_N}{5250}$

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SIMOTICS S-1FT7 Compact – natural cooling

Selection and ordering data

Shaft height	Rated speed	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 synchronous motors Compact**	Number of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
SH	n_N	P_N at ΔT=100 K	M_0 at ΔT=100 K	M_N at ΔT=100 K	I_N at ΔT=100 K		p	J	m
	r/min	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
SIMOTICS S-1FT7 Compact for DC link voltages 510 ... 720 V DC – natural cooling									
80	2000	2.39 (3.20)	13 (9.59)	11.4 (8.4)	4.9	**1FT7082-5AC7■-1 ■ ■ ■**	5	26.5 (23.5)	14 (30.9)
		3.54 (4.75)	20 (14.8)	16.9 (12.5)	8.4	**1FT7084-5AC7■-1 ■ ■ ■**	5	45.1 (39.9)	20.8 (45.9)
		4.71 (6.32)	28 (20.7)	22.5 (16.6)	9.2	**1FT7086-5AC7■-1 ■ ■ ■**	5	63.6 (56.3)	27.5 (60.6)
	3000	3.24 (4.34)	13 (9.59)	10.3 (7.6)	6.6	**1FT7082-5AF7■-1 ■ ■ ■**	5	26.5 (23.5)	14 (30.9)
		4.55 (6.10)	20 (14.8)	14.5 (10.7)	8.5	**1FT7084-5AF7■-1 ■ ■ ■**	5	45.1 (39.9)	20.8 (45.9)
		5.65 (7.58)	28 (20.7)	18 (13.3)	11	**1FT7086-5AF7■-1 ■ ■ ■**	5	63.6 (56.3)	27.5 (60.6)
	4500	3.77 (5.06)	13 (9.59)	8 (5.90)	7.8	**1FT7082-5AH7■-1 ■ ■ ■**	5	26.5 (23.5)	14 (30.9)
		4.82 (6.46) [7]	20 (14.8)	11.5 (8.48) [7]	10.1 [7]	**1FT7084-5AH7■-1 ■ ■ ■**	5	45.1 (39.9)	20.8 (45.9)
		4.71 (6.32)	28 (20.7)	10 (7.38)	10	**1FT7086-5AH7■-1 ■ ■ ■**	5	63.6 (56.3)	27.5 (60.6)

Article No. supplements

With DRIVE-CLiQ interface:												
	Flange:	Classic (compatible with 1FT6/1FK7)		1								
		Recessed (more compact) [6]		0								
	Encoder:	AS24DQI encoder	RJ45 signal port			B						
			M17 signal port			K						
		AM24DQI encoder	RJ45 signal port			C						
			M17 signal port			L						
Without DRIVE-CLiQ interface:												
	Flange:	Classic (compatible with 1FT6/1FK7)		4								
		Recessed (more compact) [6]		5								
	Encoder:	IC2048S/R encoder	M23 signal port			N						
		AM2048S/R encoder	M23 signal port			M						
Connector outlet direction:		Connector sizes 1 and 1.5	Rotatable connector		1							
		Connector size 3 [1]	Transverse right		1							
			Transverse left		2							
			Axial NDE		3							
			Axial DE		4							
Terminal box/ cable entry: [1]		Top/transverse from right			5							
		Top/transverse from left			6							
		Top/axial from NDE			7							
		Top/axial from DE			8							
Shaft end:		**Shaft and flange accuracy:**	**Holding brake:**				A					
Feather key and keyway		Tolerance N	Without				A					
Feather key and keyway		Tolerance N	With				B					
Feather key and keyway		Tolerance R	Without				D					
Feather key and keyway		Tolerance R	With				E					
Plain shaft		Tolerance N	Without				G					
Plain shaft		Tolerance N	With				H					
Plain shaft		Tolerance R	Without				K					
Plain shaft		Tolerance R	With				L					
Vibration severity:		**Degree of protection:**										0
Grade A		IP64										1
Grade A		IP65										2
Grade A		IP67										3
Grade R		IP64										4
Grade R		IP65										5
Grade R		IP67										

For footnotes, see next page.

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Motor type (repeated)	Efficiency [2]	Stall current	Calculated power [8]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current [3]	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system	Power connectors	Cable cross-section [4]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_N				
	%	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
1FT7082-5AC7...	93	5	2.72 (3.65)	5	**6SL3120-■TE15-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7084-5AC7...	93	9	4.19 (5.62)	9	**6SL3120-■TE21-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7086-5AC7...	93	10.6	5.86 (7.86)	18	**6SL3120-■TE21-8AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7082-5AF7...	93	7.6	4.08 (5.47)	9	**6SL3120-■TE21-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7084-5AF7...	93	11	6.28 (8.42)	18	**6SL3120-■TE21-8AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7086-5AF7...	93	15.5	8.8 (11.8)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7082-5AH7...	93	12.3	6.13 (8.22)	18	**6SL3120-■TE21-8AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7084-5AH7...	93	15.6	9.42 (12.63)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7086-5AH7...	91	22.4	13.19 (17.69)	24	**6SL3120-1TE22-4AD0**	1.5	4 × 4	**6FX■002-5■N46-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800PLUS	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake cores [5]	**D**
Length code	**....**

For more information about cables, see MOTION-CONNECT connection systems

1) Connector size 3 not rotatable. An alternative terminal box can be selected for connector size 3 only.

2) Optimum efficiency in continuous duty.

3) With default setting of the pulse frequency.

4) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

5) Cable cross-section for brake connection 2 × 1.5 mm^2.

6) Only up to SH 100.

7) These values refer to n = 4000 r/min.

8) $$P_{calc}[kW] = \frac{M_0[Nm] \times n_N}{9550} \qquad P_{calc}[hp] = \frac{M_0[lb_f\text{-}ft] \times n_N}{5250}$$

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SIMOTICS S-1FT7 Compact – natural cooling

Selection and ordering data

Shaft height	Rated speed	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 synchronous motors Compact**	Number of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
SH	n_N	P_N at ΔT=100 K	M_0 at ΔT=100 K	M_N at ΔT=100 K	I_N at ΔT=100 K		p	J	m
	r/min	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
SIMOTICS S-1FT7 Compact for DC link voltages 510 ... 720 V DC – natural cooling									
100	1500	4.08 (5.47)	30 (22.1)	26 (19.2)	8	**1FT7102-5AB7■-1 ■ ■ ■**	5	91.4 (80.9)	26.1 (57.6)
		6.6 (8.9)	50 (36.9)	42 (31.0)	13	**1FT7105-5AB7■-1 ■ ■ ■**	5	178 (158)	44.2 (97.5)
		9.58 (12.85)	70 (51.6)	61 (45.0)	16	**1FT7108-5AB7■-1 ■ ■ ■**	5	248 (220)	59 (130)
	2000	5.03 (6.75)	30 (22.1)	24 (17.7)	10	**1FT7102-5AC7■-1 ■ ■ ■**	5	91.4 (80.9)	26.1 (57.6)
		7.96 (10.67)	50 (36.9)	38 (28.0)	15	**1FT7105-5AC7■-1 ■ ■ ■**	5	178 (158)	44.2 (97.5)
		10.5 (14.1)	70 (51.6)	50 (36.9)	18	**1FT7108-5AC7■-1 ■ ■ ■**	5	248 (220)	59 (130)
	3000	6.28 (8.42)	30 (22.1)	20 (14.8)	12	**1FT7102-5AF7■-1 ■ ■ ■**	5	91.4 (80.9)	26.1 (57.6)
		8.8 (11.8)	50 (36.9)	28 (20.7)	15	**1FT7105-5AF7■-1 ■ ■ ■**	5	178 (158)	44.2 (97.5)
		6.28 (8.42)	70 (51.6)	20 (14.8)	12	**1FT7108-5AF7■-1 ■ ■ ■**	5	248 (220)	59 (130)

Article No. supplements

With DRIVE-CLiQ interface:									
	Flange:	Classic (compatible with 1FT6/1FK7) Recessed (more compact) [6]		1 0					
	Encoder:	AS24DQI encoder	RJ45 signal port M17 signal port			B K			
		AM24DQI encoder	RJ45 signal port M17 signal port			C L			
Without DRIVE-CLiQ interface:									
	Flange:	Classic (compatible with 1FT6/1FK7) Recessed (more compact) [6]		4 5					
	Encoder:	IC2048S/R encoder AM2048S/R encoder	M23 signal port M23 signal port			N M			
Connector outlet direction:		Connector sizes 1 and 1.5	Rotatable connector		1				
		Connector size 3 [1]	Transverse right Transverse left Axial NDE Axial DE		1 2 3 4				
Terminal box/ cable entry: [1]		Top/transverse from right Top/transverse from left Top/axial from NDE Top/axial from DE			5 6 7 8				
Shaft end:		**Shaft and flange accuracy:**	**Holding brake:**				A B D E G H K L		
Feather key and keyway		Tolerance N	Without						
Feather key and keyway		Tolerance N	With						
Feather key and keyway		Tolerance R	Without						
Feather key and keyway		Tolerance R	With						
Plain shaft		Tolerance N	Without						
Plain shaft		Tolerance N	With						
Plain shaft		Tolerance R	Without						
Plain shaft		Tolerance R	With						
Vibration severity:		**Degree of protection:**						0 1 2 3 4 5	
Grade A		IP64							
Grade A		IP65							
Grade A		IP67							
Grade R		IP64							
Grade R		IP65							
Grade R		IP67							

For footnotes, see next page.

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Motor type (repeated)	Effi-ciency [2]	Stall current	Calculated power [7]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current [3]	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system	Power connec-tors	Cable cross-section [4]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_N				
	%	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
1FT7102-5AB7...	93	9	4.71 (6.32)	9	**6SL3120-■TE21-0AD0**	1.5	4 × 1.5	**6FX■002-5■N26-....**
1FT7105-5AB7...	93	15	7.85 (10.53)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 1.5	**6FX■002-5■N26-....**
1FT7108-5AB7...	93	18	10.99 (14.74)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7102-5AC7...	93	12.5	6.28 (8.42)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 1.5	**6FX■002-5■N26-....**
1FT7105-5AC7...	93	18	10.47 (14.04)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7108-5AC7...	93	25	14.66 (19.66)	30	**6SL3120-1TE23-0AD0**	1.5	4 × 4	**6FX■002-5■N46-....**
1FT7102-5AF7...	93	18	9.42 (12.63)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7105-5AF7...	94	26	15.71 (21.07)	30	**6SL3120-1TE23-0AD0**	1.5	4 × 4	**6FX■002-5■N46-....**
1FT7108-5AF7...	93	36	21.99 (29.49)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 6	**6FX■002-5■N54-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800PLUS MOTION-CONNECT 500	**8** **5**
Without brake cores With brake cores [5]	**C** **D**
Length code	**....**

For more information about cables, see MOTION-CONNECT connection systems

1) Connector size 3 not rotatable. An alternative terminal box can be selected for connector size 3 only.
2) Optimum efficiency in continuous duty.
3) With default setting of the pulse frequency.
4) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).
5) Cable cross-section for brake connection 2 × 1.5 mm^2.
6) Only up to SH 100.
7) $P_{calc}[kW] = \frac{M_0[Nm] \times n_N}{9550}$ $P_{calc}[hp] = \frac{M_0[lb_f\text{-}ft] \times n_N}{5250}$

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SIMOTICS S-1FT7 Compact – natural cooling

Selection and ordering data

Shaft height	Rated speed	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 synchronous motors Compact**	Number of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
SH	n_N	P_N at ΔT=100 K	M_0 at ΔT=100 K	M_N at ΔT=100 K	I_N at ΔT=100 K		p	J	m
	r/min	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
SIMOTICS S-1FT7 Compact for DC link voltages 510 ... 720 V DC – natural cooling									
132	1500	10.52 (14.11)	90 (66.4)	67 (49.4)	17.4	**1FT7132-5AB7■-1 ■ ■ ■**	4	459 (406)	76 (168)
		12.88 (17.27)	118 (87.0)	82 (60.5)	22.0	**1FT7134-5AB7■-1 ■ ■ ■**	4	604 (535)	92 (203)
		14.45 (19.38)	140 (103)	92 (67.9)	25.0	**1FT7136-5AB7■-1 ■ ■ ■**	4	748 (662)	108 (238)
		16.96 (22.74)	170 (125)	108 (79.7)	28.5	**1FT7138-5AB7■-■ ■ ■ ■**	4	896 (793)	124 (273)
	2000	11.52 (15.45)	90 (66.4)	55 (40.6)	18.7	**1FT7132-5AC7■-1 ■ ■ ■**	4	459 (406)	76 (168)
		13.82 (18.53)[5]	118 (87.0)	66 (48.7)[5]	21[5]	**1FT7134-5AC7■-1 ■ ■ ■**	4	604 (535)	92 (203)
		14.87 (19.94)[5]	140 (103)	71 (52.4)[5]	23.0[5]	**1FT7136-5AC7■-■ ■ ■ ■**	4	748 (662)	109 (240)
	3000	8.48 (11.37)	90 (66.4)	27 (19.9)	14	**1FT7132-5AF7■-■ ■ ■ ■**	4	459 (406)	77 (170)

Article No. supplements

With DRIVE-CLiQ interface:								
	Flange:	Classic (compatible with 1FT6/1FK7)		10				
		Recessed (more compact) [7]						
	Encoder:	AS24DQI encoder	RJ45 signal port		BK			
			M17 signal port					
		AM24DQI encoder	RJ45 signal port		CL			
			M17 signal port					
Without DRIVE-CLiQ interface:								
	Flange:	Classic (compatible with 1FT6/1FK7)		45				
		Recessed (more compact) [7]						
	Encoder:	IC2048S/R encoder	M23 signal port		NM			
		AM2048S/R encoder	M23 signal port					
Connector outlet direction:		Connector sizes 1 and 1.5	Rotatable connector		1			
		Connector size 3 [1]	Transverse right		1			
			Transverse left		2			
			Axial NDE		3			
			Axial DE		4			
Terminal box/ cable entry: [1]		Top/transverse from right			5			
		Top/transverse from left			6			
		Top/axial from NDE			7			
		Top/axial from DE			8			
Shaft end:		**Shaft and flange accuracy:**		**Holding brake:**		A		
Feather key and keyway		Tolerance N		Without		A		
Feather key and keyway		Tolerance N		With		B		
Feather key and keyway		Tolerance R		Without		D		
Feather key and keyway		Tolerance R		With		E		
Plain shaft		Tolerance N		Without		G		
Plain shaft		Tolerance N		With		H		
Plain shaft		Tolerance R		Without		K		
Plain shaft		Tolerance R		With		L		
Vibration severity:		**Degree of protection:**					0	
Grade A		IP64					1	
Grade A		IP65					2	
Grade A		IP67					3	
Grade R		IP64					4	
Grade R		IP65					5	
Grade R		IP67						

For footnotes, see next page.

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Motor type (repeated)	Efficiency [2]	Stall current	Calculated power [8]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current [3]	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system			
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_N		Power connectors	Cable cross-section [4]	Pre-assembled cable
	%	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
1FT7132-5AB7...	94	22.5	14.14 (18.96)	24	**6SL3120-1TE22-4AD0**	1.5	4 × 4	**6FX■002-5■N46-....**
1FT7134-5AB7...	95	30.0	18.53 (24.85)	30	**6SL3120-1TE23-0AD0**	1.5	4 × 6	**6FX■002-5■N54-....**
1FT7136-5AB7...	94	36.0	21.99 (29.49)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 6	**6FX■002-5■N54-....**
1FT7138-5AB7...	94	43.0	26.7 (35.8)	45	**6SL3120-1TE24-5AC0**	3	4 × 10	**6FX■002-5■S14-....**
1FT7132-5AC7...	94	29.5	18.85 (25.28)	30	**6SL3120-1TE23-0AD0**	1.5	4 × 6	**6FX■002-5■N56-....**
1FT7134-5AC7...	95	36.0	24.71 (33.14)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 6	**6FX■002-5■N54-....**
1FT7136-5AC7...	94	43.0	29.32 (39.32)	45	**6SL3120-1TE24-5AC0**	3	4 × 10	**6FX■002-5■S14-....**
1FT7132-5AF7...	94	43.5	28.27 (37.91)	45	**6SL3120-1TE24-5AC0**	3	4 × 10	**6FX■002-5■S14-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800PLUS MOTION-CONNECT 500	**8** **5**
Without brake cores With brake cores [6]	**C** **D**
Length code	**....**

For more information about cables, see MOTION-CONNECT connection systems

8.1

1) Connector size 3 not rotatable. An alternative terminal box can be selected for connector size 3 only.

2) Optimum efficiency in continuous duty.

3) With default setting of the pulse frequency.

4) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

5) Rated data are applicable with a DC link voltage of 600 to 720 V DC.

6) Cable cross-section for brake connection 2 × 1.5 mm^2.

7) Only up to SH 100.

8) $$P_{calc}[kW] = \frac{M_0[Nm] \times n_N}{9550} \qquad P_{calc}[hp] = \frac{M_0[lb_f\text{-}ft] \times n_N}{5250}$$

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SIMOTICS S-1FT7 Compact – forced ventilation

Selection and ordering data

Shaft height	Rated speed	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 synchronous motors Compact**	Number of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
SH	n_N	P_N at ΔT=100 K	M_0 at ΔT=100 K	M_N at ΔT=100 K	I_N at ΔT=100 K		p	J	m
	r/min	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
SIMOTICS S-1FT7 Compact for DC link voltage 510 ... 720 V DC – forced ventilation									
80	2000	5.0 (6.7)	27 (19.9)	24 (17.7)	13.5	**1FT7084-5SC7■-1 ■ ■ ■**	5	45 (39.8)	25 (55.1)
		6.7 (9.0)	36 (26.6)	32 (23.6)	17	**1FT7086-5SC7■-1 ■ ■ ■**	5	64 (56.6)	36 (79.4)
	3000	7.2 (9.7)	27 (19.9)	23 (17.0)	18.5	**1FT7084-5SF7■-1 ■ ■ ■**	5	45 (39.8)	25 (55.1)
		9.1 (12.2)	36 (26.6)	29 (21.4)	24	**1FT7086-5SF7■-1 ■ ■ ■**	5	64 (56.6)	36 (79.4)
	4500	9.9 (13.3)	27 (19.9)	21 (15.5)	24.5	**1FT7084-5SH7■-1 ■ ■ ■**	5	45 (39.8)	25 (55.1)
		11.8 (15.8)	36 (26.6)	25 (18.4)	25	**1FT7086-5SH7■-1 ■ ■ ■**	5	64 (56.6)	36 (79.4)
100	2000	11.7 (15.7)	65 (47.9)	56 (41.3)	29	**1FT7105-5SC7■-1 ■ ■ ■**	5	178 (158)	50 (110)
		15.3 (20.5)	91 (67.1)	73 (53.8)	33	**1FT7108-5SC7■-1 ■ ■ ■**	5	248 (220)	64 (141)
	3000	15.1 (20.2)	65 (47.9)	48 (35.4)	35	**1FT7105-5SF7■-■ ■ ■ ■**	5	178 (158)	50 (110)
		18.8 (25.2)	91 (67.1)	60 (44.3)	38	**1FT7108-5SF7■-■ ■ ■ ■**	5	248 (220)	64 (141)
132	1500	20.5 (27.5)	140 (103)	132 (97.4)	45	**1FT7132-5SB7■-■ ■ ■ ■**	4	459 (406)	81 (179)
		31.4 (42.1)	235 (173)	200 (148)	60	**1FT7136-5SB7■-■ ■ ■ ■**	4	748 (662)	113 (249)
		39 (52.3)	280 (207)	250 (184)	79	**1FT7138-5SB7■-■ ■ ■ ■**	4	896 (793)	129 (284)
	2000	26.5 (35.5)	140 (103)	126 (92.9)	55	**1FT7132-5SC7■-■ ■ ■ ■**	4	459 (406)	81 (179)
		33.5 (44.9)	190 (140)	160 (118)	73	**1FT7134-5SC7■-■ ■ ■ ■**	4	604 (535)	97 (214)
		39.8 (53.4)	235 (173)	190 (140)	81	**1FT7136-5SC7■-■ ■ ■ ■**	4	748 (662)	113 (249)
	3000	35.5 (47.6)	140 (103)	113 (83.3)	69	**1FT7132-5SF7■-■ ■ ■ ■**	4	459 (406)	81 (179)
		45.5 (61.0)	190 (140)	145 (107)	91	**1FT7134-5SF7■-■ ■ ■ ■**	4	604 (535)	97 (214)

Article No. supplements

With DRIVE-CLiQ interface:

Flange:	Classic (compatible with 1FT6/1FK7)		1 0
	Recessed (more compact)		
Encoder:	AS24DQI encoder	RJ45 signal port	B
	AM24DQI encoder	RJ45 signal port	C

Without DRIVE-CLiQ interface:

Flange:	Classic (compatible with 1FT6/1FK7)		4 5
	Recessed (more compact)		
Encoder:	IC2048S/R encoder	M23 signal port	N
	AM2048S/R encoder	M23 signal port	M

Connector outlet direction:	Connector sizes 1 and 1.5	Rotatable connector	1
	Connector size 3 [1]	Transverse right	1
		Transverse left	2
		Axial NDE	3
		Axial DE	4

Terminal box/ cable entry: [1]	Top/transverse from right	5
	Top/transverse from left	6
	Top/axial from NDE	7
	Top/axial from DE	8

Shaft end:	**Shaft and flange accuracy:**	**Holding brake:** [8]	
Feather key	Tolerance N	Without	A
Feather key	Tolerance N	With	B
Feather key	Tolerance R	Without	D
Feather key	Tolerance R	With	E
Plain shaft	Tolerance N	Without	G
Plain shaft	Tolerance N	With	H
Plain shaft	Tolerance R	Without	K
Plain shaft	Tolerance R	With	L

Vibration severity:	**Degree of protection:** [2]	
Grade A	IP64	0
Grade A	IP65	1
Grade R	IP64	3
Grade R	IP65	4

For footnotes, see next page.

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Motor type (repeated)	Efficiency [3]	Stall current	Calculated power [9]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current [4]	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system	Power connectors	Cable cross-section [5]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_N				
	%	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
1FT7084-5SC7...	93	15	5.7 (7.6)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 1.5	**6FX■002-5■N26-....**
1FT7086-5SC7...	93	19.5	7.5 (10.1)	24	**6SL3120-1TE22-4AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7084-5SF7...	94	21	8.5 (11.4)	24	**6SL3120-1TE22-4AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7086-5SF7...	93	29	11.3 (15.2)	30	**6SL3120-1TE23-0AD0**	1.5	4 × 6	**6FX■002-5■N56-....**
1FT7084-5SH7...	94	30.5	12.7 (17.0)	30	**6SL3120-1TE23-0AD0**	1.5	4 × 6	**6FX■002-5■N56-....**
1FT7086-5SH7...	93	34	17.0 (22.8)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 6	**6FX■002-5■N54-....**
1FT7105-5SC7...	93	31	13.6 (18.2)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 6	**6FX■002-5■N54-....**
1FT7108-5SC7...	93	39	19.1 (25.6)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 10	**6FX■002-5■N64-....**
1FT7105-5SF7...	94	45	20.4 (27.4)	45	**6SL3120-1TE24-5AC0**	3	4 × 10	**6FX■002-5■S14-....**
1FT7108-5SF7...	94	57	28.6 (38.4)	60	**6SL3120-1TE26-0AC0**	3	4 × 16	**6FX■002-5■S23-....**
1FT7132-5SB7...	94	48	22 (29.5)	45	**6SL3120-1TE24-5AC0**	3	4 × 10	**6FX■0■2-5DS17-....**
1FT7136-5SB7...	95	70	36.9 (49.5)	85	**6SL3120-1TE28-5AA3**	3	4 × 25	**6FX■002-5DG33-....**
1FT7138-5SB7...	95	85	44 (59.0)	85	**6SL3120-1TE28-5AA3**	3	4 × 35	**6FX■002-5DG53-....**
1FT7132-5SC7...	95	60	29.3 (39.3)	60	**6SL3120-1TE26-0AC0**	3	4 × 16	**6FX■002-5DS23-....**
1FT7134-5SC7...	95	85	39.8 (53.4)	85	**6SL3120-1TE28-5AA3**	3	4 × 35	**6FX■002-5DG43-....**
1FT7136-5SC7...	95	98	49.2 (66.0)	132	**6SL3120-1TE31-3AA3**	b. w. [7]	4 × 35	**6FX5002-5CR73-....**
1FT7132-5SF7...	95	85	44 (59.0)	85	**6SL3120-1TE28-5AA3**	3	4 × 35	**6FX■002-5DG53-....**
1FT7134-5SF7...	96	115	59.7 (80.1)	132	**6SL3120-1TE31-3AA3**	b. w. [7]	4 × 50	**6FX5002-5CR83-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800PLUS MOTION-CONNECT 500	**8** **5**
Without brake cores With brake cores [6] [8]	**C** **D**
Length code	**....**

For more information about cables, see MOTION-CONNECT connection systems

1) Connector size 3 not rotatable. An alternative terminal box can be selected for connector size 3 only. 1FT7136-5SC7.-.... and 1FT7134-5SF7.-.... only with terminal box.

2) The degree of protection refers to the motor. The built-in fan has degree of protection IP54/IP55 (shaft height 132).

3) Optimum efficiency in continuous duty.

4) With default setting of the pulse frequency.

5) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

6) Cable cross-section for brake connection 2 × 1.5 mm^2.

7) b. w. bare wire ends. Only in conjunction with terminal boxes.

8) Holding brake not for 1FT7138-5SB7.-....

9) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_N}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_N}{5250}$

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SIMOTICS S-1FT7 Compact – water cooling

Selection and ordering data

Shaft height	Rated speed	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 synchronous motors Compact**	Number of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
SH	n_N	P_N at ΔT=100 K	M_0 at ΔT=100 K	M_N at ΔT=100 K	I_N at ΔT=100 K		p	J	m
	r/min	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
SIMOTICS S-1FT7 Compact for DC link voltage 510 ... 720 V DC – water cooling									
63	3000	3.1 (4.2)	10 (7.38)	10 (7.38)	7.8	**1FT7062-5WF7■-1 ■ ■ ■**	5	8.1 (7.2)	11 (24.3)
		5 (6.71)	16 (11.8)	16 (11.8)	12.5	**1FT7064-5WF7■-1 ■ ■ ■**	5	12.9 (11.4)	13.7 (30.2)
		6.2 (8.3)	20 (14.8)	19.6 (14.5)	14.4	**1FT7066-5WF7■-1 ■ ■ ■**	5	17.7 (15.7)	16.3 (35.9)
		9.3 (12.5)	30 (22.1)	29.5 (21.8)	19.6	**1FT7068-5WF7■-1 ■ ■ ■**	5	24.8 (22.0)	20.1 (44.3)
	4500	9.1 (12.2)	20 (14.8)	19.4 (14.3)	20.8	**1FT7066-5WH7■-1 ■ ■ ■**	5	17.7 (15.7)	16.3 (35.9)
	6000	5.8 (7.8)	10 (7.38)	9.2 (6.8)	12.7	**1FT7062-5WK7■-1 ■ ■ ■**	5	8.1 (7.2)	11 (24.3)
		8.9 (11.9)	16 (11.8)	14.2 (10.5)	20	**1FT7064-5WK7■-1 ■ ■ ■**	5	12.9 (11.4)	13.7 (30.2)
80	3000	6.4 (8.6)	21 (15.5)	20.5 (15.1)	16	**1FT7082-5WF7■-1 ■ ■ ■**	5	28.9 (25.6)	20.7 (45.6)
		11 (14.8)	35 (25.8)	35 (25.8)	24.2	**1FT7084-5WF7■-1 ■ ■ ■**	5	48.3 (42.8)	27.5 (60.6)
		15.4 (20.7)	50 (36.9)	49 (36.1)	36	**1FT7086-5WF7■-1 ■ ■ ■**	5	67.8 (60.0)	34.1 (75.2)
	4500	8.95 (12.00)	21 (15.5)	19 (14.0)	23.9	**1FT7082-5WH7■-1 ■ ■ ■**	5	28.9 (25.6)	20.7 (45.6)
		15.08 (20.22)	35 (25.8)	32 (23.6)	34.5	**1FT7084-5WH7■-1 ■ ■ ■**	5	48.3 (42.8)	27.5 (60.6)
		20.3 (27.2)	50 (36.9)	43 (31.7)	38	**1FT7086-5WH7■-1 ■ ■ ■**	5	67.8 (60.0)	34.1 (75.2)

Article No. supplements

With DRIVE-CLiQ interface:									
	Flange:	Classic (compatible with 1FT6/1FK7)		1					
		Recessed (more compact)		0					
	Encoder:	AS24DQI encoder	RJ45 signal port		B				
			M17 signal port		K				
		AM24DQI encoder	RJ45 signal port		C				
			M17 signal port		L				
Without DRIVE-CLiQ interface:									
	Flange:	Classic (compatible with 1FT6/1FK7)		4					
		Recessed (more compact)		5					
	Encoder:	IC2048S/R encoder	M23 signal port		N				
		AM2048S/R encoder	M23 signal port		M				
Connector outlet direction:		Connector sizes 1 and 1.5	Rotatable connector			1			
		Connector size 3 [1]	Transverse right			1			
			Transverse left			2			
			Axial NDE			3			
			Axial DE			4			
Terminal box/ cable entry: [1]		Top/transverse from right				5			
		Top/transverse from left				6			
		Top/axial from NDE				7			
		Top/axial from DE				8			

Shaft end:	**Shaft and flange accuracy:**	**Holding brake:**						
Feather key and keyway	Tolerance N	Without	A					
Feather key and keyway	Tolerance N	With	B					
Feather key and keyway	Tolerance R	Without	D					
Feather key and keyway	Tolerance R	With	E					
Plain shaft	Tolerance N	Without	G					
Plain shaft	Tolerance N	With	H					
Plain shaft	Tolerance R	Without	K					
Plain shaft	Tolerance R	With	L					

Vibration severity:	**Degree of protection:**	
Grade A	IP64	0
Grade A	IP65	1
Grade A	IP67	2
Grade R	IP64	3
Grade R	IP65	4
Grade R	IP67	5

For footnotes, see next page.

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Motor type (repeated)	Effi-ciency [2]	Stall current	Calculated power [7]	**SINAMICS S120 Motor Module**		**Power cable with complete shield** Motor connection (and brake connection) via power connector		
				Rated output current [3]	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system			
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_N		Power connec-tors	Cable cross-section [4]	Pre-assembled cable
	%	A	kW (hp)	A	Article No.	Size	mm²	Article No.
1FT7062-5WF7...	91	7.4	3.1 (4.2)	9	**6SL3120-■TE21-0AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7064-5WF7...	91	11.9	5.0 (6.7)	18	**6SL3120-■TE21-8AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7066-5WF7...	91	14	6.3 (8.4)	18	**6SL3120-■TE21-8AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7068-5WF7...	93	19	9.4 (12.6)	18 [5]	**6SL3120-■TE21-8AD0**	1	4 × 2.5	**6FX■002-5■N16-....**
1FT7066-5WH7...	91	19.7	9.4 (12.6)	24	**6SL3120-1TE22-4AD0**	1	4 × 2.5	**6FX■002-5■N16-....**
1FT7062-5WK7...	92	12.5	6.3 (8.4)	18	**6SL3120-■TE21-8AD0**	1	4 × 1.5	**6FX■002-5■N06-....**
1FT7064-5WK7...	92	20.2	10.1 (13.5)	24	**6SL3120-1TE22-4AD0**	1	4 × 2.5	**6FX■002-5■N16-....**
1FT7082-5WF7...	94	16	6.6 (8.9)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7084-5WF7...	94	24	11.0 (14.8)	24	**6SL3120-1TE22-4AD0**	1.5	4 × 4	**6FX■002-5■N46-....**
1FT7086-5WF7...	94	34	15.7 (21.1)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 6	**6FX■002-5■N54-....**
1FT7082-5WH7...	94	24	9.9 (13.3)	24	**6SL3120-1TE22-4AD0**	1.5	4 × 4	**6FX■002-5■N46-....**
1FT7084-5WH7...	94	34.3	16.5 (22.1)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 6	**6FX■002-5■N54-....**
1FT7086-5WH7...	94	40.5	23.6 (31.6)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 10	**6FX■002-5■N64-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:			
MOTION-CONNECT 800PLUS	**8**		
MOTION-CONNECT 500	**5**		
Without brake cores		**C**	
With brake cores [6]		**D**	
Length code			**....**

For more information about cables, see MOTION-CONNECT connection systems

1) Connector size 3 not rotatable. An alternative terminal box can be selected for connector size 3 only.

2) Optimum efficiency in continuous duty.

3) With default setting of the pulse frequency.

4) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

5) With the specified Motor Module, the motor cannot be fully utilized at M_0 with a winding temperature rise of ΔT = 100 K. If a Motor Module with a higher rating is used, you must carefully check whether the specified power cable can be connected to the larger Motor Module.

6) Cable cross-section for brake connection 2 × 1.5 mm².

7) $$P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_N}{9550} \qquad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_N}{5250}$$

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SIMOTICS S-1FT7 Compact – water cooling

Selection and ordering data

Shaft height	Rated speed	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 synchronous motors Compact**	Number of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
SH	n_N	P_N at ΔT=100 K	M_0 at ΔT=100 K	M_N at ΔT=100 K	I_N at ΔT=100 K		p	J	m
	r/min	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
SIMOTICS S-1FT7 Compact for DC link voltage 510 ... 720 V DC – water cooling									
80	2000	4.4 (5.9)	21 (15.5)	21 (15.5)	11	**1FT7082-5WC7■-1 ■ ■ ■**	5	28.9 (25.6)	20.7 (45.6)
		7.33 (9.83)	35 (25.8)	35 (25.8)	17	**1FT7084-5WC7■-1 ■ ■ ■**	5	48.3 (42.8)	27.5 (60.6)
		10.5 (14.1)	50 (36.9)	50 (36.9)	24	**1FT7086-5WC7■-1 ■ ■ ■**	5	67.8 (60.0)	34.1 (75.2)
100	1500	7.9 (10.6)	50 (36.9)	50 (36.9)	20.3	**1FT7102-5WB7■-1 ■ ■ ■**	5	98.9 (87.5)	36.6 (80.7)
		14.1 (18.9)	90 (66.4)	90 (66.4)	29.5	**1FT7105-5WB7■-1 ■ ■ ■**	5	191 (169)	54.8 (120.8)
		19.6 (26.3)	125 (92.2)	125 (92.2)	40.3	**1FT7108-5WB7■-1 ■ ■ ■**	5	265 (235)	68.6 (151.3)
	2000	10.4 (13.9)	50 (36.9)	49.5 (36.5)	29.3	**1FT7102-5WC7■-1 ■ ■ ■**	5	98.9 (87.5)	36.6 (80.7)
		18.8 (25.2)	90 (66.4)	90 (66.4)	40.8	**1FT7105-5WC7■-1 ■ ■ ■**	5	191 (169)	54.8 (120.8)
		26.2 (35.1)	125 (92.2)	125 (92.2)	47.5	**1FT7108-5WC7■-■ ■ ■ ■**	5	265 (235)	69.6 (153.5)
	3000	14.3 (19.2)	50 (36.9)	45.5 (33.6)	38.8	**1FT7102-5WF7■-1 ■ ■ ■**	5	98.9 (87.5)	36.6 (80.7)
		24.8 (33.3)	90 (66.4)	79 (58.3)	49.5	**1FT7105-5WF7■-■ ■ ■ ■**	5	164 (145)	55.9 (123.3)
		34.2 (45.9)	125 (92.2)	109 (80.4)	60	**1FT7108-5WF7■-■ ■ ■ ■**	5	265 (235)	69.6 (153.5)

Article No. supplements

With DRIVE-CLiQ interface:				
	Flange:	Classic (compatible with 1FT6/1FK7)	1 0	
		Recessed (more compact)		
	Encoder:	AS24DQI encoder	RJ45 signal port	B K
			M17 signal port	C L
		AM24DQI encoder	RJ45 signal port	
			M17 signal port	
Without DRIVE-CLiQ interface:				
	Flange:	Classic (compatible with 1FT6/1FK7)	4 5	
		Recessed (more compact)		
	Encoder:	IC2048S/R encoder	M23 signal port	N M
		AM2048S/R encoder	M23 signal port	
Connector outlet direction:		Connector sizes 1 and 1.5	Rotatable connector	1
		Connector size 3 [1]	Transverse right	1
			Transverse left	2
			Axial NDE	3
			Axial DE	4
Terminal box/ cable entry: [1]		Top/transverse from right		5
		Top/transverse from left		6
		Top/axial from NDE		7
		Top/axial from DE		8

Shaft end:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key and keyway	Tolerance N	Without	A
Feather key and keyway	Tolerance N	With	B
Feather key and keyway	Tolerance R	Without	D
Feather key and keyway	Tolerance R	With	E
Plain shaft	Tolerance N	Without	G
Plain shaft	Tolerance N	With	H
Plain shaft	Tolerance R	Without	K
Plain shaft	Tolerance R	With	L

Vibration severity:	**Degree of protection:**	
Grade A	IP64	0
Grade A	IP65	1
Grade A	IP67	2
Grade R	IP64	3
Grade R	IP65	4
Grade R	IP67	5

For footnotes, see next page.

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Motor type (repeated)	Effi-ciency [2]	Stall current	Calculated power [6]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current [3]	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system			
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_N		Power connec-tors	Cable cross-section [4]	Pre-assembled cable
	%	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
1FT7082-5WC7...	93	10.7	4.4 (5.9)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 1.5	**6FX■002-5■N26-....**
1FT7084-5WC7...	94	16.5	7.3 (9.8)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7086-5WC7...	94	23	10.5 (14.1)	24	**6SL3120-1TE22-4AD0**	1.5	4 × 4	**6FX■002-5■N46-....**
1FT7102-5WB7...	93	17.8	7.9 (10.6)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7105-5WB7...	94	28	14.1 (18.9)	30	**6SL3120-1TE23-0AD0**	1.5	4 × 4	**6FX■002-5■N46-....**
1FT7108-5WB7...	94	39	19.6 (26.3)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 10	**6FX■002-5■N64-....**
1FT7102-5WC7...	94	25.5	10.5 (14.1)	30	**6SL3120-1TE23-0AD0**	1.5	4 × 4	**6FX■002-5■N46-....**
1FT7105-5WC7...	94	39	18.8 (25.2)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 10	**6FX■002-5■N64-....**
1FT7108-5WC7...	95	45.3	26.2 (35.1)	45	**6SL3120-1TE24-5AC0**	3	4 × 10	**6FX■002-5■S14-....**
1FT7102-5WF7...	95	40	15.7 (21.1)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 10	**6FX■002-5■N64-....**
1FT7105-5WF7...	94	53.2	28.3 (38.0)	60	**6SL3120-1TE26-0AC0**	3	4 × 16	**6FX■002-5■S23-....**
1FT7108-5WF7...	95	65	39.3 (52.7)	85	**6SL3120-1TE28-5AA3**	3	4 × 16	**6FX■002-5■G23-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:		
MOTION-CONNECT 800PLUS	**8**	
MOTION-CONNECT 500	**5**	
Without brake cores		**C**
With brake cores [5]		**D**
Length code		**....**

For more information about cables, see MOTION-CONNECT connection systems

8 1

1) Connector size 3 is not rotatable. An alternative terminal box can be selected for connector size 3 only.
2) Optimum efficiency in continuous duty.
3) With default setting of the pulse frequency.
4) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).
5) Cable cross-section for brake connection 2 × 1.5 mm^2.
6) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_N}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_N}{5250}$

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SIMOTICS S-1FT7 High Dynamic – forced ventilation/water cooling

Selection and ordering data

Shaft height	Rated speed	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 synchronous motors High Dynamic**	Number of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
SH	n_N	P_N at ΔT=100 K	M_0 at ΔT=100 K	M_N at ΔT=100 K	I_N at ΔT=100 K		p	J	m
	r/min	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
SIMOTICS S-1FT7 High Dynamic for DC link voltage 510 ... 720 V DC – forced ventilation									
63	3000	3.8 (5.1)	14 (10.3)	12 (8.85)	10.5	**1FT7065-7SF7■-1 ■ ■ ■**	5	6.4 (5.7)	19 (41.9)
		4.4 (5.9)	17 (12.5)	14 (10.3)	13	**1FT7067-7SF7■-1 ■ ■ ■**	5	8.3 (7.3)	23 (50.7)
	4500	5.2 (7.0)	14 (10.3)	11 (8.11)	13.5	**1FT7065-7SH7■-1 ■ ■ ■**	5	6.4 (5.7)	19 (41.9)
		6.1 (8.2)	17 (12.5)	13 (9.59)	15	**1FT7067-7SH7■-1 ■ ■ ■**	5	8.3 (7.3)	23 (50.7)
80	3000	7.2 (9.7)	34 (25.1)	23 (17.0)	20	**1FT7085-7SF7■-1 ■ ■ ■**	5	20.7 (18.3)	34 (75.0)
		10.4 (13.9)	48 (35.4)	33 (24.3)	29	**1FT7087-7SF7■-1 ■ ■ ■**	5	27.4 (24.3)	42 (92.6)
	4500	8.2 (11.0)	34 (25.1)	17.5 (12.9)	22.5	**1FT7085-7SH7■-1 ■ ■ ■**	5	20.7 (18.3)	34 (75.0)
		10.8 (14.5)	48 (35.4)	23 (17.0)	24	**1FT7087-7SH7■-■ ■ ■ ■**	5	27.4 (24.3)	43 (94.8)
SIMOTICS S-1FT7 High Dynamic for DC link voltage 510 ... 720 V DC – water cooling									
63	3000	5.7 (7.6)	19 (14.0)	18 (13.3)	15	**1FT7065-7WF7■-1 ■ ■ ■**	5	6.4 (5.7)	16 (35.3)
		7.4 (9.9)	25 (18.4)	23.5 (17.3)	21	**1FT7067-7WF7■-1 ■ ■ ■**	5	8.3 (7.3)	22 (48.5)
	4500	7.8 (10.5)	19 (14.0)	16.5 (12.2)	20	**1FT7065-7WH7■-1 ■ ■ ■**	5	6.4 (5.7)	16 (35.3)
		10.4 (13.9)	25 (18.4)	22 (16.2)	25	**1FT7067-7WH7■-1 ■ ■ ■**	5	8.3 (7.3)	22 (48.5)
80	3000	11.9 (16.0)	43 (31.7)	38 (28.0)	32	**1FT7085-7WF7■-1 ■ ■ ■**	5	20.7 (18.3)	32 (70.6)
		16.0 (21.5)	61 (45.0)	51 (37.6)	43	**1FT7087-7WF7■-■ ■ ■ ■**	5	27.4 (24.3)	41 (90.4)
	4500	15.6 (20.9)	43 (31.7)	33 (24.3)	48	**1FT7085-7WH7■-■ ■ ■ ■**	5	20.7 (18.3)	32 (70.6)
		21.7 (29.1)	61 (45.0)	46 (33.9)	53	**1FT7087-7WH7■-■ ■ ■ ■**	5	27.4 (24.3)	41 (90.4)

Article No. supplements

With DRIVE-CLiQ interface:

Flange:	Classic (compatible with 1FT6/1FK7)		1 0
	Recessed (more compact)		
Encoder:	AS24DQI encoder	RJ45 signal port	B K
		M17 signal port (only for water cooling)	
	AM24DQI encoder	RJ45 signal port	C L
		M17 signal port (only for water cooling)	

Without DRIVE-CLiQ interface:

Flange:	Classic (compatible with 1FT6/1FK7)		4 5
	Recessed (more compact)		
Encoder:	IC2048S/R encoder	M23 signal port	N M
	AM2048S/R encoder	M23 signal port	

Connector outlet direction:	Connector sizes 1 and 1.5	Rotatable connector 1
	Connector size 3 [1]	Transverse right 1
		Transverse left 2
		Axial NDE 3
		Axial DE 4
Terminal box/ cable entry: [1]	Top/transverse from right	5
	Top/transverse from left	6
	Top/axial from NDE	7
	Top/axial from DE	8

Shaft end:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key and keyway	Tolerance N	Without	A
Feather key and keyway	Tolerance N	With	B
Feather key and keyway	Tolerance R	Without	D
Feather key and keyway	Tolerance R	With	E
Plain shaft	Tolerance N	Without	G
Plain shaft	Tolerance N	With	H
Plain shaft	Tolerance R	Without	K
Plain shaft	Tolerance R	With	L

Vibration severity:	**Degree of protection:**	
Grade A	IP64	0
Grade A	IP65	1
Grade A	IP67 (only for water cooling)	2
Grade R	IP64	3
Grade R	IP65	4
Grade R	IP67 (only for water cooling)	5

For footnotes, see next page.

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Motor type (repeated)	Effi-ciency [2]	Stall current	Calculated power [6]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current [3]	Booksize format Internal air cooling For further components, see SINAMICS S120 drive system	Power connec-tors	Cable cross-section [4]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_N				
	%	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
1FT7065-7SF7...	92	12	4.4 (5.9)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 1.5	**6FX■002-5■N26-....**
1FT7067-7SF7...	94	15	5.3 (7.1)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 1.5	**6FX■002-5■N26-....**
1FT7065-7SH7...	92	16	6.6 (8.9)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7067-7SH7...	94	19	8.0 (10.7)	24	**6SL3120-1TE22-4AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7085-7SF7...	92	28	10.7 (14.3)	30	**6SL3120-1TE23-0AD0**	1.5	4 × 4	**6FX■002-5■N46-....**
1FT7087-7SF7...	93	40	15.1 (20.2)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 10	**6FX■002-5■N64-....**
1FT7085-7SH7...	92	40	16.0 (21.5)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 10	**6FX■002-5■N64-....**
1FT7087-7SH7...	93	45	22.6 (30.3)	45	**6SL3120-1TE24-5AC0**	3	4 × 10	**6FX■002-5■S14-....**
1FT7065-7WF7...	92	16	6.0 (8.0)	18	**6SL3120-■TE21-8AD0**	1.5	4 × 2.5	**6FX■002-5■N36-....**
1FT7067-7WF7...	94	22	7.9 (10.6)	24	**6SL3120-1TE22-4AD0**	1.5	4 × 4	**6FX■002-5■N46-....**
1FT7065-7WH7...	92	22	9.0 (12.1)	24	**6SL3120-1TE22-4AD0**	1.5	4 × 4	**6FX■002-5■N46-....**
1FT7067-7WH7...	94	28	11.8 (15.8)	30	**6SL3120-1TE23-0AD0**	1.5	4 × 4	**6FX■002-5■N46-....**
1FT7085-7WF7...	93	36	13.5 (18.1)	45	**6SL3120-1TE24-5AC0**	1.5	4 × 6	**6FX■002-5■N54-....**
1FT7087-7WF7...	94	51	19.2 (25.7)	60	**6SL3120-1TE26-0AC0**	3	4 × 16	**6FX■002-5■S23-....**
1FT7085-7WH7...	94	58	20.3 (27.2)	60	**6SL3120-1TE26-0AC0**	3	4 × 16	**6FX■002-5■S23-....**
1FT7087-7WH7...	94	67	28.7 (38.5)	85	**6SL3120-1TE28-5AA3**	3	4 × 25	**6FX■002-5DG33-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:			
MOTION-CONNECT 800PLUS MOTION-CONNECT 500	**8** **5**		
Without brake cores With brake cores [5]		**C** **D**	
Length code			**....**

For more information about cables, see MOTION-CONNECT connection systems

1) Connector size 3 is not rotatable. An alternative terminal box can be selected for connector size 3 only.

2) Optimum efficiency in continuous duty.

3) With default setting of the pulse frequency.

4) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

5) Cable cross-section for brake connection 2 × 1.5 mm^2.

6) $$P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_N}{9550} \qquad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_N}{5250}$$

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Built-in holding brakes for SIMOTICS S-1FT7 motors

Overview

Many drives require a holding brake with an EMERGENCY STOP function for safety-related reasons or to comply with process requirements.

The permanent magnet brakes used for SIMOTICS S-1FT7 motors function according to the closed-circuit principle. The magnetic field of the permanent magnet pulls on the brake armature disk, i.e. in a condition of zero current, the brake is closed and the motor shaft is held. When the rated voltage of 24 V DC ± 10 % is applied to the brake, current flows through the coil and produces a counter-field that cancels the pull of the permanent magnet, causing the brake to release.

In the event of an EMERGENCY STOP or voltage failure, approximately 2000 braking operations can be performed with the maximum operating energy without causing excessive wear on the holding brake (condition: maximum external moment of inertia = moment of inertia of motor and n_{max} type-specific).

The holding brake is not an operational or safety brake.

To avoid switching overvoltages and any related impact on the system environment, a varistor must be externally connected to brake connecting cables. The connection is established using a power connector or terminal box.

When connected to the SINAMICS S120 drive system, this overvoltage protection is already provided.

Technical specifications

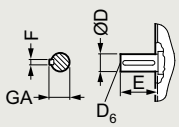
Motor		Built-in holding brake					
Shaft height SH	Type	Holding torque [1]	DC current	Opening time with varistor	Closing time with varistor	Moment of inertia	Maximum operating energy per braking operation from n = 3000 r/min
		Nm (lb_f-ft)	A	ms	ms	10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	J
SIMOTICS S-1FT7 with permanent magnet brake, zero-backlash							
36	1FT703	3 (2.21)	0.3	60	25	0.12 (0.11)	30
48	1FT704	8 (5.90)	0.6	90	30	0.87 (0.77)	270
63	1FT706	18 (13.3)	0.8	150	50	2.84 (2.51)	880
80	1FT708	48 (35.4)	1.0	220	65	15.4 (13.6)	1900
100	1FT710	85 (62.7)	1.6	250	70	27.6 (24.4)	5300
132	1FT713	140 (103)	1.8	350	70	51.0 (45.1)	9800

[1] The holding torque is the highest permissible torque with which the closed brake can be loaded in steady-state operation without slip (holding function when the motor is stationary).

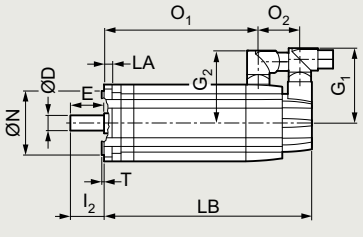
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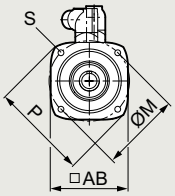
Dimensional drawings

Shaft version with feather key

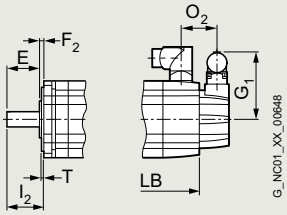


M17/M23 signal connector
Flange compatible to 1FT6/1FK7





Recessed flange



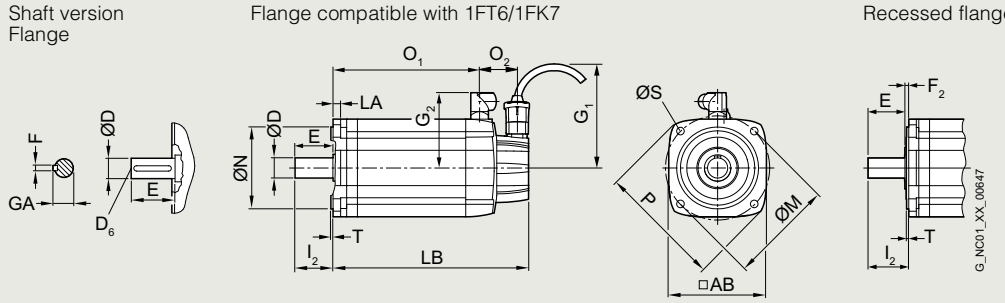
For motor		Dimensions in mm (inches)									Signal connector		Connector size		Shaft end DE				
											M17	M23	Size 1	Size 1.5					
Shaft height	Type	IEC	P	N	LA	M	AB	T	O_2	S	G_1	G_1	G_2	G_2	**D**	D_6	E	GA	F
SIMOTICS S-1FT7 natural cooling, with connector, without/with brake																			
36	1FT703.-5A		90 (3.54)	60 (2.36)	8 (0.31)	75 (2.95)	72 (2.83)	3 (0.12)	48 (1.89)	6.5 (0.26)	66 (2.60)	77 (3.03)	80 (3.15)	–	**14 (0.55)**	M5	30 (1.18)	16 (0.63)	5 (0.20)
48	1FT704.-5A		120 (4.72)	80 (3.15)	10 (0.39)	100 (3.94)	96 (3.78)	3 (0.12)	53 (2.09)	6.5 (0.26)	82 (3.23)	93 (3.66)	90 (3.54)	–	**19 (0.75)**	M6	40 (1.57)	21.5 (0.85)	6 (0.24)
63	1FT706.-5A		155 (6.10)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	53 (2.09)	9 (0.35)	82 (3.23)	93 (3.66)	104 (4.09)	–	**24 (0.94)**	M8	50 (1.97)	27 (1.06)	8 (0.31)
80	1FT708.-5A		195 (7.68)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	51 (2.01)	11 (0.43)	82 (3.23)	93 (3.66)	119 (4.69)	140 (5.51)	**32 (1.26)**	M12	58 (2.28)	35 (1.38)	10 (0.39)
100	1FT710.-5A		245 (9.65)	180 (7.09)	13 (0.51)	215 (8.46)	196 (7.72)	4 (0.16)	56 (2.20)	14 (0.55)	82 (3.23)	93 (3.66)	–	160 (6.30)	**38 (1.50)**	M12	80 (3.15)	41 (1.61)	10 (0.39)

			Recessed flange						Flange compatible with 1FT6/1FK7				
					without brake		with brake			without brake		with brake	
Shaft height	Type	IEC	F_2	l_2	LB	O_1	LB	O_1	l_2	LB	O_1	LB	O_1
36	1FT7034		5.5 (0.22)	36.5 (1.44)	189 (7.44)	127 (5.00)	216 (8.50)	154 (6.06)	30 (1.18)	195 (7.68)	133 (5.24)	222 (8.74)	160 (6.30)
	1FT7036				237 (9.33)	175 (6.89)	264 (10.39)	202 (7.95)		243 (9.57)	181 (7.13)	270 (10.63)	208 (8.19)
48	1FT7042		5.5 (0.22)	46 (1.81)	163 (6.42)	96 (3.78)	195 (7.68)	128 (5.04)	40 (1.57)	169 (6.65)	102 (4.02)	201 (7.91)	134 (5.28)
	1FT7044				213 (8.39)	146 (5.75)	245 (9.65)	178 (7.01)		219 (8.62)	152 (5.98)	251 (9.88)	184 (7.24)
	1FT7046				253 (9.96)	186 (7.32)	285 (11.22)	218 (8.58)		259 (10.20)	192 (7.56)	291 (11.46)	224 (8.82)
63	1FT7062		6 (0.24)	56.5 (2.22)	167 (6.57)	99 (3.90)	202 (7.95)	135 (5.31)	50 (1.97)	173 (6.81)	106 (4.17)	208 (8.19)	141 (5.55)
	1FT7064				198 (7.80)	131 (5.16)	233 (9.17)	166 (6.54)		205 (8.07)	137 (5.39)	240 (9.45)	173 (6.81)
	1FT7066				230 (9.06)	162 (6.38)	265 (10.43)	198 (7.80)		236 (9.29)	169 (6.65)	272 (10.71)	204 (8.03)
	1FT7068				277 (10.91)	210 (8.27)	312 (12.28)	245 (9.65)		284 (11.18)	216 (8.50)	319 (12.56)	252 (9.92)
80	1FT7082		6 (0.24)	64.5 (2.54)	184 (7.24)	124 (4.88)	241 (9.49)	176 (6.93)	58 (2.28)	196 (7.72)	130 (5.12)	248 (9.76)	183 (7.20)
	1FT7084				236 (9.29)	175 (6.89)	293 (11.54)	228 (8.98)		247 (9.72)	182 (7.17)	299 (11.77)	234 (9.21)
	1FT7086				287 (11.30)	227 (8.94)	345 (13.58)	279 (10.98)		299 (11.77)	234 (9.21)	351 (13.82)	286 (11.26)
100	1FT7102		6.5 (0.26)	87 (3.43)	209 (8.23)	144 (5.67)	266 (10.47)	196 (7.72)	80 (3.15)	221 (8.70)	151 (5.94)	273 (10.75)	203 (7.99)
	1FT7105				296 (11.65)	231 (9.09)	353 (13.90)	283 (11.14)		307 (12.09)	238 (9.37)	360 (14.17)	290 (11.42)
	1FT7108				365 (14.37)	300 (11.81)	422 (16.61)	352 (13.86)		377 (14.84)	307 (12.09)	429 (16.89)	359 (14.13)

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SIMOTICS S-1FT7 up to SH 100 with RJ45 signal connector (DRIVE-CLiQ) – natural cooling

Dimensional drawings



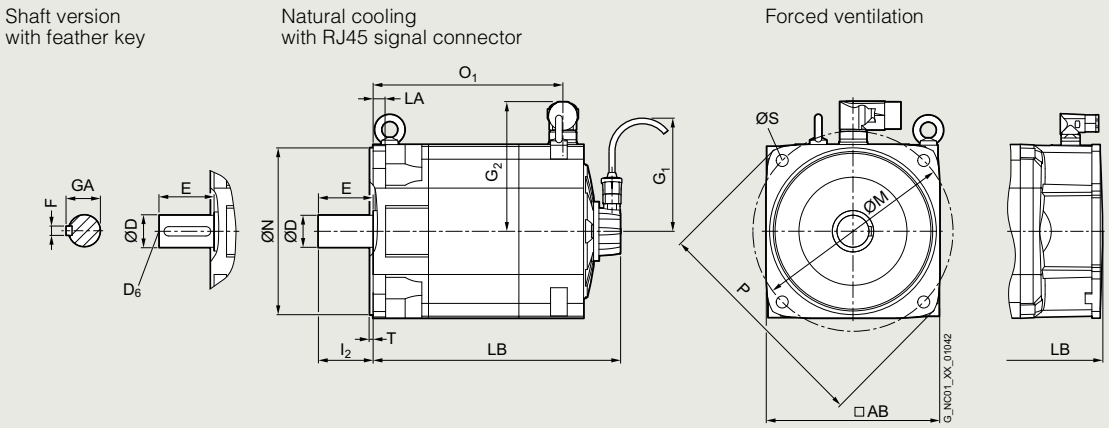
For motor			Dimensions in mm (inches)									Connector size		Shaft end DE				
												Size 1	Size 1.5					
Shaft height	Type	IEC	P	N	LA	M	AB	T	O_2	S	G_1	G_2	G_2	**D**	D_6	E	GA	F
SIMOTICS S-1FT7 natural cooling, with connector, without/with brake																		
36	1FT703.-5A		90 (3.54)	60 (2.36)	8 (0.31)	75 (2.95)	72 (2.83)	3 (0.12)	48 (1.89)	6.5 (0.26)	104.5 (4.11)	80 (3.15)	–	**14 (0.55)**	M5	30 (1.18)	16 (0.63)	5 (0.20)
48	1FT704.-5A		120 (4.72)	80 (3.15)	10 (0.39)	100 (3.94)	96 (3.78)	3 (0.12)	53 (2.09)	6.5 (0.26)	104.5 (4.11)	90 (3.54)	–	**19 (0.75)**	M6	40 (1.57)	21.5 (0.85)	6 (0.24)
63	1FT706.-5A		155 (6.10)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	53 (2.09)	9 (0.35)	104.5 (4.11)	104 (4.09)	–	**24 (0.94)**	M8	50 (1.97)	27 (1.06)	8 (0.31)
80	1FT708.-5A		195 (7.68)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	51 (2.01)	11 (0.43)	104.5 (4.11)	119 (4.69)	140 (5.51)	**32 (1.26)**	M12	58 (2.28)	35 (1.38)	10 (0.39)
100	1FT710.-5A		245 (9.65)	180 (7.09)	13 (0.51)	215 (8.46)	196 (7.72)	4 (0.16)	56 (2.20)	14 (0.55)	104.5 (4.11)	–	160 (6.30)	**38 (1.50)**	M12	80 (3.15)	41 (1.61)	10 (0.39)

			Recessed flange						Flange compatible with 1FT6/1FK7				
					without brake		with brake			without brake		with brake	
Shaft height	Type	IEC	F_2	I_2	LB	O_1	LB	O_1	I_2	LB	O_1	LB	O_1
36	1FT7034		5.5 (0.22)	36.5 (1.44)	189 (7.44)	127 (5.00)	216 (8.50)	154 (6.06)	30 (1.18)	196 (7.72)	133 (5.24)	223 (8.78)	160 (6.30)
	1FT7036				237 (9.33)	175 (6.89)	264 (10.39)	202 (7.95)		244 (9.61)	181 (7.13)	271 (10.67)	208 (8.19)
48	1FT7042		5.5 (0.22)	46 (1.81)	158 (6.22)	96 (3.78)	190 (7.48)	128 (5.04)	40 (1.57)	164 (6.46)	102 (4.02)	196 (7.72)	134 (5.28)
	1FT7044				208 (8.19)	146 (5.75)	240 (9.45)	178 (7.01)		214 (8.43)	152 (5.98)	246 (9.69)	184 (7.24)
	1FT7046				248 (9.76)	186 (7.32)	280 (11.02)	218 (8.58)		254 (10.00)	192 (7.56)	286 (11.26)	224 (8.82)
63	1FT7062		6 (0.24)	56.5 (2.22)	161 (6.34)	99 (3.90)	197 (7.76)	135 (5.31)	50 (1.97)	168 (6.61)	106 (4.17)	203 (7.99)	141 (5.55)
	1FT7064				193 (7.60)	131 (5.16)	228 (8.98)	166 (6.54)		200 (7.87)	137 (5.39)	235 (9.25)	173 (6.81)
	1FT7066				225 (8.86)	162 (6.38)	260 (10.24)	198 (7.80)		231 (9.09)	169 (6.65)	267 (10.51)	204 (8.03)
	1FT7068				272 (10.71)	210 (8.27)	307 (12.09)	245 (9.65)		279 (10.98)	216 (8.50)	314 (12.36)	252 (9.92)
80	1FT7082		6 (0.24)	64.5 (2.54)	189 (7.44)	124 (4.88)	236 (9.29)	176 (6.93)	58 (2.28)	191 (7.52)	130 (5.12)	243 (9.57)	183 (7.20)
	1FT7084				236 (9.29)	175 (6.89)	288 (11.34)	228 (8.98)		242 (9.53)	182 (7.17)	294 (11.57)	234 (9.21)
	1FT7086				287 (11.30)	227 (8.94)	340 (13.39)	279 (10.98)		294 (11.57)	234 (9.21)	346 (13.62)	286 (11.26)
100	1FT7102		6.5 (0.26)	87 (3.43)	209 (8.23)	144 (5.67)	261 (10.28)	196 (7.72)	80 (3.15)	216 (8.50)	151 (5.94)	268 (10.55)	203 (7.99)
	1FT7105				296 (11.65)	231 (9.09)	348 (13.70)	283 (11.14)		303 (11.93)	238 (9.37)	355 (13.98)	290 (11.42)
	1FT7108				365 (14.37)	300 (11.81)	417 (16.42)	352 (13.86)		372 (14.65)	307 (12.09)	424 (16.69)	359 (14.13)

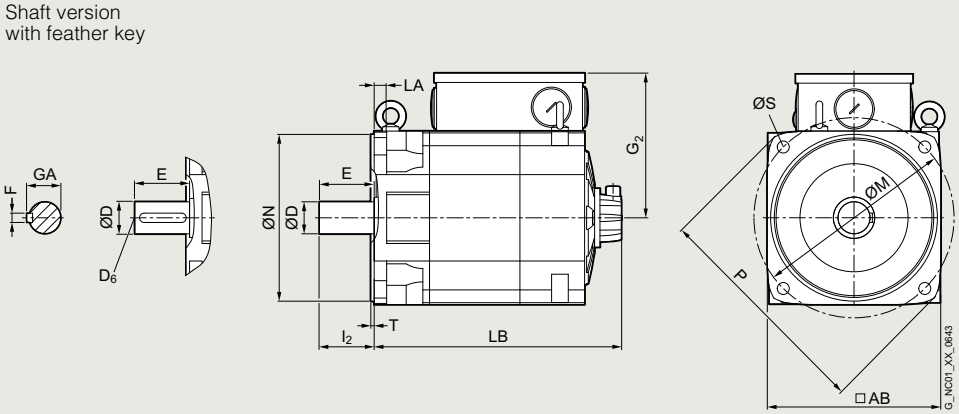
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Dimensional drawings

Version with connector



Version with terminal box



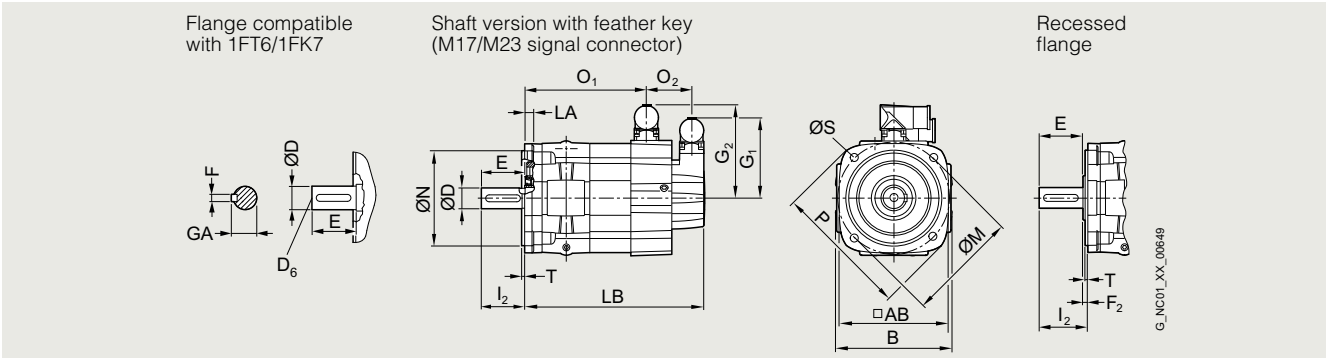
For motor		Dimensions in mm (inches)										Connector size		Terminal box	Shaft end DE				
												Size 1.5	Size 3						
Shaft height	Type	IEC	P	N	LA	M	AB	T	I_2	S	G_2	G_2	G_2	G_2	**D**	D_6	E	GA	F
SIMOTICS S-1FT7 natural cooling and forced ventilation, with connector/with terminal box, without/with brake																			
132	1FT713.-5(A/S)		340 (13.39)	250 (9.84)	18 (0.71)	300 (11.81)	260 (10.24)	5 (0.20)	82 (3.23)	18 (0.71)	193.5 (7.62)	203 (7.99)	215.5 (8.48)		**48 (1.89)**	M16	82 (3.23)	51.5 (2.03)	14 (0.55)

			Natural cooling							Forced ventilation		Natural cooling and forced ventilation			
			without brake		with brake					without brake	with brake	without brake		with brake	
			Signal connector									Connector size			
			RJ45	M17 M23	RJ45	M17 M23	RJ45	M17	M23			Size 1.5	Size 3	Size 1.5	Size 3
Shaft height	Type	IEC	LB	LB	LB	LB	G_1	G_1	G_1	LB	LB	O_1	O_1	O_1	O_1
132	1FT7132-5(A/S)		370.5 (14.59)	375.5 (14.78)	431 (16.97)	436 (17.97)	104.5 (4.11)	82 (3.23)	93 (3.65)	483.6 (19.04)	544.1 (21.42)	284.5 (11.20)	265.5 (10.45)	345 (13.58)	326 (12.83)
	1FT7134-5(A/S)		415.5 (16.36)	420.5 (16.56)	476 (18.74)	481 (18.94)				528.6 (20.81)	589.1 (23.19)	329.5 (12.97)	310.5 (12.22)	390 (15.35)	371 (14.61)
	1FT7136-5(A/S)		460.5 (18.13)	465.5 (18.53)	521 (20.51)	526 (20.71)				573.6 (22.58)	634.1 (24.96)	374.5 (14.74)	355.5 (14.00)	435 (17.13)	416 (16.38)
	1FT7138-5(A/S)		500.5 (19.70)	505.5 (19.90)	561 (22.09)	566 (22.28)				613.6 (24.16)	674.1 (26.54)	414.5 (16.32)	395.5 (15.57)	475 (18.70)	456 (17.95)

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SIMOTICS S-1FT7 with M17 / M23 signal connector – water cooling

Dimensional drawings

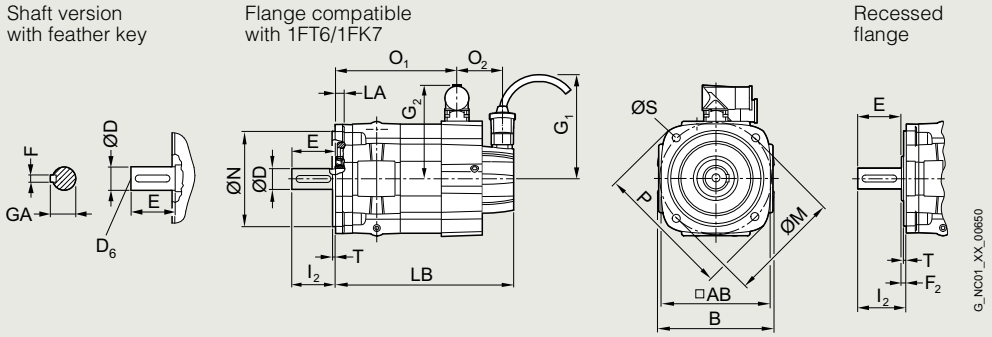


For motor		Dimensions in mm (inches)									Signal connector		Power connectors			Connector		
											M17	M23	Size 1	Size 1.5	Size 3	Size 1	Size 1.5	Size 3
Shaft height	Type	IEC	P	B	N	LA	M	AB	T	S			G_2	G_2	G_2	O_2	O_2	O_2
SIMOTICS S-1FT7 water cooling, with connector, without/with brake																		
63	1FT706.-.W		155 (6.10)	135 (5.31)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	9 (0.35)	82 (3.23)	93 (3.66)	108 (4.25)	132.5 (5.22)	–	52 (2.05)	57 (2.24)	–
80	1FT708.-.W		194 (7.68)	165 (6.50)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	11 (0.43)	82 (3.23)	93 (3.66)	–	140.5 (5.53)	168.5. (6.63)	–	50 (1.97)	67 (2.64)
100	1FT710.-5W		245 (9.65)	206 (8.11)	180 (7.09)	13 (0.51)	215 (8.46)	196 (7.72)	4 (0.16)	14 (0.55)	82 (3.23)	93 (3.66)	–	159.5 (6.28)	187.5 (7.38)	–	55 (2.17)	72 (2.83)

			Flange compatible with 1FT6/1FK7 without/with brake					Recessed flange without/with brake						Shaft end DE				
					Power connectors						Power connectors							
					Size 1	Size 1.5	Size 3				Size 1	Size 1.5	Size 3					
Shaft height	Type	IEC	l_2	LB	O_1	O_1	O_1	F_2	l_2	LB	O_1	O_1	O_1	D	D_6	E	GA	F
63	1FT7062		50 (1.97)	208 (8.19)	141 (5.55)	–	–	6 (0.24)	56.5 (2.22)	202 (7.95)	135 (5.31)	–	–	**24 (0.94)**	M8	50 (1.97)	27 (1.06)	8 (0.31)
	1FT7064			240 (9.45)	173 (6.81)	–	–			233 (9.17)	166 (6.54)	–	–					
	1FT7065			292 (11.50)	220 (8.66)	–	–			286 (11.26)	214 (8.43)	–	–					
	1FT7066			272 (10.71)	204 (8.03)	–	–			265 (10.43)	198 (7.80)	–	–					
	1FT7067			332 (13.07)	260 (10.24)	–	–			325 (12.80)	254 (10.00)	–	–					
	1FT7068			319 (12.56)	252 (9.92)	–	–			312 (12.28)	245 (9.65)	–	–					
80	1FT7082		58 (2.28)	248 (9.76)	–	183 (7.20)	–	6 (0.24)	64.5 (2.54)	241 (9.49)	–	176 (6.93)	–	**32 (1.26)**	M12	58 (2.28)	35 (1.38)	10 (0.39)
	1FT7084			299 (11.77)	–	234 (9.21)	–			293 (11.54)	–	228 (8.98)	–					
	1FT7085			319 (12.56)	–	254 (10.00)	237 (9.33)			312.5 (12.30)	–	247 (9.72)	231 (9.09)					
	1FT7086			351 (13.82)	–	286 (11.26)	–			345 (13.58)	–	279 (10.98)	–					
	1FT7087			379 (14.92)	–	314 (12.36)	297 (11.69)			372.5 (14.67)	–	307 (12.09)	291 (11.46)					
100	1FT7102		80 (3.15)	273 (10.75)	–	203 (7.99)	187 (7.36)	6.5 (0.26)	87 (3.43)	266 (10.47)	–	196 (7.72)	180 (7.09)	**38 (1.50)**	M12	80 (3.15)	41 (1.61)	10 (0.39)
	1FT7105			360 (14.17)	–	290 (11.42)	273 (10.75)			353 (13.90)	–	283 (11.14)	266 (10.47)					
	1FT7108			429 (16.89)	–	359 (14.13)	342 (13.46)			422 (16.61)	–	352 (13.86)	335 (13.19)					

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Dimensional drawings



For motor			Dimensions in mm (inches)									Signal connector	Power connectors Size 1	Power connectors Size 1.5	Power connectors Size 3	Connector Size 1	Connector Size 1.5	Connector Size 3
Shaft height	Type	IEC	P	B	N	LA	M	AB	T	S		G_1	G_2	G_2	G_2	O_2	O_2	O_2
SIMOTICS S-1FT7 water cooling, with connector, without/with brake																		
63	1FT706.-.W		155 (6.10)	135 (5.31)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	9 (0.35)		104.5 (4.11)	108 (4.25)	132.5 (5.22)	–	50 (1.97)	55 (2.17)	–
80	1FT708.-.W		194 (7.68)	165 (6.50)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	11 (0.43)		104.5 (4.11)	–	140.5 (5.53)	168.5. (6.63)	–	48 (1.89)	63 (2.48)
100	1FT710.-5W		245 (9.65)	206 (8.11)	180 (7.09)	13 (0.51)	215 (8.46)	196 (7.72)	4 (0.16)	14 (0.55)		104.5 (4.11)	–	159.5 (6.28)	187.5 (7.38)	–	53 (2.09)	69 (2.72)

			Recessed flange without/with brake					Flange compatible with 1FT6/1FK7 without/with brake						Shaft end DE				
					Power connectors						Power connectors							
					Size 1	Size 1.5	Size 3				Size 1	Size 1.5	Size 3					
Shaft height	Type	IEC	I_2	LB	O_1	O_1	O_1	F_2	I_2	LB	O_1	O_1	O_1	D	D_6	E	GA	F
63	1FT7062		50 (1.97)	204 (8.03)	141 (5.55)	–	–	6 (0.24)	56.5 (2.22)	197 (7.76)	135 (5.31)	–	–	**24 (0.94)**	M8	50 (1.97)	27 (1.06)	8 (0.31)
	1FT7064			235 (9.25)	173 (6.81)	–	–			229 (9.02)	166 (6.54)	–	–					
	1FT7065			287 (11.30)	220 (8.66)	–	–			281 (11.06)	214 (8.43)	–	–					
	1FT7066			267 (10.51)	204 (8.03)	–	–			260 (10.24)	198 (7.80)	–	–					
	1FT7067			327 (12.87)	260 (10.24)	–	–			321 (12.64)	254 (10.00)	–	–					
	1FT7068			314 (12.36)	252 (9.92)	–	–			308 (12.13)	245 (9.65)	–	–					
80	1FT7082		58 (2.28)	243 (9.57)	–	183 (7.20)	–	6 (0.24)	64.5 (2.54)	237 (9.33)	–	176 (6.93)	–	**32 (1.26)**	M12	58 (2.28)	35 (1.38)	10 (0.39)
	1FT7084			295 (11.61)	–	234 (9.21)	–			288 (11.34)	–	228 (8.98)	–					
	1FT7085			314 (12.36)	–	254 (10.00)	237 (9.33)			308 (12.13)	–	247 (9.72)	231 (9.09)					
	1FT7086			346 (13.62)	–	286 (11.26)	–			340 (13.39)	–	279 (10.98)	–					
	1FT7087			374 (14.72)	–	314 (12.36)	297 (11.69)			368 (14.49)	–	307 (12.09)	291 (11.46)					
100	1FT7102		80 (3.15)	267 (10.51)	–	203 (7.99)	187 (7.36)	6.5 (0.26)	87 (3.43)	262 (10.31)	–	196 (7.72)	180 (7.09)	**38 (1.50)**	M12	80 (3.15)	41 (1.61)	10 (0.39)
	1FT7105			355 (13.98)	–	290 (11.42)	273 (10.75)			348 (13.70)	–	283 (11.14)	266 (10.47)					
	1FT7108			424 (16.69)	–	359 (14.13)	342 (13.46)			417 (16.42)	–	352 (13.86)	335 (13.19)					

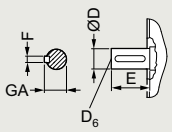
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SIMOTICS S-1FT7 with RJ45 (DRIVE-CLiQ) and M23 signal connector – forced ventilation

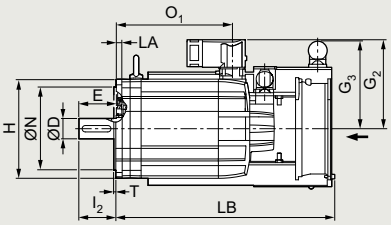
Dimensional drawings

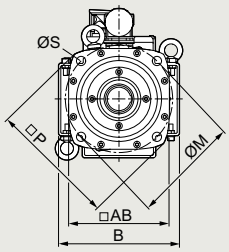
1FT706
1FT708
1FT710

Shaft version with feather key

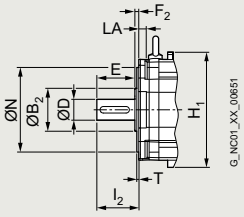


Flange compatible with 1FT6/1FK7





Recessed flange

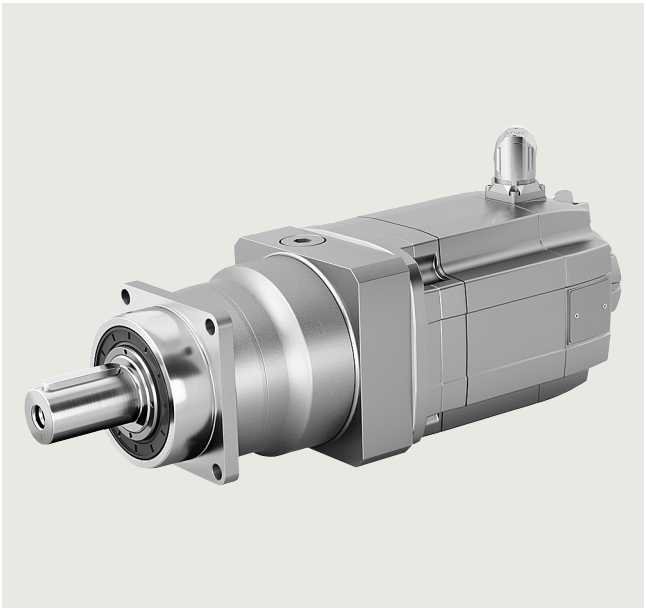


For motor			Dimensions in mm (inches)														
											Connector size					Fan	
											Size 1.5	Size 3					
Shaft height	Type	IEC	P	B	N	LA	M	AB	T	S	G_2	G_2	G_3	H	H_1	H_2	
SIMOTICS S-1FT7 forced ventilation, with connector, without/with brake																	
63	1FT706.-.S		155 (6.10)	158 (6.22)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	11 (0.43)	125 (4.92)	–	102 (4.02)	26 (1.02)	143 (5.36)	135 (5.31)	
80	1FT708.-.S		194 (7.68)	186 (7.32)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	11 (0.43)	139 (5.47)	167 (6.57)	137.5 (5.41)	27 (1.06)	177 (6.97)	186.5 (7.34)	
100	1FT710.-5S		245 (9.65)	224 (8.82)	180 (7.09)	13 (0.51)	215 (8.46)	196 (7.72)	4 (0.16)	14 (0.55)	159 (6.26)	187 (7.36)	151 (5.94)	27 (1.06)	220 (8.66)	222 (8.74)	

			Flange compatible with 1FT6/1FK7					Recessed flange						Shaft end DE				
				without brake		with brake				without brake		with brake						
Shaft height	Type	IEC	I_2	LB	O_1	LB	O_1	F_2	I_2	LB	O_1	LB	O_1	D	D_6	E	GA	F
63	1FT7065-7S		50 (1.97)	380 (14.96)	220 (8.66)	380 (14.96)	220 (8.66)	6 (0.24)	56.5 (2.22)	373.5 (14.70)	214 (8.43)	373.5 (14.70)	214 (8.43)	24 **(0.94)**	M8	50 (1.97)	27 (1.06)	8 (0.31)
	1FT7067-7S			420 (16.54)	260 (10.24)	420 (16.54)	260 (10.24)			413.5 (16.28)	254 (10.00)	413.5 (16.28)	254 (10.00)					
80	1FT7084-5S		58 (2.28)	342 (13.46)	182 (7.17)	394 (15.51)	234 (9.21)	6 (0.24)	64.5 (2.54)	336 (13.23)	175 (6.89)	387 (15.24)	228 (8.98)	**32 (1.26)**	M12	58 (2.28)	35 (1.38)	10 (0.39)
	1FT7085-7S			414 (16.30)	254 (10.00)	414 (16.30)	254 (10.00)			408 (16.06)	247 (9.72)	408 (16.06)	247 (9.72)					
	1FT7086-5S			394 (15.51)	234 (9.21)	446 (17.56)	286 (11.26)			387 (15.24)	227 (8.94)	440 (17.32)	379 (14.92)					
	1FT7087-7S			474 (18.66)	314 (12.36)	474 (18.66)	314 (12.36)			468 (18.43)	307 (12.09)	468 (18.43)	307 (12.09)					
100	1FT7105		80 (3.15)	404 (15.91)	238 (9.37)	456 (17.95)	290 (11.42)	6.5 (0.26)	87 (3.43)	397 (15.63)	231 (9.09)	449 (17.68)	283 (11.14)	**38 (1.50)**	M12	80 (3.15)	41 (1.61)	10 (0.39)
	1FT7108			473 (18.62)	307 (12.09)	525 (20.67)	359 (14.13)			466 (18.35)	300 (11.81)	518 (20.39)	352 (13.86)					

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Overview



SIMOTICS S-1FT7 motor with mounted planetary gearbox SP+ series

SIMOTICS S-1FT7 motors can be combined with planetary gearboxes to create compact coaxial drive units. The gearboxes are flanged coaxially to the DE side of the motors.

Benefits

- High efficiency;
  1-stage: > 97 %
  2-stage: > 94 %
- Minimum torsional backlash
  1-stage: ≤ 4 arcmin
  2-stage: ≤ 6 arcmin
- Very low moment of inertia and thus short acceleration times of the motors
- Output shaft bearings dimensioned for high cantilever and axial loads with preloaded tapered roller bearings
- The gearboxes are enclosed (seal between gearbox and motor) and filled with oil at the factory. They are lubricated and sealed for their service life.
  The gearboxes are suitable for all mounting positions.
- Degree of protection of gearbox: IP65
- Small dimensions
- Low weight

Integration

SIMOTICS S-1FT7 motors can be supplied with a flanged planetary gearbox from the factory.

The gearboxes assigned to the individual motors and gearbox ratios *i* available for these motor/gearbox combinations are listed in the subsequent selection table. The maximum permissible input speed of the gearbox (this is the same as the maximum motor speed) must be taken into account when a gearbox is selected.

The motor/gearbox combinations listed in the selection tables are mainly intended for cyclic operation S3-60 % (switch-on duration ≤ 60 % and ≤ 20 min). Reduced maximum motor speeds and output torques apply for use in S1 continuous duty (switch-on duration > 60 % or > 20 min). The gearbox must not exceed a temperature of 90 °C.

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Planetary gearbox SP+ series for SIMOTICS S-1FT7

Selection and ordering data

Motor	Planetary gearbox 1-stage			Available gearbox ratio i =				Motor speed, max. S3-60 %	Output torque, max. S3-60 %	Radial output shaft load, max. [1]	Axial output shaft load, max. [1]
Type	Type	Torsional backlash	Gearbox weight, approx.	4	5	7	10	n_{G1} (n_1)	M_{G2} (T_{2B})	F_r (F_{2Rmax})	F_a (F_{2Amax})
		arcmin	kg (lb)					r/min	Nm (lb$_f$-ft)	N (lb$_f$)	N (lb$_f$)
1FT7034	SP 060S-MF1	≤ 4	1.9 (4.2)	✔	✔	✔	–	7500	50 (36.9)	2800 (629)	2400 (540)
1FT7034	SP 075S-MF1	≤ 4	3.9 (8.6)	–	–	–	✔	7500	132 (97.4) (114 (84.1) for i = 10)	4200 (944)	3350 (753)
1FT7036				✔	✔	✔	✔				
1FT7042				✔	✔	✔	✔				
1FT7044				✔	✔	✔	✔				
1FT7046				✔	✔	✔	–				
1FT7046	SP 100S-MF1	≤ 3	7.7 (17.0)	–	–	–	✔	5500	378 (279) (282 (208) for i = 10)	6600 (1484)	5650 (1270)
1FT7062				✔	✔	✔	✔				
1FT7064				✔	✔	✔	✔				
1FT7065				✔	✔	✔	–				
1FT7066				✔	✔	✔	✔				
1FT7067				✔	✔	✔	–				
1FT7068				✔	✔	✔	–				
1FT7065	SP 140S-MF1	≤ 3	17.2 (37.9)	–	–	–	✔	5000	792 (584) (636 (469) for i = 10)	9900 (2226)	9870 (2219)
1FT7067				–	–	–	✔				
1FT7068				–	–	–	✔				
1FT7082				✔	✔	✔	✔				
1FT7084				✔	✔	✔	✔				
1FT7085				✔	✔	✔	–				
1FT7086				✔	✔	✔	–				
1FT7087				✔	✔	–	–				
1FT7085	SP 180S-MF1	≤ 3	34 (75.0)	–	–	–	✔	4500	1452 (1071) (1164 (859) for i = 10)	15400 (3462)	15570 (3500)
1FT7086				–	–	–	✔				
1FT7087				–	–	✔	✔				
1FT7102				✔	✔	✔	✔				
1FT7105				✔	✔	✔	–				
1FT7108				✔	✔	✔	–				
1FT7105	SP 210S-MF1	≤ 3	56 (123)	–	–	–	✔	3000	3000 (2213) (2880 (2124) for i = 7 2280 (1682) for i = 10)	21000 (4721)	30000 (6744)
1FT7108				–	–	–	✔				
1FT7132				✔	✔	✔	–				
1FT7134				✔	✔	✔	–				
1FT7136				✔	✔	✔	–				
1FT7138				✔	✔	–	–				
1FT7132	SP 240S-MF1	≤ 3	83 (183)	–	–	–	✔	3000	5400 (3983) (5160 (3806) for i = 7 4000 (2950) for i = 10)	30000 (6744)	33000 (7419)
1FT7134				–	–	–	✔				
1FT7136				–	–	–	✔				
1FT7138				–	–	✔	–				
	Gear shaft			Order code							
	With feather key			**J02**	**J03**	**J05**	**J09**				
	Without feather key			**J22**	**J23**	**J25**	**J29**				

Preconditions:

SP+ planetary gearboxes can be mounted with the following motor versions:
- Flange compatible with 1FT6/1FK7
- Plain motor shaft end, shaft and flange accuracy tolerance N, without/with holding brake
- Vibration severity grade A/IP65 degree of protection

SP+ planetary gearboxes can therefore only be ordered with these motors:

- **1FT7...-....1-..G1**,
- **1FT7...-....1-..H1,**
- **1FT7...-....4-..G1,**
- **1FT7...-....4-..H1**

When ordering a motor with gearbox, a **-Z** must be added to the article number and the order code of the required gearbox specified.

Example:
- 1FT7042 motor without holding brake
- With single-stage SP+ planetary gearbox
- With i = 5 and gearbox shaft without feather key

1FT7042-5AF74-1NG1**-Z J23**

✔ Possible
– Not possible
[1] Referred to output shaft center.

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Technical specifications

SIMOTICS S-1FT7 motor with SP+ planetary gearbox

1-stage Type	Gearbox ratio	Motor speed	Output torque	Moments of inertia of gearboxes (referred to the drive)					
		Continuous duty S1 [1]		1FT703.	1FT704.	1FT706.	1FT708.	1FT710.	1FT713.
	i	n_{N1} r/min	M_{N2} (T_{2N}) Nm (lb_f-ft)	J_1 kgcm^2 (lb_f-in^2)	J_1 kgcm^2 (lb_f-in^2)	J_1 kgcm^2 (lb_f-in^2)	J_1 kgcm^2 (lb_f-in^2)	J_1 kgcm^2 (lb_f-in^2)	J_1 kgcm^2 (lb_f-in^2)
SP 060S-MF1	4	3300	27 (19.9)	0.22 (0.08)	–	–	–	–	–
	5	3300	27 (19.9)	0.20 (0.07)	–	–	–	–	–
	7	4000	26 (19.2)	0.18 (0.06)	–	–	–	–	–
SP 075S-MF1	4	2900	81 (59.7)	0.61 (0.21)	0.78 (0.27)	–	–	–	–
	5	2900	81 (59.7)	0.51 (0.17)	0.68 (0.23)	–	–	–	–
	7	3100	81 (59.7)	0.42 (0.14)	0.59 (0.20)	–	–	–	–
	10	3100	81 (59.7)	0.38 (0.13)	0.54 (0.18)	–	–	–	–
SP 100S-MF1	4	2500	171 (126)	–	–	3.04 (1.04)	–	–	–
	5	2500	169 (125)	–	–	2.61 (0.89)	–	–	–
	7	2800	166 (122)	–	–	2.29 (0.78)	–	–	–
	10	2800	174 (128)	–	1.38 (0.47)	2.07 (0.71)	–	–	–
SP 140S-MF1	4	2100	335 (247)	–	–	–	11.0 (3.8)	–	–
	5	2100	333 (246)	–	–	–	9.95 (3.40)	–	–
	7	2600	319 (235)	–	–	–	9.00 (3.08)	–	–
	10	2600	327 (241)	–	–	5.28 (1.80)	8.44 (2.88)	–	–
SP 180S-MF1	4	1500	927 (684)	–	–	–	–	33.9 (11.6)	–
	5	1500	919 (678)	–	–	–	–	27.9 (9.5)	–
	7	2300	825 (609)	–	–	–	–	22.2 (7.6)	–
	10	2300	864 (637)	–	–	–	19.2 (6.6)	19.2 (6.6)	–
SP 210S-MF1	4	1200	1895 (1398)	–	–	–	–	–	94.3 (32.2)
	5	1500	1767 (1303)	–	–	–	–	–	76.9 (26.3)
	7	1700	1731 (1277)	–	–	–	–	–	61.5 (21.0)
	10	2000	1708 (1260)	–	–	–	–	53.1 (18.1)	–
SP 240S-MF1	7	1500	2737 (2019)	–	–	–	–	–	138 (47.2)
	10	1700	2735 (2017)	–	–	–	–	–	125 (42.7)

[1] The limit values in the table apply for S1 continuous duty (switch-on duration > 60 % or > 20 min) for a maximum gearbox temperature of 90 °C (194 °F).

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Planetary gearbox SP+ series for SIMOTICS S-1FT7

Selection and ordering data

Motor	Planetary gearbox 2-stage			Available gearbox ratio *i* =					Motor speed, max. S3-60 %	Output torque, max. S3-60 %	Radial output shaft load, max. [1]	Axial output shaft load, max. [1]
Type	Type	Torsional backlash	Gearbox weight, approx.	16	20	28	40	50	n_{G1} (n_1)	M_{G2} (T_{2B})	F_r (F_{2Rmax})	F_a (F_{2Amax})
		arcmin	kg (lb)						r/min	Nm (lb$_f$-ft)	N (lb$_f$)	N (lb$_f$)
1FT7034	SP 075S-MF2	≤ 6	3.6 (7.9)	✔	✔	✔	–	–	8500	126 (92.9)	4200 (944)	3350 (753)
1FT7036				✔	–	–	–	–				
1FT7042				✔	–	–	–	–				
1FT7034	SP 100S-MF2	≤ 5	7.9 (17.4)	–	–	–	✔	✔	6500	347 (256)	6600 (1484)	5650 (1270)
1FT7036				–	✔	✔	✔	✔				
1FT7042				–	✔	✔	✔	✔				
1FT7044				✔	✔	✔	–	–				
1FT7046				✔	✔	–	–	–				
1FT7062				✔	✔	–	–	–				
1FT7064				✔	–	–	–	–				
1FT7044	SP 140S-MF2	≤ 5	17 (37.5)	–	–	–	✔	✔	6000	726 (535) (670 (494) for *i* = 50)	9900 (2226)	9870 (2219)
1FT7046				–	–	✔	✔	✔				
1FT7062				–	–	✔	✔	✔				
1FT7064				–	✔	✔	–	–				
1FT7065				✔	✔	–	–	–				
1FT7066				✔	✔	–	–	–				
1FT7067				✔	–	–	–	–				
1FT7068				✔	✔	–	–	–				
1FT7082				✔	✔	–	–	–				
1FT7084				✔	–	–	–	–				
1FT7064	SP 180S-MF2	≤ 5	36.4 (80.3)	–	–	–	✔	✔	5000	1452 (1071)	15400 (3462)	15570 (3500)
1FT7065				–	–	✔	✔	–				
1FT7066				–	–	✔	✔	✔				
1FT7067				–	✔	✔	–	–				
1FT7068				–	–	✔	✔	✔				
1FT7082				–	–	✔	✔	✔				
1FT7084				–	✔	✔	–	–				
1FT7085				✔	–	–	–	–				
1FT7086				✔	✔	–	–	–				
1FT7102				✔	✔	–	–	–				
1FT7084	SP 210S-MF2	≤ 5	55 (121)	–	–	–	✔	✔	4500	2880 (2124) (3000 (2213) for *i* = 20) (2840 (2095) for *i* = 40)	21000 (4721)	30000 (6744)
1FT7085				–	✔	✔	–	–				
1FT7086				–	–	✔	✔	–				
1FT7087				✔	✔	✔	–	–				
1FT7102				–	–	✔	–	–				
1FT7105				✔	✔	–	–	–				
1FT7108				✔	–	–	–	–				
1FT7085	SP 240S-MF2	≤ 5	80.6 (177.7)	–	–	–	✔	✔	4500	5400 (3983) (4400 (3245) for *i* = 40 5160 (3806) for *i* = 50)	30000 (6744)	33000 (7419)
1FT7086				–	–	–	–	✔				
1FT7102				–	–	–	✔	✔				
1FT7105				–	–	✔	✔	–				
1FT7108				–	✔	✔	–	–				
1FT7132				✔	✔	–	–	–				
1FT7134				✔	–	–	–	–				
	Gear shaft			**Order code**								
	With feather key			**J12**	**J13**	**J15**	**J16**	**J17**				
	Without feather key			**J32**	**J33**	**J35**	**J36**	**J37**				

Preconditions, see page 8.1/36.

✔ Possible
– Not possible

[1] Referred to output shaft center.

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Technical specifications

SIMOTICS S-1FT7 motor with SP+ planetary gearbox

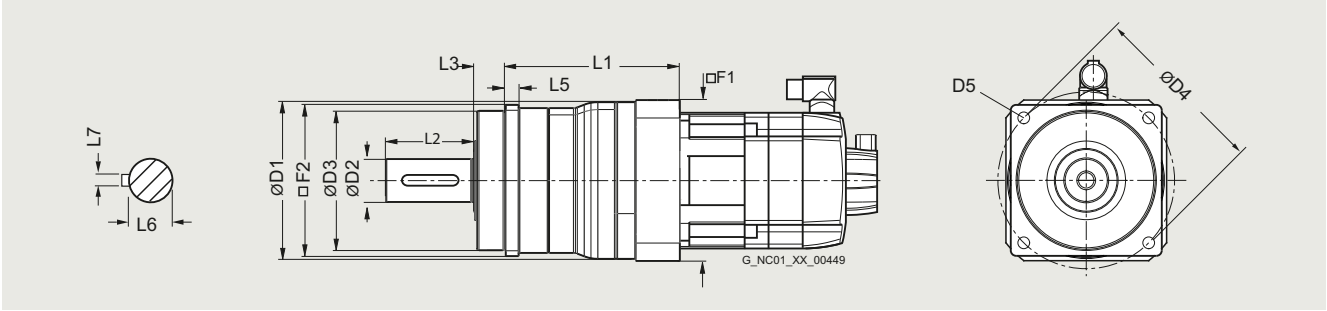
2-stage Type	Gearbox ratio	Motor speed	Output torque	Moments of inertia of gearboxes (referred to the drive)					
		Continuous duty S1[1]		1FT703.	1FT704.	1FT706.	1FT708.	1FT710.	1FT713.
	i	n_{N1} r/min	M_{N2} (T_{2N}) Nm (lb_f-ft)	J_1 kgcm^2 (lb_f-in^2)	J_1 kgcm^2 (lb_f-in^2)	J_1 kgcm^2 (lb_f-in^2)	J_1 kgcm^2 (lb_f-in^2)	J_1 kgcm^2 (lb_f-in^2)	J_1 kgcm^2 (lb_f-in^2)
SP 075S-MF2	16	3500	101 (74.5)	0.23 (0.08)	0.55 (0.19)	–	–	–	–
	20	3500	101 (74.5)	0.20 (0.07)	–	–	–	–	–
	28	3500	101 (74.5)	0.18 (0.06)	–	–	–	–	–
SP 100S-MF2	16	3100	243 (179)	–	0.81 (0.28)	2.18 (0.74)	–	–	–
	20	3100	259 (191)	0.54 (0.18)	0.70 (0.24)	2.07 (0.71)	–	–	–
	28	3100	277 (204)	0.43 (0.15)	0.60 (0.21)	–	–	–	–
	40	3100	277 (204)	0.38 (0.13)	0.55 (0.19)	–	–	–	–
	50	3500	277 (204)	0.38 (0.13)	0.54 (0.18)	–	–	–	–
SP 140S-MF2	16	2900	461 (340)	–	–	3.19 (1.09)	10.3 (3.5)	–	–
	20	2900	493 (364)	–	–	2.71 (0.93)	9.77 (3.34)	–	–
	28	2900	545 (402)	–	1.65 (0.56)	2.34 (0.80)	–	–	–
	40	2900	581 (429)	–	1.40 (0.48)	2.10 (0.72)	–	–	–
	50	3200	536 (395)	–	1.39 (0.47)	2.08 (0.71)	–	–	–
SP 180S-MF2	16	2700	1162 (857)	–	–	–	12.4 (4.2)	13.5 (4.6)	–
	20	2700	1162 (857)	–	–	–	10.9 (3.7)	12.0 (4.1)	–
	28	2700	1162 (857)	–	–	6.32 (2.16)	9.48 (3.24)	–	–
	40	2700	1162 (857)	–	–	5.51 (1.88)	8.67 (2.96)	–	–
	50	2900	1162 (857)	–	–	5.45 (1.86)	8.61 (2.94)	–	–
SP 210S-MF2	16	2500	1274 (940)	–	–	–	–	34.5 (11.8)	–
	20	2500	1266 (934)	–	–	–	–	31.5 (10.8)	–
	28	2500	1294 (954)	–	–	–	30.0 (10.3)	30.0 (10.3)	–
	40	2500	1358 (1002)	–	–	–	28.5 (9.7)	–	–
	50	2500	1679 (1238)	–	–	–	28.3 (9.7)	–	–
SP 240S-MF2	16	2300	2658 (1961)	–	–	–	–	–	39.2 (13.4)
	20	2500	2596 (1915)	–	–	–	–	34.6 (11.8)	34.6 (11.8)
	28	2500	2667 (1967)	–	–	–	–	30.5 (10.4)	–
	40	2500	2803 (2067)	–	–	–	28.2 (9.6)	28.2 (9.6)	–
	50	2500	3457 (2550)	–	–	–	27.9 (9.5)	27.9 (9.5)	–

[1] The limit values in the table apply for S1 continuous duty (switch-on duration > 60 % or > 20 min) for a maximum gearbox temperature of 90 °C (194 °F).

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Planetary gearbox SP+ series for SIMOTICS S-1FT7

Dimensional drawings



For planetary gearboxes SP+ series on SIMOTICS S-1FT7/S-1FK7 motors

Dimensions in mm (inches)

Planetary gearbox Type	D2	D3	D4	D5	F2	L2	L3	L5	L6	L7
SIMOTICS S-1FT7 with planetary gearbox SP+ series 1-stage/2-stage										
SP060S-MF1/-MF2	16 (0.63)	60 (2.36)	68 (2.68)	5.5 (0.22)	62 (2.48)	28 (1.10)	20 (0.79)	6 (0.24)	18 (0.71)	5 (0.20)
SP075S-MF1/-MF2	22 (0.87)	70 (2.76)	85 (3.35)	6.6 (0.26)	76 (2.99)	36 (1.42)	20 (0.79)	7 (0.28)	24.5 (0.96)	6 (0.24)
SP100S-MF1/-MF2	32 (1.26)	90 (3.54)	120 (4.72)	9 (0.35)	101 (3.98)	58 (2.28)	30 (1.18)	10 (0.39)	35 (1.38)	10 (0.39)
SP140S-MF1/-MF2	40 (1.57)	130 (5.12)	165 (6.50)	11 (0.43)	141 (5.55)	82 (3.23)	30 (1.18)	12 (0.47)	43 (1.69)	12 (0.47)
SP180S-MF1/-MF2	55 (2.17)	160 (6.30)	215 (8.46)	13.5 (0.53)	182 (7.17)	82 (3.23)	30 (1.18)	15 (0.59)	59 (2.32)	16 (0.63)
SP210S-MF1/-MF2	75 (2.95)	180 (7.09)	250 (9.84)	17 (0.67)	215 (8.46)	105 (4.13)	38 (1.50)	17 (0.67)	79.5 (3.13)	20 (0.79)
SP240S-MF1/-MF2	85 (3.35)	200 (7.87)	290 (11.42)	17 (0.67)	245 (9.65)	130 (5.12)	40 (1.57)	20 (0.79)	90 (3.54)	22 (0.87)

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Dimensional drawings

For planetary gearboxes SP+ series on SIMOTICS S-1FT7/S-1FK7 motors

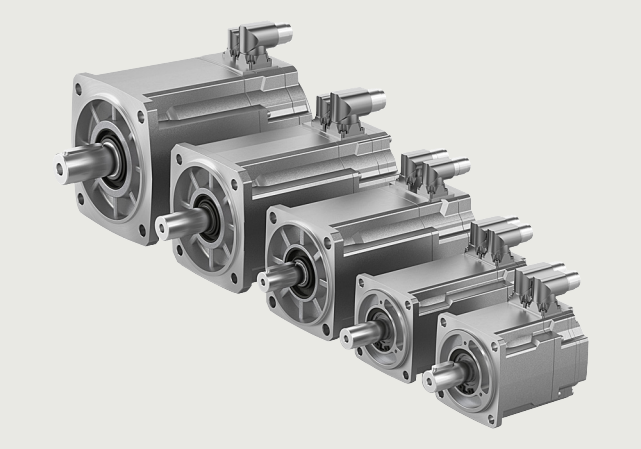
Dimensions in mm (inches)

Planetary gearbox	Motor	Planetary gearbox SP+ series 1-stage **-MF1**			Planetary gearbox SP+ series 2-stage **-MF2**		
Type	Type	D1	F1	L1	D1	F1	L1
SIMOTICS S-1FT7 with planetary gearbox SP+ series 1-stage/2-stage							
SP060S-	1FT703/	68 (2.68)	70 (2.76)	94 (3.70)	68 (2.68)	70 (2.76)	116 (4.57)
	1FT704	91 (3.58)	90 (3.54)	106 (4.17)	–	–	–
SP075S-	1FT703	91 (3.58)	90 (3.54)	107.8 (4.24)	95 (3.74)	70 (2.76)	123.4 (4.86)
	1FT704/	91 (3.58)	90 (3.54)	111.5 (4.39)	91 (3.58)	90 (3.54)	135.6 (5.34)
SP100S-	1FT703/	–	–	–	118 (4.65)	90 (3.54)	142.3 (5.60)
	1FT704	115 (4.53)	120 (4.72)	122 (4.80)	118 (4.65)	90 (3.54)	146 (5.75)
	1FT704	115 (4.53)	120 (4.72)	129 (5.08)	115 (4.53)	120 (4.72)	164 (6.46)
SP140S-	1FT704	–	–	–	152 (5.98)	120 (4.72)	186.3 (7.33)
	1FT706	146 (5.75)	150 (5.91)	162.3 (6.39)	152 (5.98)	120 (4.72)	193.3 (7.61)
	1FT708	146 (5.75)	150 (5.91)	171.3 (6.74)	146 (5.75)	150 (5.91)	220 (8.66)
	1FT710	146 (5.75)	190 (7.48)	171.3 (6.74)	–	–	–
SP180S-	1FT706	–	–	–	212 (8.35)	150 (5.91)	234 (9.21)
	1FT708	207 (8.15)	210 (8.27)	198 (7.80)	212 (8.35)	150 (5.91)	242.9 (9.56)
	1FT710	207 (8.15)	210 (8.27)	203.5 (8.01)	212 (8.35)	190 (7.48)	242.9 (9.56)
SP210S-	1FT708	–	–	–	215 (8.46)	210 (8.27)	272 (10.71)
	1FT710	215 (8.46)	190 (7.48)	242 (9.53)	215 (8.46)	210 (8.27)	272 (10.71)
	1FT713	215 (8.46)	260 (7.48)	242 (9.53)	–	–	–
SP240S-	1FT708	–	–	–	245 (9.65)	210 (8.27)	297.5 (11.71)
	1FT710	245 (9.65)	240 (9.45)	273 (10.75)	245 (9.65)	210 (8.27)	297.5 (11.71)
	1FT713	245 (9.65)	260 (9.45)	273 (10.75)	245 (9.65)	260 (8.27)	297.5 (11.71)

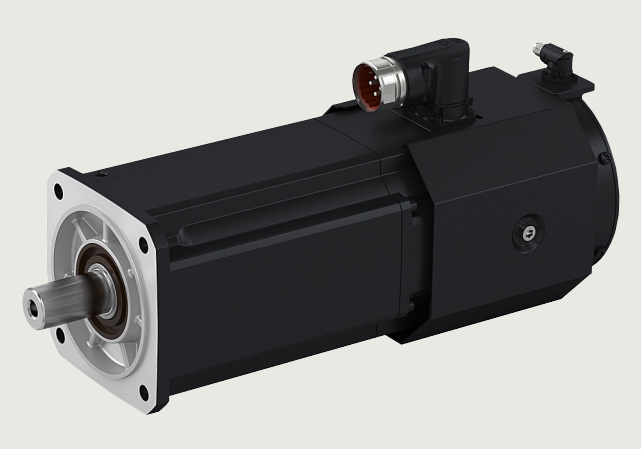
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SIMOTICS S-1FT2 and S-1FK2

Overview



SIMOTICS S-1FT2 and S-1FK2 motors natural cooling



SIMOTICS S-1FT2 motors forced ventilation

SIMOTICS S-1FT2 and S-1FK2 servomotors are compact and highly dynamic synchronous motors to address a wide range of applications in an industrial environment. They are characterized by a high power density, degree of protection and overload capability. You can select between natural cooling or forced ventilation as cooling method. For natural cooling, the resulting heat loss is dissipated through the surface, while for forced ventilation, a mounted fan dissipates the heat loss and significantly increases the continuous power rating of the motor.

SIMOTICS S High Dynamic motors

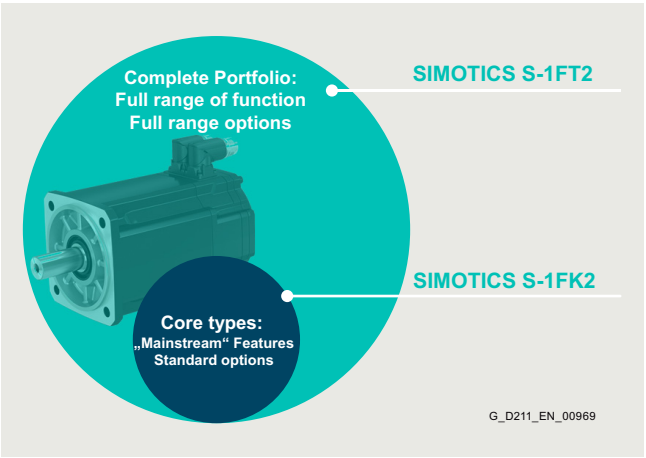
- Highest dynamic response through low inertia for highly dynamic applications with low moved masses.

SIMOTICS S Compact motors

- Precise, stable control with medium to high masses to be moved with medium moment of inertia.

SIMOTICS S High Inertia motors

- Robust control performance with high or variable load inertia. Minimal optimization and commissioning effort for compensation of disturbances.



SIMOTICS S-1FT2

SIMOTICS S-1FT2 servomotors offer a portfolio of finely graduated torque ratings and rated speeds, combined with a wide range of options and variants. This enables tailored solutions for a broad range of drive technology applications. S-1FT2 motors provide a reliable solution for demanding applications and operation in harsh environments.

SIMOTICS S-1FK2

The SIMOTICS S-1FK2 range represents a core line based on selected standard types of the S-1FT2 servomotors, featuring a reduced number of options and variants. This enables efficient coverage of key servo drive requirements. They form the core of the new servomotor portfolio.

Benefits

SIMOTICS S-1FT2 and S-1FK2 servomotors fully exploit their strengths in a system with converters from the SINAMICS S120/S220 family:

- Short adjustment and positioning times
- Quick and precise compensation of disturbances
- Stable closed-loop control with high dynamic response
- Maximum flexibility in the selection
- Increased ruggedness
- Best accuracy

This is achieved by:

- Rapid control cycle
- Complex control algorithms
- Highest resolution optical encoder
- Low moment of inertia of the motors
- High overload capability

Application

- Feed axes and auxiliary axes in machine tools
- Robots and handling equipment
- Packaging machines
- Feed and withdrawal devices
- Stacking units
- Automatic assembly machines
- Laboratory automation
- Woodworking, glass and ceramic industries
- Digital printing machines

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Configuration

The Configuration Manual for SIMOTICS S-1FT2 for SINAMICS S120 is available at:
https://support.industry.siemens.com/cs/ww/en/view/109794387

The compatibility list for SINAMICS S120/S220 Booksize Modules can be found at:
https://support.industry.siemens.com/cs/ww/en/view/109806050

The SINAMICS S220 Booksize power units along with the Motor Modules are available at:
https://support.industry.siemens.com/cs/ww/en/view/109803552

More information

Detailed dimensional drawings, 3D models, data sheets and characteristic curves are available on the internet via the Siemens Product Configurator:

www.siemens.com/spc

→ SIMOTICS S-1FT2 in the SPC

Environmental Product Declaration (EPD)

Environmental Product Declarations (EPD) are available as PDFs for this product.
The EPD PDF provides brief and concise information about the ecological properties of a product.

You can find more information on the internet at:
https://support.industry.siemens.com/cs/ww/en/ps/28193/cert?ci=5690

Siemens EcoTech Profile (SEP) for SIMOTICS S-1FT2

Siemens EcoTech is a framework for products that promotes the sustainable transformation of industry and infrastructure. The framework offers you transparency regarding the performance of our evaluated products in terms of environmental criteria, so that you can make informed decisions in order to achieve your sustainability goals.

You can find more information on the internet at:
https://support.industry.siemens.com/cs/document/109963165
www.siemens.com/SiemensEcoTech



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Technical specifications

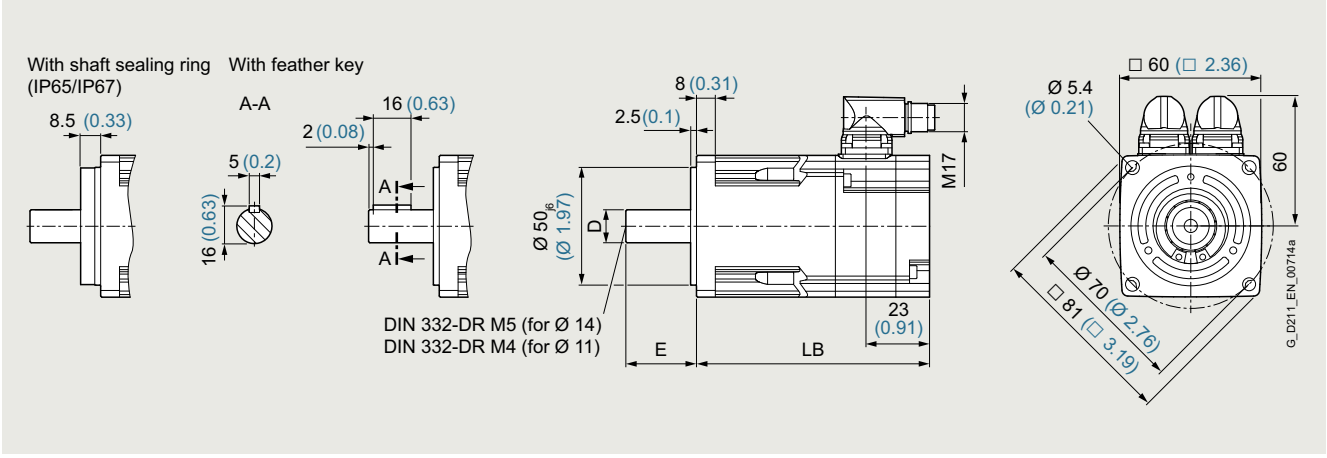
General technical specifications

SIMOTICS S-1FT2 and S-1FK2	
Motor type	Permanent-magnet synchronous motor
Cooling	Natural cooling (IC410), forced ventilation (only for 1FT2)
Type of construction according to EN 60034-7 (IEC 60034-7)	IM B5 (IM V1, IM V3)
Degree of protection according to EN 60034-5 (IEC 60034-5)	IP64, optional IP65 (also retrofittable for 1FT2.02, 1FT2.03, 1FT2.04), optional IP67 (only for 1FT2) For motors with forced ventilation: IP66 fan protection
Shaft end according to DIN 748-3 (IEC 60072-1)	Plain shaft, reduced shaft diameter (only with IP64 and without feather key for 1FT2.03) Plain shaft, reduced shaft diameter (only for 1F.2.03, 1FT2.04, 1FT2.08 and 1FT2.10) Shaft with feather key, reduced shaft diameter (only for 1FT2.04, 1FT2.08 and 1FT2.10)
Shaft and flange accuracy according to DIN 42955 (IEC 60072-1)	Tolerance N in each case for radial eccentricity of the shaft end, concentricity of the centering ring, and axial eccentricity of the mounting flange to the axis of the shaft end
Vibration severity grade according to EN 60034-14 (IEC 60034-14)	Grade A is maintained up to rated speed
Sound pressure level L_{pA} (1 m), max. according to EN ISO 1680, tolerance +3 dB(A)	
Natural cooling	
1F.2.02 to 1F.2.04	55 dB(A)
1F.2.05 and 1F.2.06	65 dB(A)
1F.2.08 and 1F.2.10	70 dB(A)
Forced ventilation	
1F.2.06 to 1F.2.10	73 dB(A)
Connection	Connectors for signals and power, rotatable
Color of the paint finish	Anthracite, RAL 7016
Holding brake	Optional integrated holding brake
Certificates of suitability	cURus, CE, EAC, CEL
Encoder system	
AS22DQC	Absolute encoder single-turn 22-bit
AM22DQC	Absolute encoder 22-bit + 12-bit multi-turn
AS26DQC	Absolute encoder single-turn 26-bit (only for 1FT2)
AM26DQC	Absolute encoder 26-bit + 12-bit multi-turn (only for 1FT2)

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Technical specifications

SIMOTICS S-1FT2 and S-1FK2 shaft height 30, High Dynamic and Compact



Dimensions in mm (inches)

SIMOTICS S-1F□2	without brake LB	with brake LB
1F□2□03-2	99 (3.90)	131 (5.16)
1F□2□03-4	123 (4.84)	155 (6.10)

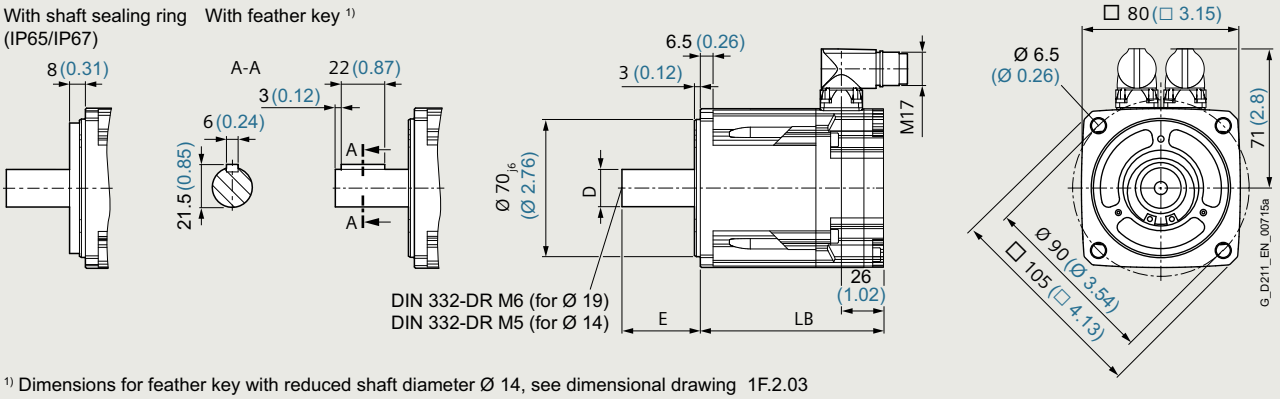
Shaft end	Ø D × E
Shaft end 0 / 1	$Ø14_{h6}$ × 30 (Ø 0.55 × 1.18)
Shaft end 2	$Ø11_{k6}$ × 23 (Ø 0.43 × 0.91)

SIMOTICS S-1F□2 servomotors		High Dynamic		Compact	
Shaft height 30 Natural cooling		**1F□2103-2AH**	**1F□2103-4AH**	**1F□2203-2AK**	**1F□2203-4AK**
Static torque M_0	Nm (lb_f-ft)	0.64 (0.47)	1.27 (0.94)	0.64 (0.47)	1.27 (0.94)
Stall current I_0	A	1.06	1.87	1.05	2.05
Maximum torque M_{max}	Nm (lb_f-ft)	1.95 (1.44)	4.05 (2.99)	1.85 (1.36)	3.75 (2.77)
Maximum current I_{max}	A	3.95	7.1	3.4	6.7
Maximum speed n_{max}	r/min	8000	8000	8000	8000
Rotor moment of inertia J_{Mot}	kg cm² (lb_f-in²)	0.093 (0.032)	0.14 (0.048)	0.20 (0.068)	0.35 (0.120)
Moment of inertia (with brake) $J_{Mot\ Br}$	kg cm² (lb_f-in²)	0.11 (0.038)	0.16 (0.055)	0.22 (0.075)	0.37 (0.126)
Weight m_{Mot}	kg (lb)	1.18 (2.60)	1.65 (3.64)	1.16 (2.56)	1.49 (3.29)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	1.55 (3.42)	1.99 (4.39)	1.53 (3.37)	1.97 (4.34)
Rated data 380 ... 480 V 3 AC					
Rated speed n_N	r/min	4500	4500	6000	6000
Rated torque M_N	Nm (lb_f-ft)	0.59 (0.44)	1.01 (0.74)	0.405 (0.299)	0.68 (0.50)
Rated current I_N	A	1.05	1.56	0.75	1.24
Rated power P_N	kW	0.28	0.48	0.255	0.43
Connection system					
Connector size, power		M17	M17	M17	M17
Recommended cross-section	mm²	1.5	1.5	1.5	1.5
Connector, signal		M17 signal connector, DRIVE-CLiQ			

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Technical specifications

SIMOTICS S-1FT2 and S-1FK2 shaft height 40, High Dynamic and Compact



1) Dimensions for feather key with reduced shaft diameter Ø 14, see dimensional drawing 1F.2.03

Dimensions in mm (inches)

SIMOTICS S-1F□2	without brake LB	with brake LB
1F□2□04-4	98 (3.86)	142 (5.59)
1F□2□04-5	126 (4.96)	170 (6.69)
1F□2□04-6	144 (5.67)	188 (7.40)

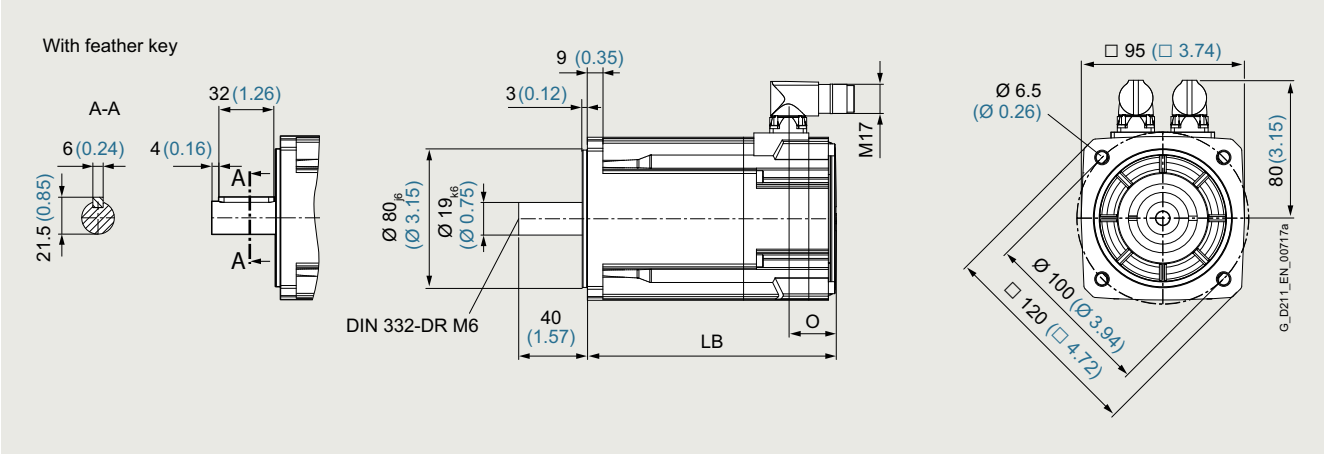
Shaft end	Ø D × E
Shaft end 0 / 1	$Ø19_{k6} \times 40$ (Ø 0.75 × 1.57)
Shaft end 2 / 3	$Ø14_{k6} \times 30$ (Ø 0.55 × 1.18)

SIMOTICS S-1F□2 servomotors		High Dynamic						Compact		
Shaft height 40 Natural cooling		**1F□2104-4AF**	**1F□2104-4AK**	**1F□2104-5AF**	**1F□2104-5AK**	**1F□2104-6AF**	**1FT2104-6AH**	**1F□2204-5AF**	**1F□2204-5AK**	**1F□2204-6AF**
Static torque M_0	Nm (lb_f-ft)	1.27 (0.94)	1.27 (0.94)	2.4 (1.77)	2.4 (1.77)	3.2 (2.36)	3.6 (2.66)	2.4 (1.77)	2.4 (1.77)	3.2 (2.36)
Stall current I_0	A	1.19	2.4	2.1	4.4	3	4.95	2.25	4.4	3
Maximum torque M_{max}	Nm (lb_f-ft)	3.75 (2.77)	3.85 (2.84)	7.5 (5.53)	7.6 (5.61)	10 (7.38)	10 (7.38)	7.1 (5.24)	7.1 (5.24)	9.5 (7.01)
Maximum current I_{max}	A	4.2	8.7	7.6	16	10.9	16.3	7.1	14.2	9.9
Maximum speed n_{max}	r/min	7200	8000	6700	8000	7200	9000	7500	8000	7600
Rotor moment of inertia J_{Mot}	kg cm² (lb_f-in²)	0.35 (0.120)	0.35 (0.120)	0.56 (0.191)	0.56 (0.191)	0.76 (0.260)	0.76 (0.260)	1.2 (0.410)	1.2 (0.410)	1.6 (0.547)
Moment of inertia (with brake) $J_{Mot\ Br}$	kg cm² (lb_f-in²)	0.43 (0.147)	0.43 (0.147)	0.65 (0.222)	0.65 (0.222)	0.84 (0.287)	0.84 (0.287)	1.3 (0.444)	1.3 (0.444)	1.7 (0.581)
Weight m_{Mot}	kg (lb)	2.1 (4.63)	2.1 (4.63)	2.9 (6.39)	2.9 (6.39)	3.4 (7.50)	3.4 (7.50)	2.9 (6.39)	2.9 (6.39)	3.5 (7.72)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	2.9 (6.39)	2.9 (6.39)	3.7 (8.16)	3.7 (8.16)	4.3 (9.48)	4.3 (9.48)	3.8 (8.38)	3.8 (8.38)	4.4 (9.70)
Rated data 380 ... 480 V 3 AC										
Rated speed n_N	r/min	3000	6000	3000	6000	3000	4500	3000	6000	3000
Rated torque M_N	Nm (lb_f-ft)	1.27 (0.94)	0.95 (0.70)	2.4 (1.77)	1.7 (1.25)	3.2 (2.36)	2.8 (2.36)	2.4 (1.77)	0.9 (0.66)	3.2 (2.36)
Rated current I_N	A	1.19	1.88	2.1	3.20	3	4	2.25	1.95	3
Rated power P_N	kW	0.4	0.6	0.75	1.07	1	1.3	0.75	0.57	1
Connection system										
Connector size, power		M17	M17	M17	M17	M17	M17	M 17	M17	M17
Recommended cross-section	mm²	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Connector, signal		M17 signal connector, DRIVE-CLiQ								

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Technical specifications

SIMOTICS S-1FT2 and S-1FK2 shaft height 48, Compact



Dimensions in mm (inches)

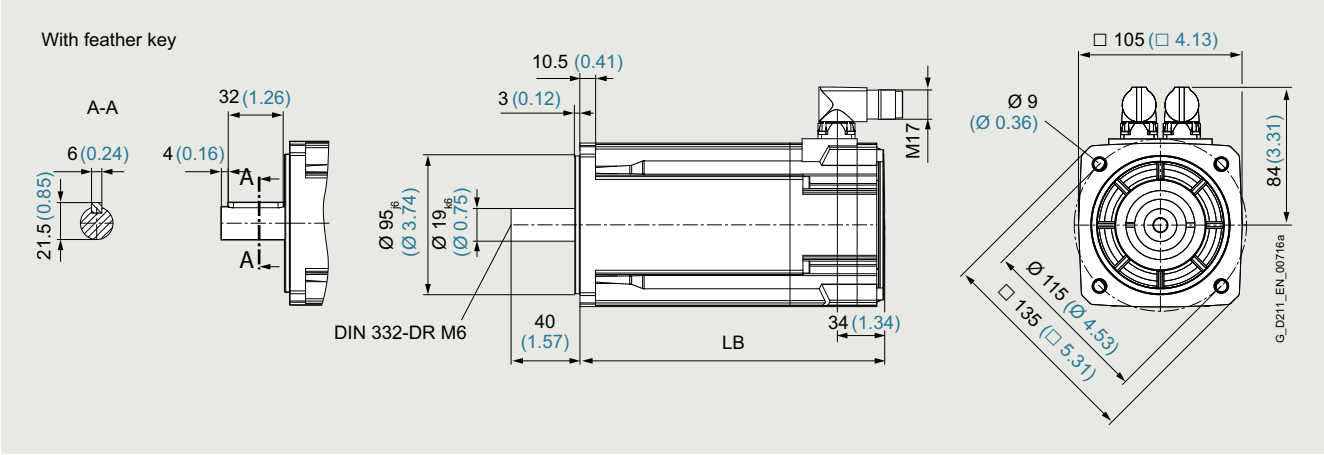
SIMOTICS S-1F□2 Compact	without brake		with brake	
	LB	O	LB	O
1F□2205-2	145 (5.71)	28 (1.10)	188 (7.40)	34 (1.34)
1F□2205-4	177 (6.97)		220 (8.66)	

SIMOTICS S-1F□2 servomotors		Compact			
Shaft height 48 Natural cooling		1FT2205-2AC	1F□2205-2AF	1FT2205-2AH	1F□2205-4AF
Static torque M_0	Nm (lb_f-ft)	3.6 (2.66)	3.6 (2.66)	3.6 (2.66)	6 (4.43)
Stall current I_0	A	1.84	2.9	3.8	4.7
Maximum torque M_{max}	Nm (lb_f-ft)	10.8 (7.97)	10.8 (7.97)	10.8 (7.97)	18 (13.28)
Maximum current I_{max}	A	6	9.5	12.1	15.1
Maximum speed n_{max}	r/min	4850	6500	8300	6200
Rotor moment of inertia J_{Mot}	kg cm^2 (lb_f-in^2)	3.2 (1.093)	3.2 (1.093)	3.2 (1.093)	5.1 (1.743)
Moment of inertia (with brake) $J_{Mot\ Br}$	kg cm^2 (lb_f-in^2)	4.1 (1.401)	4.1 (1.401)	4.1 (1.401)	6.0 (2.050)
Weight m_{Mot}	kg (lb)	3.8 (8.38)	3.8 (8.38)	3.8 (8.38)	5.2 (11.47)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	4.8 (10.58)	4.8 (10.58)	4.8 (10.58)	6.2 (13.67)
Rated data 380 ... 480 V 3 AC					
Rated speed n_N	r/min	2000	3000	4500	3000
Rated torque M_N	Nm (lb_f-ft)	3.3 (2.43)	3 (2.21)	2.25 (1.66)	4.6 (3.39)
Rated current I_N	A	1.74	2.5	2.55	3.75
Rated power P_N	kW	0.69	0.94	1.10	1.45
Connection system					
Connector size, power		M17	M17	M17	M17
Recommended cross-section	mm^2	1.5	1.5	1.5	1.5
Connector, signal		M17 signal connector, DRIVE-CLiQ			

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Technical specifications

SIMOTICS S-1FT2 and S-1FK2 shaft height 52, High Dynamic



Dimensions in mm (inches)

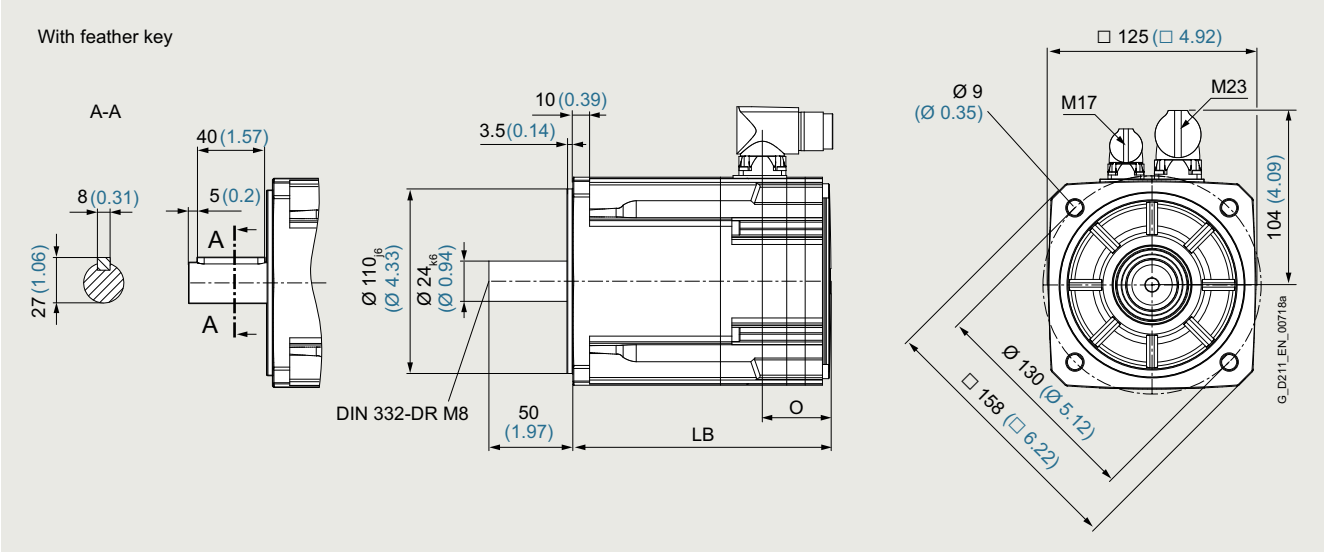
SIMOTICS S-1F□2 High Dynamic	without brake LB	with brake LB
1F□2105-4	173 (6.81)	200 (7.87)
1F□2105-6	215 (8.46)	242 (9.53)

SIMOTICS S-1F□2 servomotors Shaft height 52 Natural cooling		High Dynamic 1F□2105-4AF	1FT2105-4AH	1F□2105-6AF
Static torque M_0	Nm (lb_f-ft)	5 (3.69)	5 (3.69)	8 (5.90)
Stall current I_0	A	4.65	6.9	6.7
Maximum torque M_{max}	Nm (lb_f-ft)	15 (11.06)	15 (11.06)	24 (17.70)
Maximum current I_{max}	A	18	27	24
Maximum speed n_{max}	r/min	7400	9000	6600
Rotor moment of inertia J_{Mot}	kg cm² (lb_f-in²)	1.7 (0.581)	1.7 (0.581)	2.7 (0.923)
Moment of inertia (with brake) $J_{Mot\ Br}$	kg cm² (lb_f-in²)	2.6 (0.888)	2.6 (0.888)	3.5 (1.196)
Weight m_{Mot}	kg (lb)	5.6 (12.35)	5.6 (12.35)	7.7 (16.98)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	6.6 (14.55)	6.6 (14.55)	8.7 (19.18)
Rated data 380 ... 480 V 3 AC				
Rated speed n_N	r/min	3000	4500	3000
Rated torque M_N	Nm (lb_f-ft)	4.6 (3.39)	3.7 (2.73)	6.6 (4.87)
Rated current I_N	A	4.35	5.4	5.6
Rated power P_N	kW	1.45	1.74	2.1
Connection system				
Connector size, power		M17	M17	M17
Recommended cross-section	mm²	1.5	1.5	1.5
Connector, signal			M17 signal connector, DRIVE-CLiQ	

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Technical specifications

SIMOTICS S-1FT2 and S-1FK2 shaft height 63, High Dynamic and Compact



Dimensions in mm (inches)

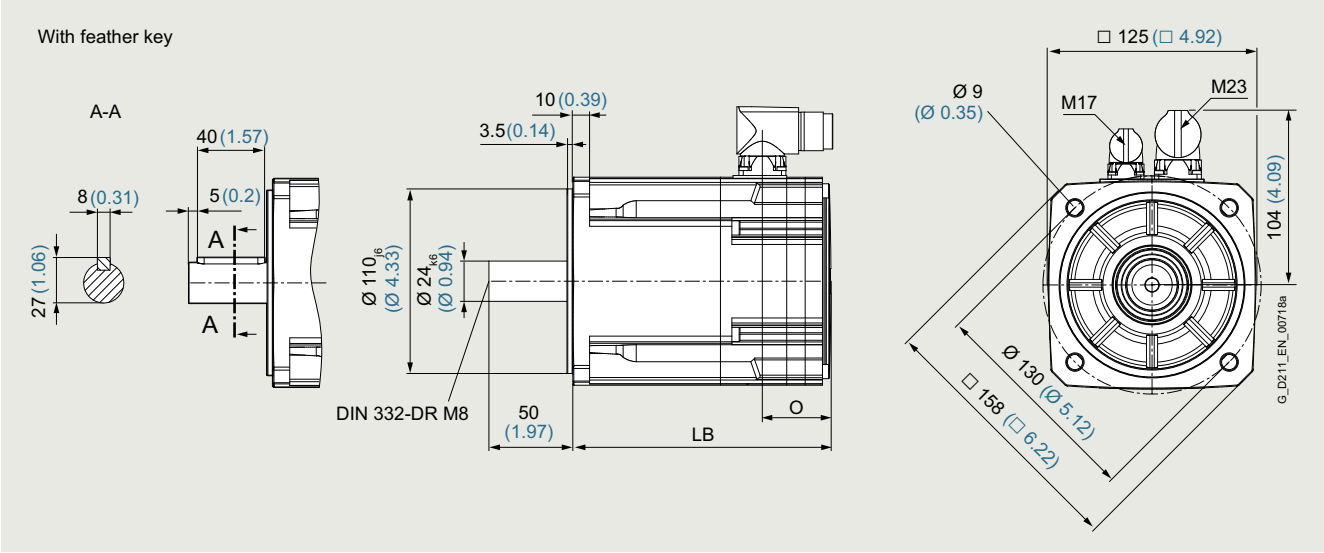
SIMOTICS S-1F□2	without brake		with brake	
	LB	O	LB	O
1F□2□06-2	154 (6.06)	41 (1.61)	205 (8.07)	53 (2.09)
1F□2□06-3	174 (6.85)		225 (8.86)	
1F□2□06-4	193 (7.60)		244 (9.61)	
1F□2□06-6	232 (9.13)		283 (11.14)	

SIMOTICS S-1F□2 servomotors Shaft height 63 Natural cooling		High Dynamic			Compact							
		1F□21 06-3AF	1F□21 06-4AF	1F□21 06-6AF	1FT22 06-2AC	1F□22 06-2AF	1FT22 06-2AH	1FT22 06-3AB	1FT22 06-3AF	1FT22 06-4AC	1F□22 06-4AF	1FT22 06-4AH
Static torque M_0	Nm (lb$_f$-ft)	9 (6.64)	12 (8.85)	16 (11.80)	6 (4.43)	6.5 (4.79)	6.5 (4.79)	9 (6.64)	9 (6.64)	12 (8.85)	12 (8.85)	12 (8.85)
Stall current I_0	A	9.2	10.7	14.3	2.8	5	6.5	3.15	5.4	4.5	7.9	12
Maximum torque M_{max}	Nm (lb$_f$-ft)	26 (19.18)	33 (24.34)	45.5 (33.56)	18 (13.28)	18 (13.28)	18 (13.28)	27 (19.92)	27 (19.92)	38 (28.03)	36 (26.55)	36 (26.55)
Maximum current I_{max}	A	43	42	49	10.3	17.8	22.5	11.4	19.7	17	29.5	44
Maximum speed n_{max}	r/min	8000	7800	7600	4300	6800	8000	3300	5700	3300	5800	8000
Rotor moment of inertia J_{Mot}	kg cm^2 (lb$_f$-in^2)	4.6 (1.572)	6.0 (2.050)	8.7 (2.973)	7.8 (2.665)	7.8 (2.665)	7.8 (2.665)	11.5 (3.930)	11.5 (3.930)	15.1 (5.160)	15.1 (5.160)	15.1 (5.160)
Moment of inertia (with brake) $J_{Mot\ Br}$	kg cm^2 (lb$_f$-in^2)	6.3 (2.153)	7.6 (2.597)	10 (3.417)	9.4 (3.212)	9.4 (3.212)	9.4 (3.212)	13.1 (4.476)	13.1 (4.476)	16.8 (5.741)	16.8 (5.741)	16.8 (5.741)
Weight m_{Mot}	kg (lb)	7.4 (16.32)	9,0 (19.85)	11.8 (26.02)	6.3 (13.89)	6.3 (13.89)	6.3 (13.89)	7.4 (16.32)	7.4 (16.32)	8.9 (19.62)	8.9 (19.62)	8.9 (19.62)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	9,0 (19.85)	10.6 (23.37)	13.4 (29.55)	7.9 (17.42)	7.9 (17.42)	7.9 (17.42)	9 (19.85)	9 (19.85)	10.6 (23.37)	10.6 (23.37)	10.6 (23.37)
Rated data 380 ... 480 V 3 AC												
Rated speed n_N	r/min	3000	3000	3000	2000	3000	4500	1500	3000	2000	3000	4500
Rated torque M_N	Nm (lb$_f$-ft)	7.3 (5.38)	8.6 (6.34)	10.6 (7.82)	5.5 (4.06)	5.4 (3.98)	3.85 (2.84)	8.3 (6.12)	7.5 (5.53)	10.5 (7.74)	9.1 (6.71)	4.7 (3.47)
Rated current I_N	A	7.9	8.1	9.7	2.8	4.35	4.1	2.9	4.65	4.1	6.2	5.2
Rated power P_N	kW	2.3	2.7	3.3	1.15	1.71	1.8	1.3	2.35	2.2	2.85	2.2
Connection system												
Connector size, power		M23	M23	M23	M23	M23	M23	M23	M23	M23	M23	M23
Recommended cross-section	mm^2	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Connector, signal		M17 signal connector, DRIVE-CLiQ										

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Technical specifications

SIMOTICS S-1FK2 shaft height 63, High Inertia



Dimensions in mm (inches)

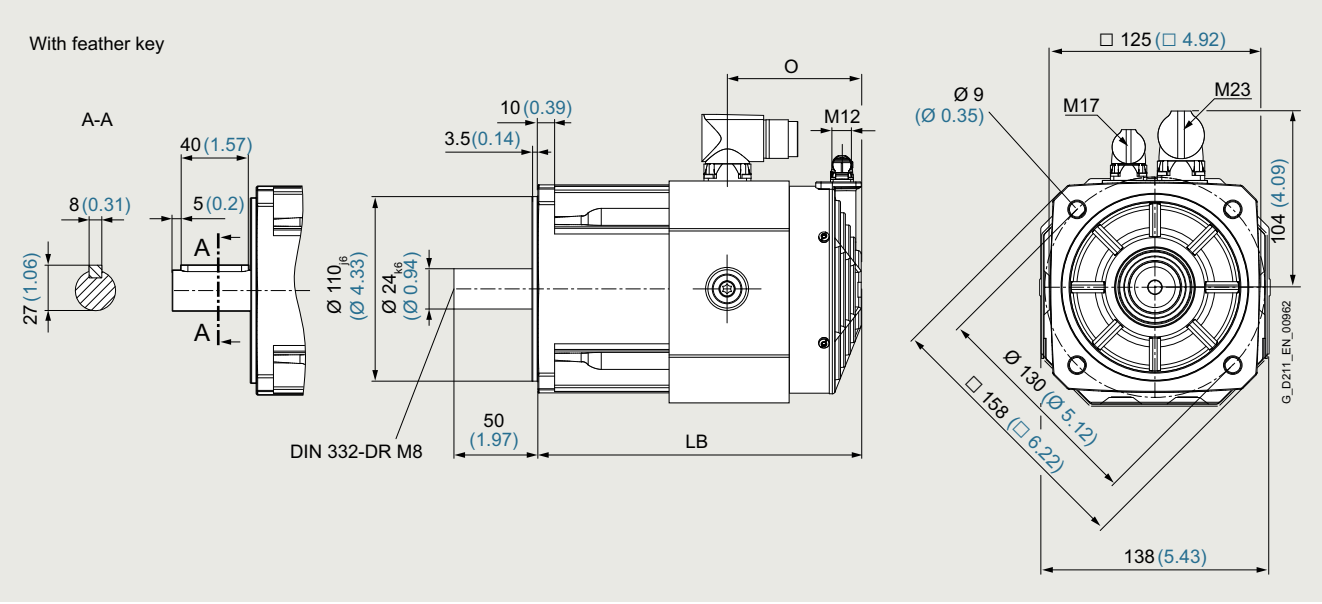
SIMOTICS S-1FK2	without brake		with brake	
	LB	O	LB	O
1FK2□06-2A	205 (8.07)	41 (1.61)	242 (9.53)	53 (2.09)
1FK2□06-4A	244 (9.61)		281 (11.06)	

SIMOTICS S-1FK2 servomotors Shaft height 63 Natural cooling		High Inertia 1FK2306-2AC	1FK2306-4AC
Static torque M_0	Nm (lb_f-ft)	6 (4.43)	12 (8.85)
Stall current I_0	A	2.8	4.5
Maximum torque M_{max}	Nm (lb_f-ft)	18 (13.28)	38 (28.03)
Maximum current I_{max}	A	10.3	17
Maximum speed n_{max}	r/min	4250	3300
Rotor moment of inertia J_{Mot}	kg cm^2 (lb_f-in^2)	12 (4.10)	30 (10.25)
Moment of inertia (with brake) $J_{Mot\ Br}$	kg cm^2 (lb_f-in^2)	13 (4.44)	30 (10.25)
Weight m_{Mot}	kg (lb)	7.6 (16.5)	11.4 (25.1)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	9 (19.8)	12.8 (28.2)
Rated data 380 ... 480 V 3 AC			
Rated speed n_N	r/min	2000	2000
Rated torque M_N	Nm (lb_f-ft)	5.5 (4.06)	10.5 (7.74)
Rated current I_N	A	2.8	4.1
Rated power P_N	kW	1.15	2.2
Connection system			
Connector size, power		M23	M23
Recommended cross-section	mm^2	1.5	1.5
Connector, signal		M17 signal connector, DRIVE-CLiQ	

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Technical specifications

SIMOTICS S-1FT2 shaft height 63, High Dynamic and Compact – forced ventilation



Dimensions in mm (inches)

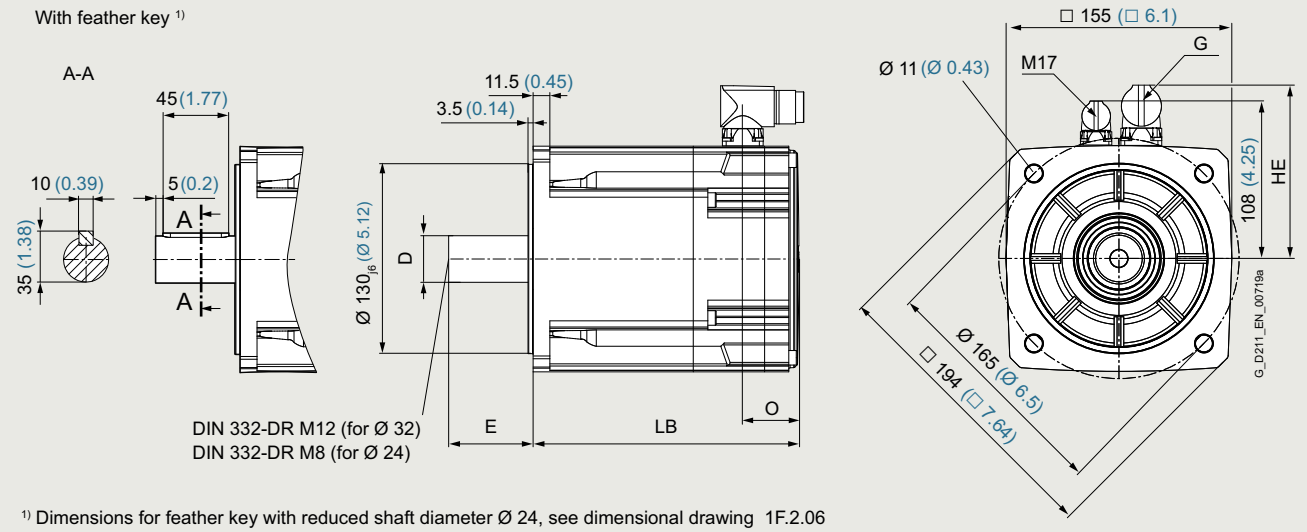
SIMOTICS S-1FT2	without brake		with brake	
	LB	O	LB	O
1FT2106-3S	279 (10.98)		330 (12.99)	
1FT2□06-4S	299 (11.77)	147 (5.79)	350 (13.78)	159 (6.26)
1FT2106-6S	338 (13.31)		389 (15.31)	

SIMOTICS S-1FT2 servomotors		High Dynamic			Compact	
Shaft height 63 Forced ventilation		1FT2106-3SF	1FT2106-4SF	1FT2106-6SF	1FT2206-4SF	1FT2206-4SH
Static torque M_0	Nm (lb_f-ft)	11.5 (8.48)	16 (11.80)	22 (16.23)	14.5 (10.69)	14.5 (10.69)
Stall current I_0	A	11.6	14.6	19.6	9.6	14.3
Maximum torque M_{max}	Nm (lb_f-ft)	26 (19.18)	33 (24.34)	45.5 (33.58)	36 (26.55)	36 (26.55)
Maximum current I_{max}	A	43	42	49	29.5	44
Maximum speed n_{max}	r/min	8000	8000	8000	6300	8000
Rotor moment of inertia J_{Mot}	kg cm^2 (lb_f-in^2)	4.6 (1.572)	6.0 (2.050)	8.7 (2.974)	15.1 (5.162)	15.1 (5.162)
Moment of inertia (with brake) $J_{Mot\ Br}$	kg cm^2 (lb_f-in^2)	6.3 (2.153)	7.6 (2.598)	10 (3.417)	17 (5.809)	17 (5.809)
Weight m_{Mot}	kg (lb)	9.5 (20.94)	11.1 (24.47)	14 (30.87)	11 (24.25)	11 (24.25)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	11.1 (24.47)	12.7 (28.00)	15.8 (34.84)	12.7 (28.00)	12.7 (28.00)
Rated data 380 ... 480 V 3 AC						
Rated speed n_N	r/min	3000	3000	3000	3000	4500
Rated torque M_N	Nm (lb_f-ft)	9.8 (7.23)	12.9 (9.52)	17.5 (12.91)	12.2 (8.99)	10 (7.38)
Rated current I_N	A	10.3	12.4	16.6	8.6	10.6
Rated power P_N	kW	3.1	4.05	5.5	3.85	4.7
Connection system						
Connector size, power		M23	M23	M23	M23	M23
Recommended cross-section	mm^2	1.5	1.5	2.5	1.5	1.5
Connector, signal		M17 signal connector, DRIVE-CLiQ				

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Technical specifications

SIMOTICS S-1FT2 shaft height 80, High Dynamic



1) Dimensions for feather key with reduced shaft diameter Ø 24, see dimensional drawing 1F.2.06

Dimensions in mm (inches)

SIMOTICS S-1FT2 High Dynamic	without brake LB	with brake LB
1FT2108-4A	227 (8.94)	280 (11.02)
1FT2108-5A	247 (9.72)	300 (11.81)
1FT2108-7A	287 (11.30)	340 (13.39)

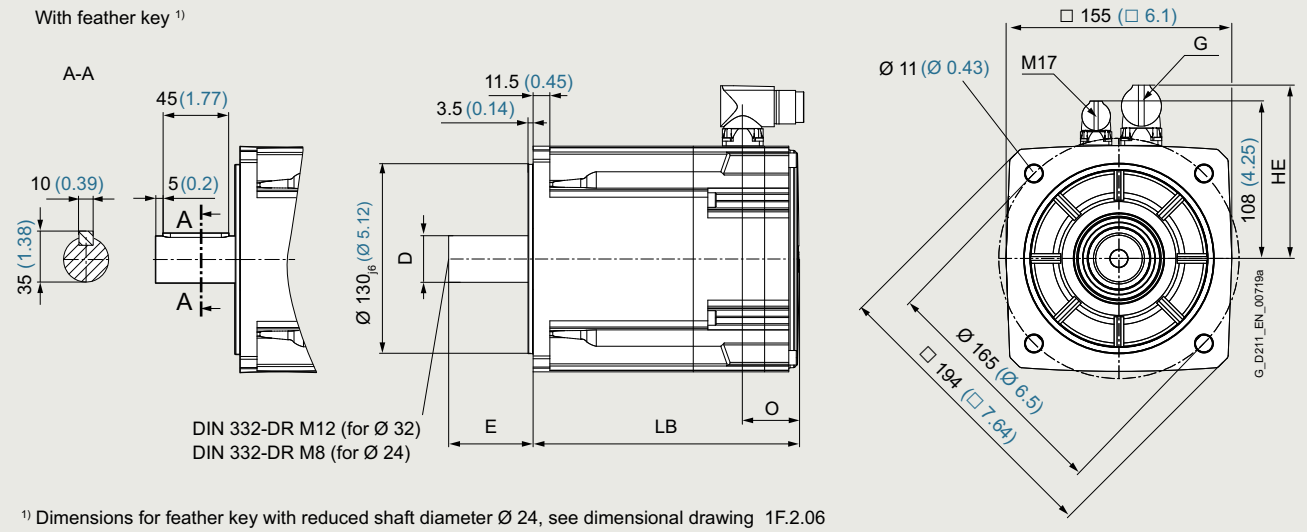
Shaft end	Ø D × E	G	HE	O
Shaft end 0 / 1	$Ø32_{k6}$ × 58 (Ø 1.26 × 2.28)	M23	119 (4.69)	39 (1.54)
Shaft end 2 / 3	$Ø24_{k6}$ × 50 (Ø 0.94 × 1.97)	M40	139 (5.47)	45 (1.77)

SIMOTICS S-1FT2 servomotors Shaft height 80 Natural cooling		High Dynamic 1FT21 08-4AC	1FT21 08-5AB	1FT21 08-5AC	1FT21 08-7AB	1FT21 08-7AC	1FT21 08-7AE
Static torque M_0	Nm (lb_f-ft)	25 (18.44)	30 (22.13)	30 (22.13)	37.5 (27.66)	37.5 (27.66)	37.5 (27.66)
Stall current I_0	A	14.8	11.8	18.4	14	22	28
Maximum torque M_{max}	Nm (lb_f-ft)	87 (64.17)	105 (77.45)	105 (77.45)	140 (103.26)	140 (103.26)	140 (103.26)
Maximum current I_{max}	A	77	61	96	78	123	155
Maximum speed n_{max}	r/min	5600	3750	5800	3550	5600	6500
Rotor moment of inertia J_{Mot}	kg cm² (lb_f-in²)	18 (6.151)	22 (7.517)	22 (7.517)	28 (9.568)	28 (9.568)	28 (9.568)
Rotor moment of inertia (with brake) $J_{Mot\ br}$	kg cm² (lb_f-in²)	22 (7.517)	26 (8.884)	26 (8.884)	32 (10.934)	32 (10.934)	32 (10.934)
Rotor moment of inertia (with reinforced brake) $J_{Mot\ br}$	kg cm² (lb_f-in²)	24 (8.201)	27 (9.226)	27 (9.226)	34 (11.618)	34 (11.618)	34 (11.618)
Weight m_{Mot}	kg (lb)	17 ((37.49)	19.7 (43.44)	20 (44.10)	24.5 (54.02)	25 (55.13)	25.2 (55.57)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	19.7 (43.44)	22.4 (49.39)	22.7 (50.05)	27.2 (59.98)	27.7 (61.08)	27.9 (61.52)
Weight (with reinforced brake) $m_{Mot\ Br}$	kg (lb)	19.9 (43.88)	22.5 (49.61)	22.9 (50.49)	27.4 (60.42)	27.9 (61.52)	28 (61.74)
Rated data 380 ... 480 V 3 AC							
Rated speed n_N	r/min	2000	1500	2000	1500	2000	2500
Rated torque M_N	Nm (lb_f-ft)	20.5 (15.12)	25.5 (18.81)	23.5 (17.33)	30 (22.13)	26 (19.18)	21 (15.49)
Rated current I_N	A	12.8	10.3	15.2	11.5	16	17
Rated power P_N	kW	4.3	4	4.9	4.7	5.4	5.5
Connection system							
Connector size, power		M23	M23	M40	M23	M40	M40
Recommended cross-section	mm²	1.5	1.5	2.5	1.5	4	4
Connector, signal		M17 signal connector, DRIVE-CLiQ					

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Technical specifications

SIMOTICS S-1FT2 and S-1FK2 shaft height 80, Compact



1) Dimensions for feather key with reduced shaft diameter Ø 24, see dimensional drawing 1F.2.06

Dimensions in mm (inches)

SIMOTICS S-1F□2 Compact	without brake LB	with brake LB
1FT2208-2A	168 (6.61)	221 (8.70)
1F□2208-3A	183 (7.20)	236 (9.29)
1F□2208-4A	203 (7.99)	256 (10.08)
1F□2208-5A	223 (8.78)	276 (10.87)

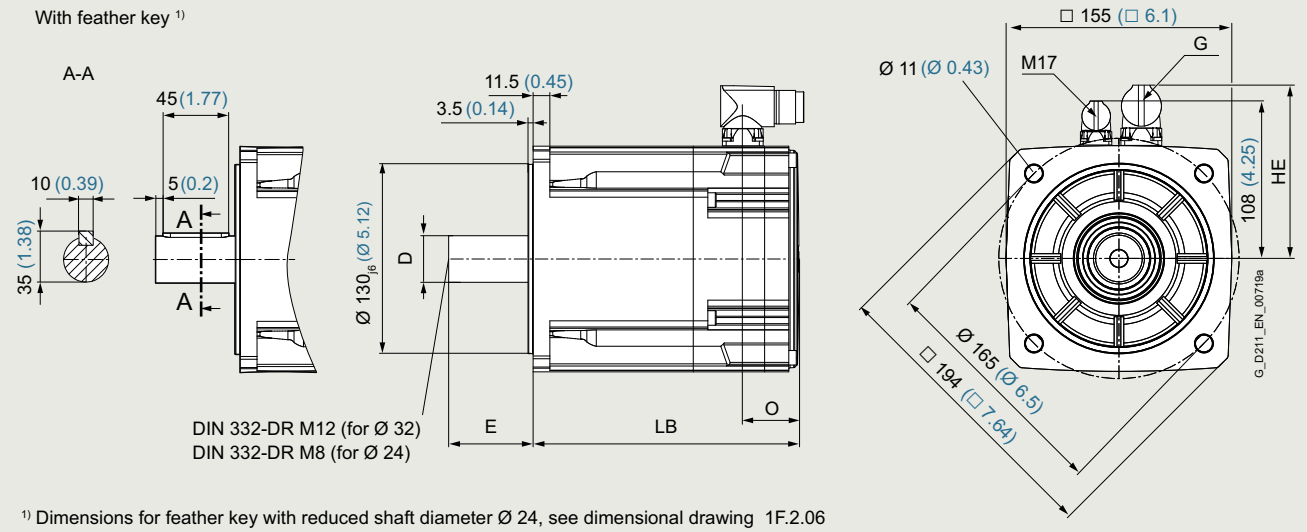
Shaft end	Ø D × E	G	HE	O
Shaft end 0 / 1	$Ø32_{k6}$ × 58 (Ø 1.26 × 2.28)	M23	119 (4.69)	39 (1.54)
Shaft end 2 / 3	$Ø24_{k6}$ × 50 (Ø 0.94 × 1.97)			

SIMOTICS S-1F□2 servomotors Shaft height 80 Natural cooling		Compact 1FT22 08-2AF	1FT22 08-3AB	1F□22 08-3AC	1FT22 08-3AF	1FT22 08-3AH	1FT22 08-4AB	1F□22 08-4AC	1FT22 08-4AF	1FT22 08-5AB	1F□22 08-5AC
Static torque M_0	Nm (lb$_f$-ft)	12.5 (9.22)	18 (13.28)	18 (13.28)	18 (13.28)	18 (13.28)	22 (16.23)	22 (16.23)	22 (16.23)	27 (19.92)	27 (19.92)
Stall current I_0	A	8.3	6.2	8.4	11.9	16.5	7.1	11.7	15	8.6	14.6
Maximum torque M_{max}	Nm (lb$_f$-ft)	38 (28.03)	51 (37.62)	51 (37.62)	51 (37.62)	51 (37.62)	66 (48.68)	66 (48.68)	66 (48.68)	80 (59.01)	80 (59.01)
Maximum current I_{max}	A	31	20.5	29.5	40	57	25	43.5	55	29.5	51.5
Maximum speed n_{max}	r/min	6000	3000	4100	5600	6000	3000	4600	5900	3000	4700
Rotor moment of inertia J_{Mot}	kg cm^2 (lb$_f$-in^2)	23 (7.859)	30 (10.251))	30 (10.251)	30 (10.251)	30 (10.251)	39 (13.326)	39 (13.326)	39 (13.326)	48 (16.402)	48 (16.402)
Rotor moment of inertia (with brake) $J_{Mot\ br}$	kg cm^2 (lb$_f$-in^2)	26 (8.884)	33 (11.276)	33 (11.276)	33 (11.276)	33 (11.276)	44 (15.035)	44 (15.035)	44 (15.035)	54 (18.452))	54 (18.452)
Rotor moment of inertia (with reinforced brake) $J_{Mot\ br}$	kg cm^2 (lb$_f$-in^2)	28 (9.568)	35 (11.960)	35 (11.960)	35 (11.960)	35 (11.960)	-	-	-	-	-
Weight m_{Mot}	kg (lb)	10.4 (22.93)	12.6 (27.78)	12.6 (27.78)	12.6 (27.78)	12.6 (27.78)	14.6 (32.19)	14.6 (32.19)	14.6 (32.19)	16.6 (36.60)	16.6 (36.60)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	12.6 (27.78)	14.6 (32.19)	14.6 (32.19)	14.6 (32.19)	14.6 (32.19)	17.3 (38.15)	17.3 (38.15)	17.3 (38.15)	19.3 (42.56)	19.3 (42.56)
Weight (with reinforced brake) $m_{Mot\ Br}$	kg (lb)	13.2 (29.11)	15.2 (33.52)	15.2 (33.52)	15.2 (33.52)	15.2 (33.52)	-	-	-	-	-
Rated data 380 ... 480 V 3 AC											
Rated speed n_N	r/min	3000	1500	2000	3000	4000	1500	2000	3000	1500	2000
Rated torque M_N	Nm (lb$_f$-ft)	9 (6.64)	16 (11.80)	14.5 (10.70)	11.1 (8.19)	6.2 (4.57)	18.6 (13.72)	17 (12.54)	11.8 (8.70)	22 (16.23)	19.1 (14.09)
Rated current I_N	A	6.5	5.7	7	7.7	6.4	6.4	9.3	8.5	7.2	10.8
Rated power P_N	kW	2.85	2.5	3.05	3.5	2.6	2.9	3.55	3.7	3.45	4
Connection system											
Connector size, power		M23	M23	M23	M23	M23	M23	M23	M23	M23	M23
Recommended cross-section	mm^2	1.5	1.5	1.5	1.5	2.5	1.5	1.5	1.5	1.5	1.5
Connector, signal		M17 signal connector, DRIVE-CLiQ									

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Technical specifications

SIMOTICS S-1FK2 shaft height 80, High Inertia



1) Dimensions for feather key with reduced shaft diameter Ø 24, see dimensional drawing 1F.2.06

Dimensions in mm (inches)

SIMOTICS S-1FK2 High Inertia	without brake LB	with brake LB
1FK2308-3	236 (9.29)	270 (10.63)
1FK2308-4	256 (10.08)	290 (11.42)

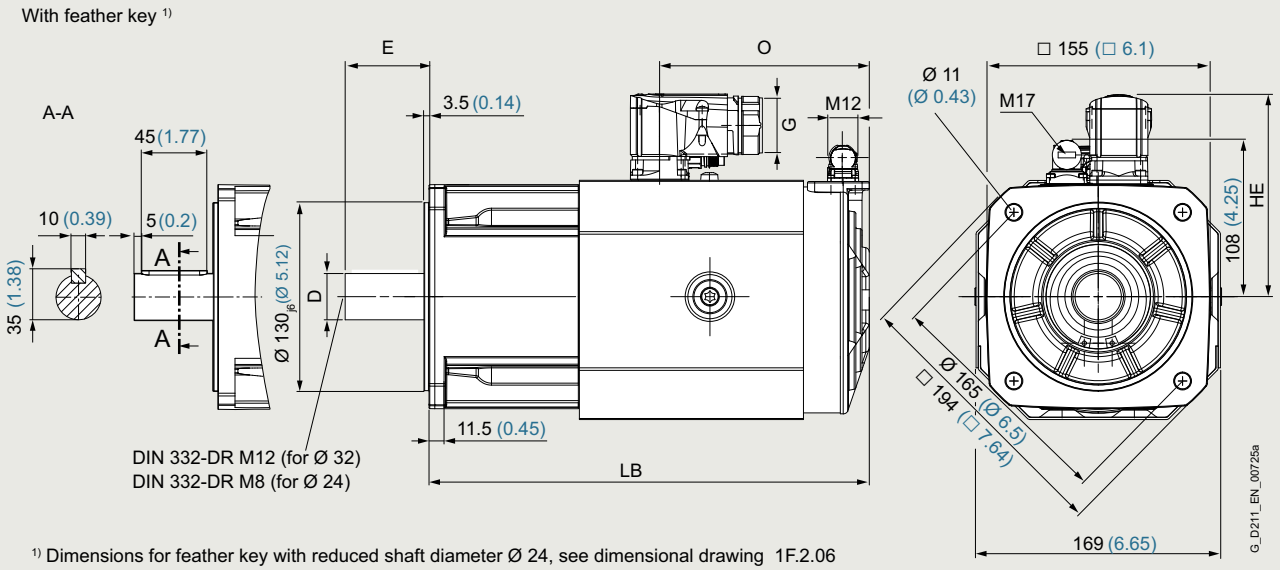
Shaft end	Ø D × E	G	HE	O
Shaft end 0 / 1	$Ø32_{k6}$ × 58 (Ø 1.26 × 2.28)	M23	119 (4.69)	39 (1.54)

SIMOTICS S-1FK2 servomotors Shaft height 80 Natural cooling		High Inertia 1FK2308-3AB	1FK2308-4AB
Static torque M_0	Nm (lb_f-ft)	18 (13.28)	22 (16.23)
Stall current I_0	A	6.2	7.1
Maximum torque M_{max}	Nm (lb_f-ft)	51 (37.62)	66 (48.68)
Maximum current I_{max}	A	20.5	25
Maximum speed n_{max}	r/min	3000	3000
Rotor moment of inertia J_{Mot}	kg cm² (lb_f-in²)	60 (20.50)	69 (23.58)
Rotor moment of inertia (with brake) $J_{Mot\ br}$	kg cm² (lb_f-in²)	63(21.53)	74 (25.29)
Rotor moment of inertia (with reinforced brake) $J_{Mot\ br}$	kg cm² (lb_f-in²)	-	-
Weight m_{Mot}	kg (lb)	16.2 (35.71)	18.5 (40.79)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	18 (39.68)	20.5 (45.19)
Weight (with reinforced brake) $m_{Mot\ Br}$	kg (lb)	-	-
Rated data 380 ... 480 V 3 AC			
Rated speed n_N	r/min	1500	1500
Rated torque M_N	Nm (lb_f-ft)	16 (11.80)	18.6 (13.72)
Rated current I_N	A	5.7	6.4
Rated power P_N	kW	2.5	2.9
Connection system			
Connector size, power		M23	M23
Recommended cross-section	mm²	1.5	1.5
Connector, signal		M17 signal connector, DRIVE-CLiQ	

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Technical specifications

SIMOTICS S-1FT2 shaft height 80, High Dynamic – forced ventilation



1) Dimensions for feather key with reduced shaft diameter Ø 24, see dimensional drawing 1F.2.06

Dimensions in mm (inches)

SIMOTICS S-1FT2 High Dynamic	without brake LB	with brake LB
1FT2108-4	327 (12.87)	380 (14.96)
1FT2108-5	347 (13.66)	400 (15.75)
1FT2108-7	387 (15.24)	440 (17.32)

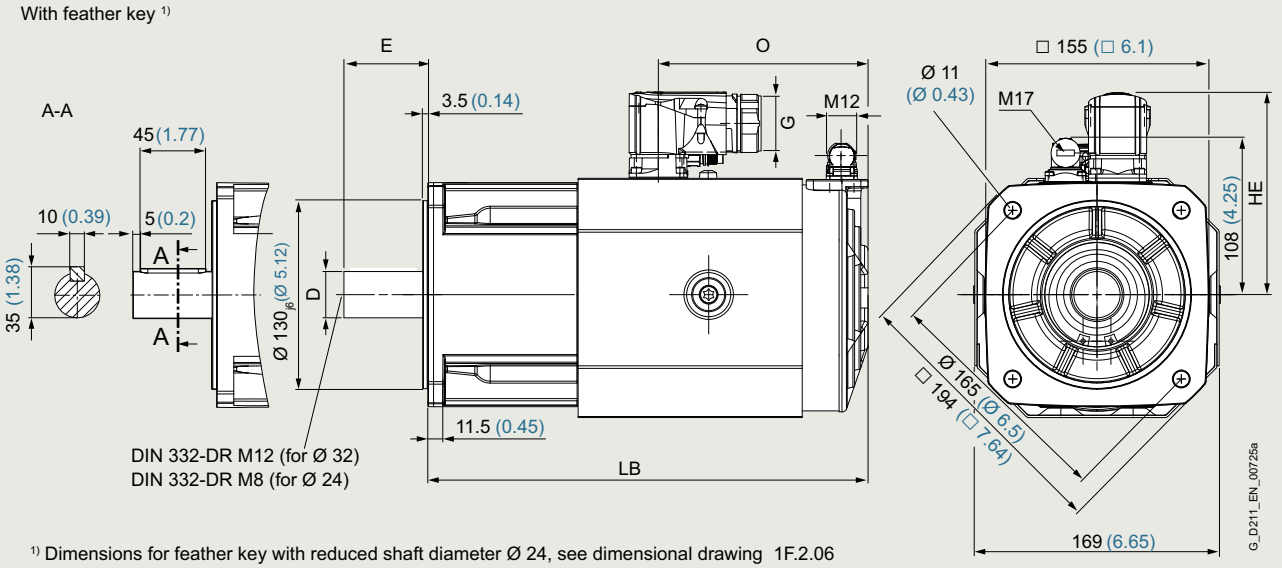
Shaft end	Ø D × E	G	HE	O
Shaft end 0 / 1	$Ø32_{k6}$ × 58 (Ø 1.26 × 2.28)	M23	119 (4.69)	139 (5.47)
Shaft end 2 / 3	$Ø24_{k6}$ × 50 (Ø 0.94 × 1.97)	M40	139 (5.47)	145 (5.71)

SIMOTICS S-1FT2 servomotors Shaft height 80 Forced ventilation		High Dynamic 1FT21 08-4SC	1FT21 08-5SB	1FT21 08-5SC	1FT21 08-7SB	1FT21 08-7SC	1FT21 08-7SE
Static torque M_0	Nm (lb_f-ft)	33 (24.34)	40 (29.50)	40 (29.50)	50 (36.88)	50 (36.88)	49.5 (36.51)
Stall current I_0	A	19.2	15.5	24	18.2	29	36
Maximum torque M_{max}	Nm (lb_f-ft)	87 (64.17)	105 (77.45)	105 (77.45)	140 (103.26)	140 (103.26)	140 (103.26)
Maximum current I_{max}	A	77	61	96	78	123	155
Maximum speed n_{max}	r/min	5500	3700	5800	3450	5500	6500
Rotor moment of inertia J_{Mot}	kg cm² (lb_f-in²)	18 (6.151)	22 (7.517)	22 (7.517)	28 (9.568)	28 (9.568)	28 (9.568)
Rotor moment of inertia (with brake) $J_{Mot\ br}$	kg cm² (lb_f-in²)	22 (7.517)	26 (8.884)	26 (8.884)	32 (10.934)	32 (10.934)	32 (10.934)
Rotor moment of inertia (with reinforced brake) $J_{Mot\ br}$	kg cm² (lb_f-in²)	24 (8.201)	27 (9.226)	27 (9.226)	34 (11.618)	34 (11.618)	34 (11.618)
Weight m_{Mot}	kg (lb)	19.8 (43.66)	22.1 (48.73)	22.4 (49.39)	27.3 (60.20)	27.4 (60.42)	27.6 (60.86)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	22.5 (49.61)	24.8 (54.68)	25.1 (55.35)	30 (66.15)	30.1 (66.37)	30.3 (66.81)
Weight (with reinforced brake) $m_{Mot\ Br}$	kg (lb)	22.7 (50.05)	24.9 (54.90)	25.3 (55.79)	30.2 (66.59)	30.3 (66.81)	30.4 (67.03)
Rated data 380 ... 480 V 3 AC							
Rated speed n_N	r/min	2000	1500	2000	1500	2000	2500
Rated torque M_N	Nm (lb_f-ft)	28.5 (21.02)	35.5 (26.18)	34 (25.08)	44 (32.45)	42 (30.98)	39 (28.77)
Rated current I_N	A	17.4	14.9	21.5	16.8	26	31
Rated power P_N	kW	6	5.6	7.1	6.9	8.8	10.2
Connection system							
Connector size, power		M40	M23	M40	M40	M40	M40
Recommended cross-section	mm²	2.5	2.5	4	2.5	6	6
Connector, signal		M17 signal connector, DRIVE-CLiQ					

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Technical specifications

SIMOTICS S-1FT2 shaft height 80, Compact – forced ventilation



1) Dimensions for feather key with reduced shaft diameter Ø 24, see dimensional drawing 1F.2.06

Dimensions in mm (inches)

SIMOTICS S-1FT2 Compact	without brake LB	with brake LB
1FT2208-3S	283 (11.14)	336 (13.23)
1FT2208-4S	303 (11.93)	356 (14.02)
1FT2208-5S	323 (12.72)	376 (14.80)

Shaft end	Ø D × E	G	HE	O
Shaft end 0 / 1	$Ø32_{k6}$ × 58 (Ø 1.26 × 2.28)	M23	119 (4.69)	139 (5.47)
Shaft end 2 / 3	$Ø24_{k6}$ × 50 (Ø 0.94 × 1.97)	M40	139 (5.47)	145 (5.71)

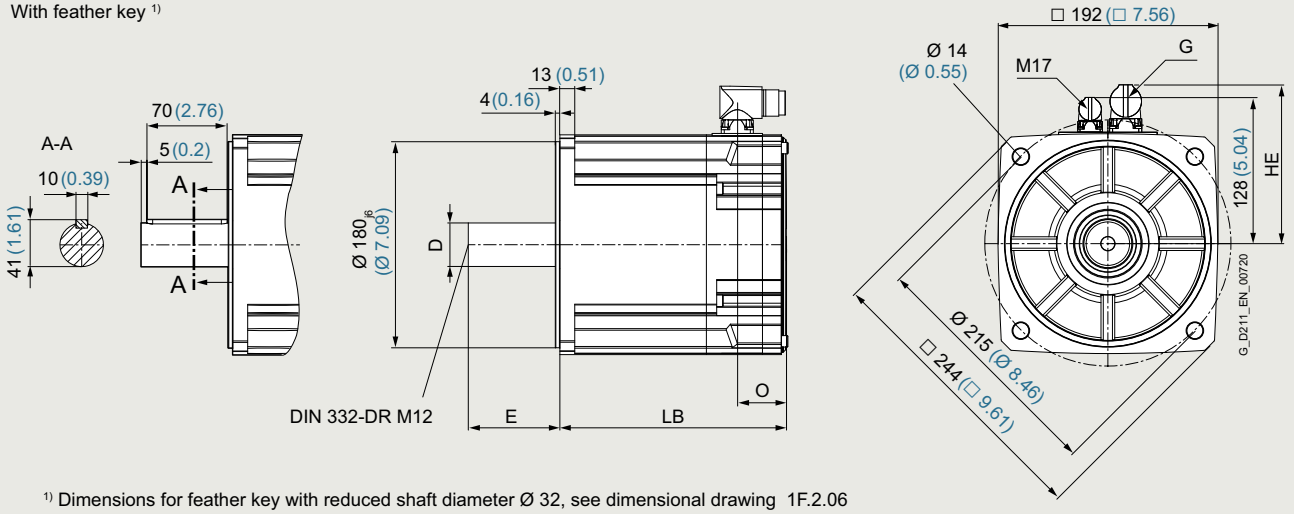
SIMOTICS S-1FT2 servomotors Shaft height 80 Forced ventilation		Compact 1FT22 08-3SB	1FT22 08-3SC	1FT22 08-3SF	1FT22 08-3SH	1FT22 08-4SB	1FT22 08-4SC	1FT22 08-4SF	1FT22 08-5SB	1FT22 08-5SC
Static torque M_0	Nm (lb_f-ft)	22 (16.23)	22 (16.23)	22 (16.23)	22 (16.23)	28 (20.65)	28 (20.65)	28 (20.65)	35 (25.82)	35 (25.82)
Stall current I_0	A	7.8	10.4	14.1	19.8	9.3	14.6	18.7	10.7	18.8
Maximum torque M_{max}	Nm (lb_f-ft)	51 (37.62)	51 (37.62)	51 (37.62)	51 (37.62)	66 (48.68)	66 (48.68)	66 (48.68)	80 (59.01)	80 (59.01)
Maximum current I_{max}	A	20.5	29.5	40	57	25	43.5	55	29.5	51.5
Maximum speed n_{max}	r/min	3350	4500	6000	6000	3150	4950	6000	2900	5100
Rotor moment of inertia J_{Mot}	kg cm² (lb_f-in²)	30 (10.251)	30 (10.251)	30 (10.251)	30 (10.251)	39 (13.326)	39 (13.326)	39 (13.326)	48 (16.402)	48 (16.402)
Rotor moment of inertia (with brake) $J_{Mot\ br}$	kg cm² (lb_f-in²)	33 (11.276)	33 (11.276)	33 (11.276)	33 (11.276)	44 (15.035	44 (15.035	44 (15.035	54 (18.452)	54 (18.452)
Rotor moment of inertia (with reinforced brake) $J_{Mot\ br}$	kg cm² (lb_f-in²)	35 (11.960)	35 (11.960)	35 (11.960)	35 (11.960)	-	-	-	-	-
Weight m_{Mot}	kg (lb)	14.9 (32.85)	14.9 (32.85)	14.9 (32.85)	15.3 (33.74)	17.5 (38.59)	17.5 (38.59)	17.9 (39.47)	20 (44.10)	20.4 (44.98)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	17.1 (37.71)	17.1 (37.71)	17.1 (37.71)	17.5 (38.59)	20.3 (44.76)	20.3 (44.76)	20.7 (45.64)	22.8 (50.27)	23.2 (51.16)
Weight (with reinforced brake) $m_{Mot\ Br}$	kg (lb)	17.7 (39.03)	17.7 (39.03)	17.7 (39.03)	18.1 (39.91)	-	-	-	-	-
Rated data 380 ... 480 V 3 AC										
Rated speed n_N	r/min	1500	2000	3000	4500	1500	2000	3000	1500	2000
Rated torque M_N	Nm (lb_f-ft)	19.9 (14.68)	19.1 (14.09)	17.6 (12.98)	14.4 (10.62)	25.5 (18.81)	24 (17.70)	22.5 (16.60)	32 (23.60)	30 (22.13)
Rated current I_N	A	7.3	9.5	12.2	14.2	8.8	13.3	16.3	10.2	17.1
Rated power P_N	kW	3.1	4	5.5	6.8	4	5.1	7.1	5	6.3
Connection system										
Connector size, power		M23	M23	M23	M40	M23	M23	M40	M23	M40
Recommended cross-section	mm²	1.5	1.5	1.5	2.5	1.5	1.5	2.5	1.5	2.5
Connector, signal		M17 signal connector, DRIVE-CLiQ								

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Technical specifications

SIMOTICS S-1FT2 and S-1FK2 shaft height 100, Compact

With feather key [1)]



[1)] Dimensions for feather key with reduced shaft diameter Ø 32, see dimensional drawing 1F.2.06

Dimensions in mm (inches)

SIMOTICS S-1F□2	without brake LB	with brake LB
1FT2210-2A	174 (6.85)	233 (9.17)
1F□2210-3A	198 (7.80)	257 (10.12)
1F□2210-4A	223 (8.78)	282 (11.10)
1F□2210-5A	248 (9.76)	307 (12.09)

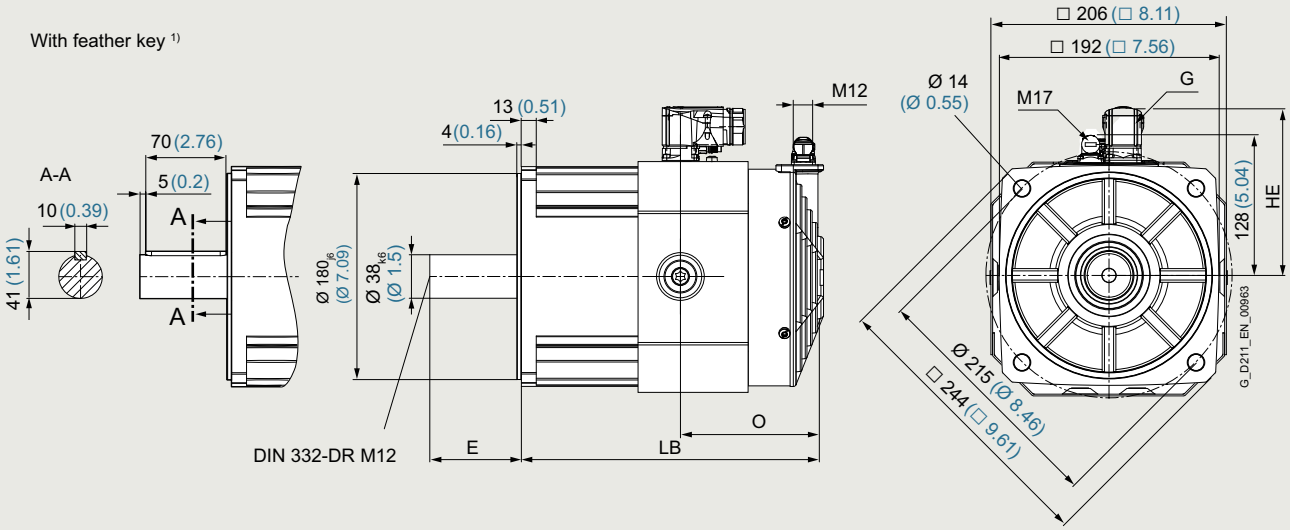
Shaft end	Ø D × E	G	HE	O
Shaft end 0 / 1	Ø38_{k6} × 80 (Ø 1.5 × 3.15)	M23	139 (5.47)	37 (1.46)
Shaft end 2 / 3	Ø32_{k6} × 58 (Ø 1.26 × 2.28)	M40	159 (6.26)	43 (1.69)

SIMOTICS S-1F□2 servomotors		Compact										
Shaft height 100 Natural cooling		**1FT22 10-2AC**	**1FT22 10-2AF**	**1F□22 10-3AB**	**1F□22 10-3AC**	**1FT22 10-3AF**	**1F□22 10-4AB**	**1F□22 10-4AC**	**1FT22 10-4AF**	**1FT22 10-5AB**	**1F□22 10-5AC**	**1FT22 10-5AF**
Static torque M_0	Nm (lb$_f$-ft)	22 (16.23)	22 (16.23)	30 (22.13)	30 (22.13)	30 (22.13)	40 (29.50)	40 (29.50)	40 (29.50)	50 (36.88)	50 (36.88)	50 (36.88)
Stall current I_0	A	9.3	12.9	8.5	15	19.8	11.8	15	22.5	15	22.5	30
Maximum torque M_{max}	Nm (lb$_f$-ft)	60 (44.26)	60 (44.26)	90 (66.38)	90 (66.38)	90 (66.38)	120 (88.51)	120 (88.51)	120 (88.51)	150 (110.64)	150 (110.64)	150 (110.64)
Maximum current I_{max}	A	32	44.5	31.5	55	74	43.5	55	84	55	83	111
Maximum speed n_{max}	r/min	4050	5000	2500	4400	5000	2500	3300	4950	2850	4000	5000
Rotor moment of inertia J_{Mot}	kg cm^2 (lb$_f$-in^2)	62 (21.185)	62 (21.185)	89 (30.411)	89 (30.411)	89 (30.411)	120 (41.004)	120 (41.004)	120 (41.004)	150 (51.255)	150 (51.255)	150 (51.255)
Rotor moment of inertia (with brake) $J_{Mot\ br}$	kg cm^2 (lb$_f$-in^2)	68 (23.236)	68 (23.236)	95 (32.462)	95 (32.462)	95 (32.462)	130 (44.421)	130 (44.421)	130 (44.421)	160 (54.672)	160 (54.672)	160 (54.672)
Rotor moment of inertia (with reinforced brake) $J_{Mot\ br}$	kg cm^2 (lb$_f$-in^2)	77 (26.311)	77 (26.311)	100 (34.173)	100 (34.173)	100 (34.173)	-	-	-	-	-	-
Weight m_{Mot}	kg (lb)	17 (37.49)	17 (37.49)	22 (48.51)	22 (48.51)	22 (48.51)	27 (59.54)	27 (59.54)	27 (59.54)	32 (70.56)	32 (70.56)	32 (70.56)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	20 (44.10)	20 (44.10)	25 (55.13)	25 (55.13)	25 (55.13)	31 (68.36)	31 (68.36)	31 (68.36)	36 (79.38)	36 (79.38)	36 (79.38)
Weight (with reinforced brake) $m_{Mot\ Br}$	kg (lb)	21 (46.31)	21 (46.31)	26 (57.33)	26 (57.33)	26 (57.33)	-	-	-	-	-	-
Rated data 380 ... 480 V 3 AC												
Rated speed n_N	r/min	2000	3000	1500	2000	3000	1500	2000	3000	1500	2000	3000
Rated torque M_N	Nm (lb$_f$-ft)	18.4 (13.57)	16.2 (11.95)	28.5 (21.02)	26 (19.18)	18.5 (13.65)	34.5 (25.45)	30.5 (22.50)	18 (13.28)	39 (28.77)	33.5 (24.71)	26 (19.18)
Rated current I_N	A	8.1	10.1	8.3	13.5	13.6	10.4	11.8	11.1	12.1	15.8	16.7
Rated power P_N	kW	3.85	5.1	4.5	5.5	5.8	5.4	6.4	5.7	6.1	7.1	8.2
Connection system												
Connector size, power		M23	M23	M23	M23	M40	M23	M23	M40	M23	M40	M40
Recommended cross-section	mm^2	1.5	1.5	1.5	1.5	2.5	1.5	1.5	4	1.5	4	6
Connector, signal		M17 signal connector, DRIVE-CLiQ										

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Technical specifications

SIMOTICS S-1FT2 shaft height 100, Compact – forced ventilation



1) Dimensions for feather key with reduced shaft diameter Ø 32, see dimensional drawing 1F.2.06

Dimensions in mm (inches)

SIMOTICS S-1FT2	without brake LB	with brake LB
1FT2210-3S	313 (12,32)	372 (14,65)
1FT2210-4S	338 (13,31)	397 (15,63)
1FT2210-5S	363 (14,29)	422 (16,61)

Shaft end	Ø D × E
Shaft end 0 / 1	Ø38_{k6} × 80 (Ø 1.5 × 3.15)
Shaft end 2 / 3	Ø32_{k6} × 58 (Ø 1.26 × 2.28)

G	HE	O
M23	139 (5.47)	152 (5.98)
M40	159 (6.26)	158 (6.22)

SIMOTICS S-1FT2 servomotors		Compact							
Shaft height 100 Forced ventilation		**1FT22 10-3SC**	**1FT22 10-3SF**	**1FT22 10-4SB**	**1FT22 10-4SC**	**1FT22 10-4SF**	**1FT22 10-5SB**	**1FT22 10-5SC**	**1FT22 10-5SF**
Static torque M_0	Nm (lb_f-ft)	40 (29.50)	40 (29.50)	53 (39.1)	53 (39.1)	53 (39.1)	65 (47.0)	65 (47.0)	65 (47.0)
Stall current I_0	A	19.9	27.5	15.5	19.8	31	19.3	30.5	38.5
Maximum torque M_{max}	Nm (lb_f-ft)	90 (66.38)	90 (66.38)	120 (88.51)	120 (88.51)	120 (88.51)	150 (110.63)	150 (110.63)	150 (110.63)
Maximum current I_{max}	A	55	78	43.5	55	88	55	88	111
Maximum speed n_{max}	r/min	4750	5000	2800	3600	5000	2850	4500	5000
Rotor moment of inertia J_{Mot}	kg cm² (lb_f-in²)	89 (30.411)	89 (30.411)	120 (41.004)	120 (41.004)	120 (41.004)	150 (51.255)	150 (51.255)	150 (51.255)
Rotor moment of inertia (with brake) $J_{Mot\ br}$	kg cm² (lb_f-in²)	95 (32.462)	95 (32.462)	130 (44.423)	130 (44.423)	130 (44.423)	160 (54.672)	160 (54.672)	160 (54.672)
Rotor moment of inertia (with reinforced brake) $J_{Mot\ br}$	kg cm² (lb_f-in²)	100 (34.173)	100 (34.173)	-	-	-	-	-	-
Weight m_{Mot}	kg (lb)	25 (55.1)	25 (55.1)	29 (63.9)	29.5 (65.1)	29.5 (65.1)	34 (75.0)	34 (75.0)	34 (75.0)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	28.5 (62.8)	28.5 (62.8)	34 (75.0)	34.5 (76.1)	34.5 (76.1)	39 (86.0)	39 (86.0)	39 (86.0)
Weight (with reinforced brake) $m_{Mot\ Br}$	kg (lb)	29.5 (65.0)	29.5 (65.0)	-	-	-	-	-	-
Rated data 380 ... 480 V 3 AC									
Rated speed n_N	r/min	2000	3000	1500	2000	3000	1500	2000	3000
Rated torque M_N	Nm (lb_f-ft)	35 (25.81)	32 (23.60)	48 (35.40)	46 (33.93)	42 (30.98)	58 (42.78)	55 (40.57)	50 (36.88)
Rated current I_N	A	18.1	24	14.5	17,8	26	18	27.5	31.5
Rated power P_N	kW	7.3	10.1	7.6	9.6	13.2	9.1	11.5	15.7
Connection system									
Connector size, power		M40	M49	M23	M40	M40	M40	M40	M40
Recommended cross-section	mm²	2.5	4	2.5	2.5	6	2.5	6	10
Connector, signal		M17 signal connector, DRIVE-CLiQ							

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Options

SIMOTICS S-1FT2 motors can be expanded with numerous options.

Holding brake

The holding brake is used to hold the motor shaft when the motor is stationary and is designed for at least 5 million switching cycles. The holding brake is not a working brake for braking a rotating motor. A limited number of Emergency Off operations is permitted: The specified maximum operating energy for each emergency braking operation as well as the total operating energy over the service life must not be exceeded.

The following table contains technical specifications of the holding brakes for operation with a SINAMICS S120/S220:

Motor	Holding torque at 120 °C (248 °F)	Dynamic braking torque at 120 °C (248 °F)	Maximum permissible (single operating energy [1])	Total operating energy (lifetime)	Opening time	Closing time	Rated current
	Nm (lb_f-ft)	Nm (lb_f-ft)	J	kJ	ms	ms	A
Spring-loaded brake, maximum play 1°							
1F□2□03	1.3 (0.96)	1.3 (0.96)	62	5	90	30	0.4
1F□2□04	3.3 (2.43)	3.3 (2.43)	270	35	110	40	0.5
Permanent magnet brake, zero-backlash							
1F□2□05	8 (5.90)	5 (3.69)	570	284	90	25	0.6
1F□2106	16 (11.80)	9 (6.64)	1065	774	100	50	0.7
1F□2206, 1F□2306	13 (9.59)	6.5 (4.79)	1550	774	100	50	0.7
1F□2208-2, 1F□2308-3 1F□2208-3	19 (14.01)	12 (8.85)	2000	1800	100	40	0.8
1F□2108	36 (26.55)	12 (8.85)	1300	2400	200	60	0.9
1F□2208-4 1F□2208-5, 1F□2308-4	32 (23.60)	17 (12.54)	4800	2400	200	60	0.9
1F□2210-2 1F□2210-3	32 (23.60)	17 (12.54)	6600	2400	200	60	0.9
1F□2210-4 1F□2210-5	55 (40.57)	26 (19.18)	8700	3800	220	80	1.0
Reinforced permanent magnet brake, zero-backlash							
1FT2108 1FT2208-2 1FT2208-3	32 (23.60)	17 (12.54)	4800	2400	200	60	0.9
1FT2210-2 1FT2210-3	55 (40.57)	26 (19.18)	8700	3800	220	80	1.0

Degree of protection

SIMOTICS S-1FT2 motors have degree of protection IP64 as standard. Optionally, the motor can be supplied with an IP65 or IP67 degree of protection.

Recommended degree of protection, see page 8.1/2

For S-1F.2.03 and S-1F.2.04 motors, the optional IP65 and IP67 shaft sealing ring shortens the shaft end that can be used. These motors can also be upgraded from IP64 to IP65 using the separately available degree of protection kit.

Shaft end

SIMOTICS S-1F.2 motors have a cylindrical shaft end. This can optionally be realized with keyway and feather key (half-key balancing).

For the S-1F.2.03, S-1F.2.04, S-1FT2.08 and S-1FT2.10 motors, an alternative shaft geometry (smaller diameter and shorter length of the shaft) is optionally available. It is suitable, for example, for mounting planetary gears with a small, low-inertia clamping system or for mounting small diameter pinions.

[1] Maximum three EMERGENCY STOP operations in sequence with a maximum of 25 % total operating energy

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Options

Encoder

SIMOTICS S-1F.2 motors are equipped with digital absolute encoders with DRIVE-CLiQ interface.

The following encoders are available:

- AS22DCQ: Absolute encoder single-turn 22-bit
- AM22DQC: Absolute encoder 22-bit + 12-bit multi-turn (with rotation counter for 4096 revolutions)

The following encoders with higher resolution are additionally available for S-1FT2:

- AS26DQC: Absolute encoder single-turn 26-bit
- AM26DQC: Absolute encoder 26-bit + 12-bit multi-turn (with rotation counter for 4096 revolutions)

Planetary gearbox

SIMOTICS S-1F.2 motors can optionally be supplied as coaxial or angular planetary geared motors. The geared motors are specified as unit; interaction between the motor and gearbox thermal situation has been taken into account. More information about planetary geared motors: See page 8.1/83

Paint finish

If a special color and paint finish are not specified, then the motors are painted in the standard anthracite gray color (RAL 7016). Optionally, various special colors are possible. Special colors are ordered by adding an order code to the article number.

Order code	Description
X00	unpainted
X01	Paint finish jet black RAL 9005
X02	Paint finish cream white RAL 9001
X03	Paint finish reseda green RAL 6011
X04	Paint finish pebble gray RAL 7032
X05	Paint finish sky blue RAL 5015
X06	Paint finish light ivory RAL 1015
X08	Paint finish white aluminum

The paint finish in standard and special colors meets the requirements for environmental conditions of climate class 3K4 according to IEC 60721-3-3 with the exception of the influencing variables "low air temperature", "condensation" and "low air pressure". It meets corrosivity category C1 according to EN ISO 12944-2.

Resistance

Options relating to resistance for S-1FT2 are ordered by adding an order code to the article number.

Order code	Description
K23	**Special paint finish with additional primer** Additional primer, paint finish in standard color RAL 7016, anthracite grey Properties same as standard paint finish, in addition, condensation is permitted on the external surfaces of the motor. Combination with special color X■■ according to color table is permissible. However, a combination with X00 is not permissible.
N16	**Motors with increased chemical resistance** (Includes the properties of the paint with additional primer K23) • 4-layer paint system (PS Premium paint system) • Nickel-plated plug connectors • Resistant to greases, mineral oils, aliphatic solvents (10 %), caustic soda (10 %) With this option, the motor meets the requirements of corrosivity category C4(M) according to EN ISO 12944-2. A certificate regarding resistance against common ECOLAB cleaning agents and disinfectants is available here: https://support.industry.siemens.com/cs/document/58657336
Q31	**Metal rating plate** The rating plate of the motor is designed as an adhesive label as standard. With this option, an aluminum rating plate can be ordered instead. The labeling is lasered on. This ensures legibility for a long time even under poor ambient conditions.
Q20	**Pressure equalization** If a motor with degree of protection IP67 cools down after operation, a vacuum may build up in the motor. This may result in moisture ingress. Moisture ingress of this kind can be prevented by using a defined air supply via a connected pressure equalization tube.

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Options

Low temperature -30 °C (-22 °F) – Q30

The permissible temperature range is defined as -15 °C to +40 °C (5 °F to 104 °F) (without power reduction).

Optionally, S-1FT2 motors can be designed for an extended temperature range down to -30 °C (-22 °F) by adding order code **Q30** to the article number. Application e.g. in cold storage facilities.

The extended operating temperature range is not possible for the following variants:

- Degree of protection IP67
- Motors with gearbox
- Motors with forced ventilation

Suitability for dry room environments and certification for clean rooms – Q40

The permissible range for relative ambient air humidity is 5 % to 95 % as standard, suitability for use in clean rooms is not certified.

The S-1FT2 motors can optionally be designed for use in extremely dry environments and with certification for use in clean rooms by adding order code **Q40** to the article number:

The following clean room classes are achieved according to ISO 156441-14, and have been certified accordingly by the TÜV (German Technical Inspectorate):

- Motors without gearbox, with degree of protection IP64: ISO Class 7 or better
- Motors without gearbox, with degree of protection IP65: ISO Class 6 or better
- Motors with gearbox NRB(W), NRK(W) or NLC(W): ISO Class 7 or better

Certificates are available here:
https://support.industry.siemens.com/cs/document/109815586

These motors feature extended specifications for use in relative air humidity: Operation from a relative humidity level of 0.3 % (dew point -50 °C at 20 °C (-58 F at 68 °F) ambient temperature) is permitted.

Customer-specific text on the rating plate – Y84

A text selected by the customer (maximum 20 characters) can be optionally printed on the rating plate of S-1FT2 motors. For example, inscriptions for the name of the axis, the installation location or customer-specific spare part numbers can be provided. The order is entered using supplementary order code **Y84** and the plain text for the required inscription.

Ordering options using order codes

When ordering a motor with one or more order codes, the 16 position article number must be supplemented once with "-Z". Different order codes can be separated by spaces or "+".

Example for order codes X01 and N16:
1FT2■■■-■■■■-■■■■-Z X01 + N16

Accessories

Description	For motor	Article No.
Shaft sealing ring		
Degree of protection kit to achieve degree of protection IP65 for mounting on the motor. For retrofitting or as a spare part.	1F.2.03	**1FY2903-0GC00**
	1F.2.04	**1FY2904-0GC00**

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Selection and ordering data

Structure of the article number of SIMOTICS S-1F.2 servomotors

Data position of the Article No.		1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16
		1	**F**	**T**	**2**	■	■	■	-	■	■	■	■	■	-	■	■	■	**0**
1st to 4th position: Digit, letter, letter, digit	**Motor**	1	F	T	2														
		1	F	K	2														
5th position: Digit	**Moment of inertia**																		
	High Dynamic					1													
	Compact					2													
	High Inertia					3													
6th and 7th position: Digit, digit	**Shaft height**																		
	20																		
	30					1/2	0	3											
	40					1/2	0	4											
	52					1	0	5											
	48					2	0	5											
	63					1/2/3	0	6											
	80					1/2/3	0	8											
	100					2	1	0											
8th position: Digit	**Overall length**																		
	See specific technical specifications									0 ... 8									
9th position: Letter	Natural cooling										A								
	Forced ventilation										S								
10th position: Letter	**Winding/rated speed**																		
	1500 r/min											B							
	2000 r/min											C							
	2500 r/min											E							
	3000 r/min											F							
	4500 r/min											H							
	6000 r/min											K							
11th position: Digit	**Brake**																		
	Without												0						
	Holding brake												1						
	Reinforced holding brake												2						
12th position: Digit	**Degree of protection**																		
	IP64 (without shaft sealing ring)													0					
	IP65 (with shaft sealing ring)													1					
	IP67 (with shaft sealing ring and spring lock washer)													2					
13th position: Digit	**Shaft end, feather key**																		
	Plain shaft															0			
	Shaft with feather key															1			
	Plain shaft. reduced shaft diameter															2			
	Shaft with feather key, reduced shaft diameter															3			
14th position: Letter	**Encoder**																		
	Absolute encoder single-turn 22-bit (AS22DQC)																S		
	Absolute encoder 22-bit + 12-bit multi-turn (AM22DQC)																M		
	Absolute encoder single-turn 26-bit (AS26DQC)																B		
	Absolute encoder 26-bit + 12-bit multi-turn (AM26DQC)																C		
15th position: Letter	**Connection technology**																		
	One-cable technology (OCC) for SINAMICS S210																	A	
	Two-cable technology (2CC) for SINAMICS S120/S220																	B	
16th position: Digit	Reserved																		0

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Selection and ordering data

SIMOTICS S-1FT2 and S-1FK2 servomotors for SINAMICS S120/S220 with line connection 380 ... 480 V 3 AC

SIMOTICS S-1FT2 and S-1FK2 servomotor											SINAMICS S120/S220
Shaft height	Static torque M_0 Nm (lb_f-ft)	Stall current I_0 A	Maximum torque M_{max} Nm (lb_f-ft)	Rated speed n_N r/min	Rated power P_N kW	Rated torque M_N Nm (lb_f-ft)	Rotor moment of inertia J_{Mot} kg cm^2 (lb_f-in^2)	Article No.	Cable con-nector Size	Recommended cross-section [1] of the power cable 4 × mm^2	Rated output current SINAMICS S120/S220 Booksize I_N A
High Dynamic for highly dynamic applications											
30	0.64 (0.47)	1.06	1.95 (1.44)	4500	0.28	0.59 (0.44)	0.093 (0.032)	**1F■2103-2AH■■-■■B0**	M17	4 × 0.75	3
30	1.27 (0.94)	1.87	4.05 (2.99)	4500	0.48	1.01 (0.74)	0.14 (0.048)	**1F■2103-4AH■■-■■B0**	M17	4 × 0.75	3
40	1.27 (0.94)	1.19	3.75 (2.77)	3000	0.4	1.27 (0.94)	0.35 (0.120)	**1F■2104-4AF■■-■■B0**	M17	4 × 0.75	3
40	1.27 (0.94)	2.4	3.85 (2.84)	6000	0.6	0.95 (0.70)	0.35 (0.120)	**1F■2104-4AK■■-■■B0**	M17	4 × 0.75	3
40	2.4 (1.8)	2.1	7.5 (5.5)	3000	0.75	2.4 (1.8)	0.56 (0.191)	**1F■2104-5AF■■-■■B0**	M17	4 × 0.75	3
40	2.4 (1.8)	4.4	7.6 (5.6)	6000	1.07	1.7 (1.3)	0.56 (0.191)	**1F■2104-5AK■■-■■B0**	M17	4 × 0.75	5
40	3.2 (2.4)	3	10 (7.38)	3000	1	3.2 (2.4)	0.76 (0.260)	**1F■2104-6AF■■-■■B0**	M17	4 × 0.75	3
40	3.6 (2.66)	4.95	10 (7.38)	4500	1.32	2.8 (2.07)	0.76 (0.260)	**1FT2104-6AH■■-■■B0**	M17	4 × 0.75	5
52	5 (3.69)	4.65	15 (11.1)	3000	1.45	4.6 (3.4)	1.7 (0.581)	**1F■2105-4AF■■-■■B0**	M17	4 × 0.75	5
52	5 (3.69)	6.9	15 (11.1)	4500	1.74	3.7 (2.7)	1.7 (0.581)	**1FT2105-4AH■■-■■B0**	M17	4 × 0.75	9
52	8 (5.90)	6.7	24 (17.7)	3000	2.1	6.6 (4.9)	2.7 (0.923)	**1F■2105-6AF■■-■■B0**	M17	4 × 0.75	9
63	9 (6.64)	9.2	26 (19.2)	3000	2.3	7.3 (5.4)	4.6 (1.572)	**1F■2106-3AF■■-■■B0**	M23	4 × 1.5	9
63	12 (8.85)	10.7	33 (24.3)	3000	2.7	8.6 (6.3)	6.0 (2.050)	**1F■2106-4AF■■-■■B0**	M23	4 × 1.5	18
63	16 (11.8)	14.3	45.5 (33.6)	3000	3.3	10.6 (7.8)	8.7 (2.973)	**1F■2106-6AF■■-■■B0**	M23	4 × 1.5	18
80	25 (18.4)	14.8	87 (64.2)	2000	4.3	20.5 (15.1)	18 (6.151)	**1FT2108-4AC■■-■■B0**	M23	4 × 1.5	18
80	30 (22.1)	11.8	105 (77.4)	1500	4	25.5 (18.8)	22 (7.517)	**1FT2108-5AB■■-■■B0**	M23	4 × 1.5	18
80	30 (22.1)	18.4	105 (77.4)	2000	4.9	23.5 (17.3)	22 (7.517)	**1FT2108-5AC■■-■■B0**	M40	4 × 2.5	18
80	37.5 (27.7)	14	140 (103)	1500	4.7	30 (22.1)	28 (9.568)	**1FT2108-7AB■■-■■B0**	M23	4 × 1.5	18
80	37.5 (27.7)	22	140 (103)	2000	5.4	26 (19.2)	28 (9.568)	**1FT2108-7AC■■-■■B0**	M40	4 × 4	24
80	37.5 (27.7)	28	140 (103)	2500	5.5	21 (15.5)	28 (9.568	**1FT2108-7AE■■-■■B0**	M40	4 × 4	30

Article No. supplements

Motor type									
Standard type 1FT2	**T**								
Core type 1FK2	**K**								
Holding brake									
Without brake		**0**							
With brake		**1**							
With reinforced holding brake (only for 1FT2108)		**2**							
Degree of protection									
IP64 (without shaft sealing ring)			**0**						
IP65 (with shaft sealing ring)			**1**						
IP67 (with shaft sealing ring with annular spring) (only for 1FT2)			**2**						
Shaft end / feather key									
Plain shaft				**0**					
Shaft with feather key				**1**					
Plain shaft, reduced shaft diameter (only for 1F.2103-....0, 1FT2104 and 1FT2108)				**2**					
Shaft with feather key, reduced shaft diameter (only for 1FT2104 and 1FT2108)				**3**					
Encoder									
AS22DQC (absolute encoder 22-bit single-turn)					**S**				
AM22DQC (absolute encoder 22-bit + 12-bit multi-turn)					**M**				
AS26DQC (absolute encoder 26-bit single-turn) (only for 1FT2)					**B**				
AM26DQC (absolute encoder 26-bit + 12-bit multi-turn) (only for 1FT2)					**C**				

Power cable		
	Article No.	**for I_0 motor**
M17	**6FX ■ 002-5 ■ N27-...**	4 × 1.5 for max. 15.2 A
M23	**6FX ■ 002-5 ■ N06-...**	4 × 1.5 for max. 15.2 A
M23	**6FX ■ 002-5 ■ N16-...**	4 × 2.5 for max. 21 A
M40	**6FX ■ 002-5 ■ N36-...**	4 × 2.5 for max. 21 A
M40	**6FX ■ 002-5 ■ N46-...**	4 ×4 for max. 28 A
M40	**6FX ■ 002-5 ■ N56-...**	4 × 6 for max. 36 A

... Length code

C Without brake cores
D With brake cores [2]

8 MOTION-CONNECT 800PLUS
5 MOTION-CONNECT 500

For more information about cables, see MOTION-CONNECT connection systems

[1] For installation type "C" and 40 °C (104 °F).

[2] Cable cross-section for brake connection 2 × 1.5 mm^2.

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Selection and ordering data

SIMOTICS S-1FT2 and S-1FK2 servomotors for SINAMICS S120/S220 with line connection 380 ... 480 V 3 AC

SIMOTICS S-1FT2 and S-1FK2 servomotor											SINAMICS S120/S220
Shaft height	Static torque M_0 Nm (lb_f-ft)	Stall current I_0 A	Maximum torque M_{max} Nm (lb_f-ft)	Rated speed n_N r/min	Rated power P_N kW	Rated torque M_N Nm (lb_f-ft)	Rotor moment of inertia J_{Mot} kg cm^2 (lb_f-in^2)	Article No.	Cable connector Size	Recommended cross-section [1] of the power cable 4 × mm^2	Rated output current SINAMICS S120/S220 Booksize I_N A
Compact for high precision applications											
30	0.64 (0.47)	1.05	1.85 (1.36)	6000	0.255	0.405 (0.299)	0.20 (0.068)	**1F■2203-2AK■■-■■B0**	M17	4 × 0.75	3
30	1.27 (0.94)	2.05	3.75 (2.77)	6000	0.43	0.68 (0.50)	0.35 (0.120)	**1F■2203-4AK■■-■■B0**	M17	4 × 0.75	3
40	2.4 (1.8)	2.25	7.1 (5.2)	3000	0.75	2.4 (1.8)	1.2 (0.410)	**1F■2204-5AF■■-■■B0**	M17	4 × 0.75	3
40	2.4 (1.8)	4.4	7.1 (5.2)	6000	0.57	0.9 (0.7)	1.2 (0.410)	**1F■2204-5AK■■-■■B0**	M17	4 × 0.75	5
40	3.2 (2.4)	3	9.5 (7.0)	3000	1	3.2 (2.4)	1.6 (0.547)	**1F■2204-6AF■■-■■B0**	M17	4 × 0.75	3
48	3.6 (2.7)	1.84	10.8 (8.0)	2000	0.69	3.3 (2.4)	3.2 (1.093)	**1FT2205-2AC■■-■■B0**	M17	4 × 0.75	3
48	3.6 (2.7)	2.9	10.8 (8.0)	3000	0.94	3 (2.21)	3.2 (1.093)	**1F■2205-2AF■■-■■B0**	M17	4 × 0.75	3
48	3.6 (2.7)	3.8	10.8 (8.0)	4500	1.06	2.25 (1.66)	3.2 (1.093)	**1FT2205-2AH■■-■■B0**	M17	4 × 0.75	5
48	6 (4.43)	4.7	18 (13.3)	3000	1.45	4.6 (3.4)	5.1 (1.743)	**1F■2205-4AF■■-■■B0**	M17	4 × 0.75	5
63	6 (4.43)	2.8	18 (13.3)	2000	1.15	5.5 (4.1)	7.8 (2.665)	**1FT2206-2AC■■-■■B0**	M23	4 × 1.5	3
63	6.5 (4.8)	5	18 (13.3)	3000	1.71	5.4 (4.0)	7.8 (2.665)	**1F■2206-2AF■■-■■B0**	M23	4 × 1.5	5
63	6.5 (4.8)	6.5	18 (13.3)	4500	1.8	3.85 (2.84)	7.8 (2.665)	**1FT2206-2AH■■-■■B0**	M23	4 × 1.5	9
63	9 (6.64)	3.15	27 (19.9)	1500	1.3	8.3 (6.1)	12 (4.100)	**1FT2206-3AB■■-■■B0**	M23	4 × 1.5	5
63	9 (6.64)	5.4	27 (19.9)	3000	2.35	7.5 (5.5)	12 (4.100)	**1FT2206-3AF■■-■■B0**	M23	4 × 1.5	9
63	12 (8.85)	4.5	38 (28.0)	2000	2.2	10.5 (7.7)	15 (5.126)	**1FT2206-4AC■■-■■B0**	M23	4 × 1.5	5
63	12 (8.85)	7.9	36 (26.6)	3000	2.85	9.1 (6.7)	15 (5.126)	**1F■2206-4AF■■-■■B0**	M23	4 × 1.5	9
63	12 (8.85)	12	36 (26.6)	4500	2.2	4.7 (3.5)	15 (5.126)	**1FT2206-4AH■■-■■B0**	M23	4 × 1.5	18

Article No. supplements

Motor type	
Standard type 1FT2	**T**
Core type 1FK2	**K**

Holding brake	
Without brake	**0**
With brake	**1**
With reinforced holding brake (1FT2208-2, 1FT2208-3, 1FT2210-2, 1FT2210-3 only)	**2**

Degree of protection	
IP64 (without shaft sealing ring)	**0**
IP65 (with shaft sealing ring)	**1**
IP67 (with shaft sealing ring with annular spring) (only for 1FT2)	**2**

Shaft end / feather key	
Plain shaft	**0**
Shaft with feather key	**1**
Plain shaft, reduced shaft diameter (only for 1F22.03-….0, 1FT2204, 1FT2208 and 1FT2210)	**2**
Shaft with feather key, reduced shaft diameter (only for 1FT2204, 1FT2208 and 1FT2210)	**3**

Encoder	
AS22DQC (absolute encoder 22-bit single-turn)	**S**
AM22DQC (absolute encoder 22-bit + 12-bit multi-turn)	**M**
AS26DQC (absolute encoder 26-bit single-turn) (only for 1FT2)	**B**
AM26DQC (absolute encoder 26-bit + 12-bit multi-turn) (only for 1FT2)	**C**

Cable connector Size	**Power cable** Article No.	for I_0 motor
M17	**6FX ■ 002-5 ■ N27-...**	4 × 1.5 for max. 15.2 A
M23	**6FX ■ 002-5 ■ N06-...**	4 × 1.5 for max. 15.2 A
M23	**6FX ■ 002-5 ■ N16-...**	4 × 2.5 for max. 21 A
M40	**6FX ■ 002-5 ■ N36-...**	4 × 2.5 for max. 21 A
M40	**6FX ■ 002-5 ■ N46-...**	4 × 4 for max. 28 A
M40	**6FX ■ 002-5 ■ N56-...**	4 × 6 for max. 36 A

... Length code

C Without brake cores
D With brake cores [2]

8 MOTION-CONNECT 800PLUS
5 MOTION-CONNECT 500

For more information about cables, see MOTION-CONNECT connection systems

[1] For installation type "C" and 40 °C (104 °F).
[2] Cable cross-section for brake connection 2 × 1.5 mm^2.

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Selection and ordering data

SIMOTICS S-1FT2 and S-1FK2 servomotors for SINAMICS S120/S220 with line connection 380 ... 480 V 3 AC

SIMOTICS S-1FT2 and S-1FK2 servomotor										SINAMICS S120/S220
Shaft height	Static torque M_0 Nm (lb_f-ft)	Stall current I_0 A	Maximum torque M_{max} Nm (lb_f-ft)	Rated speed n_N r/min	Rated power P_N kW	Rated torque M_N Nm (lb_f-ft)	Rotor moment of inertia J_{Mot} kg cm^2 (lb_f-in^2)	Article No.	Cable connector Size	Recommended cross-section [1] of the power cable 4 × mm^2	Rated output current SINAMICS S120/S220 Booksize I_N A
Compact for high precision applications											
80	12.5 (9.2)	8.3	38 (28.0)	3000	2.85	9 (6.64)	23 (7.859)	**1FT2208-2AF■■-■■B0**	M23	4 × 1.5	9
80	18 (13.3)	6.2	51 (37.6)	1500	2.5	16 (11.8)	30 (10.251)	**1FT2208-3AB■■-■■B0**	M23	4 × 1.5	9
80	18 (13.3)	8.4	51 (37.6)	2000	3.05	14.5 (10.7)	30 (10.251)	**1F■2208-3AC■■-■■B0**	M23	4 × 1.5	9
80	18 (13.3)	11.9	51 (37.6)	3000	3.5	11.1 (8.2)	30 (10.251)	**1FT2208-3AF■■-■■B0**	M23	4 × 1.5	18
80	18 (13.3)	16.5	51 (37.6)	4000	2.6	6.2 (4.6)	30 (10.251)	**1FT2208-3AH■■-■■B0**	M23	4 × 2.5	18
80	22 (16.2)	7.1	66 (48.7)	1500	2.9	18.6 (13.7)	39 (13.326)	**1FT2208-4AB■■-■■B0**	M23	4 × 1.5	9
80	22 (16.2)	11.7	66 (48.7)	2000	3.55	17 (12.5)	39 (13.326)	**1F■2208-4AC■■-■■B0**	M23	4 × 1.5	18
80	22 (16.2)	15	66 (48.7)	3000	3.7	11.8 (8.7)	39 (13.326)	**1FT2208-4AF■■-■■B0**	M23	4 × 1.5	18
80	27 (19.9)	8.6	80 (59.0)	1500	3.45	22 (16.2)	48 (16.402)	**1FT2208-5AB■■-■■B0**	M23	4 × 1.5	9
80	27 (19.9)	14.6	80 (59.0)	2000	4	19.1 (14.1)	48 (16.402)	**1F■2208-5AC■■-■■B0**	M23	4 × 1.5	18
100	22 (16.2)	9.3	60 (44.3)	2000	3.85	18.4 (13.6)	62 (21.185)	**1FT2210-2AC■■-■■B0**	M23	4 × 1.5	18
100	22 (16.2)	12.9	60 (44.3)	3000	5.1	16.2 (11.9)	62 (21.185)	**1FT2210-2AF■■-■■B0**	M23	4 × 1.5	18
100	30 (22.1)	8.5	90 (66.4)	1500	4.5	28.5 (21.0)	89 (30.411)	**1FT2210-3AB■■-■■B0**	M23	4 × 1.5	9
100	30 (22.1)	15	90 (66.4)	2000	5.5	26 (19.2)	89 (30.411)	**1F■2210-3AC■■-■■B0**	M23	4 × 1.5	18
100	30 (22.1)	19.8	90 (66.4)	3000	5.8	18.5 (13.6)	89 (30.411)	**1FT2210-3AF■■-■■B0**	M40	4 × 2.5	24
100	40 (29.5)	11.8	120 (88.5)	1500	5.4	34.5 (25.4)	120 (41.004)	**1F■2210-4AB■■-■■B0**	M23	4 × 1.5	18
100	40 (29.5)	15	120 (88.5)	2000	6.4	30.5 (22.5)	120 (41.004)	**1F■2210-4AC■■-■■B0**	M23	4 × 1.5	18
100	40 (29.5)	22.5	120 (88.5)	3000	5.7	18 (13.3)	120 (41.004)	**1FT2210-4AF■■-■■B0**	M40	4 × 4	24
100	50 (36.9)	15	150 (111)	1500	6.1	39 (28.8)	150 (51.255)	**1FT2210-5AB■■-■■B0**	M23	4 × 1.5	18
100	50 (36.9)	22.5	150 (111)	2000	7.1	33.5 (24.7)	150 (51.255)	**1F■2210-5AC■■-■■B0**	M40	4 × 4	24
100	50 (36.9)	30	150 (111)	3000	8.2	26 (19.2)	150 (51.255)	**1FT2210-5AF■■-■■B0**	M40	4 × 6	30

Article No. supplements

Motor type												
Standard type 1FT2	**T**											
Core type 1FK2	**K**											
Holding brake												
Without brake		**0**										
With brake		**1**										
With reinforced holding brake (1FT2208-2, 1FT2208-3, 1FT2210-2, 1FT2210-3 only)		**2**										
Degree of protection												
IP64 (without shaft sealing ring)			**0**									
IP65 (with shaft sealing ring)			**1**									
IP67 (with shaft sealing ring with annular spring) (only for 1FT2)			**2**									
Shaft end / feather key												
Plain shaft				**0**								
Shaft with feather key				**1**								
Plain shaft. reduced shaft diameter (only for 1F22.03-….0, 1FT2204, 1FT2208 and 1FT2210)				**2**								
Shaft with feather key, reduced shaft diameter (only for 1FT2204, 1FT2208 and 1FT2210)				**3**								
Encoder												
AS22DQC (absolute encoder 22-bit single-turn)					**S**							
AM22DQC (absolute encoder 22-bit + 12-bit multi-turn)					**M**							
AS26DQC (absolute encoder 26-bit single-turn) (only for 1FT2)					**B**							
AM26DQC (absolute encoder 26-bit + 12-bit multi-turn) (only for 1FT2)					**C**							

Power cable		
	Article No.	**for I_0 motor**
M17	**6FX ■ 002-5 ■ N27-...**	4 × 1.5 for max. 15.2 A
M23	**6FX ■ 002-5 ■ N06-...**	4 × 1.5 for max. 15.2 A
M23	**6FX ■ 002-5 ■ N16-...**	4 × 2.5 for max. 21 A
M40	**6FX ■ 002-5 ■ N36-...**	4 × 2.5 for max. 21 A
M40	**6FX ■ 002-5 ■ N46-...**	4 × 4 for max. 28 A
M40	**6FX ■ 002-5 ■ N56-...**	4 × 6 for max. 36 A

... Length code

C Without brake cores
D With brake cores [2]

8 MOTION-CONNECT 800PLUS
5 MOTION-CONNECT 500

For more information about cables, see MOTION-CONNECT connection systems

[1] For installation type "C" and 40 °C (104 °F).

[2] Cable cross-section for brake connection 2 × 1.5 mm^2.

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SIMOTICS S-1FK2 High Inertia

Selection and ordering data

SIMOTICS S-1FK2 servomotors for SINAMICS S120/S220 with line connection 380 ... 480 V 3 AC

SIMOTICS S-1FK2 servomotor											SINAMICS S120/S220
Shaft height	Static torque M_0 Nm (lb_f-ft)	Stall current I_0 A	Maximum torque M_{max} Nm (lb_f-ft)	Rated speed n_N r/min	Rated power P_N kW	Rated torque M_N Nm (lb_f-ft)	Rotor moment of inertia J_{Mot} kg cm^2 (lb_f-in^2)	Article No.	Cable connector Size	Recommended cross-section [1] of the power cable 4 × mm^2	Rated output current SINAMICS S120/S220 Booksize I_N A
High Inertia for applications with very high or variable load inertia											
63	6 (4.43	2.8	18 (13.28)	2000	1.15	5.5 (4.06)	12 (4.100)	**1FK2306-2AC■■-■■B0**	M23	4 × 1,5	3
63	12 (8.85)	4.5	38 (28.03)	2000	2.2	10.5 (7.74)	30 (10.251)	**1FK2306-4AC■■-■■B0**	M23	4 × 1,5	5
80	18 (13.28)	6.2	51 (37.62)	1500	2.5	16 (11.80)	60 (20.502)	**1FK2308-3AB■■-■■B0**	M23	4 × 1,5	9
80	22 (16.23)	7.1	66 (48.68)	1500	2.9	18.6 (13.72)	70 (23.919)	**1FK2308-4AB■■-■■B0**	M23	4 × 1,5	9

Article No. supplements

Motor type											
Core type 1FK2	**K**										
Holding brake											
Without brake		**0**									
With brake		**1**									
Degree of protection											
IP64 (without shaft sealing ring)			**0**								
IP65 (with shaft sealing ring)			**1**								
Shaft end / feather key											
Plain shaft				**0**							
Shaft with feather key				**1**							
Encoder											
AS22DQC (absolute encoder 22-bit single-turn)					**S**						
AM22DQC (absolute encoder 22-bit + 12-bit multi-turn)					**M**						

Power cable		
Article No.		for I_0 motor
M17	**6FX ■ 002-5 ■ N27-...**	4 × 1.5 for max. 15.2 A
M23	**6FX ■ 002-5 ■ N06-...**	4 × 1.5 for max. 15.2 A
M23	**6FX ■ 002-5 ■ N16-...**	4 × 2.5 for max. 21 A
M40	**6FX ■ 002-5 ■ N36-...**	4 × 2.5 for max. 21 A
M40	**6FX ■ 002-5 ■ N46-...**	4 ×4 for max. 28 A
M40	**6FX ■ 002-5 ■ N56-...**	4 × 6 for max. 36 A

... Length code

C Without brake cores
D With brake cores [2]

8 MOTION-CONNECT 800PLUS
5 MOTION-CONNECT 500

For more information about cables, see MOTION-CONNECT connection systems

[1] For installation type "C" and 40 °C (104 °F).
[2] Cable cross-section for brake connection 2 × 1.5 mm^2.

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Selection and ordering data

SIMOTICS S-1FT2 servomotors for SINAMICS S120/S220 with line connection 380 ... 480 V 3 AC

SIMOTICS S-1FT2 servomotor											SINAMICS S120/S220
Shaft height	Static torque M_0 Nm (lb$_f$-ft)	Stall current I_0 A	Maximum torque M_{max} Nm (lb$_f$-ft)	Rated speed n_N r/min	Rated power P_N kW	Rated torque M_N Nm (lb$_f$-ft)	Rotor moment of inertia J_{Mot} kg cm^2 (lb$_f$-in^2)	Article No.	Cable connector Size	Recommended cross-section [1] of the power cable 4 × mm^2	Rated output current SINAMICS S120/S220 Booksize I_N A
Forced ventilation: High Dynamic for highly dynamic applications											
63	11.5 (8.5)	11.6	26 (19.2)	3000	3.1	9.8 (7.2)	4.6 (1.572)	**1FT2106-3SF■■-■■B0**	M23	4 × 1.5	18
63	16 (11.8)	14.6	33 (24.3)	3000	4.05	12.9 (9.5)	6.0 (2.050)	**1FT2106-4SF■■-■■B0**	M23	4 × 1.5	18
63	22 (16.2)	19.6	45.5 (33.6)	3000	5.5	17.5 (12.9)	9 (3.075)	**1FT2106-6SF■■-■■B0**	M23	4 × 2.5	18
80	33 (24.3)	19.2	87 (64.2)	2000	6	28.5 (21.0)	18 (6.151)	**1FT2108-4SC■■-■■B0**	M40	4 × 2.5	24
80	40 (29.5)	15.5	105 (77.4)	1500	5.6	35.5 (26.2)	22 (7.517)	**1FT2108-5SB■■-■■B0**	M23	4 × 2.5	18
80	40 (29.5)	24	105 (77.4)	2000	7.1	34 (25.1)	22 (7.517)	**1FT2108-5SC■■-■■B0**	M40	4 × 4	24
80	50 (36.9)	18.2	140 (103)	1500	6.9	44 (32.5)	28 (9.568)	**1FT2108-7SB■■-■■B0**	M40	4 × 2.5	18
80	50 (36.9)	29	140 (103)	2000	8.8	42 (31.0)	28 (9.568)	**1FT2108-7SC■■-■■B0**	M40	4 × 6	30
80	49.5 (36.5)	36	140 (103)	2500	10.2	39 (28.8)	28 (9.568)	**1FT2108-7SE■■-■■B0**	M40	4 × 6	45

Article No. supplements

Motor type											
Standard type 1FT2	**T**										
Holding brake											
Without brake		**0**									
With brake		**1**									
With reinforced holding brake (only for 1FT2108)		**2**									
Degree of protection											
IP64 (without shaft sealing ring)			**0**								
IP65 (with shaft sealing ring)			**1**								
IP67 (with shaft sealing ring with annular spring)			**2**								
Shaft end / feather key											
Plain shaft				**0**							
Shaft with feather key				**1**							
Plain shaft. reduced shaft diameter (only for 1FT2.08)				**2**							
Shaft with feather key, reduced shaft diameter (only for 1FT2.08)				**3**							
Encoder											
AS22DQC (absolute encoder 22-bit single-turn)					**S**						
AM22DQC (absolute encoder 22-bit + 12-bit multi-turn)					**M**						
AS26DQC (absolute encoder 26-bit single-turn) (only for 1FT2)					**B**						
AM26DQC (absolute encoder 26-bit + 12-bit multi-turn) (only for 1FT2)					**C**						

Power cable

Cable connector Size	Article No.	for I_0 motor
M17	**6FX ■ 002-5 ■ N27-...**	4 × 1.5 for max. 15.2 A
M23	**6FX ■ 002-5 ■ N06-...**	4 × 1.5 for max. 15.2 A
M23	**6FX ■ 002-5 ■ N16-...**	4 × 2.5 for max. 21 A
M40	**6FX ■ 002-5 ■ N36-...**	4 × 2.5 for max. 21 A
M40	**6FX ■ 002-5 ■ N46-...**	4 × 4 for max. 28 A
M40	**6FX ■ 002-5 ■ N56-...**	4 × 6 for max. 36 A

... Length code

C Without brake cores
D With brake cores [2]

8 MOTION-CONNECT 800PLUS
5 MOTION-CONNECT 500

For more information about cables, see MOTION-CONNECT connection systems

[1] For installation type "C" and 40 °C (104 °F).
[2] Cable cross-section for brake connection 2 × 1.5 mm^2.

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SIMOTICS S-1FT2 Compact – forced ventilation

Selection and ordering data

SIMOTICS S-1FT2 servomotors for SINAMICS S120/S220 with line connection 380 ... 480 V 3 AC

SIMOTICS S-1FT2 servomotor										SINAMICS S120/S220
Shaft height	Static torque M_0 Nm (lb_f-ft)	Stall current I_0 A	Maximum torque M_{max} Nm (lb_f-ft)	Rated speed n_N r/min	Rated power P_N kW	Rated torque M_N Nm (lb_f-ft)	Rotor moment of inertia J_{Mot} kg cm^2 (lb_f-in^2)	Article No.	Cable connector Size	Recommended cross-section [1] of the power cable 4 × mm^2	Rated output current SINAMICS S120/S220 Booksize I_N A
Forced ventilation: Compact for high precision applications											
63	14.5 (10.7)	9.6	36 (26.6)	3000	3.85	12.2 (9.0)	15 (5.126)	**1FT2206-4SF■■-■■B0**	M23	4 × 1.5	18
63	14.5 (10.7)	14.3	36 (26.6)	4500	4.7	4.7 (3.5)	15 (5.126)	**1FT2206-4SH■■-■■B0**	M23	4 × 1.5	18
80	22 (16.2)	7.8	51 (37.6)	1500	3.1	19.9 (14.7)	30 (10.251)	**1FT2208-3SB■■-■■B0**	M23	4 × 1.5	9
80	22 (16.2)	10.4	51 (37.6)	2000	4	19.1 (14.1)	30 (10.251)	**1FT2208-3SC■■-■■B0**	M23	4 × 1.5	18
80	22 (16.2)	14.1	51 (37.6)	3000	5.5	17.6 (13.0)	30 (10.251)	**1FT2208-3SF■■-■■B0**	M23	4 × 1.5	18
80	22 (16.2)	19.8	51 (37.6)	4500	6.8	14.4 (10.6)	30 (10.251)	**1FT2208-3SH■■-■■B0**	M40	4 × 2.5	24
80	28 (20.7)	9.3	66 (48.7)	1500	4	25.5 (18.8)	39 (13.326)	**1FT2208-4SB■■-■■B0**	M23	4 × 1.5	18
80	28 (20.7)	14.6	66 (48.7)	2000	5.1	24 (17.7)	39 (13.326)	**1FT2208-4SC■■-■■B0**	M23	4 × 1.5	18
80	28 (20.7)	18.7	66 (48.7)	3000	7.1	22.5 (16.6)	39 (13.326)	**1FT2208-4SF■■-■■B0**	M40	4 × 2.5	24
80	35 (25.8)	10.7	80 (59.0)	1500	5	32 (23.6)	48 (16.402)	**1FT2208-5SB■■-■■B0**	M23	4 × 1.5	18
80	35 (25.8)	18.8	80 (59.0)	2000	6.3	30 (22.1)	48 (16.402)	**1FT2208-5SC■■-■■B0**	M40	4 × 2.5	24
100	40 (29.50)	19.9	90 (66.38)	2000	7.3	35 (25.82)	89 (30.411)	**1FT2208-3SC■■-■■B0**	M40	4 × 2.5	24
100	40 (29.50)	27.5	90 (66.38)	3000	10.1	32 (23.60)	89 (30.411)	**1FT2208-3SF■■-■■B0**	M40	4 × 4	30
100	53 (39.09)	15.5	120 (88.51)	1500	7.6	48 (35.40)	120 (41.004)	**1FT2208-3SB■■-■■B0**	M23	4 × 2.5	18
100	53 (39.09)	19.8	120 (88.51)	2000	9.6	46 (33.93)	120 (41.004)	**1FT2208-4SC■■-■■B0**	M40	4 × 2.5	24
100	53 (39.09)	31	120 (88.51)	3000	13.2	42 (30.98)	120 (41.004)	**1FT2208-4SF■■-■■B0**	M40	4 × 6	45
100	65 (47.94)	19.3	150 (110.6)	1500	9.1	58 (42.78)	150 (51.255)	**1FT2208-4SB■■-■■B0**	M40	4 × 2.5	24
100	65 (47.94)	30.5	150 (110.6)	2000	11.5	55 (40.57)	150 (51.255)	**1FT2208-5SC■■-■■B0**	M40	4 × 6	30
100	65 (47.94)	38.5	150 (110.6)	3000	15.7	50 (36.88)	150 (51.255)	**1FT2208-5SF■■-■■B0**	M40	4 × 10	45

Article No. supplements

Motor type												
Standard type 1FT2	**T**											
Holding brake												
Without brake		**0**										
With brake		**1**										
With reinforced holding brake (only for 1FT2208-2, 1FT2208-3, 1FT2210-3)		**2**										
Degree of protection												
IP64 (without shaft sealing ring)			**0**									
IP65 (with shaft sealing ring)			**1**									
IP67 (with shaft sealing ring with annular spring)			**2**									
Shaft end / feather key												
Plain shaft				**0**								
Shaft with feather key				**1**								
Plain shaft. reduced shaft diameter (only for 1FT2.08 and 1FT2210)				**2**								
Shaft with feather key, reduced shaft diameter (only for 1FT2.08 and 1FT2210)				**3**								
Encoder												
AS22DQC (absolute encoder 22-bit single-turn)					**S**							
AM22DQC (absolute encoder 22-bit + 12-bit multi-turn)					**M**							
AS26DQC (absolute encoder 26-bit single-turn) (only for 1FT2)					**B**							
AM26DQC (absolute encoder 26-bit + 12-bit multi-turn) (only for 1FT2)					**C**							

Power cable												
Article No.												for I_0 motor
M17	**6FX** ■ **002-5** ■ **N27-...**											4 × 1.5 for max. 15.2 A
M23	**6FX** ■ **002-5** ■ **N06-...**											4 × 1.5 for max. 15.2 A
M23	**6FX** ■ **002-5** ■ **N16-...**											4 × 2.5 for max. 21 A
M40	**6FX** ■ **002-5** ■ **N36-...**											4 × 2.5 for max. 21 A
M40	**6FX** ■ **002-5** ■ **N46-...**											4 × 4 for max. 28 A
M40	**6FX** ■ **002-5** ■ **N56-...**											4 × 6 for max. 36 A
										...		Length code
									C			Without brake cores
									D			With brake cores [2]
								8				MOTION-CONNECT 800PLUS
								5				MOTION-CONNECT 500

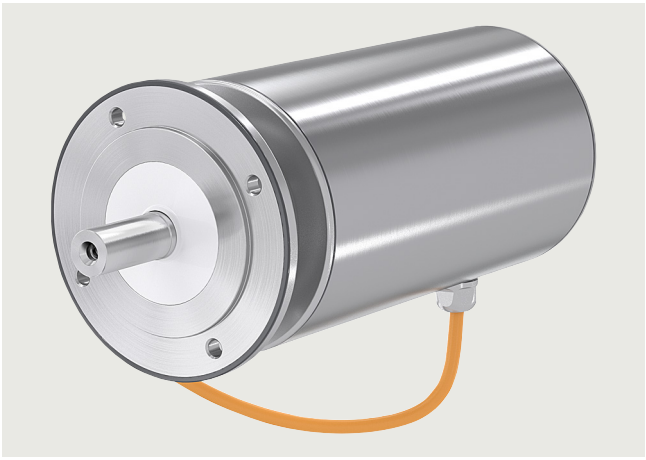
For more information about cables, see MOTION-CONNECT connection systems

[1] For installation type "C" and 40 °C (104 °F).

[2] Cable cross-section for brake connection 2 × 1.5 mm^2.

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Overview



The SIMOTICS S-1FS2 servomotors are compact and highly dynamic synchronous motors, especially designed for use in hygienic environments in the consumer packaged goods, pharmaceutical, and life science industries with the most stringent requirements for hygiene and cleanliness. They are characterized by high power density, degree of protection and overload capability, a design suitable for cleaning and the use of materials that are approved to be used in food processing.

Benefits

The SIMOTICS S-1FS2 servomotors fully exploit their strengths in the system with the SINAMICS S210 converter and in combination with the OCC adapter with the SINAMICS S120/S220 converters:

- Short adjustment and positioning times
- Quick and precise compensation of disturbances
- Stable closed loop control with high dynamic response
- Maximum flexibility in the selection
- Increased ruggedness
- Simplified cleaning

This is achieved by:

- Rapid control cycle
- Complex control algorithms
- High-resolution optical encoders
- Low moment of inertia of the motors
- High overload capability
- One cable connection system

Application

- CPG (consumer packaged goods)
- Pharmaceutical industry
- Packaging machines
- Handling equipment
- Feed and withdrawal devices

More information

In addition, the SIMOTICS S-1FS2 servo motors can be found at the following address in the Siemens Product Configurator in SiePortal:
www.siemens.com/simotics-1fs2/configuration

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SIMOTICS S-1FS2

Selection and ordering data

	Static torque	Maximum torque	Maxi-mum speed	Rated speed for 200 ... 240 V 1/3 AC	Rated speed for 380 ... 480 V 3 AC	Rotor moment of inertia without/with brake	**SIMOTICS S-1FS2 servomotor with connection cable**	Additional order code for cable end and cable length	**SINAMICS S120/S220** Rated out-put current SINAMICS S120/S220 Booksize
	M_0	M_{max}	n_{max}	n_N	n_N	J_{Mot}			I_N
	Nm (lb_f-ft)	Nm (lb_f-ft)	r/min	r/min	r/min	kg cm^2 (lb_f-in^2)	Article No.	Order code	A
Shaft height 40									
	3.1 (2.29)	10 (7.38)	7200	1500	3000	0.72/0.8 (0.246/0.273)	**1FS2104-6AF ■ 7- ■MZ0**	**Q■ ■**	3
Shaft height 52									
	7.6 (5.61)	24 (17.7)	6000	1500	3000	2.8/3.6 (0.957/1.230)	**1FS2105-6AF ■ 7- ■MZ0**	**Q■ ■**	9
Shaft height 63									
	14 (10.3)	42 (31)	6000	1250	2500	–/11 (–/3.759)	**1FS2106-6AE 1 7- ■MZ0**	**Q■ ■**	18
	14 (10.3)	42 (31)	6000	1500	3000	9/– (3.075/–)	**1FS2106-6AF 0 7- ■MZ0**	**Q■ ■**	18
Shaft height 80									
	23.5 (17.33)	80 (59.01)	4750	1000	2000	49/55 (16.743/18.794)	**1FS2208-5AC ■ 7- ■MZ0**	**Q■ ■**	18

Article No. supplements			
Holding brake			
Without holding brake	**0**		
With holding brake	**1**		
Shaft end / feather key			
Plain shaft		**0**	
Shaft with feather key		**1**	
Supplements for the additional order code			
Cable end			
Free cable ends for direct connection to the converter			**0**
Cable end with SPEED-CONNECT coupling M17 (1FS2104 and 1FS2105) or M23 (1FS2106 and 1FS2208)			**1**
Cable length			

0.5 m (1.64 ft)	**A**	6 m (19.69 ft)	**M**
1 m (3.28 ft)	**B**	6.5 m (21.33 ft)	**N**
1.5 m (4.92 ft)	**C**	7 m (22.97 ft)	**P**
2 m (6.56 ft)	**D**	7.5 m (24.61 ft)	**Q**
2.5 m (8.20 ft)	**E**	8 m (26.25 ft)	**R**
3 m (9.84 ft)	**F**	8.5 m (27.89 ft)	**S**
3.5 m (11.48 ft)	**G**	9 m (29.53 ft)	**T**
4 m (13.12 ft)	**H**	9.5 m (31.17 ft)	**U**
4.5 m (14.76 ft)	**J**	10 m (32.81 ft)	**V**
5 m (16.41 ft)	**K**	10.5 m (34.45 ft)	**W**
5.5 m (18.05 ft)	**L**	11 m (36.09 ft)	**X**

The total length of the connecting cable, including any optional extension cables, must not exceed 50 m (164 ft).
For further information see section MOTION-CONNECT connection systems.

Spare parts

Description	For motor	Article No.
Gasket External flange gasket on the drive side (DE) of the motor	1FS2104	**1FY2904-1GF00**
	1FS2105	**1FY2905-1GF00**
	1FS2106	**1FY2906-1GF00**
	1FS2208	**1FY2908-1GF00**

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Technical specifications

General technical specifications

SIMOTICS S-1FS2 motors	
Motor type	Permanent-magnet synchronous motor
Permissible operating conditions without derating • Ambient temperature • Installation altitude, max.	 -15 ... +40 °C (5 ... 104 °F) 1000 m (3281 ft)
Degree of protection According to EN 60034-5 (IEC 60034-5), ISO 20653	IP66, IP67 IP69K (does not apply to the shaft outlet)
Cooling According to EN 60034-6	Natural cooling (IC410)
Type of construction According to EN 60034-7 (IEC 60034-7)	IM B5 (IM V1, IM V3)
Shaft end According to DIN 748-3 (IEC 60072-1)	Plain shaft Optional shaft with feather key (half-key balancing)
Shaft and flange accuracy According to DIN 42955 (IEC 60072-1)	Tolerance N In each case for radial eccentricity of the shaft end, concentricity of the centering edge, and axial eccentricity of the mounting flange to the axis of the shaft end
Vibration severity grade According to EN 60034-14 (IEC 60034-14)	Grade A is maintained up to rated speed
Stator winding insulation According to EN 60034-1 (IEC 60034-1)	Thermal class 155 (F) for a winding overtemperature of ΔT = 100 K
Sound pressure level L_{pA} (1 m), max. According to ISO 1680 • 1FS2104 • 1FS2105 and 1FS2106 • 1FS2208	 55 dB(A) + 3 dB(A) tolerance 65 dB(A) + 3 dB(A) tolerance 70 dB(A) + 3 dB(A) tolerance
Encoder system	AM22DQC (absolute encoder 22-bit + 12-bit multiturn)
Holding brake	Optional integrated holding brake
Connection	One Cable Connection (OCC) for signals and power, open cable end for direct connection to converter or cable end with plug connector to connect a MOTION-CONNECT basic line
Surface	Stainless steel 1.4404, roughness < 0.8 µm
Certificates of suitability	cURus, CE, EAC, CEL, EHEDG

Note:

SIMOTICS motors are designed for operation with frequency converters and non-periodic load and speed changes.

Typical applications include machine tools or production machines with non-periodic speed and load cycles. This corresponds to IEC 60034-1 operating mode S9.

In operating mode S9, a correspondingly selected constant load, similar to operating mode S1, is used as a reference value.

Regulations, standards, specifications

The motors comply with the appropriate standards and regulations, see table below.

As a result of the fact that in many countries the national regulations have been completely harmonized with the international IEC 60034-1 recommendation, there are no longer any differences with respect to coolant temperatures, temperature classes and temperature rise limits.

General specifications for rotating electrical machines	IEC 60034-1
Terminal designations and direction of rotation for electrical machines	IEC 60034-8
Types of construction of rotating electrical machines	IEC 60034-7
Cooling methods of rotating electrical machines	IEC 60034-6
Degrees of protection of rotating electrical machines	IEC 60034-5
Vibration severity of rotating electrical machines	IEC 60034-14
Noise limit values for rotating electrical machines	IEC 60034-9
Cylindrical shaft ends for electrical machines	DIN 748-3/IEC 60072-1

SIMOTICS S-1FS2 motors have UL approval from Underwriters Laboratories Inc. and are marked with the "UL Recognized Component" test symbol. This is used for components which are part of a larger product or system. This confirmed compliance with the corresponding US American and Canadian regulations, and allowed access to the North American market.

For SIMOTICS S-1FS2 motors, conformity with the relevant EC directives 2006/95/EC and 2014/35/EU and the relevant standards EN 60034-1:2010 and EN 60204-1:2006 is confirmed. By applying the CE mark to the product, Siemens AG confirms this for the product, and secures the free movement of goods within the European Union.

Specific standards for the food industry

The SIMOTICS S-1FS2 motors meet the EHEDG directives for "Class I EL AUX". FDA-listed plastic materials are used in the relevant exterior areas. The bearing grease is approved in accordance with NSF H1.

EHEDG certificate:
https://support.industry.siemens.com/cs/document/109805184

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Technical specifications

Degree of protection according to IEC 60034-5

A suitable degree of protection must be selected according to the operating and environmental conditions to protect the motor against damage caused by the ingress of water and other liquids, as well as dust and foreign bodies.

SIMOTICS S-1FS2 motors have degree of protection IP66/IP67 as standard.

In contrast to the degree of protection IP65, the degree of protection IP67 provides increased protection against water jets and splashing water as well as brief immersion. The mounting position of the motor must be chosen so that the stagnant water at the shaft exit is avoided.

The degree of protection designation is composed from the code IP (for International Protection) and two code numbers for the protection against touching and penetration of foreign bodies, and the degree of protection against the ingress of water.

First code number

6 Protection against dust ingress and complete protection against touching

Second code number

4: Protection against splashwater from any direction

5: Protection against jet water from any direction

6: Increased protection against powerful water jets from any direction

7: Protection against brief immersion

Degree of protection according to ISO 20653

The motor meets the IP69K requirements of the ISO 20653 standard. Using a much higher pressure for cleaning is generally not advisable in the food sector, as there is a risk of re-contaminating already cleaned system parts with the spray mist.

Chemical resistance and cleaning agents

The SIMOTICS S-1FS2 motor is resistant to a wide range of cleaning agents and processes used in the food industry.

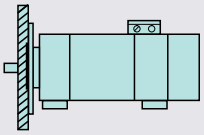
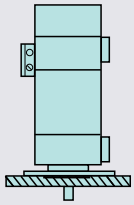
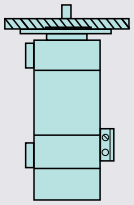
For detailed information, such as admissible cleaning agents, see operating instructions "SINAMICS servo drive system with 1FS2":
https://support.industry.siemens.com/cs/document/109796333

Type of construction, mounting position according to IEC 60034-7

SIMOTICS S-1FS2 motors are designed in type of construction IM B5. They may also be used in the mounting positions IM V1 and IM V3.

Note:

An EHEDG-compliant V3 mounting position requires additional measures, such as a cover for the motor flange.

Code 1	IM B5	IM V1	IM V3
Code 2	IM 3001	IM 3011	IM 3031
			
	Horizontal flange mounting	Flange mounting, output shaft pointing vertically downwards	Flange mounting, output shaft pointing vertically upwards

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Technical specifications

Shaft and flange accuracy in accordance with IEC 60072-1

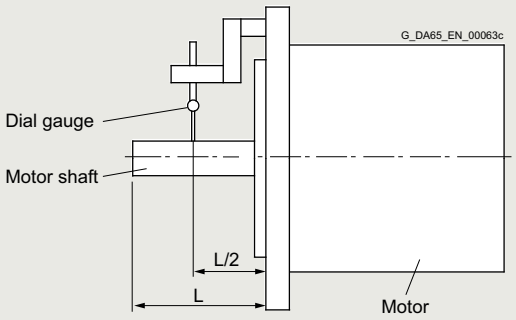
Radial eccentricity tolerance of shaft in relation to housing axis
(referred to cylindrical shaft ends)

Motor	Shaft end D × L mm (in)	Radial eccentricity Tolerance N µm
1FS2104	19 × 40 (0.75 × 1.57)	40
1FS2105		
1FS2106	24 × 50 (0.94 × 1.97)	
1FS2208	32 × 58 (1.26 × 2.28)	50

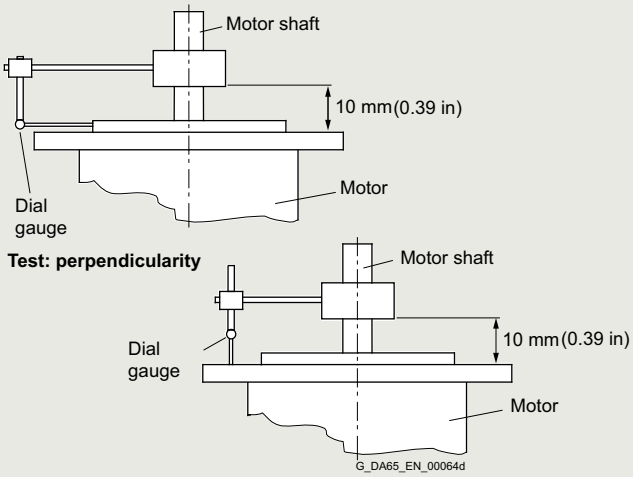
Concentricity and axial eccentricity tolerance of the flange surface for the shaft axis
(referred to the centering diameter of the mounting flange)

Motor	Centering diameter mm (in)	Concentricity and axial eccentricity Tolerance N µm
1FS2104	70 (2.76)	80
1FS2105	95 (3.74)	
1FS2106	110 (4.33)	100
1FS2208	130 (5.12)	

Test: runout



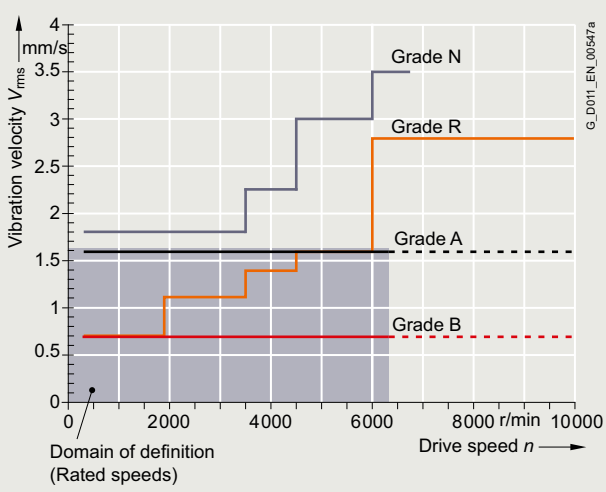
Test: concentricity



Vibration severity and vibration severity grade A according to IEC 60034-14

The vibration severity is the RMS value of the vibration velocity (frequency range from 10 Hz to 1000 Hz). The vibration severity is measured using electrical measuring devices according to DIN 45666.

The specified values refer only to the motor. These values can increase as a result of the overall system vibrational behavior due to installation.



Vibration severity limit values

The speeds of 1800 r/min and 3600 r/min and the associated limit values are specified according to IEC 60034-14.
The speeds of 4500 r/min and 6000 r/min and the specified values are defined by the motor manufacturer.

The motors maintain vibration severity grade A up to the rated speed.

Balancing according to ISO 21940-32

Apart from the balance quality of the motor, the vibrational quality of motors with attached belt pulleys is mainly determined by the balance state of the mounted component. If the motor and the mounted component are balanced separately before being joined, the balancing process of the belt pulley is to be adapted to the motor's balancing type.

SIMOTICS S-1FS2 motors with feather keys are always half-key balanced. In general, motors with a plain shaft are recommended for systems with the most stringent vibrational quality requirements.

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Technical specifications

Vibration stress, immitted vibration values

The requirements of environmental class 3M8 (according to EN 60721-3-3 Table 6) must be maintained for proper function and safeguard the bearing life. The following limits are valid for (immitted) vibration values introduced into the motor from outside:

- Vibration velocity V_{rms} according to ISO 10816, max. 4.5 mm/s (0.18 in/s)
- Vibration acceleration a_{peak} axial and radial 50 m/s^2 (164 ft/s^2)

During transport, the motors withstand single shocks (6 ms) of up to 250 m/s^2 (820 ft/s^2).

Ambient temperature and installation altitude

Operating range without restrictions:

Temperature range from -15 °C to +40 °C (5.0 °F to 104 °F), installation altitude up to 1000 m (3281 ft).
If deviating conditions are encountered, the S1 characteristic of the motor must be adapted with regard to speed and torque.

Use the following equation to calculate the reduced S1 characteristic:
$S1_{red}\,(n) = x_D \times S1_{40°C;\ 1000m}\,(n/x_D)$

Installation altitude above sea level	Derating factor x_D at an ambient temperature of				
m (ft)	30 °C (86 °F)	40 °C (104 °F)	45 °C (113 °F)	50 °C (122 °F)	55 °C (131 °F)
1000 (3281)	1.05	1	0.95	0.89	0.84
2000 (6562)	1	0.95	0.86	0.8	0.73
3000 (9843)	0.95	0.89	0.76	0.69	0.62
4000 (13123)	0.89	0.84	0.65	0.57	0.47

Larger installation heights with boundary conditions possible, see operating instructions. Operation up to 80 °C (176 °F) ambient temperature is possible with extended derating, design via TIA Selection Tool required.

Encoder system

In motors with integrated OCC/DRIVE-CLiQ interface, the sensor signal is already digitally prepared in the motor, and then transferred quickly and without loss to the drive system. Motors with an OCC/DRIVE-CLiQ interface simplify commissioning and diagnostics, as the motor parameters and encoder system are identified automatically.

Multiturn absolute encoder

AM22DQC: absolute encoder 22-bit + 12-bit multiturn
This encoder outputs an absolute angular position between 0° and 360° in the specified resolution. It can also count 4096 revolutions. The absolute position is also sensed in the de-energized state. With a ball screw, for example, the absolute position of the slide can be determined over a longer distance.

Holding brake

Many drives need a holding brake with an EMERGENCY STOP function for safety reasons or to meet process requirements. The brakes used on the SIMOTICS S-1FS2 motors operate on the quiescent current principle. A spring or permanent magnet exerts a tensile force on the brake armature disk. This means that the brake is closed and the motor shaft thereby stopped in a state of zero current.

An electric current that flows through a coil generates an opposing field that counteracts the force effect of the spring or permanent magnet and releases or holds open the brake. Only a limited number of braking operations can be performed for an EMERGENCY STOP or voltage failure without causing excessive wear on the holding brake. The holding brake is not an operational brake. Regular dynamic braking leads to increased wear and premature brake failure. In order to ensure the functionality and specification of the brake, neither the total operating energy nor the maximum switching energy per braking operation may be exceeded.

The brake control is already fully integrated into the SINAMICS S210 converter system, so that an external circuit is not necessary.

After an EMERGENCY STOP at the maximum single switching energy, a cooling time of at least 5 minutes is required.

The following table contains technical specifications of the holding brakes for operating on a SINAMICS S120/S220.

Motor	Holding torque at 120 °C (248 °F)	Dynamic braking torque at 120 °C (248 °F)	Maximum permissible (single operating energy [1])	Total operating energy (lifetime)	Opening time	Closing time	Rated current
	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	J	kJ	ms	ms	A
Spring-loaded brake, maximum play 1°							
1FS2104	3.3 (2.43)	3.3 (2.43)	270	35	110	40	0.5
Permanent magnet brake, zero-backlash							
1FS2105	8 (5.90)	5 (3.69)	570	284	90	25	0.6
1FS2106	16 (11.80)	9 (6.64)	1065	774	100	50	0.7
1FS2208	32 (23.60)	17 (12.54)	4800	2400	200	60	0.9

[1] Maximum three EMERGENCY STOP operations in sequence with a maximum of 25 % total operating energy.

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Technical specifications

SIMOTICS S-1FS2 shaft height 40



Specific technical specifications

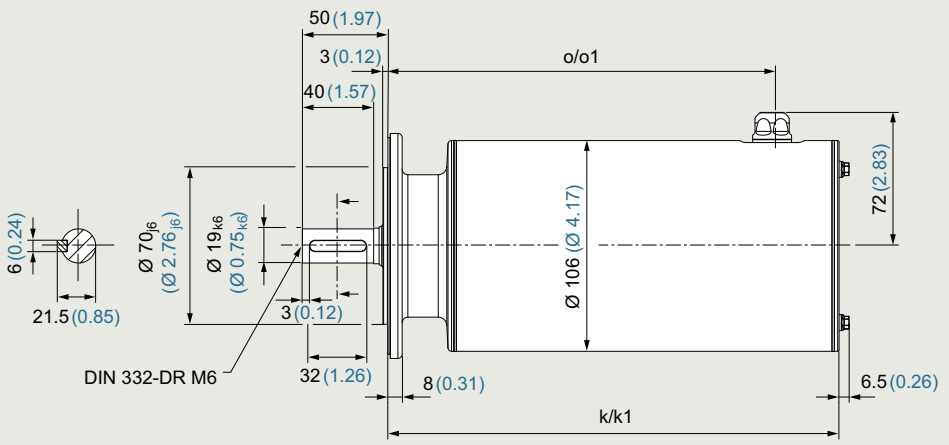
SIMOTICS S-1FS2 servomotors		
Shaft height 40		**1FS2104-6AF**
Static torque M_0	Nm (lb_f-ft)	3.1 (2.29)
Stall current I_0	A	2.75
Maximum torque M_{max}	Nm (lb_f-ft)	10 (7.38)
Maximum current I_{max}	A	10.9
Maximum speed n_{max}	r/min	7200
Rotor moment of inertia J_{Mot}	kg cm^2 (lb_f-in^2)	0.72 (0.246)
Moment of inertia (with brake) $J_{Mot\ Br}$	kg cm^2 (lb_f-in^2)	0.8 (0.273)
Weight m_{Mot}	kg (lb)	7.2 (15.88)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	8.7 (19.18)
200 ... 240 V 1 AC / 3 AC		
Rated speed n_N	r/min	1500
Rated torque M_N	Nm (lb_f-ft)	2.85 (2.10)
Rated current I_N	A	2.7
Rated power P_N	W	450
380 ... 480 V 3 AC		
Rated speed n_N	r/min	3000
Rated torque M_N	Nm (lb_f-ft)	2.55 (1.88)
Rated current I_N	A	2.4
Rated power P_N	W	800
In combination with the OCC adapter suitable for SINAMICS S120/S220 Motor Modules booksize format at 380 ... 480 V 3 AC and rated output current I_N = 3 A		

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SIMOTICS S-1FS2 shaft height 40

Technical specifications

Dimensional drawing



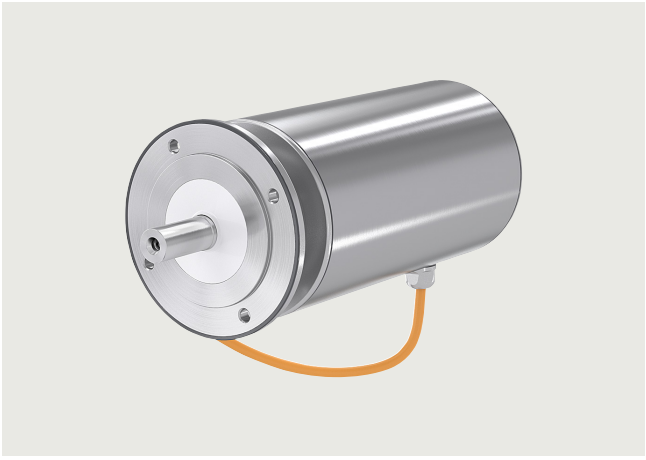
Shaft height 40	Without brake	With brake	Without brake	With brake
DIN	k	k1	o	o1
IEC	LB	LB1	–	–
1FS2104-6	215 (8.46)	259 (10.2)	183 (7.2)	226 (8.9)

All dimensions in mm (values in brackets are in inches).

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Technical specifications

SIMOTICS S-1FS2 shaft height 52



Specific technical specifications

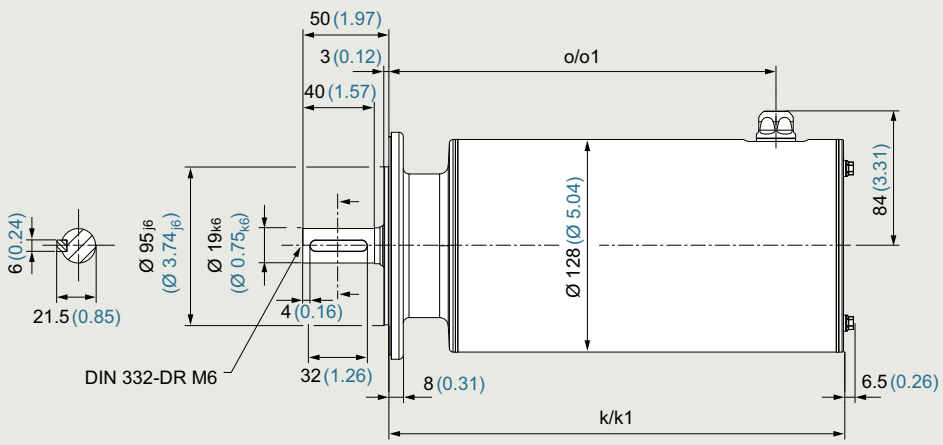
SIMOTICS S-1FS2 servomotors		
Shaft height 52		**1FS2105-6AF**
Static torque M_0	Nm (lb_f-ft)	7.6 (5.61)
Stall current I_0	A	6.2
Maximum torque M_{max}	Nm (lb_f-ft)	24 (17.70)
Maximum current I_{max}	A	24
Maximum speed n_{max}	r/min	6000
Rotor moment of inertia J_{Mot}	kg cm^2 (lb_f-in^2)	2.8 (0.957)
Moment of inertia (with brake) $J_{Mot\ Br}$	kg cm^2 (lb_f-in^2)	3.6 (1.230)
Weight m_{Mot}	kg (lb)	13.3 (29.33)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	14.6 (32.19)
200 ... 240 V 3 AC		
Rated speed n_N	r/min	1500
Rated torque M_N	Nm (lb_f-ft)	6.2 (4.57)
Rated current I_N	A	5.5
Rated power P_N	W	980
380 ... 480 V 3 AC		
Rated speed n_N	r/min	3000
Rated torque M_N	Nm (lb_f-ft)	4.1 (3.02)
Rated current I_N	A	3.7
Rated power P_N	W	1290
In combination with the OCC adapter suitable for SINAMICS S120/S220 Motor Modules booksize format at 380 ... 480 V 3 AC and rated output current I_N = 9 A		

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SIMOTICS S-1FS2 shaft height 52

Technical specifications

Dimensional drawing



Shaft height 52	Without brake	With brake	Without brake	With brake
DIN	k	k1	o	o1
IEC	LB	LB1	–	–
1FS2105-6	272 (10.71)	299 (11.77)	234 (9.21)	261 (10.28)

G_D211_EN_00553

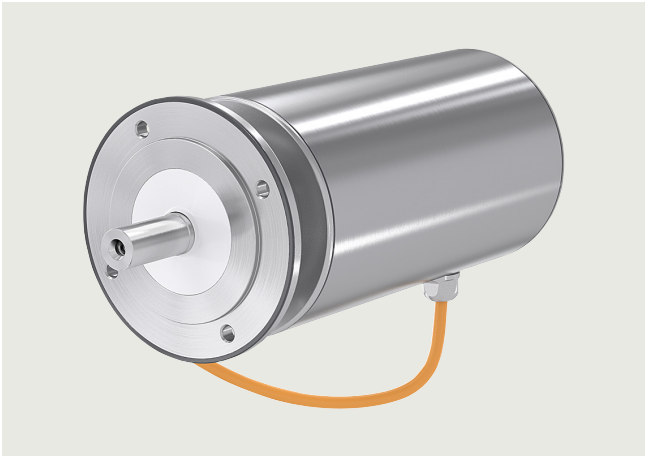
All dimensions in mm (values in brackets are in inches).

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Technical specifications

SIMOTICS S-1FS2 shaft height 63



Specific technical specifications

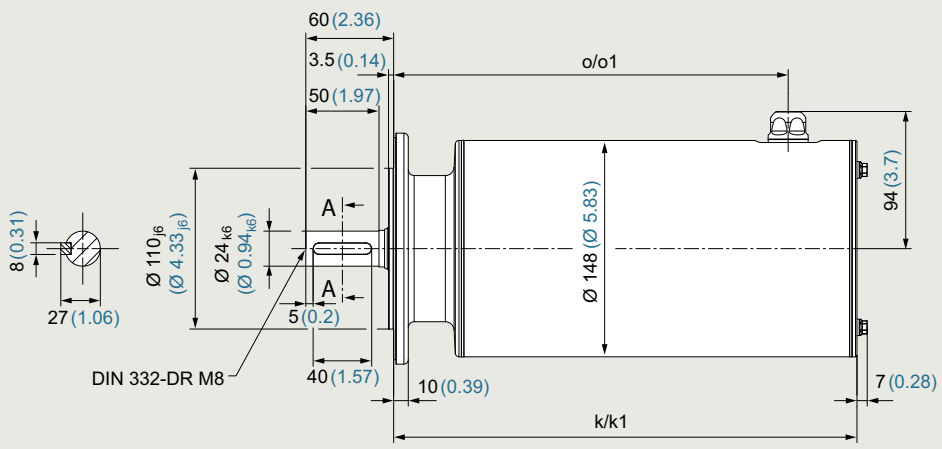
SIMOTICS S-1FS2 servomotors			
Shaft height 63		**1FS2106-6AE1**	**1FS2106-6AF0**
Static torque M_0	Nm (lb_f-ft)	14 (10.33)	14 (10.33)
Stall current I_0	A	12.4	12.4
Maximum torque M_{max}	Nm (lb_f-ft)	42 (30.98)	42 (30.98)
Maximum current I_{max}	A	44	44
Maximum speed n_{max}	r/min	6000	6000
Rotor moment of inertia J_{Mot}	kg cm^2 (lb_f-in^2)	–	9 (3.075)
Moment of inertia (with brake) $J_{Mot\ Br}$	kg cm^2 (lb_f-in^2)	11 (3.759)	–
Weight m_{Mot}	kg (lb)	–	18.6 (41.01)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	21 (46.31)	–
200 ... 240 V 3 AC			
Rated speed n_N	r/min	1250	1500
Rated torque M_N	Nm (lb_f-ft)	11.2 (8.26)	11 (8.11)
Rated current I_N	A	10	10.3
Rated power P_N	W	1470	1730
380 ... 480 V 3 AC			
Rated speed n_N	r/min	2500	3000
Rated torque M_N	Nm (lb_f-ft)	6.9 (5.09)	6.2 (4.57)
Rated current I_N	A	6.5	6
Rated power P_N	W	1810	1950
In combination with the OCC adapter suitable for SINAMICS S120/S220 Motor Modules booksize format at 380 ... 480 V 3 AC and rated output current I_N = 18 A			

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SIMOTICS S-1FS2 shaft height 63

Technical specifications

Dimensional drawing



Shaft height 63 DIN IEC	Without brake k LB	With brake k1 LB1	Without brake o –	With brake o1 –
1FS2106-6AF07	265 (10.43)	-	230 (9.06)	-
1FS2106-6AE17	-	317 (12.48)	-	282 (11.1)

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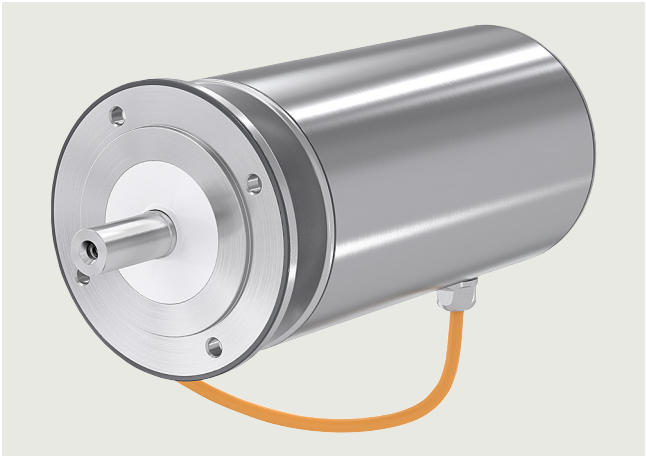
All dimensions in mm (values in brackets are in inches).

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Technical specifications

SIMOTICS S-1FS2 shaft height 80



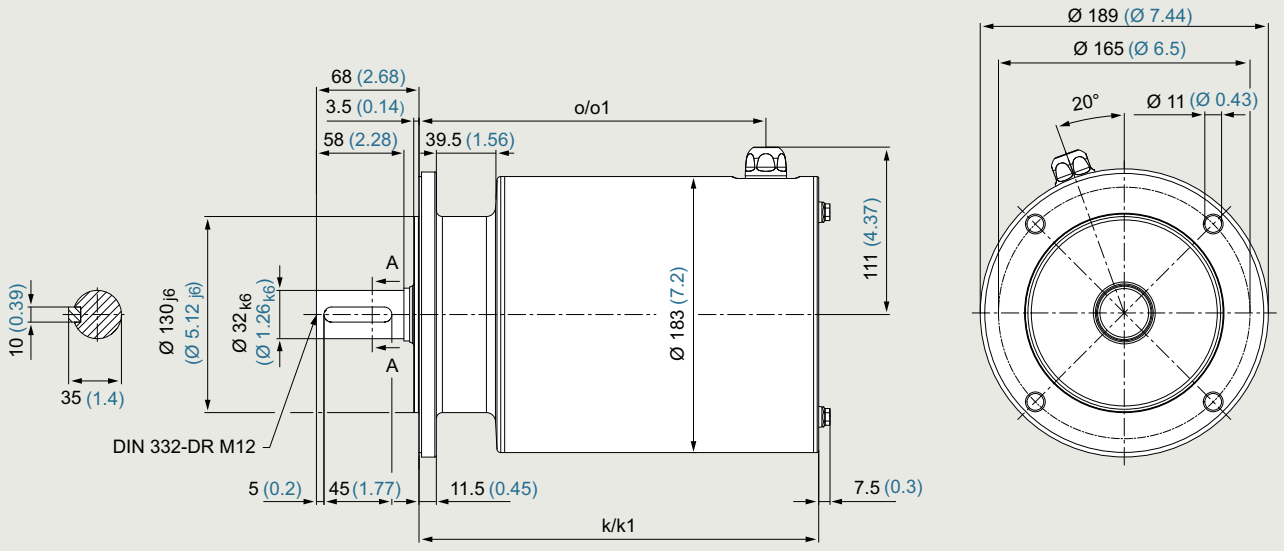
Specific technical specifications

SIMOTICS S-1FS2 servomotors		
Shaft height 80		**1FS2208-5AC**
Static torque M_0	Nm (lb_f-ft)	23.5 (17.33)
Stall current I_0	A	12.8
Maximum torque M_{max}	Nm (lb_f-ft)	80 (59.01)
Maximum current I_{max}	A	51.5
Maximum speed n_{max}	r/min	4750
Rotor moment of inertia J_{Mot}	kg cm^2 (lb_f-in^2)	49.1 (16.777)
Moment of inertia (with brake) $J_{Mot\ Br}$	kg cm^2 (lb_f-in^2)	54.7 (18.691)
Weight m_{Mot}	kg (lb)	28 (61.74)
Weight (with brake) $m_{Mot\ Br}$	kg (lb)	32 (70.56)
200 ... 240 V 3 AC		
Rated speed n_N	r/min	1000
Rated torque M_N	Nm (lb_f-ft)	19.5 (14.38)
Rated current I_N	A	11.1
Rated power P_N	W	2040
380 ... 480 V 3 AC		
Rated speed n_N	r/min	2000
Rated torque M_N	Nm (lb_f-ft)	12 (8.85)
Rated current I_N	A	7.1
Rated power P_N	W	2510
In combination with the OCC adapter suitable for SINAMICS S120/S220 Motor Modules booksize format at 380 ... 480 V 3 AC and rated output current I_N = 18 A		

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Technical specifications

Dimensional drawing



Shaft height 80 DIN IEC	Without brake k LB	With brake k1 LB1	Without brake o –	With brake o1 –
1FS2208-5AC07	265 (10.43)	-	230 (9.06)	-
1FS2208-5AC17	-	318 (12.52)	-	283 (11.14)

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All dimensions in mm (values in brackets are in inches).

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Overview

Servo planetary geared motors

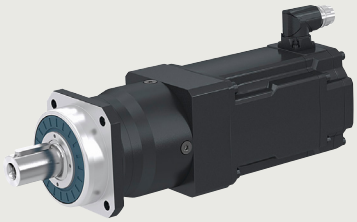
– SIMOTICS S-1FK2 and S-1FT2 with economy gearbox



• gearbox NRB



• gearbox NRK



• gearbox NLC

– SIMOTICS S-1FT2 with economy angular gearbox



• gearbox NRBW

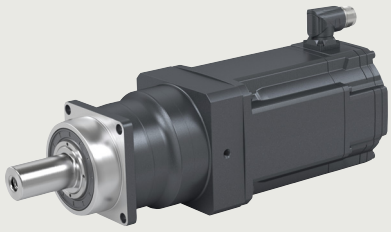


• gearbox NRKW

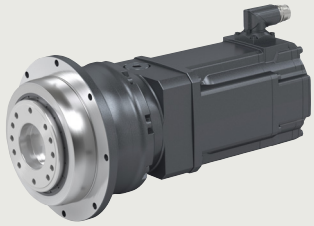


• gearbox NLCW

– SIMOTICS S-1FT2 with precision gearbox



• gearbox SP+



• gearbox TP+

G_D211_EN_00577c

SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors with the NRB, NRK, NLC economy gearboxes, the NRBW, NRKW, NLCW economy angular gearboxes, and SP+ and TP+ precision gearboxes are highly dynamic, compact and cost-effective drive units. The combinations, each composed of a servomotor with a high-performance planetary gearbox, are suitable for a wide range of applications in an industrial environment.
These planetary geared motors are specified and delivered completely as a unit. All outstanding performance data are matched to the motor-gearbox combination.

Motors

High Dynamic

Wherever small masses have to be moved with maximum dynamics and precision, the 1FK2 and 1FT2 High Dynamic servomotors with low inertia really come into their own.
The lightweight and low-friction gearboxes in conjunction with inertia-optimized clamping systems allow the highest cycle rates in the application.

Compact

If larger loads need to be moved with precision and dynamically, a motor version with higher inertia is unavoidable for controllable operations. The 1FK2 and 1FT2 Compact servomotors with medium inertia and planetary gearboxes with higher transmission ratios enable even difficult inertia conditions to be mastered in terms of the control technology.

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SIMOTICS S-1FK2 and S-1FT2

Overview

Planetary gearboxes

The three planetary gearboxes NRB(W), NRK(W) and NLC(W) can be mounted in all spatial positions without restriction and are maintenance-free thanks to their life-long lubrication.

Economy gearboxes

NRB

NRB is the lightest gearbox with the highest power density. Thanks to its low friction bearing design it is suitable for high speeds and only generates a slight amount of heat.

Application areas:
- Packaging
- Food industry
- Pharmaceutical and medical systems
- Auxiliary axes in machine tools

NRK

The NRK series gearbox is suitable for higher radial and axial forces due to the large output bearing. This gearbox is also suitable for higher speeds thanks to low internal friction.

Application areas:
- Automation and mounting technology
- Packaging
- Auxiliary axes in machine tools

NLC

Thanks to the preloaded tapered roller bearing, the NLC gearbox has a high degree of rigidity and is perfectly suited for high radial and axial loads. The IP65 cover provides protection against dust and water.

Application areas:
- Automation and mounting technology
- Packaging
- Food industry
- Printing industry
- Auxiliary axes in machine tools

Economy angular gearboxes

With a pre-built bevel gear stage, the planetary gearboxes NRB, NRK and NLC are also available as economy angular gearboxes NRBW, NRKW and NLCW.

The angled versions are suitable for confined spaces.

Due to the additional angular stage, the losses in the angular gearbox are slightly higher, and the nominal data is reduced, compared to the corresponding coaxial version.

Precision gearboxes

Precision gearboxes are helical toothed, lubricated with oil and have a further reduced torsional backlash compared to the economy gearboxes NRB(W), NRK(W) and NLC(W).

SP+

The low-backlash coaxial SP+ precision gearbox impresses with its high positioning accuracy and is suitable for highly dynamic cycle operation. Thanks to the preloaded tapered roller bearing, it is perfect for high radial and axial loads.

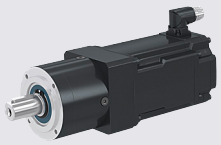
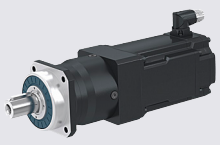
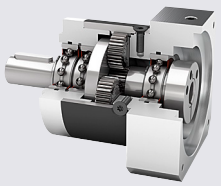
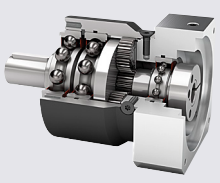
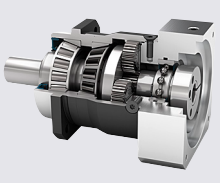
Due to the IP65 sealing, it offers protection against dust and water.

Applications:
- Automation and assembly technology
- Packaging
- Pharmaceutical and medical technology
- Food industry
- Auxiliary axes in machine tools
- Woodworking
- Plastics Machines
- Paper industry

TP+

The TP+ coaxial gearbox is characterised by a very compact design with an output flange. It offers low backlash with maximum torsional rigidity and is intended for demanding tasks with high torque and large external loads.

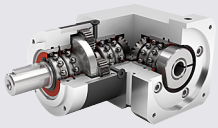
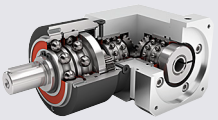
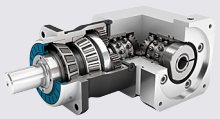
Applications:
- Main axes in machine tools
- Packaging
- Pressure
- Robotics

		Economy gearbox		
		NRB	**NRK**	**NLC**
SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors				
Transmission ratio *i*		3 ... 512	3 ... 100	3 ... 100
Gearbox stages *z*		1-, 2- and 3-stage	1- and 2-stage	1- and 2-stage
Torsional backlash φ_2	'	6 ... 22	6 ... 19	7 ... 12
Gearbox type • Economy planetary gearbox • Straight gearing • Life-long grease lubrication • Average torsional backlash		IM B14 / IM V18 / IM V19 IP64 High input speeds thanks to low-friction bearing design 	IM B14 / IM V18 / IM V19 IP64 Large ball bearing, optimized for high radial and axial forces 	IM B5 / IM V1 / IM V3 IP65 Preloaded tapered roller bearing for best rigidity at highest loads 
Geared motor data for 200 ... 240 V 1/3 AC				
Maximum torque M_{2max}	Nm (lb_f-ft)	1.5 ... 1280 (1.11 ... 944)	1.4 ... 736 (1.03 ... 543)	3 ... 416 (2.21 ... 307)
Rated torque M_{2N}	Nm (lb_f-ft)	0.2 ... 650 (0.15 ... 479)	0.1 ... 460 (0.07 ... 339)	0.14 ... 260 (0.10 ... 192)
Rated speed n_{2N}	r/min	3 ... 1000	15 ... 1000	15 ... 500

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Overview (Continued)

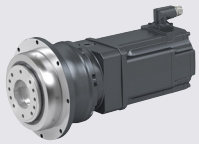
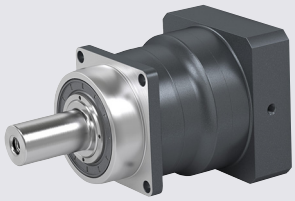
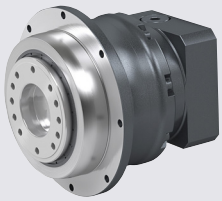
Geared motor data for 380 ... 480 V 3 AC				
Maximum torque M_{2max}	Nm (lb_f-ft)	4.9 ... 1280 (3.61 ... 944)	4.7 ... 736 (3.47 ... 376)	4.7 ... 416 (3.47 ... 307)
Rated torque M_{2N}	Nm (lb_f-ft)	0.8 ... 650 (0.59 ... 479)	0.54 ... 460 (0.40 ... 339)	0.36 ... 260 (0,27 ... 192)
Rated speed n_{2N}	r/min	3 ... 1000	20 ... 750	25 ... 500
Suitability				
Power density		+++	++	++
Bearing loading capacity		+	++	+++
Suitable for high speeds		++	++	+
Degree of protection		IP64	IP64	IP65
Options				
Plain shaft / solid shaft with feather key		✓ / ✓	✓ / ✓	✓ / ✓
Standard lubrication / food-grade lubricant		✓ / ✓	✓ / ✓	✓ / ✓

		Economy angular gearbox		
		NRBW	**NRKW**	**NLCW**
SIMOTICS S-1FT2 servo planetary geared motors				
Transmission ratio *i*		3 ... 512	3 ... 100	3 ... 100
Gearbox stages *z*		1-, 2- and 3-stage	1- and 2-stage	1- and 2-stage
Torsional backlash φ_2	'	11 ... 28	11 ... 25	11 ... 18
Gearbox type • Economy planetary gearbox • Straight gearing • Life-long grease lubrication • Average torsional backlash		IM B14 / IM V18 / IM V19 IP64 High input speeds thanks to low-friction bearing design 	IM B14 / IM V18 / IM V19 IP64 Large ball bearing, optimized for high radial and axial forces 	IM B5 / IM V1 / IM V3 IP65 Preloaded tapered roller bearing for best rigidity at highest loads 
Geared motor data for 200 ... 240 V 1/3 AC				
Maximum torque M_{2max}	Nm (lb_f-ft)	1.4 ... 416 (1.03 ... 307)	1.5 ... 312 (1.11 ... 230)	3.5 ... 416 (2.58 ... 307)
Rated torque M_{2N}	Nm (lb_f-ft)	0.1 ... 260 (0.07 ... 192)	0.11 ... 195 (0.08 ... 144)	0.12 ... 230 (0.09 ... 170)
Rated speed n_{2N}	r/min	3 ... 1000	15 ... 1000	15 ... 375
Geared motor data for 380 ... 480 V 3 AC				
Maximum torque M_{2max}	Nm (lb_f-ft)	4.6 ... 416 (3.39 ... 307)	4.35 ... 312 (3.21 ... 230)	4.6 ... 416 (3.39 ... 307)
Rated torque M_{2N}	Nm (lb_f-ft)	0.52 ... 260 (0.38 ... 192)	0.34 ... 195 (0.25 ... 144)	0.26 ... 230 (0.19 ... 170)
Rated speed n_{2N}	r/min	6 ... 1000	15 ... 750	15 ... 375
Suitability				
Power density		++	+	+
Bearing loading capacity		+	++	+++
Suitable for high speeds		+	+	+
Degree of protection		IP64	IP64	IP65
Options				
Plain shaft / solid shaft with feather key		✓ / ✓	✓ / ✓	✓ / ✓
Standard lubrication / food-grade lubricant		✓ / ✓	✓ / ✓	✓ / ✓

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SIMOTICS S-1FK2 and S-1FT2

Overview

		Precision gearbox type	
		SP+	**TP+**
SIMOTICS S-1FT2 servo planetary geared motors			
Transmission ratio *i*		3 ... 100	4 ... 100
Gearbox stages z		1- and 2-stage	1- and 2-stage
Torsional backlash φ_2	'	3 ... 6	3 ... 4
Reduced torsional backlash φ_2		1 ... 4	1 ... 2
Gearbox type • Planetary gearbox • Helical gearing • Life-long oil lubrication • Low torsional backlash		IMB5 / IMV1 / IMV3 IP65 Smooth-running gearbox with very low torsional backlash and preloaded tapered roller bearing for the best stiffness at the highest loads 	IMB5 / IMV1 / IMV3 IP65 Smooth-running gearbox with very low torsional backlash and preloaded tapered roller bearing for the best stiffness at the highest loads, flange output 
Geared motor data for 200 ... 240 V 1/3 AC			
Maximum torque M_{2max}	Nm	1,5 ... 5700	2,1 ... 5500
Rated torque M_{2N}	Nm	0,197 ... 2550	0,12 ... 2500
Rated speed n_{2N}	r/min	5 ... 750	5 ... 600
Geared motor data for 380 ... 480 V 3 AC			
Maximum torque M_{2max}	Nm	4,55 ... 5700	6,6 ... 5500
Rated torque M_{2N}	Nm	0,54 ... 2050	0,41 ... 1980
Rated speed n_{2N}	r/min	5 ... 750	5 ... 600
Suitability			
Power density		+++	++++
Bearing loading capacity		+++	++++
Suitable for high speeds		+++	+++
Degree of protection		IP65	IP65
Options			
Plain shaft / solid shaft with feather key / toothed shaft		✓ / ✓ / ✓	- / - / -
Standard lubricant/ Food-grade lubricant		✓ / ✓	✓ / ✓
Reduced torsional backlash		✓	✓

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Overview

Structure of the Article No.

Configuration in the Siemens Product Configurator
www.siemens.com/simotics-1fk2-servogearedmotors/configuration
www.siemens.com/simotics-1ft2-servogearedmotors/configuration

SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Basic motor Article No. | Planetary gearbox Order codes

1 F ■ 2 . . . - . A . ■ ■ - . ■ ■ 0 -Z ■■■+■■■+■■■+■■■

Basic servomotor		**K**	
		T	
Holding brake	Without holding brake	**0**	
	With holding brake	**1**	
	Reinforced holding brake	**2**	
Degree of protection motor	IP64	**0**	
	IP65	**1**	
Motor shaft	Assignment depends on the gearbox size		
Encoder	Absolute encoder 22-bit single-turn (AS22DQC)	**S**	
	Absolute encoder 22-bit + 12-bit multi-turn (AM22DQC)	**M**	
	Absolute encoder 26-bit single-turn (AS26DQC)	**B**	
	Absolute encoder 26-bit + 12-bit multi-turn (AM26DQC)	**C**	
Connection technology	One-cable technology for SINAMICS S210 servo converters (see Catalog D 32)	**A**	
	Two-cable technology for SINAMICS S120/S220 servo converters (see Catalog D 21.4)	**B**	

Gearbox type, gearbox size, number of gearbox stages, transmission ratio, lubrication and gearbox shaft

1. Order code – gearbox type, gearbox size and number of gearbox stages

• Gearbox type	Economy gearbox NRB or economy angular gearbox NRBW	**A**
	Economy gearbox NRK or economy angular gearbox NRKW	**B**
	Economy gearbox NLC or economy angular gearbox NLCW	**C**
	Precision gearbox SP+	**J**
	Precision gearbox TP+	**H**

• Gearbox size				
040/050/-/-/-	**1**	160/155/-/140/050	**5**	
060/070/060/060/004	**2**	-/-/-/180/110	**6**	
080/090/080/075/010	**3**	-/-/-/210/300	**7**	
120/120/120/100/025	**4**	-/-/-/240/500	**8**	

• Number of gearbox stages	Coaxial gearboxes		Angular gearboxes (only for 1FT2)	
	1-stage	**1**	 1-stage	**6**
	2-stage	**2**	2-stage	**7**
	3-stage	**3**	3-stage	**8**

2. Order code – transmission ratio *i*

1-stage				2-stage						3-stage			
3	**R03**	10	**R10**	9	**R09**	25	**R25**	50	**R50**	60	**R60**	200	**R02**
4	**R04**			12	**R12**	28	**R28**	64	**R64**	80	**R80**	256	**R52**
5	**R05**			15	**R15**	32	**R32**	70	**R70**	100	**R01**	320	**R23**
7	**R07**			16	**R16**	35	**R35**	100	**R00**	120	**R21**	512	**R51**
8	**R08**			20	**R20**	40	**R40**			160	**R61**		

3. Order code – gearbox lubrication, shaft version and torsional backlash

Lubrication	Shaft end at gearbox		Torsional backlash	
Standard lubrication	+ Plain solid shaft	**M00**	+ reduced-backlash version	**M05**
	+ Solid shaft with feather key	**M01**		**M06**
	+ Splined shaft	**M02**		**M07**
Food-safe lubricant	+ Plain solid shaft	**M10**		**M15**
	+ Solid shaft with feather key	**M11**		**M16**
	+ Splined shaft	**M12**		**M17**

4. Order code (optional) – different orientation of the output for angular gearboxes (only for 1FT2)

 Standard orientation	–	 Connector on the output side	**Q91**	 Connector offset through 180° with respect to the standard	**Q92**	 Connector opposite the output	**Q93**

Notes:
- The geared motor can only be delivered as a unit – motor plus gearbox – (no individual gearboxes).
- Not all combinations are possible – See selection and ordering data tables.

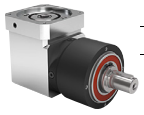
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SIMOTICS S-1FK2 and S-1FT2

Overview

Motor-gearbox combinations (overview for guidance purposes - for available combinations refer to selection and ordering data)

Economy gearbox	Gearbox size	Motor 1FK2102 1FT2102	1FK2 . 03 1FT2 . 03	1FK2 . 04 1FT2 . 04	1FK2 . 05 1FT2 . 05	1FK2 . 06 1FT2 . 06	1FK2208 1FT2 . 08	1FK2210 1FT2210	Order code Number of gearbox stages 1-stage	2-stage	3-stage
		For servo converters connected to 200 ... 240 V	200 ... 240 V and 380 ... 480 V								
NRB 	040	✓	✓	–	–	–	–	–	**A11**	**A12**	**A13**
	060	✓	✓	✓	✓	–	–	–	**A21**	**A22**	**A23**
	080	–	✓	✓	✓	✓	–	–	**A31**	**A32**	**A33**
	120	–	✓	✓	✓	✓	✓	–	**A41**	**A42**	**A43**
	160	–	–	–	✓	✓	✓	–	**A51**	**A52**	**A53**
NRK 	050	✓	✓	–	–	–	–	–	**B11**	**B12**	–
	070	✓	✓	✓	✓	–	–	–	**B21**	**B22**	–
	090	–	✓	✓	✓	✓	–	–	**B31**	**B32**	–
	120	–	✓	✓	✓	✓	✓	–	**B41**	**B42**	–
	155	–	–	–	✓	✓	✓	✓	**B51**	**B52**	–
NLC 	060	✓	✓	✓	✓	–	–	–	**C21**	**C22**	–
	080	–	✓	✓	✓	✓	–	–	**C31**	**C32**	–
	120	–	✓	✓	✓	✓	✓	–	**C41**	**C42**	–

Economy angular gearbox	Gearbox size	Motor 1FT2102	1FT2 . 03	1FT2 . 04	1FT2 . 05	1FT2 . 06	1FT2208	1FT2210	Order code Number of gearbox stages 1-stage	2-stage	3-stage
		For servo converters connected to 200 ... 240 V	200 ... 240 V and 380 ... 480 V								
NRBW 	040	✓	–	–	–	–	–	–	**A16**	**A17**	**A18**
	060	✓	✓	✓	–	–	–	–	**A26**	**A27**	**A28**
	080	–	✓	✓	✓	–	–	–	**A36**	**A37**	**A38**
	120	–	✓	✓	✓	✓	–	–	**A46**	**A47**	**A48**
NRKW 	050	✓	–	–	–	–	–	–	**B16**	**B17**	–
	070	✓	✓	✓	–	–	–	–	**B26**	**B27**	–
	090	–	✓	✓	✓	–	–	–	**B36**	**B37**	–
	120	–	✓	✓	✓	✓	–	–	**B46**	**B47**	–
NLCW 	060	✓	✓	✓	–	–	–	–	**C26**	**C27**	–
	080	–	✓	✓	✓	–	–	–	**C36**	**C37**	–
	120	–	✓	✓	✓	✓	–	–	**C46**	**C47**	–

Precision gearbox	Gearbox size	Motor 1FT2102	1FT2 . 03	1FT2 . 04	1FT2 . 05	1FT2 . 06	1FT2 . 08	1FT2210	Order code Number of gearbox stages 1-stage	2-stage
		For servo converters connected to 200 ... 240 V	200 ... 240 V and 380 ... 480 V							
SP+ 	060	✓	✓	✓	–	–	–	–	**J21**	**J22**
	075	✓	✓	✓	✓	–	–	–	**J31**	**J32**
	100	–	✓	✓	✓	✓	–	–	**J41**	**J42**
	140	–	–	✓	✓	✓	✓	–	**J51**	**J52**
	180	–	–	✓	✓	✓	✓	✓	**J61**	**J62**
	210	–	–	–	–	✓	✓	✓	**J71**	**J72**
	240	–	–	–	–	✓	✓	✓	**J81**	**J82**
TP+ 	004	✓	✓	✓	–	–	–	–	**H21**	**H22**
	010	✓	✓	✓	✓	–	–	–	**H31**	**H32**
	025	–	✓	✓	✓	✓	–	–	**H41**	**H42**
	050	–	–	✓	✓	✓	✓	–	**H51**	**H52**
	110	–	–	✓	✓	✓	✓	✓	**H61**	**H62**
	300	–	–	–	–	✓	✓	✓	**H71**	**H72**
	500	–	–	–	–	✓	✓	✓	**H81**	**H82**

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Overview

Gearbox ratio

Number of gearbox stages	Transmission ratio *i*	Order code
1-stage	3	**R03**
	4	**R04**
	5	**R05**
	7	**R07**
	8	**R08**
	10	**R10**
2-stage	9	**R09**
	12	**R12**
	15	**R15**
	16	**R16**
	20	**R20**
	25	**R25**
	28	**R28**
	32	**R32**
	35	**R35**
	40	**R40**
	50	**R50**
	64	**R64**
	100	**R00**
3-stage	60	**R60**
	70	**R70**
	80	**R80**
	100	**R01**
	120	**R21**
	160	**R61**
	200	**R02**
	256	**R52**
	320	**R23**
	512	**R51**

Option for shaft

Shaft end as "plain shaft"

For dynamic loads, particularly with reversals in operation, it is preferable to select a friction-locked and zero-backlash connection with a plain gearbox shaft.

Shaft extension as "shaft with feather key"

Alternatively, a positively driven connection with feather key is also suitable for pulsating loads without reversals. The feather key connection must be implemented according to DIN6885-1/DIN 6880 (keyway P9, feather key h9). If you would still like to configure a feather key connection for changing application loads, then limit the application torque as a function of the expected load change according to the following tables:

Gearbox	**Max. application torque M_2 in feather key design in Nm**	
	up to 10 million load changes	up to 100 million load changes
NRB040, NRBW040	9	7
NRB060, NRBW060	31	25
NRB080, NRBW080	68	54
NRB120, NRBW120	132	105
NRB160	401	319
NRK050, NRKW050	12	9
NRK070, NRKW070	No restriction	29
NRK090, NRKW090	84	67
NRK120, NRKW120	No restriction	190
NRK155	389	309

Gearbox	**Max. application torque M_2 in feather key design in Nm**	
	up to 10 million load changes	up to 100 million load changes
NLC060, NLCW060	37	29
NLC080, NLCW080	76	60
NLC120, NLCW120	239	190
SP060S	36	28
SP075S	86	68
SP100S	279	220
SP140S	450	355
SP180S	850	680
SP210S	1200	960
SP240S	2400	1900

Shaft end as splined shaft according to DIN 5480 for SP+ gearboxes

For dynamic applications with fluctuating loads, which require a precise positively driven connection, a connection that can be axially shifted or a connection that can be easily released, then an SP+ gearbox as output option offers a splined shaft with involute flanks and a reference diameter according to DIN 5480. With this solution, it is not necessary to reduce the output torque depending on the load change.

Option for backlash-reduced design for precision gearboxes

SP+ and TP+ gearboxes are optionally available in a backlash-reduced version.

Option for lubrication

Planetary gearboxes can be optionally ordered with a food-grade lubricant.
This lubricant was developed for the food and pharmaceutical industries for unpredictable contact with products and packaging in the food, cosmetics, pharmaceutical and animal feed industries. NSF H1 registration ensures that the lubricant is compliant with FDA 21 CFR §178.3570.

For the planetary gearboxes NRBW, NRKW, NLCW, SP+ and TP+, the choice of the food-grade lubricant leads to a reduction in the rating data from the following data tables.In this case, the exact performance and rating data can be found in the data sheet from the online configurator:
www.siemens.com/spc

Lubrication	Shaft design on the gearbox	Order code	Torsional backlash	Order code
Standard lubrication	+ Smooth solid shaft	**M00**	+ reduced-backlash version	**M05**
	+ Solid shaft with feather key	**M01**		**M06**
	+ Splined shaft	**M02**		**M07**
Food-grade lubricant	+ Smooth solid shaft	**M10**		**M15**
	+ Solid shaft with feather key	**M11**		**M16**
	+ Splined shaft	**M12**		**M17**

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Overview

Option for the orientation of the output for angular gearboxes

For angular geared motors, the gearbox output in relation to the connector points to the right by default (viewing the motor from the front). A different assembly can optionally be produced in accordance with the following table.

Note: The geared motor can be mounted in any spatial position.

Orientation of the gearbox		Order code
	Gearbox output to the right, standard orientation	–
	Gearbox output upwards	**Q91**
	Gearbox output left	**Q92**
	Gearbox output to the bottom	**Q93**

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Technical specifications

General technical specifications for planetary gearboxes NRB(W), NRK(W), NLC(W), SP+ and TP+

Largest average input speed $n_{1av,G}$ and maximum input speed $n_{1max,G}$

$n_{1av,G}$ – largest average input speed:
In each time window of 15 minutes (for NRB(W), NRK(W) and NLC(W), or 10 minutes (for SP+ and TP+), the average input speed must be below $n_{1av,G}$

$n_{1max,G}$ – maximum input speed:
The maximum input speed $n_{1max,G}$ must never be exceeded.

The maximum speeds of the mounted motor can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Economy gearbox type	Motor	Largest average input speed $n_{1av,G}$ in r/min	Maximum input speed $n_{1max,G}$ in r/min
NRB040, NRK050	1FK2102, 1FT2102	5000	18000
	1FK2.03, 1FT2.03	4500	
NRB060, NRK070, NLC060	1FK2102, 1FT2102 1FK2.03, 1FT2.03 1FK2.04, 1FT2.04	4500	13000
	1FK2.05, 1FT2.05	4000	
NRB080, NRK090, NLC080	1FK2.03, 1FT2.03 1FK2.04, 1FT2.04 1FK2.05, 1FT2.05	4000	7000
	1FK2.06, 1FT2.06	3500	
NRB120, NRK120, NLC120	1FK2.03, 1FT2.03 1FK2.04, 1FT2.04 1FK2.05, 1FT2.05 1FK2.06, 1FT2.06	3500	6500
	1FK2208, 1FT2.08 1FK2210, 1FT2210	3000	
NRB160, NRK155	1FK2.05, 1FT2.05 1FK2.06, 1FT2.06 1FK2208, 1FT2.08 1FK2210, 1FT2210	3000	5500

Economy angular gearbox type	Motor	Largest average input speed $n_{1av,G}$ in r/min	Maximum input speed $n_{1max,G}$ in r/min
NRBW040, NRKW050	1FT2102	5000	18000
	1FT2.03	4500	
NRBW060, NRKW070, NLCW060	1FT2102 1FT2.03 1FT2.04	4500	13000
	1FT2.05	4000	
NRBW080, NRKW090, NLCW080	1FT2.03 1FT2.04 1FT2.05	4000	7000
	1FT2.06	3500	
NRBW120, NRKW120, NLCW120	1FT2.03 1FT2.04 1FT2.05 1FT2.06	3500	6500
	1FT2208 1FT2210	3000	

Precision gearbox type SP+	Number of gearbox stages	Transmission ratio i	Largest average input speed $n_{1av,G}$ in r/min	Maximum input speed $n_{1max,G}$ in r/min
SP060	1-stage	3; 4; 5	3300	7500
		7; 10	4000	
	2-stage	16; 20; 25; 28; 35; 40	4400	8500
		50	4800	
		70; 100	5500	
SP075	1-stage	3; 4; 5	2900	7500
		7; 10	3100	
	2-stage	16; 20; 25; 28; 35; 40	3500	8500
		50	3800	
		70; 100	4500	

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General technical specifications for planetary gearboxes NRB(W), NRK(W), NLC(W), SP+ and TP+

Precision gearbox type SP+	Number of gear-box stages	Transmission ratio *i*	Largest average input speed $n_{1av,\,G}$ in r/min	Maximum input speed $n_{1max,\,G}$ in r/min
SP100	1-stage	3; 4; 5	2500	5500
		7; 10	2800	
	2-stage	16; 20; 25; 28; 35; 40	3100	6500
		50	3500	
		70; 100	4200	
SP140	1-stage	3; 4; 5	2100	5000
		7; 10	2600	
	2-stage	16; 20; 25; 28; 35; 40	2900	6000
		50; 70	3200	
		100	3900	
SP180	1-stage	3; 4; 5	1500	4500
		7; 10	2300	
	2-stage	16; 20; 25; 28; 35; 40	2700	5000
		50	2900	
		70	3200	
		100	3400	
SP210	1-stage	4	1200	3000
		5	1500	
		7	1700	
		10	2000	
	2-stage	16; 20; 25; 28; 35; 40	2500	4500
		70; 100	3000	
SP240	1-stage	4	1000	3000
		5	1200	
		7	1500	
		10	1700	
	2-stage	16	2300	4500
		16; 20; 25; 28; 35; 40	2500	
		70; 100	2800	

Precision gearbox type TP+	Number of gear-box stages	Transmission ratio *i*	Largest average input speed $n_{1av,\,G}$ in r/min	Maximum input speed $n_{1max,\,G}$ in r/min
TP004	1-stage	3; 4; 5	3300	7500
		7; 10	4000	
	2-stage	16; 20; 25; 28; 35; 40	4400	
		50	4800	
		70; 100	5500	
TP010	1-stage	4	2600	
		5	2900	
		7; 10	3100	
	2-stage	16; 20; 25; 28; 35; 40	3500	
		50	3800	
		70; 100	4500	
TP025	1-stage	4	2300	5500
		5; 7; 10	2500	
	2-stage	16; 20; 25; 28; 35; 40	2800	7500
		50	3100	
		70	3500	
		100	4200	

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General technical specifications for planetary gearboxes NRB(W), NRK(W), NLC(W), SP+ and TP+

Precision gearbox type TP+	Number of gearbox stages	Transmission ratio *i*	Largest average input speed $n_{1av,\,G}$ in r/min	Maximum input speed $n_{1max,\,G}$ in r/min
TP050	1-stage	4	1900	5000
		5	2000	
		7; 10	2500	
	2-stage	16; 20; 25; 28; 35; 40	2900	6250
		50; 70	3200	
		100	3900	
TP110	1-stage	4	1400	4500
		5	1500	
		7; 10	2000	
	2-stage	16; 20; 25; 28; 35; 40	2500	5625
		50	2900	
		70	3200	
		100	3400	
TP300	1-stage	5	1000	3000
		7	1400	
		10	1700	
	2-stage	20; 25; 28; 35	2000	4375
		50	2300	
		70	2400	
		100	2500	
TP500	1-stage	5	900	3000
		7	1300	
		10	1500	
	2-stage	20; 25; 28; 35	1500	4375
		50	2000	
		70	2100	
		100	2200	

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Economy gearbox type NRB

Technical specifications

Technical specifications for NRB economy gearbox

$M_{2N,G}$ – Rated torque for gearbox components

An endurance strength calculation becomes necessary if this torque is exceeded (see Configuration Manual).
For the feather key version, the gearbox nominal torque is only permissible as a pulsating load or a reduction must be carried out depending on the number of load changes (see Components and Options).

Transmission ratio *i*	$M_{2N,G}$ – Rated torque for gearbox components in Nm				
	Gearbox				
	NRB040	NRB060	NRB080	NRB120	NRB160
1-stage					
3	11	28	85	115	400
4	15	38	115	155	450
5	14	40	110	195	450
7	8.5	25	65	135	–
8	6	18	50	120	450
10	5	15	38	95	–
2-stage					
9	16.5	44	130	210	–
12	20	44	120	260	800
15	18	44	110	230	700
16	20	44	120	260	800
20	20	44	120	260	800
25	18	40	110	230	700
32	20	44	120	260	800
40	18	40	110	230	700
64	7.5	18	50	120	450
3-stage					
60	20	44	110	260	–
80	20	44	120	260	–
100	20	44	120	260	–
120	18	44	110	230	–
160	20	44	120	260	–
200	18	40	110	230	–
256	20	44	120	260	–
320	18	40	110	230	–
512	7.5	18	50	120	–

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Technical specifications

$M_{2max,G}$ – Maximum output torque of the gearbox components

This torque must not be exceeded during operation. It is permissible for a maximum of 30000 revolutions of the output shaft. An endurance strength configuration of the gearbox becomes necessary, if the output torques up to $M_{2max,G}$ are used (see Configuration Manual).

Transmission ratio *i*	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm				
	Gearbox				
	NRB040	NRB060	NRB080	NRB120	NRB160
1-stage					
3	17.5	45	136	184	640
4	24	61	184	248	720
5	22	64	176	312	720
7	13.5	40	104	216	–
8	10	29	80	192	720
10	8	24	61	152	–
2-stage					
9	26	70	208	336	–
12	32	70	192	416	1280
15	29	70	176	368	1120
16	32	70	192	416	1280
20	32	70	192	416	1280
25	29	64	176	368	1120
32	32	70	192	416	1280
40	29	64	176	368	1120
64	12	29	80	192	720
3-stage					
60	32	70	176	416	–
80	32	70	192	416	–
100	32	70	192	416	–
120	29	70	176	368	–
160	32	70	192	416	–
200	29	64	176	368	–
256	32	70	192	416	–
320	29	64	176	368	–
512	12	29	80	192	–

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Economy gearbox type NRB

Technical specifications

$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components

The Emergency Off torque can be tolerated a maximum of 1000 times within the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether the torques, caused by very rare operating faults, can damage the gearbox.

Transmission ratio *i*	$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components in Nm Gearbox				
	NRB040	NRB060	NRB080	NRB120	NRB160
1-stage					
3	22.5	66	180	390	800
4	30	88	240	520	900
5	36	80	220	500	900
7	26	80	178	340	–
8	27	80	190	380	900
10	27	80	200	480	–
2-stage					
9	33	88	260	500	–
12	40	88	240	520	1600
15	36	88	220	500	1400
16	40	88	240	520	1600
20	40	88	240	520	1600
25	36	80	220	500	1400
32	40	88	240	520	1600
40	36	80	220	500	1400
64	27	80	190	380	900
3-stage					
60	40	88	220	520	–
80	40	88	240	520	–
100	40	88	240	520	–
120	36	88	220	500	–
160	40	88	240	520	–
200	36	80	220	500	–
256	40	88	240	520	–
320	36	80	220	500	–
512	27	80	190	380	–

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Technical specifications

η_G – Efficiency of the gearbox components under full load

The exact values for the efficiency are, to some extent, dependent on the frame size of the mounted motor and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.
In the partial load range, especially when the gearbox is cold, the efficiency of the gearbox is always lower than at operating speed.
The gear losses are already taken into account in the characteristic curves and in the following characteristic data of the geared motor or its components: $M_{2,0}$, $M_{2,max}$, $M_{0,M}$, $M_{max,M}$.
A reduction of this characteristic curve and the characteristics on efficiency is not necessary.

Transmission ratio *i*	**η_G – Efficiency of the gearbox components under full load in %**				
	Gearbox				
	NRB040	**NRB060**	**NRB080**	**NRB120**	**NRB160**
1-stage					
3	98	98	98	98	98
4	98	98	98	98	98
5	97 ... 98	98	98	98	98
7	96 ... 97	96 ... 97	97	97	–
8	94 ... 96	95 ... 97	96 ... 97	97	97
10	92 ... 95	94 ... 96	94 ... 96	97	–
2-stage					
9	96 ... 97	96 ... 97	96 ... 97	97	–
12	95 ... 96	95 ... 96	96 ... 97	96	96
15	95 ... 96	95 ... 96	95 ... 96	96	96
16	95 ... 96	95 ... 96	95 ... 96	96	96
20	94 ... 96	94 ... 96	95 ... 96	96	96
25	93 ... 95	93 ... 95	94 ... 95	95	95
32	92 ... 95	92 ... 95	93 ... 95	95	95
40	91 ... 94	91 ... 94	92 ... 94	94	94
64	76 ... 86	78 ... 87	81 ... 89	89	90
3-stage					
60	88 ... 92	88 ... 92	88 ... 92	92	–
80	85 ... 90	86 ... 91	87 ... 91	91	–
100	83 ... 89	83 ... 89	85 ... 90	90	–
120	79 ... 87	81 ... 88	82 ... 89	88	–
160	77 ... 86	77 ... 86	80 ... 88	87	–
200	71 ... 82	72 ... 83	75 ... 85	84	–
256	69 ... 81	69 ... 81	73 ... 84	83	–
320	62 ... 76	63 ... 77	67 ... 80	79	–
512	31 ... 48	34 ... 51	38 ... 57	58	–

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Economy gearbox type NRB

Technical specifications

C_{T2} – Torsional rigidity of the gearbox (related to the output)

The exact values for the torsional rigidity are dependent on the motor-gearbox combination and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Transmission ratio *i*	C_{T2} – Torsional rigidity of the gearbox in Nm/ ' Gearbox				
	NRB040	NRB060	NRB080	NRB120	NRB160
1-stage					
3	0.65 ... 0.75	2.2 ... 2.6	7.2 ... 7.9	17.5 ... 18.5	57.5 ... 59.5
4	0.85 ... 0.95	2.4 ... 2.8	9.2 ... 10.1	19 ... 20.5	65 ... 68
5	0.9 ... 0.95	2.5 ... 2.8	9.4 ... 10.2	19.5 ... 21	66 ... 69
7	0.8 ... 0.85	2.3 ... 2.5	8.1 ... 8.7	17.5 ... 18.5	–
8	0.8 ... 0.85	2.2 ... 2.5	8 ... 8.4	17 ... 18	60 ... 62
10	0.75	2 ... 2.2	7.5 ... 7.9	15.5 ... 16.4	–
2-stage					
9	0.75 ... 0.8	2.4 ... 2.7	7.9 ... 8.4	19 ... 20	–
12	0.9 ... 1	2.5 ... 2.8	9.6 ... 10.3	20.5 ... 22	70 ... 73
15	0.9 ... 1	2.4 ... 2.7	9.5 ... 10.2	20 ... 21.5	69 ... 73
16	0.95 ... 1	2.5 ... 2.8	9.8 ... 10.5	20.5 ... 22	72 ... 75
20	0.95 ... 1	2.5 ... 2.8	9.8 ... 10.4	20.5 ... 22	72 ... 75
25	0.95 ... 1	2.5 ... 2.8	9.7 ... 10.3	20 ... 21.5	70 ... 74
32	0.95 ... 1	2.5 ... 2.8	9.7 ... 10.3	20.5 ... 22	71 ... 75
40	0.95 ... 1	2.5 ... 2.8	9.6 ... 10.2	20 ... 21.5	70 ... 73
64	0.8 ... 0.85	2.3 ... 2.5	7.9 ... 8.3	17.5 ... 18.5	61 ... 63
3-stage					
60	0.95 ... 1	2.5 ... 2.8	9.7 ... 10.3	20.5 ... 22	–
80	0.95 ... 1	2.5 ... 2.8	9.8 ... 10.5	20.5 ... 22	–
100	0.95 ... 1	2.5 ... 2.8	9.8 ... 10.4	20.5 ... 22	–
120	0.95 ... 1	2.4 ... 2.7	9.6 ... 10.2	20 ... 21.5	–
160	0.95 ... 1	2.5 ... 2.8	9.8 ... 10.4	20.5 ... 22	–
200	0.95 ... 1	2.5 ... 2.8	9.7 ... 10.3	20 ... 21.5	–
256	0.95 ... 1	2.5 ... 2.8	9.7 ... 10.3	20.5 ... 22	–
320	0.95 ... 1	2.5 ... 2.8	9.6 ... 10.2	20 ... 21.5	–
512	0.8 ... 0.85	2.3 ... 2.5	7.9 ... 8.3	17.5 ... 18.5	–

φ_2 – Torsional backlash of the gearbox on the gearbox output

Gearbox stages *z*	φ_2 – Torsional backlash of the gearbox on the gearbox output in ' Gearbox				
	NRB040	NRB060	NRB080	NRB120	NRB160
1-stage	15	10	7	7	6
2-stage	19	12	9	9	10
3-stage	22	15	11	11	–

Permissible shaft loading capacity

The limit values shown for the bearing load refer to equivalent forces to be determined mathematically, whose effect is equivalent to the forces occurring in the load profile.
They only apply to radial and axial loads. Axial forces up to maximum $F_A = 0.24 \times F_R$ are permissible in case of superimposition. They apply to the output speed of 100 r/min and in case of radial force for a force application point in the center of the shaft or for centrally applied axial force. For other speeds or force application points, the permissible radial forces must be obtained from the radial force diagrams of the Configuration Manual.

	Permissible shaft loading capacity, radial and axial forces in N Gearbox				
	NRB040	NRB060	NRB080	NRB120	NRB160
Average radial force $F_{R\,eq}$					
• for L_{10h} = 20000 h	200	400	750	1750	5000
• for L_{10h} = 30000 h	160	340	650	1500	4200
Maximum radial force $F_{R\,max}$	200	700	1250	2000	5000
Average axial force $F_{A\,eq}$					
• for L_{10h} = 20000 h	200	500	1000	2500	7000
• for L_{10h} = 30000 h	160	450	900	2100	6000
Maximum axial force $F_{A\,max}$	240	800	1600	3800	11000

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Technical specifications

m_G – Weight of the gearbox components

The weight of the assigned motors and the total weight of the geared motors are in the data sheet resulting from the configuration of the motor or the geared motor in the Siemens Product Configurator.

Transmission ratio *i*	m_G – Weight of the gearbox components in kg								
	Gearbox								
	NRB040		**NRB060**		**NRB080**		**NRB120**		**NRB160**
	Motor								
	1FK2102 1FT2102	**1FK2□03 1FT2□03**	**1FK2102 1FT2102** **1FK2□03 1FT2□03**	**1FK2□04 1FT2□04** **1FK2□05 1FT2□05**	**1FK2□03 1FT2□03** **1FK2□04 1FT2□04** **1FK2□05 1FT2□05**	**1FK2□06 1FT2□06**	**1FK2□03 1FT2□03** **1FK2□04 1FT2□04** **1FK2□05 1FT2□05** **1FK2□06 1FT2□06**	**1FK2208 1FT2□08**	**1FK2□05 1FT2□05** **1FK2□06 1FT2□06** **1FK2208 1FT2□08**
1-stage									
3	0.34	0.60	0.87	1.7	2.1	3.2	5.7	7.4	17
4	0.35	0.60	0.88	1.4	2.1	3.2	5.7	7.8	17
5	0.35	0.60	0.89	1.4	2.2	3.2	5.8	7.8	17
7	0.35	0.60	0.88	1.4	2.1	3.2	5.7	7.8	–
8	0.35	0.68	0.88	1.4	2.1	3.2	5.7	7.0	17
10	0.35	0.61	0.89	1.4	2.2	3.2	5.7	7.8	–
2-stage									
9	0.43	0.69	1.1	1.9	2.6	3.7	7.4	9.2	–
12	0.43	0.69	1.1	1.9	2.6	3.7	7.4	9.2	23
15	0.43	0.69	1.1	1.6	2.6	3.7	7.5	9.3	23
16	0.44	0.69	1.1	1.6	2.6	3.7	7.5	9.5	23
20	0.44	0.69	1.1	1.6	2.6	3.7	7.5	9.6	23
25	0.44	0.69	1.1	1.6	2.7	3.7	7.5	9.6	23
32	0.44	0.77	1.1	1.6	2.7	3.7	7.5	8.9	23
40	0.44	0.77	1.1	1.6	2.7	3.7	7.6	8.9	23
64	0.44	0.78	1.1	1.6	2.7	3.7	7.6	8.9	23
3-stage									
60	0.52	0.78	1.3	1.8	3.1	4.2	9.2	11	–
80	0.53	0.78	1.3	1.8	3.1	4.2	9.2	11	–
100	0.53	0.78	1.3	1.8	3.1	4.2	9.3	11	–
120	0.53	0.78	1.3	1.8	3.2	4.2	9.3	11	–
160	0.53	0.86	1.3	1.8	3.1	4.2	9.3	11	–
200	0.53	0.86	1.3	1.8	3.2	4.2	9.4	11	–
256	0.54	0.87	1.3	1.8	3.2	4.2	9.4	11	–
320	0.53	0.87	1.3	1.8	3.2	4.3	9.4	11	–
512	0.54	0.87	1.3	1.8	3.2	4.3	9.4	11	–

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Economy gearbox type NRK

Technical specifications

Technical specifications for NRK economy gearbox

$M_{2N,G}$ – Rated torque for gearbox components

An endurance strength calculation becomes necessary if this torque is exceeded (see Configuration Manual).
For the feather key version, the gearbox nominal torque is only permissible as a pulsating load or a reduction must be carried out depending on the number of load changes (see Components and Options).

Transmission ratio *i*	$M_{2N,G}$ – Rated torque for gearbox components in Nm Gearbox				
	NRK050	NRK070	NRK090	NRK120	NRK155
1-stage					
3	11	28	85	115	–
4	15	33	90	155	460
5	13	30	82	172	445
7	8.5	25	65	135	–
8	6	18	50	120	–
10	5	15	38	95	210
2-stage					
9	12	33	97	157	–
12	15	33	90	195	–
15	13	33	82	172	–
16	15	33	90	195	460
20	15	33	90	195	460
25	13	30	82	172	445
32	15	33	90	195	–
40	13	30	82	172	460
50	–	–	–	–	445
64	7.5	18	50	120	–
100	5	15	38	95	210

$M_{2max,G}$ – Maximum output torque of the gearbox components

This torque must not be exceeded during operation. It is permissible for a maximum of 30000 revolutions of the output shaft.
An endurance strength configuration of the gearbox becomes necessary, if the output torques up to $M_{2max,G}$ are used (see Configuration Manual).

Transmission ratio *i*	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm Gearbox				
	NRK050	NRK070	NRK090	NRK120	NRK155
1-stage					
3	17.5	45	136	184	–
4	24	53	144	248	736
5	21	48	131	275	712
7	13.5	40	104	216	–
8	9.5	29	80	192	–
10	8	24	61	152	336
2-stage					
9	19	53	155	251	–
12	24	53	144	312	–
15	21	53	131	275	–
16	24	53	144	312	736
20	24	53	144	312	736
25	21	48	131	275	712
32	24	53	144	312	–
40	21	48	131	275	736
50	–	–	–	–	712
64	12	29	80	192	–
100	8	24	61	152	336

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Technical specifications

$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components

The Emergency Off torque can be tolerated a maximum of 1000 times within the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether the torques, caused by very rare operating faults, can damage the gearbox.

Transmission ratio *i*	$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components in Nm Gearbox				
	NRK050	NRK070	NRK090	NRK120	NRK155
1-stage					
3	22.5	66	180	390	–
4	30	88	240	520	920
5	36	80	220	500	890
7	26	80	178	340	–
8	27	80	190	380	–
10	27	80	200	480	420
2-stage					
9	33	88	260	500	–
12	40	88	240	520	–
15	36	88	220	500	–
16	40	88	240	520	920
20	40	88	240	520	920
25	36	80	220	500	890
32	40	88	240	520	–
40	36	80	220	500	920
50	–	–	–	–	890
64	27	80	190	380	–
100	27	80	200	480	420

η_G – Efficiency of the gearbox components under full load

The exact values for the efficiency are, to some extent, dependent on the frame size of the mounted motor and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.
In the partial load range, especially when the gearbox is cold, the efficiency of the gearbox is always lower than at operating speed.
The gear losses are already taken into account in the characteristic curves and in the following characteristic data of the geared motor or its components: $M_{2,0}$, $M_{2,max}$, $M_{0,M}$, $M_{max,M}$.
A reduction of this characteristic curve and the characteristics on efficiency is not necessary.

Transmission ratio *i*	η_G – Efficiency of the gearbox components under full load in % Gearbox				
	NRK050	NRK070	NRK090	NRK120	NRK155
1-stage					
3	97 ... 98	97 ... 98	98	98	–
4	97 ... 98	97 ... 98	98	98	98
5	97 ... 98	97	97 ... 98	98	98
7	95 ... 97	96 ... 97	96 ... 97	97	–
8	94 ... 96	95 ... 96	96 ... 97	97	–
10	92 ... 95	93 ... 95	94 ... 96	96	97
2-stage					
9	95 ... 96	95 ... 96	96 ... 97	96	–
12	95 ... 96	95 ... 96	95 ... 96	96	–
15	94 ... 95	94 ... 95	94 ... 96	96	–
16	94 ... 95	94 ... 95	94 ... 96	96	96
20	93 ... 95	93 ... 95	94 ... 95	95	96
25	91 ... 94	92 ... 94	92 ... 95	95	95 ... 96
32	91 ... 94	91 ... 94	92 ... 94	94	–
40	88 ... 92	89 ... 93	90 ... 94	93	94 ... 95
50	–	–	–	–	94 ... 95
64	76 ... 86	78 ... 86	81 ... 89	89	–
100	60 ... 75	67 ... 80	69 ... 82	83	84 ... 88

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Economy gearbox type NRK

Technical specifications

C_{T2} – Torsional rigidity of the gearbox (related to the output)

The exact values for the torsional rigidity are dependent on the motor-gearbox combination and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Transmission ratio *i*	C_{T2} – Torsional rigidity of the gearbox in Nm/ '				
	Gearbox				
	NRK050	NRK070	NRK090	NRK120	NRK155
1-stage					
3	0.7 ... 0.75	4 ... 5.1	9.7 ... 10.8	29.5 ... 31.5	–
4	0.9 ... 1	4.7 ... 5.7	13.6 ... 15.3	35.5 ... 38.5	65 ... 70
5	0.95 ... 1	5 ... 5.9	14 ... 15.5	36.5 ... 39.5	68 ... 72
7	0.85	4.2 ... 4.6	11.4 ... 12.2	29.5 ... 31	–
8	0.85	4.1 ... 4.5	11.1 ... 11.8	28.5 ... 30.5	–
10	0.75 ... 0.8	3.5 ... 3.8	10.1 ... 10.6	24.5 ... 25.5	54.5 ... 56.5
2-stage					
9	0.8 ... 0.85	4.7 ... 5.2	11 ... 11.7	34 ... 36.5	–
12	1 ... 1.05	5.1 ... 5.7	14.6 ... 15.7	39.5 ... 43	–
15	1 ... 1.05	4.8 ... 5.3	14.4 ... 15.5	37.5 ... 40.5	–
16	1 ... 1.05	5.2 ... 5.8	15 ... 16.1	40 ... 43.5	69 ... 73
20	1 ... 1.05	5.2 ... 5.7	15 ... 16.1	40 ... 43.5	70 ... 73
25	1 ... 1.05	5.3 ... 5.8	14.7 ... 15.8	37.5 ... 41	70 ... 73
32	1 ... 1.05	5.1 ... 5.6	14.8 ... 15.8	39.5 ... 43	–
40	1 ... 1.05	5.2 ... 5.8	14.6 ... 15.6	37.5 ... 40.5	69 ... 72
50	–	–	–	–	69 ... 73
64	0.85 ... 0.9	4.2 ... 4.6	11 ... 11.5	30 ... 31.5	–
100	0.7	3.3 ... 3.6	9.7 ... 10.1	21 ... 22	55 ... 57

φ_2 – Torsional backlash of the gearbox on the gearbox output

Gearbox stages *z*	φ_2 – Torsional backlash of the gearbox on the gearbox output in '				
	Gearbox				
	NRK050	NRK070	NRK090	NRK120	NRK155
1-stage	15	10	7	7	6
2-stage	19	12	9	9	9

Permissible shaft loading capacity

The limit values shown for the bearing load refer to equivalent forces to be determined mathematically, whose effect is equivalent to the forces occurring in the load profile.
They only apply to radial and axial loads. Axial forces up to maximum $F_A = 0.24 \times F_R$ are permissible in case of superimposition. They apply to the output speed of 100 r/min and in case of radial force for a force application point in the center of the shaft or for centrally applied axial force. For other speeds or force application points, the permissible radial forces must be obtained from the radial force diagrams of the Configuration Manual.

	Permissible shaft loading capacity, radial and axial forces in N				
	Gearbox				
	NRK050	NRK070	NRK090	NRK120	NRK155
Average radial force $F_{R\,eq}$					
• for L_{10h} = 20000 h	800	1050	1900	2500	5200
• for L_{10h} = 30000 h	700	900	1700	2150	4600
Maximum radial force $F_{R\,max}$	1300	1650	3100	4000	8400
Average axial force $F_{A\,eq}$					
• for L_{10h} = 20000 h	1000	1350	2000	4000	7000
• for L_{10h} = 30000 h	800	1000	1500	3000	6000
Maximum axial force $F_{A\,max}$	1000	2100	3800	5900	11000

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Technical specifications

m_G – Weight of the gearbox components

The weight of the assigned motors and the total weight of the geared motors are in the data sheet resulting from the configuration of the motor or the geared motor in the Siemens Product Configurator.

Transmission ratio *i*	m_G – Weight of the gearbox components in kg									
	Gearbox									
	NRK050		**NRK070**		**NRK090**		**NRK120**		**NRK155**	
	Motor									
	1FK2102 1FT2102	**1FK2□03 1FT2□03**	**1FK2102 1FT2102 1FK2□03 1FT2□03 1FK2□04 1FT2□04**	**1FK2□05 1FT2□05**	**1FK2□03 1FT2□03 1FK2□04 1FT2□04 1FK2□05 1FT2□05**	**1FK2□06 1FT2□06**	**1FK2□03 1FT2□03 1FK2□04 1FT2□04 1FK2□05 1FT2□05 1FK2□06 1FT2□06**	**1FK2208 1FT2□08**	**1FK2□05 1FT2□05 1FK2□06 1FT2□06 1FK2208 1FT2□08**	**1FK2210 1FT2210**
1-stage										
3	0.61	0.86	1.4	2.2	3.3	4.3	7.5	9.2	–	–
4	0.61	0.87	1.4	1.9	3.3	4.3	7.5	9.6	17	22
5	0.61	0.87	1.4	2	3.3	4.3	7.5	9.6	17	22
7	0.62	0.87	1.4	2	3.3	4.3	7.5	9.6	–	–
8	0.61	0.95	1.4	2	3.3	4.4	7.5	8.9	–	–
10	0.63	0.88	1.4	2	3.3	4.4	7.6	9.7	17	22
2-stage										
9	0.77	1.0	1.7	2.5	3.9	5.0	9.4	11	–	–
12	0.77	1.0	1.7	2.5	3.9	5.0	9.4	11	–	–
15	0.77	1.0	1.7	2.2	3.9	5.0	9.4	11	–	–
16	0.77	1.0	1.7	2.2	3.9	5.0	9.4	11	22	28
20	0.77	1.0	1.7	2.2	3.9	5.0	9.4	12	22	28
25	0.77	1.0	1.7	2.3	4.0	5.0	9.5	12	22	28
32	0.77	1.1	1.7	2.3	4.0	5.0	9.5	11	–	–
40	0.78	1.1	1.7	2.3	4.0	5.0	9.5	11	22	28
50	–	–	–	–	–	–	–	–	22	28
64	0.78	1.1	1.7	2.3	4.0	5.1	9.6	11	–	–
100	0.81	1.1	1.9	2.4	4.1	5.1	9.7	12	22	28

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Technical specifications

Technical specifications for NLC economy coaxial gearbox

$M_{2N,G}$ – Rated torque for gearbox components

An endurance strength calculation becomes necessary if this torque is exceeded (see Configuration Manual).
For the feather key version, the gearbox nominal torque is only permissible as a pulsating load or a reduction must be carried out depending on the number of load changes (see Components and Options).

Transmission ratio *i*	$M_{2N,G}$ – Rated torque for gearbox components in Nm Gearbox		
	NLC060	NLC080	NLC120
1-stage			
3	28	85	115
4	38	115	155
5	40	110	195
7	25	65	135
8	18	50	120
10	15	38	95
2-stage			
9	44	130	210
12	44	120	260
15	44	110	230
16	44	120	260
20	44	120	260
25	40	110	230
32	44	120	260
40	40	110	230
64	18	50	120
100	15	38	95

$M_{2max,G}$ – Maximum output torque of the gearbox components

This torque must not be exceeded during operation. It is permissible for a maximum of 30000 revolutions of the output shaft.
An endurance strength configuration of the gearbox becomes necessary, if the output torques up to $M_{2max,G}$ are used (see Configuration Manual).

Transmission ratio *i*	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm Gearbox		
	NLC060	NLC080	NLC120
1-stage			
3	45	136	184
4	61	148	248
5	64	176	312
7	40	104	216
8	29	80	192
10	24	61	152
2-stage			
9	70	208	336
12	70	192	416
15	70	176	368
16	70	192	416
20	70	192	416
25	64	176	368
32	70	192	416
40	64	176	368
64	29	80	192
100	24	61	152

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Technical specifications

$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components

The Emergency Off torque can be tolerated a maximum of 1000 times within the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether the torques, caused by very rare operating faults, can damage the gearbox.

Transmission ratio *i*	$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components in Nm Gearbox		
	NLC060	NLC080	NLC120
1-stage			
3	66	180	390
4	88	240	520
5	80	220	500
7	80	178	340
8	80	190	380
10	80	200	480
2-stage			
9	88	260	500
12	88	240	520
15	88	220	500
16	88	240	520
20	88	240	520
25	80	220	500
32	88	240	520
40	80	220	500
64	80	190	380
100	80	200	480

η_G – Efficiency of the gearbox components under full load

The exact values for the efficiency are, to some extent, dependent on the frame size of the mounted motor and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.
In the partial load range, especially when the gearbox is cold, the efficiency of the gearbox is always lower than at operating speed.
The gear losses are already taken into account in the characteristic curves and in the following characteristic data of the geared motor or its components: $M_{2,0}$, $M_{2,max}$, $M_{0,M}$, $M_{max,M}$.
A reduction of this characteristic curve and the characteristics on efficiency is not necessary.

Transmission ratio *i*	η_G – Efficiency of the gearbox components under full load in % Gearbox		
	NLC060	NLC080	NLC120
1-stage			
3	96	97	97
4	96 ... 97	97	97
5	96 ... 97	97	97
7	94 ... 95	95 ... 96	96
8	93 ... 94	94 ... 96	96
10	91 ... 93	92 ... 94	96
2-stage			
9	95 ... 96	96	96
12	94 ... 95	95 ... 96	96
15	94 ... 95	94 ... 95	96
16	94 ... 95	94 ... 96	96
20	93 ... 95	94 ... 95	95
25	92 ... 94	93 ... 95	95
32	91 ... 94	93 ... 95	95
40	90 ... 93	91 ... 94	94
64	77 ... 85	80 ... 88	89
100	66 ... 78	68 ... 81	83

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Economy gearbox type NLC

Technical specifications

C_{T2} – Torsional rigidity of the gearbox (related to the output)

The exact values for the torsional rigidity are dependent on the motor-gearbox combination and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Transmission ratio *i*	C_{T2} – Torsional rigidity of the gearbox in Nm/ ' Gearbox		
	NLC060	NLC080	NLC120
1-stage			
3	3,4 ... 4,1	8,2 ... 8,9	21,5 ... 22
4	3,9 ... 4,5	10,9 ... 11,8	24,5 ... 25,5
5	4 ... 4,6	11,2 ... 11,9	25 ... 26
7	3.5 ... 3.8	9.4 ... 9.9	21.5 ... 22
8	3.4 ... 3.7	9.2 ... 9.6	21 ... 22
10	3 ... 3.2	8.5 ... 8.9	18.5 ... 19.5
2-stage			
9	3.8 ... 4.2	9.2 ... 9.6	23.5 ... 24.5
12	4.1 ... 4.5	11.5 ... 12.1	26 ... 27.5
15	3.9 ... 4.2	11.4 ... 12	25.5 ... 26.5
16	4.2 ... 4.6	11.8 ... 12.3	26.5 ... 27.5
20	4.1 ... 4.5	11.8 ... 12.3	26.5 ... 27.5
25	4.2 ... 4.6	11.6 ... 12.1	25.5 ... 26.5
32	4.1 ... 4.5	11.5 ... 12.2	26 ... 27.5
40	4.2 ... 4.5	11.5 ... 12	25.5 ... 26.5
64	3.5 ... 3.8	9.2 ... 9.5	21.5 ... 22.5
100	2.9 ... 3.1	8.2 ... 8.5	16.7 ... 17

φ_2 – Torsional backlash of the gearbox on the gearbox output

Gearbox stages *z*	φ_2 – Torsional backlash of the gearbox on the gearbox output in ' Gearbox		
	NLC060	NLC080	NLC120
1-stage	10	7	7
2-stage	12	9	9

Permissible shaft loading capacity

The limit values shown for the bearing load refer to equivalent forces to be determined mathematically, whose effect is equivalent to the forces occurring in the load profile.
They only apply to radial and axial loads. Axial forces up to maximum $F_A = 0.24 \times F_R$ are permissible in case of superimposition. They apply to the output speed of 100 r/min and in case of radial force for a force application point in the center of the shaft or for centrally applied axial force. For other speeds or force application points, the permissible radial forces must be obtained from the radial force diagrams of the Configuration Manual.

	Permissible shaft loading capacity, radial and axial forces in N Gearbox		
	NLC060	NLC080	NLC120
Average radial force $F_{R\,eq}$			
• for L_{10h} = 20000 h	3200	5500	6000
• for L_{10h} = 30000 h	3200	4800	5400
Maximum radial force $F_{R\,max}$	3200	5500	6000
Average axial force $F_{A\,eq}$			
• for L_{10h} = 20000 h	4400	6400	8000
• for L_{10h} = 30000 h	3900	5700	7000
Maximum axial force $F_{A\,max}$	4400	6400	8000

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Technical specifications

m_G – Weight of the gearbox components

The weight of the assigned motors and the total weight of the geared motors are in the data sheet resulting from the configuration of the motor or the geared motor in the Siemens Product Configurator.

Transmission ratio *i*	m_G – Weight of the gearbox components in kg					
	Gearbox					
	NLC060		**NLC080**		**NLC120**	
	Motor					
	1FK2102 1FT2102 1FK2□03 1FT2□03 1FK2□04 1FT2□04	**1FK2□05 1FT2□05**	**1FK2□03 1FT2□03 1FK2□04 1FT2□04 1FK2□05 1FT2□05**	**1FK2□06 1FT2□06**	**1FK2□03 1FT2□03 1FK2□04 1FT2□04 1FK2□05 1FT2□05 1FK2□06 1FT2□06**	**1FK2208 1FT2□08**
1-stage						
3	1.6	2.4	3.0	4.1	6.9	8.7
4	1.6	2.1	3.0	4.1	6.9	9.0
5	1.6	2.1	3.1	4.1	7.0	9.1
7	1.6	2.1	3.0	4.1	7.0	9.1
8	1.6	2.1	3.0	4.1	6.9	8.2
10	1.6	2.1	3.1	4.1	7.0	9.1
2-stage						
9	1.7	2.6	3.6	4.6	8.6	10
12	1.8	2.6	3.5	4.6	8.6	10
15	1.7	2.3	3.5	4.6	8.7	10
16	1.8	2.3	3.5	4.6	8.6	11
20	1.8	2.3	3.5	4.6	8.7	11
25	1.8	2.3	3.6	4.6	8.7	11
32	1.8	2.3	3.6	4.6	8.7	10
40	1.8	2.3	3.6	4.6	8.8	10
64	1.8	2.3	3.6	4.6	8.7	10
100	1.8	2.3	3.6	4.7	8.9	11

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Economy angular gearbox type NRBW

Technical specifications

Technical specifications for NRBW economy angular gearbox

$M_{2N,G}$ – Rated torque for gearbox components

An endurance strength calculation becomes necessary if this torque is exceeded (see Configuration Manual).
For the feather key version, the gearbox nominal torque is only permissible as a pulsating load or a reduction must be carried out depending on the number of load changes (see Components and Options).

Transmission ratio *i*	$M_{2N,G}$ – Rated torque for gearbox components in Nm Gearbox			
	NRBW040	NRBW060	NRBW080	NRBW120
1-stage				
3	4.5	14	40	80
4	6	19	53	105
5	7.5	24	67	130
7	8.5	25	65	135
8	6	18	50	120
10	5	15	38	95
2-stage				
9	16.5	44	130	210
12	20	44	120	260
15	18	44	110	230
16	20	44	120	260
20	20	44	120	260
25	18	40	110	230
32	20	44	120	260
40	18	40	110	230
64	7.5	18	50	120
3-stage				
60	20	44	110	260
80	20	44	120	260
100	20	44	120	260
120	18	44	110	230
160	20	44	120	260
200	18	40	110	230
256	20	44	120	260
320	18	40	110	230
512	7.5	18	50	120

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Technical specifications

$M_{2max,G}$ – Maximum output torque of the gearbox components

This torque must not be exceeded during operation. It is permissible for a maximum of 30000 revolutions of the output shaft. An endurance strength configuration of the gearbox becomes necessary, if the output torques up to $M_{2max,G}$ are used (see Configuration Manual).

Transmission ratio *i*	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm Gearbox			
	NRBW040	NRBW060	NRBW080	NRBW120
1-stage				
3	7	22	64	128
4	10	30	85	168
5	12	38	107	208
7	13.5	40	104	216
8	10	29	80	192
10	8	24	61	152
2-stage				
9	26	70	208	336
12	32	70	192	416
15	29	70	176	368
16	32	70	192	416
20	32	70	192	416
25	29	64	176	368
32	32	70	192	416
40	29	64	176	368
64	12	29	80	192
3-stage				
60	32	70	176	416
80	32	70	192	416
100	32	70	192	416
120	29	70	176	368
160	32	70	192	416
200	29	64	176	368
256	32	70	192	416
320	29	64	176	368
512	12	29	80	192

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Economy angular gearbox type NRBW

Technical specifications

$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components

The Emergency Off torque can be tolerated a maximum of 1000 times within the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether the torques, caused by very rare operating faults, can damage the gearbox.

Transmission ratio *i*	$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components in Nm Gearbox			
	NRBW040	NRBW060	NRBW080	NRBW120
1-stage				
3	22.5	66	180	360
4	28	86	240	474
5	35	80	220	500
7	26	80	178	340
8	27	80	190	380
10	25	70	170	430
2-stage				
9	33	88	260	500
12	40	88	240	520
15	36	88	220	500
16	40	88	240	520
20	40	88	240	520
25	36	80	220	500
32	40	88	240	520
40	36	80	220	500
64	27	80	190	380
3-stage				
60	40	88	220	520
80	40	88	240	520
100	40	88	240	520
120	36	88	220	500
160	40	88	240	520
200	36	80	220	500
256	40	88	240	520
320	36	80	220	500
512	27	80	190	380

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Technical specifications

η_G – Efficiency of the gearbox components under full load

The exact values for the efficiency are, to some extent, dependent on the frame size of the mounted motor and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.
In the partial load range, especially when the gearbox is cold, the efficiency of the gearbox is always lower than at operating speed.
The gear losses are already taken into account in the characteristic curves and in the following characteristic data of the geared motor or its components: $M_{2,0}$, $M_{2,max}$, $M_{0,M}$, $M_{max,M}$.
A reduction of this characteristic curve and the characteristics on efficiency is not necessary.

Transmission ratio *i*	η_G – Efficiency of the gearbox components under full load in %			
	Gearbox			
	NRBW040	NRBW060	NRBW080	NRBW120
1-stage				
3	94	95	95	95
4	94	95	95	95
5	94	95	95	95
7	94	94	95	95
8	92	93	94	95
10	90	92	93	94
2-stage				
9	94	94	94	94
12	94	94	94	94
15	93	93	93	94
16	93	93	93	94
20	92	92	93	93
25	91	91	92	92
32	91	91	92	92
40	89	89	90	91
64	75	77	80	84
3-stage				
60	86	86	87	88
80	84	84	86	87
100	82	82	84	85
120	78	80	81	82
160	76	76	79	81
200	70	71	74	77
256	68	68	72	75
320	61	62	66	70
512	31	33	38	46

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Economy angular gearbox type NRBW

Technical specifications

C_{T2} – Torsional rigidity of the gearbox (related to the output)

The exact values for the torsional rigidity are dependent on the motor-gearbox combination and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Transmission ratio *i*	C_{T2} – Torsional rigidity of the gearbox in Nm/ ' Gearbox			
	NRBW040	NRBW060	NRBW080	NRBW120
1-stage				
3	0.45	1.6	4.1	10
4	0.63	2.0	6.0	14
5	0.73	2.2	7.0	15
7	0.78	2.2	7.5	17
8	0.78	2.2	7.5	17
10	0.73	2.2	7.8	16
2-stage				
9	0.73	2.4	7.4	18
12	0.93	2.6	9.3	20
15	0.93	2.5	9.5	20
16	0.95	2.6	9.7	21
20	0.98	2.6	9.9	21
25	0.95	2.7	9.8	20
32	0.98	2.7	10	21
40	0.98	2.7	9.9	21
64	0.83	2.4	8.1	18
3-stage				
60	0.98	2.7	10	21
80	0.98	2.7	10	21
100	0.98	2.7	10	21
120	0.98	2.6	9.9	21
160	0.98	2.7	10	21
200	0.98	2.7	10	21
256	0.98	2.7	10	21
320	0.98	2.7	9.9	21
512	0.83	2.4	8.1	18

φ_2 – Torsional backlash of the gearbox on the gearbox output

Gearbox stages *z*	φ_2 – Torsional backlash of the gearbox on the gearbox output in ' Gearbox			
	NRBW040	NRBW060	NRBW080	NRBW120
1-stage	21	16	13	11
2-stage	25	18	15	13
3-stage	28	21	17	15

Permissible shaft loading capacity

The limit values shown for the bearing load refer to equivalent forces to be determined mathematically, whose effect is equivalent to the forces occurring in the load profile.
They only apply to radial and axial loads. Axial forces up to maximum $F_A = 0.24 \times F_R$ are permissible in case of superimposition. They apply to the output speed of 100 r/min and in case of radial force for a force application point in the center of the shaft or for centrally applied axial force. For other speeds or force application points, the permissible radial forces must be obtained from the radial force diagrams of the Configuration Manual.

	Permissible shaft loading capacity, radial and axial forces in N Gearbox			
	NRBW040	NRBW060	NRBW080	NRBW120
Average radial force $F_{R\,eq}$				
• for L_{10h} = 20000 h	200	400	750	1750
• for L_{10h} = 30000 h	160	340	650	1500
Maximum radial force $F_{R\,max}$	200	700	1250	2000
Average axial force $F_{A\,eq}$				
• for L_{10h} = 20000 h	200	500	1000	2500
• for L_{10h} = 30000 h	160	450	900	2100
Maximum axial force $F_{A\,max}$	240	800	1600	3800

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Technical specifications

m_G – Weight of the gearbox components

The weight of the assigned motors and the total weight of the geared motors are in the data sheet resulting from the configuration of the motor or the geared motor in the Siemens Product Configurator.

Transmission ratio *i*	m_G – Weight of the gearbox components in kg							
	Gearbox							
	NRBW040	NRBW060		NRBW080			NRBW120	
	Motor							
	1FT2102	1FT2102 1FT2□03	1FT2□04	1FT2□03 1FT2□04	1FT2105	1FT2205	1FT2□03 1FT2□04 1FT2□05	1FT2□06
1-stage								
3	0.55	1.6	1.8	3.6	4.0	3.8	9.6	10
4	0.56	1.6	1.8	3.6	4.0	3.8	9.7	10
5	0.56	1.6	1.8	3.6	4.0	3.8	9.7	10
7	0.56	1.6	1.8	3.6	4.0	3.8	9.7	10
8	0.56	1.6	1.8	3.6	4.0	3.8	9.7	10
10	0.56	1.6	1.8	3.6	4.0	3.8	9.7	10
2-stage								
9	0.64	1.8	2.0	4.1	4.5	4.3	11	12
12	0.64	1.8	2.0	4.1	4.5	4.3	11	12
15	0.64	1.8	2.0	4.1	4.5	4.3	11	12
16	0.64	1.8	2.0	4.0	4.5	4.2	11	12
20	0.65	1.8	2.0	4.1	4.5	4.3	11	12
25	0.64	1.8	2.0	4.1	4.5	4.3	12	12
32	0.65	1.8	2.0	4.1	4.5	4.3	12	12
40	0.65	1.8	2.0	4.1	4.5	4.3	12	12
64	0.65	1.8	2.0	4.1	4.5	4.3	12	12
3-stage								
60	0.74	2.0	2.2	4.5	5.0	4.7	13	14
80	0.74	2.0	2.2	4.5	5.0	4.7	13	14
100	0.74	2.0	2.2	4.6	5.0	4.8	13	14
120	0.74	2.0	2.2	4.6	5.0	4.8	13	14
160	0.74	2.0	2.2	4.6	5.0	4.8	13	14
200	0.74	2.0	2.2	4.6	5.0	4.8	13	14
256	0.74	2.0	2.2	4.6	5.0	4.8	13	14
320	0.74	2.0	2.2	4.6	5.1	4.8	13	14
512	0.75	2.0	2.2	4.6	5.1	4.8	13	14

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Economy angular gearbox type NRKW

Technical specifications

Technical specifications for NRKW economy angular gearbox

$M_{2N,G}$ – Rated torque for gearbox components

An endurance strength calculation becomes necessary if this torque is exceeded (see Configuration Manual).
For the feather key version, the gearbox nominal torque is only permissible as a pulsating load or a reduction must be carried out depending on the number of load changes (see Components and Options).

Transmission ratio *i*	$M_{2N,G}$ – Rated torque for gearbox components in Nm Gearbox			
	NRKW050	NRKW070	NRKW090	NRKW120
1-stage				
3	4.5	14	40	80
4	6	19	53	105
5	7.5	24	67	130
7	8.5	25	65	135
8	6	18	50	120
10	5	15	38	95
2-stage				
9	12	33	97	157
12	15	33	90	195
15	13	33	82	172
16	15	33	90	195
20	15	33	90	195
25	13	30	82	172
32	15	33	90	195
40	13	30	82	172
64	7.5	18	50	120
100	5	15	38	95

$M_{2max,G}$ – Maximum output torque of the gearbox components

This torque must not be exceeded during operation. It is permissible for a maximum of 30000 revolutions of the output shaft.
An endurance strength configuration of the gearbox becomes necessary, if the output torques up to $M_{2max,G}$ are used (see Configuration Manual).

Transmission ratio *i*	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm Gearbox			
	NRKW050	NRKW070	NRKW090	NRKW120
1-stage				
3	7	22	64	128
4	10	30	85	168
5	12	38	107	208
7	13.5	40	104	216
8	10	29	80	192
10	8	24	61	152
2-stage				
9	19	53	155	251
12	24	53	144	312
15	21	53	131	275
16	24	53	144	312
20	24	53	144	312
25	21	48	131	275
32	24	53	144	312
40	21	48	131	275
64	12	29	80	192
100	8	24	61	152

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Technical specifications

$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components

The Emergency Off torque can be tolerated a maximum of 1000 times within the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether the torques, caused by very rare operating faults, can damage the gearbox.

Transmission ratio *i*	$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components in Nm Gearbox			
	NRKW050	NRKW070	NRKW090	NRKW120
1-stage				
3	22.5	66	180	360
4	28	86	240	474
5	35	80	220	500
7	26	80	178	340
8	27	80	190	380
10	25	70	170	430
2-stage				
9	33	88	260	500
12	40	88	240	520
15	36	88	220	500
16	40	88	240	520
20	40	88	240	520
25	36	80	220	500
32	40	88	240	520
40	36	80	220	500
64	27	80	190	380
100	27	80	170	430

η_G – Efficiency of the gearbox components under full load

The exact values for the efficiency are, to some extent, dependent on the frame size of the mounted motor and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.
In the partial load range, especially when the gearbox is cold, the efficiency of the gearbox is always lower than at operating speed.
The gear losses are already taken into account in the characteristic curves and in the following characteristic data of the geared motor or its components: $M_{2,0}$, $M_{2,max}$, $M_{0,M}$, $M_{max,M}$.
A reduction of this characteristic curve and the characteristics on efficiency is not necessary.

Transmission ratio *i*	η_G – Efficiency of the gearbox components under full load in % Gearbox			
	NRKW050	NRKW070	NRKW090	NRKW120
1-stage				
3	94	94	95	95
4	94	94	95	95
5	94	95	95	95
7	94	94	95	95
8	92	93	94	94
10	90	91	92	94
2-stage				
9	93	93	94	94
12	93	93	93	94
15	92	92	93	93
16	92	92	93	93
20	91	91	92	93
25	90	90	91	91
32	89	89	90	91
40	87	87	89	90
64	75	76	80	84
100	59	65	69	75

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Economy angular gearbox type NRKW

Technical specifications

C_{T2} – Torsional rigidity of the gearbox (related to the output)

The exact values for the torsional rigidity are dependent on the motor-gearbox combination and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Transmission ratio *i*	C_{T2} – Torsional rigidity of the gearbox in Nm/ ' Gearbox			
	NRK0W50	NRKW070	NRKW090	NRKW120
1-stage				
3	0.45	2.3	4.8	13
4	0.65	3.2	7.5	20
5	0.75	3.8	9.2	24
7	0.80	4.0	10	27
8	0.80	4.0	10	27
10	0.78	3.7	11	25
2-stage				
9	0.75	4.4	10	31
12	0.98	5.0	14	37
15	0.98	4.8	14	37
16	1.0	5.3	15	39
20	1.0	5.3	15	40
25	1.0	5.5	15	39
32	1.0	5.4	15	41
40	1.0	5.5	15	39
64	0.88	4.4	11	31
100	0.70	3.5	9.9	22

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φ_2 – Torsional backlash of the gearbox on the gearbox output

Gearbox stages *z*	φ_2 – Torsional backlash of the gearbox on the gearbox output in ' Gearbox			
	NRKW050	NRKW070	NRKW090	NRKW120
1-stage	21	16	13	11
2-stage	25	18	15	13

Permissible shaft loading capacity

The limit values shown for the bearing load refer to equivalent forces to be determined mathematically, whose effect is equivalent to the forces occurring in the load profile.
They only apply to radial and axial loads. Axial forces up to maximum $F_A = 0.24 \times F_R$ are permissible in case of superimposition. They apply to the output speed of 100 r/min and in case of radial force for a force application point in the center of the shaft or for centrally applied axial force. For other speeds or force application points, the permissible radial forces must be obtained from the radial force diagrams of the Configuration Manual.

	Permissible shaft loading capacity, radial and axial forces in N Gearbox			
	NRKW050	NRKW070	NRKW090	NRKW120
Average radial force $F_{R\,eq}$				
• for L_{10h} = 20000 h	800	1050	1900	2500
• for L_{10h} = 30000 h	700	900	1700	2150
Maximum radial force $F_{R\,max}$	1300	1650	3100	4000
Average axial force $F_{A\,eq}$				
• for L_{10h} = 20000 h	1000	1350	2000	4000
• for L_{10h} = 30000 h	800	1000	1500	3000
Maximum axial force $F_{A\,max}$	1000	2100	3800	5900

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Technical specifications

m_G – Weight of the gearbox components

The weight of the assigned motors and the total weight of the geared motors are in the data sheet resulting from the configuration of the motor or the geared motor in the Siemens Product Configurator.

Transmission ratio *i*	m_G – Weight of the gearbox components in kg							
	Gearbox							
	NRKW050	NRKW070		NRKW090			NRKW120	
	Motor							
	1FT2102	1FT2102 1FT2□03	1FT2□04	1FT2□03 1FT2□04	1FT2105	1FT2205	1FT2□03 1FT2□04 1FT2□05	1FT2□06
1-stage								
3	0.82	2.1	2.3	4.7	5.1	4.9	11	12
4	0.82	2.1	2.3	4.7	5.1	4.9	11	12
5	0.82	2.1	2.3	4.7	5.2	4.9	11	12
7	0.83	2.1	2.3	4.7	5.1	4.9	12	12
8	0.82	2.1	2.3	4.7	5.2	4.9	12	12
10	0.84	2.1	2.3	4.8	5.2	5.0	12	12
2-stage								
9	0.98	2.4	2.6	5.4	5.8	5.6	13	14
12	0.98	2.4	2.6	5.4	5.8	5.6	13	14
15	0.98	2.4	2.6	5.4	5.8	5.6	13	14
16	0.98	2.4	2.6	5.4	5.8	5.6	13	14
20	0.98	2.4	2.6	5.4	5.8	5.6	13	14
25	0.98	2.4	2.6	5.4	5.8	5.6	13	14
32	0.98	2.4	2.6	5.4	5.8	5.6	13	14
40	0.99	2.4	2.6	5.4	5.8	5.6	13	14
64	0.99	2.4	2.6	5.4	5.9	5.6	14	14
100	1.0	2.6	2.8	5.5	5.9	5.7	14	14

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Economy angular gearbox type NLCW

Technical specifications

Technical specifications for NLCW economy angular gearbox

$M_{2N,G}$ – Rated torque for gearbox components

An endurance strength calculation becomes necessary if this torque is exceeded (see Configuration Manual).
For the feather key version, the gearbox nominal torque is only permissible as a pulsating load or a reduction must be carried out depending on the number of load changes (see Components and Options).

Transmission ratio *i*	$M_{2N,G}$ – Rated torque for gearbox components in Nm Gearbox		
	NLCW060	NLCW080	NLCW120
1-stage			
3	14	40	80
4	19	53	105
5	24	67	130
7	25	65	135
8	18	50	120
10	15	38	95
2-stage			
9	44	130	210
12	44	120	260
15	44	110	230
16	44	120	260
20	44	120	260
25	40	110	230
32	44	120	260
40	40	110	230
64	18	50	120
100	15	38	95

$M_{2max,G}$ – Maximum output torque of the gearbox components

This torque must not be exceeded during operation. It is permissible for a maximum of 30000 revolutions of the output shaft.
An endurance strength configuration of the gearbox becomes necessary, if the output torques up to $M_{2max,G}$ are used (see Configuration Manual).

Transmission ratio *i*	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm Gearbox		
	NLCW060	NLCW080	NLCW120
1-stage			
3	22	64	128
4	30	85	168
5	38	107	208
7	40	104	216
8	29	80	192
10	24	61	152
2-stage			
9	70	208	336
12	70	192	416
15	70	176	368
16	70	192	416
20	70	192	416
25	64	176	368
32	70	192	416
40	64	176	368
64	29	80	192
100	24	61	152

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Technical specifications

$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components

The Emergency Off torque can be tolerated a maximum of 1000 times within the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether the torques, caused by very rare operating faults, can damage the gearbox.

Transmission ratio *i*	$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components in Nm Gearbox		
	NLCW060	NLCW080	NLCW120
1-stage			
3	66	180	360
4	86	240	474
5	80	220	500
7	80	178	340
8	80	190	380
10	70	170	430
2-stage			
9	88	260	500
12	88	240	520
15	88	220	500
16	88	240	520
20	88	240	520
25	80	220	500
32	88	240	520
40	80	220	500
64	80	190	380
100	80	200	430

η_G – Efficiency of the gearbox components under full load

The exact values for the efficiency are, to some extent, dependent on the frame size of the mounted motor and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.
In the partial load range, especially when the gearbox is cold, the efficiency of the gearbox is always lower than at operating speed.
The gear losses are already taken into account in the characteristic curves and in the following characteristic data of the geared motor or its components: $M_{2,0}$, $M_{2,max}$, $M_{0,M}$, $M_{max,M}$.
A reduction of this characteristic curve and the characteristics on efficiency is not necessary.

Transmission ratio *i*	η_G – Efficiency of the gearbox components under full load in % Gearbox		
	NLCW060	NLCW080	NLCW120
1-stage			
3	91	93	94
4	92	93	94
5	92	94	94
7	92	93	94
8	90	92	93
10	88	90	92
2-stage			
9	93	94	94
12	93	94	94
15	93	93	94
16	92	93	94
20	92	93	93
25	91	92	92
32	90	91	92
40	88	90	91
64	75	78	83
100	64	67	74

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Economy angular gearbox type NLCW

Technical specifications

C_{T2} – Torsional rigidity of the gearbox (related to the output)

The exact values for the torsional rigidity are dependent on the motor-gearbox combination and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Transmission ratio *i*	C_{T2} – Torsional rigidity of the gearbox in Nm/ ' Gearbox		
	NLCW060	NLCW080	NLCW120
1-stage			
3	2,1	4,4	11
4	2,8	6,6	16
5	3,2	7,9	18
7	3,3	8,5	20
8	3,3	8,6	20
10	3,1	8,9	19
2-stage			
9	3,7	8,4	22
12	4,1	11	25
15	4,0	11	25
16	4,2	11	26
20	4,3	12	26
25	4,4	12	26
32	4,3	12	27
40	4,4	12	26
64	3,7	9,3	22
100	3,0	8,4	17

φ_2 – Torsional backlash of the gearbox on the gearbox output

Gearbox stages *z*	φ_2 – Torsional backlash of the gearbox on the gearbox output in ' Gearbox		
	NLCW060	NLCW080	NLCW120
1-stage	16	13	11
2-stage	18	15	13

Permissible shaft loading capacity

The limit values shown for the bearing load refer to equivalent forces to be determined mathematically, whose effect is equivalent to the forces occurring in the load profile.
They only apply to radial and axial loads. Axial forces up to maximum $F_A = 0.24 \times F_R$ are permissible in case of superimposition. They apply to the output speed of 100 r/min and in case of radial force for a force application point in the center of the shaft or for centrally applied axial force. For other speeds or force application points, the permissible radial forces must be obtained from the radial force diagrams of the Configuration Manual.

	Permissible shaft loading capacity, radial and axial forces in N Gearbox		
	NLCW060	NLCW080	NLCW120
Average radial force $F_{R\,eq}$			
• for L_{10h} = 20000 h	3200	5500	6000
• for L_{10h} = 30000 h	3200	4800	5400
Maximum radial force $F_{R\,max}$	3200	5500	6000
Average axial force $F_{A\,eq}$			
• for L_{10h} = 20000 h	4400	6400	8000
• for L_{10h} = 30000 h	3900	5700	7000
Maximum axial force $F_{A\,max}$	4400	6400	8000

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Technical specifications

m_G – Weight of the gearbox components

The weight of the assigned motors and the total weight of the geared motors are in the data sheet resulting from the configuration of the motor or the geared motor in the Siemens Product Configurator.

Transmission ratio *i*	m_G – Weight of the gearbox components in kg						
	Gearbox						
	NLCW060		NLCW080			NLCW120	
	Motor						
	1FT2102 1FT2□03	1FT2□04	1FT2□03 1FT2□04	1FT2105	1FT2205	1FT2□03 1FT2□04 1FT2□05	1FT2206
1-stage							
3	2.3	2.5	4.5	4.9	4.7	11	11
4	2.3	2.5	4.5	4.9	4.7	11	11
5	2.3	2.5	4.5	4.9	4.7	11	11
7	2.3	2.5	4.5	4.9	4.7	11	11
8	2.3	2.5	4.5	4.9	4.7	11	11
10	2.3	2.5	4.5	4.9	4.7	11	11
2-stage							
9	2.4	2.6	5.0	5.4	5.2	12	13
12	2.5	2.7	5.0	5.4	5.2	13	13
15	2.4	2.6	5.0	5.4	5.2	13	13
16	2.5	2.7	5.0	5.4	5.2	13	13
20	2.5	2.7	5.0	5.4	5.2	13	13
25	2.5	2.7	5.0	5.4	5.2	13	13
32	2.5	2.7	5.0	5.4	5.2	13	13
40	2.5	2.7	5.0	5.4	5.2	13	13
64	2.5	2.7	5.0	5.4	5.2	13	13
100	2.5	2.7	5.0	5.5	5.2	13	13

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Precision gearbox type SP+

Technical specifications

Technical specifications for SP+ precision gearbox

$M_{2N,G}$ – Rated torque for gearbox components

An endurance strength calculation becomes necessary if this torque is exceeded (see Configuration Manual).
For the feather key version, the gearbox nominal torque is only permissible as a pulsating load or a reduction must be carried out depending on the number of load changes (see Components and Options).

Transmission ratio *i*	$M_{2N,G}$ – Rated torque for gearbox components in Nm										
	Gearbox	SP060		SP075		SP100		SP140		SP180	SP210	SP240
	Motor	1FT2102 1FT2□03	1FT2□04 1FT2□05	1FT2□03 1FT2□04	1FT2□05 1FT2□06	1FT2□03 1FT2□04 1FT2□05	1FT2□06 1FT2□08 1FT2210	1FT2□04 1FT2□05 1FT2□06	1FT2□08 1FT2210	1FT2□06 1FT2□08 1FT2210	1FT2□08 1FT2210	1FT2210
1-stage												
3		29	36	96	102	139	282	454	468	1164	–	–
4		38	50	113	132	185	378	605	792	1452	3000	5400
5		48	50	132	132	232	378	681	792	1452	3000	5400
7		50	50	132	132	292	378	792	792	1452	2880	5160
10		38	38	114	114	282	282	636	636	1164	2280	4000

Transmission ratio *i*	$M_{2N,G}$ – Rated torque for gearbox components in Nm									
	Gearbox	SP060	SP075		SP100		SP140		SP180	SP210	SP240
	Motor	1FT2102 1FT2□03 1FT2□04	1FT2102 1FT2□03 1FT2□04 1FT2205	1FT2105	1FT2□03	1FT2□04 1FT2□05 1FT2□06	1FT2□04 1FT2□05	1FT2□06 1FT2□08 1FT2210	1FT2□04 1FT2□05 1FT2□06 1FT2□08 1FT2210	1FT2□06 1FT2□08 1FT2210	1FT2□06 1FT2□08 1FT2210
2-stage											
16		50	126	126	232	347	536	726	1452	2880	5400
20		50	126	126	232	347	536	726	1452	3000	5400
25		50	132	132	290	347	670	670	1452	3000	5400
28		50	126	126	232	347	536	726	1452	2880	5400
35		50	132	132	290	347	670	670	1452	2880	5400
40		50	126	126	232	347	536	726	1452	2840	4400
50		50	132	132	290	347	670	670	1452	2880	5160
70		50	113	113	181	347	367	726	1356	2457	4730
100		38	105	–	193	259	376	583	1164	2043	3642

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Technical specifications

$M_{2max,G}$ – Maximum output torque of the gearbox components

This torque must not be exceeded during operation. It is permissible for a maximum of 30000 revolutions of the output shaft. An endurance strength configuration of the gearbox becomes necessary, if the output torques up to $M_{2max,G}$ are used (see Configuration Manual).

Transmission ratio *i*	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm										
	Gearbox	SP060			SP075				SP100				
	Motor	1FT2102 1FT2□03	1FT2□04	1FT2□05	1FT2102	1FT2□03 1FT2□04	1FT2□05	1FT2□06 1FT2□08	1FT2□03	1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2210
1-stage												
3		29	38	38	–	96	109	109	139	139	301	301
4		38	54	54	–	113	141	141	185	185	396	396
5		48	54	54	–	141	141	141	232	232	396	396
7		54	54	54	–	141	141	141	292	292	342	342
10		41	41	41	–	122	122	122	301	301	301	301
2-stage												
16		46	46	–	101	101	101	–	232	278	278	–
20		46	46	–	101	101	101	–	232	278	278	–
25		54	54	–	126	126	126	–	278	278	278	–
28		46	46	–	101	101	101	–	232	278	278	–
35		54	54	–	126	126	126	–	278	278	278	–
40		46	46	–	101	101	101	–	232	278	278	–
50		54	54	–	126	126	126	–	278	278	278	–
70		45	45	–	90	90	90	–	181	278	278	–
100		38	38	–	84	84	105	–	193	207	207	–

Transmission ratio *i*	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm								
	Gearbox	SP140			SP180		SP210		SP240	
	Motor	1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2210	1FT2□04 1FT2□05	1FT2□06 1FT2□08 1FT2210	1FT2□06	1FT2□08 1FT2210	1FT2□06 1FT2□08	1FT2210
1-stage										
3		454	454	499	–	1242	–	–	–	–
4		605	605	845	–	1549	–	3200	–	4560
5		681	681	845	–	1549	–	3200	–	4560
7		660	660	660	–	1549	–	3072	–	4560
10		576	576	576	–	1242	–	2240	–	3200
2-stage										
16		536	581	581	1188	1188	2527	2527	4357	4357
20		536	581	581	1188	1188	2527	2527	4357	4357
25		536	536	536	1486	1486	3159	3159	4560	4560
28		536	581	581	1188	1188	2527	2527	4357	4357
35		536	536	536	1486	1486	3072	3072	4560	4560
40		536	581	581	1188	1188	2304	2304	4357	4357
50		536	536	536	1486	1486	2880	2880	4560	4560
70		367	581	581	1085	1085	1966	1966	4560	4560
100		376	466	583	990	990	1634	1634	2914	2914

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Precision gearbox type SP+

Technical specifications

$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components

The Emergency Off torque can be tolerated a maximum of 1000 times within the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether the torques, caused by very rare operating faults, can damage the gearbox.

Transmission ratio i	$M_{2Em.Off}$ – Emergency Off output torque of the gear components in Nm										
	Gearbox	SP060			SP075				SP100				
	Motor	1FT2102 1FT2□03	1FT2□04	1FT2□05	1FT2102	1FT2□03 1FT2□04	1FT2□05	1FT2□06 1FT2□08	1FT2□03	1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2210
1-stage												
3		40	96	100	–	100	139	250	250	250	500	625
4		50	109	109	–	125	185	250	313	313	625	625
5		50	109	109	–	160	250	250	313	313	625	625
7		67	109	109	–	213	250	250	324	324	625	625
10		95	100	100	–	213	250	250	463	463	625	625
2-stage												
16		109	109	–	152	250	250	–	512	625	625	–
20		109	109	–	190	250	250	–	599	625	625	–
25		109	109	–	213	250	250	–	599	625	625	–
28		109	109	–	213	250	250	–	599	625	625	–
35		109	109	–	213	250	250	–	625	625	625	–
40		109	109	–	250	250	250	–	625	625	625	–
50		109	109	–	250	250	250	–	625	625	625	–
70		109	109	–	250	250	250	–	625	625	625	–
100		100	100	–	250	250	250	–	625	625	625	–

Transmission ratio i	$M_{2Em.Off}$ – Emergency Off output torque of the gear components in Nm									
	Gearbox	SP140			SP180			SP210		SP240	
	Motor	1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2210	1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2210	1FT2□06	1FT2□08 1FT2210	1FT2□06 1FT2□08	1FT2210
1-stage											
3		500	500	1250	–	2400	2400	–	–	–	–
4		625	625	1350	–	2750	2750	–	5900	–	8500
5		756	756	1350	–	2750	2750	–	5900	–	8500
7		1059	1059	1350	–	2750	2750	–	5900	–	8500
10		1250	1250	1250	–	2750	2750	–	5900	–	6850
2-stage											
16		741	1350	1350	2420	2420	2750	5900	5900	8500	8500
20		926	1350	1350	2750	2750	2750	5900	5900	8500	8500
25		1158	1350	1350	2750	2750	2750	5900	5900	8500	8500
28		1297	1350	1350	2750	2750	2750	5900	5900	8500	8500
35		1350	1350	1350	2750	2750	2750	5900	5900	8500	8500
40		1350	1350	1350	2750	2750	2750	5900	5900	8500	8500
50		1350	1350	1350	2750	2750	2750	5900	5900	8500	8500
70		1350	1350	1350	2750	2750	2750	5900	5900	8500	8500
100		1250	1250	1250	2750	2750	2750	5900	5900	6850	6850

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Technical specifications

η_G – Efficiency of the gearbox components under full load

The exact values for the efficiency are, to some extent, dependent on the frame size of the mounted motor and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.
In the partial load range, especially when the gearbox is cold, the efficiency of the gearbox is always lower than at operating speed.
The gear losses are already taken into account in the characteristic curves and in the following characteristic data of the geared motor or its components: $M_{2,0}$, $M_{2,max}$, $M_{0,M}$, $M_{max,M}$.
A reduction of this characteristic curve and the characteristics on efficiency is not necessary.

	η_G – Efficiency of the gearbox components under full load in % **Gearbox** **SP060, SP075, SP100, SP140, SP180, SP210, SP240**
1-stage	97
2-stage	94

C_{T2} – Torsional rigidity of the gearbox (related to the output)

The exact values for the torsional rigidity are dependent on the motor-gearbox combination and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

C_{T2} – Torsional rigidity of the gearbox in Nm/ ' **Gearbox**						
SP060	**SP075**	**SP100**	**SP140**	**SP180**	**SP210**	**SP240**
3,5	10	31	53	175	400	550

φ_2 – Torsional backlash of the gearbox on the gear output

	C_{T2} – Torsional backlash of the gearbox on the gearbox output in ' **Gearbox**	
	SP060, SP075	**SP100, SP140, SP180, SP210, SP240**
1-stage	4	3
2-stage	6	5

φ_2 – Optional: Reduced torsional backlash of the gearbox on the gearbox output

	φ_2 – Optional: Reduced torsional backlash of the gearbox on the gearbox output in ' **Gearbox**	
	SP060, SP075	**SP100, SP140, SP180, SP210, SP240**
1-stufig	2	1
2-stufig	4	3

Permissible shaft loading capacity

The limit values shown for the bearing load refer to equivalent forces to be determined mathematically, whose effect is equivalent to the forces occurring in the load profile.
They only apply to radial and axial loads. Axial forces up to maximum $F_A = 0.24 \times F_R$ are permissible in case of superimposition.
They apply to the output speed of 100 r/min and in case of radial force for a force application point in the center of the shaft or for centrally applied axial force. For other speeds or force application points, the permissible radial forces must be obtained from the radial force diagrams of the Configuration Manual.

	Permissible shaft loading capacity, radial and axial forces in N **Gearbox**						
	SP060	**SP075**	**SP100**	**SP140**	**SP180**	**SP210**	**SP240**
Average radial force $F_{R\,eq}$							
• for L_{10h} = 20000 h	1700	2400	3800	6300	11300	20700	22100
• for L_{10h} = 30000 h	1500	2100	3400	5500	10000	18400	19600
Maximum radial force $F_{R\,max}$	2800	4200	6300	9600	15000	21000	30000
Average axial force $F_{A\,eq}$							
• for L_{10h} = 20000 h	2400	3350	5650	9870	15570	30000	33000
• for L_{10h} = 30000 h	2100	3000	5000	8700	13800	26600	29200
Maximum axial force $F_{A\,max}$	2400	3350	5650	9870	15570	30000	33000
Speed for average axial forces $n_{2F\,av}$	833	506	318	323	373	174	188

Values for pure radial force at the center of the shaft or pure centric axial force. Average values for a given speed.

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Precision gearbox type SP+

Technical specifications

m_G – Weight of the gearbox components

The weight of the assigned motors and the total weight of the geared motors are in the data sheet resulting from the configuration of the motor or the geared motor in the Siemens Product Configurator.

Transmission ratio *i*	m_G – Weight of the gearbox components in kg										
	Gearbox										
	SP060			SP075				SP100			
	Motor										
	1FT2102 1FT2□03	1FT2□04	1FT2□05	1FT2102	1FT2□03 1FT2□04	1FT2□05	1FT2□06 1FT2□08	1FT2□03	1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2□10
1-stage											
3	0.21	0.28	0.61	–	0.86	1.03	2.4	3.29	3.29	3.99	11.05
4	0.15	0.22	0.55	–	0.61	0.78	2.15	2.35	2.35	3.04	10.11
5	0.12	0.2	0.52	–	0.51	0.68	2.05	1.92	1.92	2.61	9.68
7	0.1	0.18	0.5	–	0.42	0.59	1.96	1.6	1.6	2.29	9.36
10	0.09	0.16	0.49	–	0.38	0.54	1.91	1.38	1.38	2.07	9.14
2-stage											
16	0.08	0.17	–	0.16	0.23	0.55	–	0.64	0.81	2.18	–
20	0.07	0.16	–	0.13	0.2	0.53	–	0.54	0.7	2.07	–
25	0.07	0.16	–	0.13	0.2	0.52	–	0.52	0.68	2.05	–
28	0.06	0.16	–	0.1	0.18	0.5	–	0.43	0.6	1.97	–
35	0.06	0.16	–	0.1	0.18	0.5	–	0.43	0.59	1.96	–
40	0.06	0.15	–	0.09	0.16	0.49	–	0.38	0.55	1.92	–
50	0.06	0.15	–	0.09	0.16	0.49	–	0.38	0.54	1.91	–
70	0.06	0.15	–	0.09	0.16	0.49	–	0.37	0.54	1.91	–
100	0.06	0.15	–	0.09	0.16	0.49	–	0.37	0.54	1.91	–

Transmission ratio *i*	m_G – Weight of the gearbox components in kg									
	Gearbox									
	SP140			SP180			SP210		SP240	
	Motor									
	1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2□10	1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2□10	1FT2□06	1FT2□08 1FT2□10	1FT2□06 1FT2□08	1FT2□10
1-stage										
3	10.68	10.68	14.92	–	50.84	50.84	–	–	–	–
4	7.82	7.82	12.06	–	33.91	33.91	–	94.3	–	198.2
5	6.79	6.79	11.02	–	27.93	27.93	–	76.9	–	163
7	5.84	5.84	10.08	–	22.23	22.23	–	61.5	–	138.3
10	5.28	5.28	9.51	–	19.16	19.16	–	53.1	–	124.7
2-stage										
16	2.5	3.19	10.25	9.27	9.27	13.51	34.5	34.5	39.2	39.2
20	2.01	2.71	9.77	7.72	7.72	11.95	31.5	31.5	34.6	34.6
25	1.97	2.67	9.73	7.48	7.48	11.72	30.8	30.8	33.2	33.2
28	1.65	2.34	9.41	6.32	6.32	10.55	30	30	30.5	30.5
35	1.63	2.32	9.39	6.2	6.2	10.43	29.7	29.7	29.7	29.7
40	1.4	2.1	9.16	5.51	5.51	9.74	28.5	28.5	28.2	28.2
50	1.39	2.08	9.15	5.45	5.45	9.68	28.3	28.3	27.9	27.9
70	1.38	2.08	9.14	5.39	5.39	9.63	28.1	28.1	27.6	27.6
100	1.38	2.07	9.14	5.36	5.36	9.6	28	28	27.5	27.5

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Technical specifications

Technical specifications for TP+ precision gearbox type

$M_{2N,G}$ – Rated torque for gearbox components

An endurance strength calculation becomes necessary if this torque is exceeded (see Configuration Manual).
For the feather key version, the gearbox nominal torque is only permissible as a pulsating load or a reduction must be carried out depending on the number of load changes (see Components and Options).

Transmission ratio *i*	$M_{2N,G}$ – Rated torque for gearbox components in Nm										
	Gearbox										
	TP004		TP010		TP025		TP050		TP110	TP300	TP500
	Motor										
	1FT2102 1FT2□03	1FT2□04 1FT2□05	1FT2□03 1FT2□04	1FT2□05 1FT2□06	1FT□□03 1FT□□04 1FT□□05	1FT2□06 1FT2□08 1FT2□10	1FT2□04 1FT2□05 1FT2□06	1FT2□08 1FT2□10	1FT2□06 1FT2□08 1FT2□10	1FT2□08 1FT2□10	1FT2□10
1-stage											
3	–	–	–	–	–	–	–	–	–	–	–
4	38	66	115	172	185	352	605	840	1920	–	–
5	48	66	144	172	232	380	681	840	1920	4200	7200
7	60	66	172	172	292	352	840	840	1920	3960	6000
10	42	42	126	126	318	318	648	648	1680	2280	4000

Transmission ratio *i*	$M_{2N,G}$ – Rated torque for gearbox components in Nm									
	Gearbox									
	TP004	TP010			TP025	TP050		TP110	TP300	TP500
	Motor									
	1FT2102 1FT2□03 1FT2□04	1FT2102	1FT2□03 1FT2□04 1FT2205	1FT2105	1FT2□03 1FT2□04 1FT2□05 1FT2□06	1FT2□04 1FT2□05	1FT2□06 1FT2□08 1FT2□10	1FT2□04 1FT2□05 1FT2□06 1FT2□08 1FT2□10	1FT2□06 1FT2□08 1FT2□10	1FT2□06 1FT2□08 1FT2□10
2-stage										
9	57	137	157	157	352	667	825	1760	–	–
12	57	126	126	126	352	825	825	1760	3850	5446
15	66	158	158	158	380	825	825	1760	3949	6808
16	57	157	157	157	352	825	825	1760	–	–
20	66	158	158	158	380	825	825	1760	3949	6808
25	57	154	154	154	352	825	825	1760	–	–
32	66	158	158	158	380	825	825	1760	3600	4975
40	56	157	157	157	352	770	770	1760	3630	5500
64	42	105	105	–	292	594	594	1540	2800	4800

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Precision gearbox type TP+

Technical specifications

$M_{2max,G}$ – Maximum output torque of the gearbox components

This torque must not be exceeded during operation. It is permissible for a maximum of 30000 revolutions of the output shaft. An endurance strength configuration of the gearbox becomes necessary, if the output torques up to $M_{2max,G}$ are used (see Configuration Manual).

Transmission ratio *i*	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm									
	Gearbox	TP004			TP010				TP025		
	Motor	1FT2102 1FT2□03	1FT2□04	1FT2□05	1FT2102	1FT2□03 1FT2□04	1FT2□05	1FT2□06 1FT2□08	1FT2□03 1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2210
1-stage											
4		38	66	66	–	115	148	168	185	282	282
5		48	66	66	–	144	168	168	232	304	304
7		60	66	66	–	168	168	168	282	282	282
10		45	45	45	–	134	134	134	282	282	282
2-stage											
16		46	46	–	126	126	126	–	282	282	–
20		46	46	–	101	101	101	–	282	282	–
25		58	58	–	126	126	126	–	304	304	–
28		46	46	–	126	126	126	–	282	282	–
35		58	58	–	126	126	126	–	304	304	–
40		46	46	–	123	123	123	–	282	282	–
50		58	58	–	126	126	126	–	304	304	–
70		45	45	–	126	126	126	–	282	282	–
100		38	38	–	84	84	105	–	282	282	–

Transmission ratio *i*	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm							
	Gearbox	TP050		TP110		TP300		TP500	
	Motor	1FT2□04 1FT2□05 1FT2□06 1FT2□08	1FT2210	1FT2□04 1FT2□05	1FT2□06 1FT2□08 1FT2210	1FT2□06	1FT2□08 1FT2210	1FT2□06 1FT2□08	1FT2210
1-stage									
4		605	794	–	2048	–	–	–	–
5		681	794	–	2048	–	4480	–	7680
7		694	694	–	2048	–	4200	–	5432
10		576	576	–	1792	–	2240	–	3200
2-stage									
16		660	660	1408	1408	–	–	–	–
20		660	660	1408	1408	3080	3080	4357	4357
25		660	660	1408	1408	3159	3159	5446	5446
28		660	660	1408	1408	–	–	–	–
35		660	660	1408	1408	3159	3159	5446	5446
40		660	660	1408	1408	–	–	–	–
50		660	660	1408	1408	2880	2880	3980	3980
70		616	616	1408	1408	2904	2904	4400	4400
100		475	475	1232	1232	2240	2240	3840	3840

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Technical specifications

$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components

The Emergency Off torque can be tolerated a maximum of 1000 times within the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether the torques, caused by very rare operating faults, can damage the gearbox.

Transmission ratio *i*	$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components in Nm										
	Gearbox	TP004			TP010				TP025			
	Motor	1FT2102 1FT2□03	1FT2□04	1FT2□05	1FT2102	1FT2□03 1FT2□04	1FT2□05	1FT2□06 1FT2□08	1FT2□03	1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2210
1-stage												
4		50	100	100	–	128	250	251	313	313	625	625
5		50	100	100	–	160	250	251	313	313	625	625
7		67	100	100	–	224	251	251	324	324	625	625
10		95	100	100	–	251	251	251	424	424	625	625
2-stage												
16		100	100	–	152	251	251	–	512	625	625	–
20		100	100	–	190	251	251	–	625	625	625	–
25		100	100	–	238	251	251	–	625	625	625	–
28		100	100	–	251	251	251	–	625	625	625	–
35		100	100	–	251	251	251	–	625	625	625	–
40		100	100	–	251	251	251	–	625	625	625	–
50		100	100	–	251	251	251	–	625	625	625	–
70		100	100	–	251	251	251	–	625	625	625	–
100		100	100	–	251	251	251	–	625	625	625	–

Transmission ratio *i*	$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components in Nm									
	Gearbox	TP050			TP110			TP300		TP500	
	Motor	1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2210	1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2210	1FT2□06	1FT2□08 1FT2210	1FT2□06 1FT2□08	1FT2210
1-stage											
4		625	625	1250	–	3075	3075	–	–	–	–
5		756	756	1250	–	3075	3075	–	9900	–	15000
7		1059	1059	1250	–	3075	3075	–	9900	–	15000
10		1190	1190	1250	–	3075	3075	–	8750	–	15000
2-stage											
16		741	1250	1250	2420	2420	3075	–	–	–	–
20		926	1250	1250	3025	3025	3075	9900	9900	15000	15000
25		1158	1250	1250	3075	3075	3075	9900	9900	15000	15000
28		1250	1250	1250	3075	3075	3075	–	–	–	–
35		1250	1250	1250	3075	3075	3075	9900	9900	15000	15000
40		1250	1250	1250	3075	3075	3075	–	–	–	–
50		1250	1250	1250	3075	3075	3075	9900	9900	15000	15000
70		1250	1250	1250	3075	3075	3075	9900	9900	15000	15000
100		1250	1250	1250	3075	3075	3075	8750	8750	15000	15000

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Technical specifications

η_G – Efficiency of the gearbox components under full load

The exact values for the efficiency are, to some extent, dependent on the frame size of the mounted motor and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.
In the partial load range, especially when the gearbox is cold, the efficiency of the gearbox is always lower than at operating speed.
The gear losses are already taken into account in the characteristic curves and in the following characteristic data of the geared motor or its components: $M_{2,0}$, $M_{2,max}$, $M_{0,M}$, $M_{max,M}$.
A reduction of this characteristic curve and the characteristics on efficiency is not necessary.

	η_G – Efficiency of the gearbox components under full load in % **Gearbox**	
	TP004 – TP110	**TP300 – TP500**
1-stage	97	95
2-stage	94	93

C_{T2} – Torsional rigidity of the gearbox (related to the output)

The exact values for the torsional rigidity are dependent on the motor-gearbox combination and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Transmission ratio *i*	**C_{T2} – Torsional rigidity of the gearbox in Nm/ ’** **Gearbox**						
	TP004	**TP010**	**TP025**	**TP050**	**TP110**	**TP300**	**TP500**
1-stage							
4	12	32	80	190	610	–	–
5	12	33	86	187	610	1000	1450
7	11	30	76	159	550	900	1300
10	8	23	62	123	445	700	1100
2-stage							
16	12	32	81	180	585	–	–
20	12	32	81	185	580	850	1400
25	12	32	83	180	570	950	1450
28	12	31	80	180	560	–	–
35	12	32	82	175	560	900	1400
40	11	30	76	175	520	–	–
50	12	30	80	175	525	800	1300
70	11	28	71	145	480	800	1250
100	8	22	60	115	395	650	1050

φ_2 – Torsional backlash of the gearbox on the gear output

	φ_2 – Torsional backlash of the gearbox at the gear output in ’ **Gearbox** **TP004 – TP500**
1-stage	4
2-stage	4

φ_2 – Optional: Reduced torsional backlash at the gear output

	φ_2 – Optional: Reduced torsional backlash of the gearbox at the gear output in ’ **Gearbox**		
	TP004	**TP010 – TP110**	**TP300 – TP500**
1-stage	2	1	1
2-stage	2	1	2

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Technical specifications

Permissible shaft loading capacity

The limit values shown for the bearing load refer to equivalent forces to be determined mathematically, whose effect is equivalent to the forces occurring in the load profile.
They only apply to radial and axial loads. Axial forces up to maximum $F_A = 0.24 \times F_R$ are permissible in case of superimposition. They apply to the output speed of 100 r/min and in case of radial force for a force application point in the center of the shaft or for centrally applied axial force. For other speeds or force application points, the permissible radial forces must be obtained from the radial force diagrams of the Configuration Manual.

	Permissible shaft loading capacity, radial and axial forces in N						
	Gearbox						
	TP004	**TP010**	**TP025**	**TP050**	**TP110**	**TP300**	**TP500**
Average axial force $F_{A\,eq}$							
• for L_{10h} = 20000 h	1630	2795	4800	6130	10050	33000	50000
• for L_{10h} = 30000 h	1400	2500	4300	5400	8900	29200	44300
Maximum axial force $F_{A\,max}$	1630	2795	4800	6130	10050	33000	50000
Speed for average axial forces $n_{2F\,av}$	5682	7620	2287	338	510	39	26

Values for pure centric axial force, average values for given speed.

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Precision gearbox type TP+

Technical specifications

m_G – Weight of the gearbox components

The weight of the assigned motors and the total weight of the geared motors are in the data sheet resulting from the configuration of the motor or the geared motor in the Siemens Product Configurator.

Transmission ratio *i*	m_G – Weight of the gearbox components in kg										
	Gearbox										
	TP004			TP010				TP025			
	Motor										
	1FT2102 1FT2□03	1FT2□04	1FT2□05	1FT2102	1FT2□03 1FT2□04	1FT2□05	1FT2□06 1FT2□08	1FT2□03	1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2210
1-stage											
4	0.172	0.245	0.569	–	0.779	0.945	2.315	2.589	2.589	3.282	10.347
5	0.139	0.213	0.537	–	0.622	0.788	2.158	2.111	2.111	2.804	9.869
7	0.11	0.184	0.508	–	0.478	0.645	2.015	1.69	1.69	2.382	9.449
10	0.095	0.168	0.492	–	0.402	0.568	1.94	1.448	1.448	2.14	9.208
2-stage											
16	0.078	0.174	–	0.167	0.24	0.564	–	0.661	0.828	2.198	–
20	0.07	0.165	–	0.136	0.21	0.533	–	0.548	0.714	2.084	–
25	0.068	0.164	–	0.13	0.204	0.527	–	0.529	0.695	2.065	–
28	0.062	0.157	–	0.108	0.181	0.506	–	0.44	0.607	1.977	–
35	0.061	0.157	–	0.104	0.178	0.502	–	0.431	0.597	1.968	–
40	0.057	0.153	–	0.093	0.167	0.491	–	0.383	0.549	1.922	–
50	0.057	0.153	–	0.091	0.165	0.489	–	0.378	0.545	1.917	–
70	0.056	0.152	–	0.09	0.164	0.488	–	0.374	0.54	1.913	–
100	0.056	0.152	–	0.089	0.163	0.487	–	0.372	0.538	1.91	–

Transmission ratio *i*	m_G – Weight of the gearbox components in kg									
	Gearbox									
	TP050			TP110			TP300		TP500	
	Motor									
	1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2210	1FT2□04 1FT2□05	1FT2□06 1FT2□08	1FT2210	1FT2□06	1FT2□08 1FT2210	1FT2□06 1FT2□08	1FT2210
1-stage										
4	9.471	9.471	13.708		44.452	44.452				
5	7.852	7.852	12.089		34.631	34.631		82.6		181.9
7	6.391	6.391	10.625		25.494	25.494		61.2		142
10	5.544	5.544	9.778		20.59	20.59		49.5		119.8
2-stage										
16	2.531	3.224	10.289	8.51	8.51	12.747				
20	2.075	2.768	9.833	8.214	8.214	12.451	27.5	27.5	35.9	35.9
25	2.01	2.703	9.768	7.821	7.821	12.058	25.9	25.9	33.7	33.7
28	1.672	2.365	9.432	6.57	6.57	10.803				
35	1.639	2.332	9.399	6.374	6.374	10.607	22.4	22.4	27.4	27.4
40	1.439	2.132	9.199	5.634	5.634	9.868				
50	1.423	2.115	9.183	5.536	5.536	9.769	21.5	21.5	25.4	25.4
70	1.408	2.101	9.168	5.444	5.444	9.678	21.3	21.3	25	25
100	1.4	2.093	9.16	5.395	5.395	9.629	21.2	21.2	24.8	24.8

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Selection and ordering data

Selection of holding brake, degree of protection motor, encoder, connection technology, gearbox lubrication and shaft design

Configuration in the Siemens Product Configurator
www.siemens.com/simotics-1fk2-servogearedmotors/configuration
www.siemens.com/simotics-1ft2-servogearedmotors/configuration

SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Basic motor Article No. — Planetary gearbox Order codes

1F■2...-.A.■■-.■■0-Z ■■■+■■■+■■■+■■■

Basic servomotor – See selection and ordering data tables		K / T
Holding brake	Without holding brake	0
	With holding brake	1
	Reinforced holding brake (only for 1FT2208-2, 1FT2208-3, 1FT2210-2 and 1FT2210-3)	2
Degree of protection motor	IP64	0
	IP65	1
Motor shaft – Assignment depends on the gearbox size, see selection and ordering data tables		
Encoder	Absolute encoder 22-bit single-turn (AS22DQC)	S
	Absolute encoder 22-bit + 12-bit multi-turn (AM22DQC)	M
	Absolute encoder 26-bit single-turn (AS26DQC)	B
	Absolute encoder 26-bit + 12-bit multi-turn (AM26DQC)	C
Connection technology	One-cable technology for SINAMICS S210 servo converters (see Catalog D 32)	A
	Two-cable technology for SINAMICS S120/S220 servo converters (see Catalog D 21.4)	B

Gearbox type, gearbox size, number of gearbox stages, transmission ratio, lubrication and gearbox shaft

1. Order code – gearbox type, gearbox size and number of gearbox stages

• Gearbox type Order codes see selection and ordering data tables	Economy gearbox NRB or economy angular gearbox NRBW	A
	Economy gearbox NRK or economy angular gearbox NRKW	B
	Economy gearbox NLC or economy angular gearbox NLCW	C
	Precision gearbox SP+	J
	Precision gearbox TP+	H

• Gearbox size Order codes see selection and ordering data tables				
040/050/-/-/-	1	160/155/-/140/050	5	
060/070/060/060/004	2	-/-/-/180/110	6	
080/090/080/075/010	3	-/-/-/210/300	7	
120/120/120/100/025	4	-/-/-/240/500	8	

• Number of gearbox stages Order codes see selection and ordering data tables	Coaxial gearboxes		Angular gearboxes (only for 1FT2)	
	1-stage	1	 1-stage	6
	2-stage	2	2-stage	7
	3-stage	3	3-stage	8

2. Order code – transmission ratio i – Order code, see selection and ordering data tables

1-stage				2-stage						3-stage			
3	R03	10	R10	9	R09	25	R25	50	R50	60	R60	200	R02
4	R04			12	R12	28	R28	64	R64	80	R80	256	R52
5	R05			15	R15	32	R32	70	R70	100	R01	320	R23
7	R07			16	R16	35	R35	100	R00	120	R21	512	R51
8	R08			20	R20	40	R40			160	R61		

3. Order code – gearbox lubrication, shaft version and torsional backlash

Lubrication	Shaft end at gearbox		Torsional backlash	
Standard lubrication	+ Plain solid shaft	M00	+ reduced-backlash version	M05
	+ Solid shaft with feather key	M01		M06
	+ Splined shaft	M02		M07
Food-safe lubricant	+ Plain solid shaft	M10		M15
	+ Solid shaft with feather key	M11		M16
	+ Splined shaft	M12		M17

4. Order code (optional) – different orientation of the output for angular gearboxes (only for 1FT2)

–	Q91	Q92	Q93
 Standard orientation	 Connector on the output side	 Connector offset through 180° with respect to the standard	 Connector opposite the output

Notes:
- The geared motor can only be delivered as a unit – motor plus gearbox (no individual gearboxes).
- Not all combinations are possible – See selection and ordering data tables.

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Notes on the selection

Selection and ordering data

Characteristic curves of the geared motor (available via the Siemens Product Configurator)

❶ $M_{S1,M}$ – Characteristic of the largest thermally permissible effective torque of the motor component minus the gear friction and with consideration of the thermal interactions of the gearbox attachment.
The effective operating point must be below this line to avoid thermal overload of the geared motor.

❷ $M_{max,M}$ – Characteristic of the largest torque that can be generated by the motor component for a short time minus the gear friction.

$M_{S1,M}$ and $M_{max,M}$ may exceed the mechanically permissible limits of the gearbox, depending on the selection of the motor-gearbox combination [1].

Important gearbox component data in this catalog:

❸ $M_{2N,G}$ – The rated torque of the gearbox component at the output. This represents the fatigue strength limit of the gear teeth (independently of the motor). If exceeded, the gearbox is partially damaged and a service life calculation is required.

❹ $M_{2max,G}$ – Maximum torque of the gearbox component. This is the limit of the time strength range (can be tolerated for 30000 revolutions of the output shaft).
There is a risk of breakage if the limit is exceeded.

❺ $n_{1av,G}$ – Greatest average input speed. In each time window of 15 minutes, the average input speed must be below $n_{1av,G}$.

Important motor component data in this catalog:

❻ $M_{0,M}$ – The motor component can deliver this torque thermally on a sustained basis at standstill and near standstill. It may exceed the mechanical limits of the gearbox component if necessary [1].

❼ $M_{max,M}$ – The motor component can deliver this torque for a short time. It may exceed the mechanical limits of the gearbox component if necessary [1].

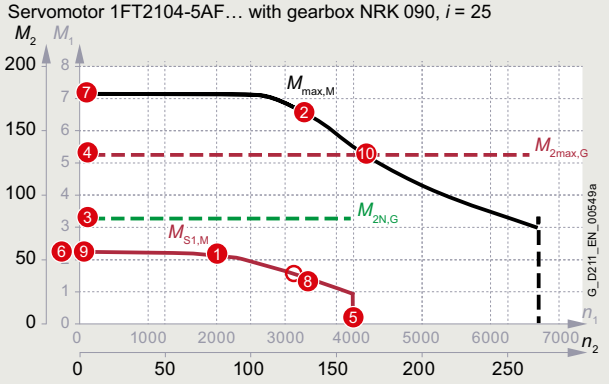
Important geared motor system data in this catalog:

❽ Rated operating point:
M_{2N} – Rated torque and
n_{2N} – rated speed.
This rated point can be permanently driven thermally and mechanically. If the S1 characteristic $M_{S1,M}$ at n_{2N} is greater than $M_{2N,G}$, M_{2N} is reduced accordingly. At the rated point, the geared motor has approximately its maximum power.

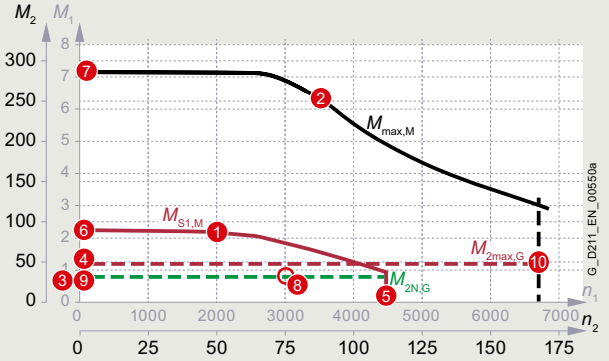
❾ $M_{2.0}$ – The geared motor can deliver this torque thermally on a sustained basis at standstill and near standstill.
It is reduced to $M_{2N,G}$ if necessary.

❿ M_{2max} – The geared motor can deliver this torque for a short time. It may be within the time strength range of the gearbox.

Servomotor 1FT2104-5AF… with gearbox NRK 090, i = 25



Servomotor 1FT2104-5AF… with gearbox NRK 070, i = 40



[1] In this case, it must be ensured that the torque effective at the gearbox output does not exceed the permissible limits (consideration of the load-to-motor inertia ratio during acceleration processes).
More information is provided in the Configuration Manual.

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Selection and ordering data

Glossary

Formula symbols	Unit	Designation	Explanation
i		Transmission ratio	Input-to-output speed transmission ratio
C_{T2}	Nm/ ‘	Torsional stiffness of the gearbox	Torsional stiffness of the gearbox related to the output
J_1	kg cm^2	Mass moment of inertia of the geared motor	Total mass moment of inertia of the geared motor related to the input or the motor shaft
$J_{1,G}$	kg cm^2	Mass moment of inertia of the gearbox component	Mass moment of inertia of the gearbox component of a geared motor related to the input of the gearbox
J_M	kg cm^2	Mass moment of inertia of the motor component without brake	Mass moment of inertia of the motor component of a geared motor
$J_{M,Br}$	kg cm^2	Mass moment of inertia of the motor component with brake	Mass moment of inertia of the motor component of a geared motor including motor holding brake
m	kg	Mass of the geared motor	Total mass of the geared motor
m_G	kg	Mass of the gearbox component	Mass of the gearbox component of a geared motor
m_M	kg	Mass of the motor component	Mass of the motor component of a geared motor
$m_{M,Br}$	kg	Mass of the motor component with brake	Mass of the motor component with motor holding brake
$M_{0,M}$	Nm	Static torque of the motor component on the geared motor	Torque of the motor component at standstill and near standstill that can be generated permanently electrically or on average. If this is above $M_{2max,G}$, it must be ensured that a maximum of $M_{2max,G}/ i$ is applied to the gearbox input (observe the gearbox inertia to load inertia ratio). If necessary, limit the acceleration, torque or current accordingly on the application side.
$M_{2.0}$	Nm	Geared motor static torque	The geared motor can deliver this torque thermally on a sustained basis at standstill and near standstill. It is within the fatigue strength range of the gearbox.
M_{2N}	Nm	Rated torque of the geared motor	The geared motor can deliver this torque thermally on a sustained basis at its rated speed. It is within the fatigue strength range of the gearbox.
$M_{2N,G}$	Nm	Rated torque of the gearbox component	Rated torque of the gearbox component at the output. This represents the fatigue strength limit of the gear teeth (independently of the motor). If exceeded, the gearbox is partially damaged and a service life calculation is required.
M_{max}	Nm	Maximum torque of the motor	Maximum torque of the motor that can be generated for a short time.
M_{2max}	Nm	Maximum torque of the geared motor	Maximum possible short-term and permissible torque at the output of the geared motor.
$M_{max,M}$	Nm	Maximum torque of the motor component	Electrically generated maximum torque of the motor component. If this is above $M_{2max,G}$, it must be ensured that a maximum of $M_{2max,G}/ i$ is applied to the gearbox input (observe the gearbox inertia to load inertia ratio). If necessary, limit the acceleration, torque or current accordingly on the application side.
$M_{2max,G}$	Nm	Maximum torque of the gearbox component	Maximum (very rare) permissible torque at the output of the gearbox. This is the limit of the time strength range. There is a risk of breakage if the limit is exceeded.
$M_{2Em.Off}$	Nm	Emergency Off torque	$M_{2Em.Off}$ can be tolerated a maximum of 1000 times during the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether high torques, caused by very rare operating faults, can damage the gearbox.
$n_{1av,G}$	r/min	Largest average input speed of the gearbox component	In each time window of 15 minutes, the average input speed must be below $n_{1av,G}$.
$n_{1max,G}$	r/min	Maximum input peed of the gearbox component	Maximum permissible short-term input speed of the gearbox component on a geared motor
$n_{max,M}$	r/min	Maximum speed of the motor component	Maximum achievable and maximum permissible speed of the motor component on a geared motor
$n_{2B,G}$	r/min	Reference speed of the gearbox	Reference speed relative to the rated torque $M_{2N,G}$ of the gearbox component. This is required to perform a service life calculation of the gearbox output bearings.
n_{2max}	r/min	Maximum speed of the geared motor	Maximum achievable and maximum permissible speed at the gearbox output of a geared motor
n_{2N}	r/min	Rated speed of the geared motor	The rated torque of the geared motor is specified at this speed
F_R	N	Radial force	Radial force perpendicular to the shaft axis
$F_{R\,eq}$	N	Average radial force	Radial force averaged over the cycle, perpendicular to the shaft axis. For ball bearings, use the cubic mean. For roller bearings, use the exponent 3.33 instead of the exponent 3.
$F_{R\,max}$	N	Maximum radial force	Maximum statically permissible radial force
F_A	N	Axial force	Axial force
$F_{A\,eq}$	N	Average axial force	Axial force averaged over the cycle. For ball bearings, use the cubic mean. For roller bearings, use the exponent 3.33 instead of the exponent 3.
$F_{A\,max}$	N	Maximum axial force	Maximum statically permissible axial force
M_b	Nm	Maximum permissible bending moment	Maximum permissible bending moment at the motor flange to gearbox adapter separation point
φ_2	’	Torsional backlash of the gearbox	Torsional backlash of the gearbox related to the output

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Notes on the selection

Selection and ordering data

Selection of servomotors with planetary gearbox

- Select gearbox type and gearbox size, e.g. on the basis of the required torque or the required shaft loads - Table *Permissible output shaft loads*.
- Select a suitable servomotor-gearbox combination from the *Selection data servomotors with planetary gearbox*, the *Servomotor data* and the *Planetary gearbox data*, e.g. on the basis of the rated speed of the servomotor with planetary gearbox, the associated transmission ratio and the rated torque.
  The fatigue strength of the motor and gearbox combination must be taken into account – see color background of the *Selection data servomotors with planetary gearbox* with associated color legend.

Structure of the tables for selection and ordering data

All combinations of servomotors with planetary gearbox including the transmission ratios available in each case can be found in the selection tables for SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors.

The selection tables are sorted according to the following criteria:

- Line supply voltage of the converter
- Gearbox type and size

The following views contain legends with explanations of the formula symbols and units specified in the selection and order tables.

Legend for "Servomotor data":

Servomotor data			Selection data servomotors with planetary gearbox	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)		
Nm	Nm	kg cm²		
				1F.2102-0AG..-0.A0-Z
			Rotor moment of inertia of the motor component (with holding brake) [1]	■■■ + ■■■ + . . .
			Maximum possible short-term torque of the motor component [2]	
			Maximum thermally permissible effective torque of the motor component at standstill or near standstill [2]	

Legend for "Selection data servomotors with planetary gearbox":

Servomotor data			**Selection data servomotors with planetary gearbox**			Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)				
Nm	Nm	kg cm²				
...	...	...	n_{2N}	r/min	Rated speed of the servo planetary geared motor	1F.2102-0AG..-0.A0-Z
			M_{2N}	Nm	Rated torque of the servo planetary geared motor	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	Static torque of the servo planetary geared motor	
			M_{2max}	Nm	Max. permissible short-term output torque of the servo planetary geared motor	

Legend for "Planetary gearbox data":

Servomotor data			Selection data servomotors with planetary gearbox			Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)				
Nm	Nm	kg cm²				
Planetary gearbox data						1F.2102-0AG..-0.A0-Z
Gearbox type, gearbox stages:					Gearbox type and number of gearbox stages	■■■ + ■■■ + . . .
1. Order code					1. Order code for gearbox type, gearbox size and number of gearbox stages	
	i				Transmission ratio	
2. Order code					2. Order code for transmission ratio	
	$M_{2N,G}$	Nm			Rated torque of the gearbox component (fatigue strength)	
	$M_{2max,G}$	Nm			Maximum permissible short-term output torque of the gearbox (fatigue strength, max. 30000 revolutions of the output shaft)	
	$M_{2Em.Off}$	Nm			Emergency Off output torque of the gearbox (max. 1000 times)	
	$J_{1,G}$	kg cm²			Moment of inertia of the gearbox related to the input [1]	
	$\varphi_{2,G}$	'			Torsional backlash of the gearbox related to the output	

Color legend for the fatigue strength of the motor and gearbox combination:

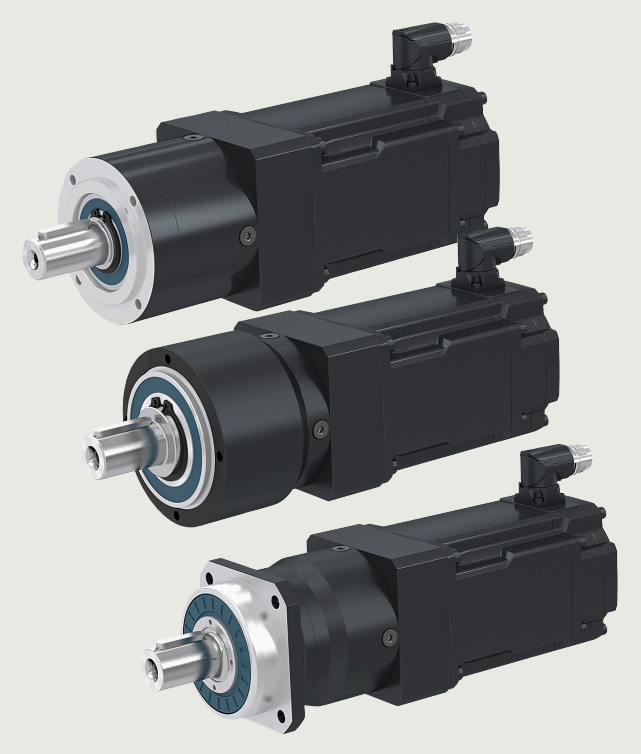
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

[1] The total mass inertia is the sum of the motor and gearbox mass inertia. On some motors, the inertia of the gearbox clamping system is attributed to the motor.

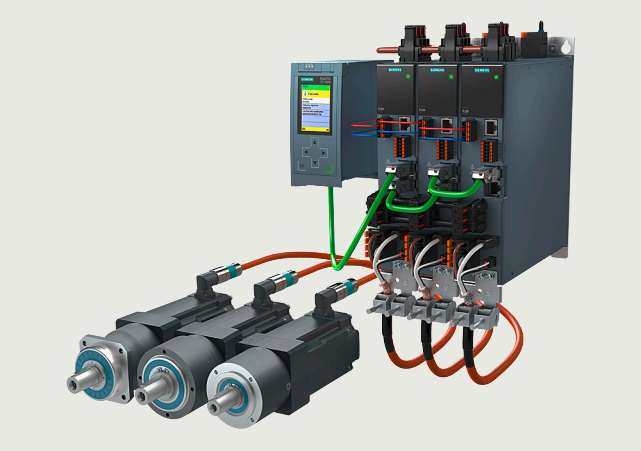
[2] Exact values can be found in the data sheet of the motor-gearbox combination, available via the Siemens Product Configurator.

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Selection and ordering data



SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors with economy gearbox



Example: SINAMICS S210 servo converter with SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

The following pages show the permissible combinations of **servo motors for 230 V 1 AC / 240 V 3 AC** converters

and coaxial economy planetary geared motors **NRB, NRK and NLC** geared motors.

They show the most important component data of the motor and gearbox as well as the rating of the system geared motor.

The rated operating points of the geared motors are adapted to the converter supply voltage.

More information on selection is provided in the section "Information on Selection".

Economy gearboxes have straight gearing, are grease-lubricated and have a low torsional backlash.

NRB

NRB is the lightest gearbox with the highest power density. Thanks to its low-friction bearing design it is suitable for high speeds and generates very little heat.

NRK

The NRK series gearbox is suitable for higher radial and axial forces due to the large output bearing. This gearbox is also suitable for higher speeds thanks to low internal friction.

NLC

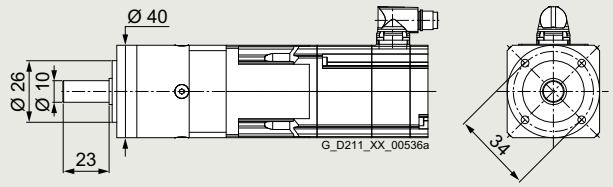
Thanks to the preloaded tapered roller bearing, the NLC gearbox has a high degree of stiffness and is perfectly suited for high radial and axial loads. The IP65 seal provides protection against dust and water.

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Gearbox type NRB040

Selection and ordering data

NRB040



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	200 N at 100 r/min
Average axial force for 20000 h	$F_{A,eq}$	200 N at 100 r/min
Average radial force for 30000 h	$F_{R,eq}$	160 N at 100 r/min
Average axial force for 30000 h	$F_{A,eq}$	160 N at 100 r/min
Maximum radial force	$F_{R,max}$	200 N
Maximum axial force	$F_{A,max}$	240 N

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB040 1- and 2-stage																			
0.117	0.521	0.0245	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	**1F.2102-0AG..-0.A0-Z**
...	...	(0.0285)	M_{2N}	Nm	0.25	0.35	0.465	0.64	0.78	0.99	0.78	1.11	1.4	1.46	1.92	2.35	3.05	3.9	6.2	■■■ + ■■■ + . . .
0.124	0.535		$M_{2, 0}$	Nm	0.35	0.475	0.6	0.85	0.98	1.23	1.07	1.43	1.8	1.92	2.4	3	3.85	4.8	7.5	
			M_{2max}	Nm	1.59	2.1	2.65	3.7	4.25	5.3	4.75	6.3	7.9	8.4	10.5	13.2	16.9	21	12	
0.247	1.05	0.036	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	**1F.2102-1AG..-0.A0-Z**
...	...	(0.04)	M_{2N}	Nm	0.62	0.84	1.07	1.47	1.77	2.2	1.82	2.5	3.15	3.3	4.25	5.2	6.8	8.6	7.5	■■■ + ■■■ + . . .
0.264	1.08		$M_{2, 0}$	Nm	0.77	1.04	1.31	1.84	2.1	2.6	2.25	3.05	3.8	4.05	5.1	6.4	8.1	10.2	7.5	
			M_{2max}	Nm	3.2	4.25	5.3	7.5	8.5	8	9.5	12.7	15.9	17	21	26.5	32	29	12	
0.466	1.83	0.1396	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	**1F.2103-2AG..-2.A0-Z**
...	...	(0.1586)	M_{2N}	Nm	1.03	1.4	1.78	2.3	2.9	3.65	2.9	4.15	5.2	5.4	7	8.6	11	14.2	7.5	■■■ + ■■■ + . . .
0.496	1.89		$M_{2, 0}$	Nm	1.47	1.97	2.45	3.45	3.95	4.95	4.3	5.7	7.2	7.7	9.6	12	15.4	18	7.5	
			M_{2max}	Nm	5.6	7.5	9.4	13.2	10	8	16.8	22	28	29.5	32	29	32	29	12	
0.452	1.83	0.1396	n_{2N}	r/min	1000	750	500	375	375	250	300	250	200	200	125	100	100	75	50	**1F.2103-2AH..-2..0-Z**
...	...	(0.1586)	M_{2N}	Nm	0.86	1.21	1.79	2.45	2.65	3.65	3	3.8	4.8	4.9	7	8.7	10	13	7.5	■■■ + ■■■ + . . .
0.482	1.89		$M_{2, 0}$	Nm	1.43	1.91	2.35	3.35	3.8	4.8	4.2	5.6	7	7.4	9.3	11.6	14.9	18	7.5	
			M_{2max}	Nm	5.6	7.5	9.4	13.2	10	8	16.8	22	28	29.5	32	29	32	29	12	
0.976	3.85	0.1856	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	150	150	125	100	75	–	**1F.2103-4AG..-2.A0-Z**
...	...	(0.2046)	M_{2N}	Nm	2.3	3	3.7	5	5.1	5	6.5	7.7	9.7	12.6	13	15.5	19.4	18	–	■■■ + ■■■ + . . .
1.04	3.96		$M_{2, 0}$	Nm	3.1	4.1	5.1	7.2	6	5	9	12	15.1	16.1	20	18	20	18	–	
			M_{2max}	Nm	11.8	15.8	19.7	13.5	10	8	26	32	29	32	32	29	32	29	–	
0.881	3.85	0.1856	n_{2N}	r/min	750	600	500	375	375	250	300	250	200	200	125	100	100	75	–	**1F.2103-4AH..-2..0-Z**
...	...	(0.2046)	M_{2N}	Nm	2.05	2.65	3.3	4.55	4.6	5	5.9	7	8.8	8.6	13.9	17.4	17.9	18	–	■■■ + ■■■ + . . .
0.933	3.96		$M_{2, 0}$	Nm	2.75	3.7	4.65	6.5	6	5	8.1	10.8	13.6	14.5	18.1	18	20	18	–	
			M_{2max}	Nm	11.8	15.8	19.7	13.5	10	8	26	32	29	32	32	29	32	29	–	

Planetary gearbox data																	
Gearbox type:			NRB040, 1-stage						NRB040, 2-stage								
1. Order code			A11						A12								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	11	15	14	8.5	6	5	16.5	20	18	20	20	18	20	18	7.5
	$M_{2max,G}$	Nm	17.5	24	22	13.5	10	8	26	32	29	32	32	29	32	29	12
	$M_{2Em.Off}$	Nm	22.5	30	36	26	27	27	33	40	36	40	40	36	40	36	27
	$J_{1,G}$	kg cm²	0.027	0.021	0.019	0.015	0.015	0.014	0.026	0.025	0.025	0.02	0.018	0.018	0.015	0.015	0.015
	$\varphi_{2,G}$	'	15						19								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB040

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB040 1- and 2-stage																			
0.53	1.74	0.2466	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1F.2203-2AG..-2.A0-Z
...	...	(0.2666)	M_{2N}	Nm	0.99	1.35	1.73	2.05	2.8	3.55	2.65	4.05	5	5	6.8	8.2	10.4	13.8	7.5	■■■ + ■■■ + . . .
0.566	1.79		$M_{2,0}$	Nm	1.68	2.25	2.8	3.95	4.5	5	4.9	6.5	8.2	8.7	10.9	13.7	17.5	18	7.5	
			M_{2max}	Nm	5.3	7.1	8.9	12.5	10	8	15.9	21	26.5	28	32	29	32	29	12	
0.493	1.74	0.2466	n_{2N}	r/min	750	600	500	375	300	250	300	200	150	150	125	100	75	60	50	1F.2203-2AK..-2..0-Z
...	...	(0.2666)	M_{2N}	Nm	0.93	1.2	1.47	2	2.5	3.05	2.35	3.55	4.7	4.75	5.7	7.2	9.6	12.1	7.5	■■■ + ■■■ + . . .
0.527	1.79		$M_{2,0}$	Nm	1.56	2.05	2.6	3.65	4.2	5	4.6	6.1	7.6	8.1	10.2	12.7	16.3	18	7.5	
			M_{2max}	Nm	5.3	7.1	8.9	12.5	10	8	15.9	21	26.5	28	32	29	32	29	12	
1.13	3.56	0.3966	n_{2N}	r/min	1000	750	600	375	375	300	300	250	200	200	150	125	100	75	–	1F.2203-4AG..-2.A0-Z
...	...	(0.4166)	M_{2N}	Nm	2.3	3.15	4.05	6.5	6	5	7.9	9.8	12.2	11.9	16.4	18	20	18	–	■■■ + ■■■ + . . .
1.2	3.67		$M_{2,0}$	Nm	3.55	4.75	5.9	8.3	6	5	10.5	14	17.5	18.6	20	18	20	18	–	
			M_{2max}	Nm	10.9	14.6	18.3	13.5	10	8	26	32	29	32	32	29	32	29	–	
1	3.56	0.3966	n_{2N}	r/min	750	500	500	300	300	300	300	200	150	150	125	100	75	75	–	1F.2203-4AK..-2..0-Z
...	...	(0.4166)	M_{2N}	Nm	2.05	3.15	3.15	5.4	5.5	4.75	5.5	8.4	11	11.2	13.7	17.1	20	18	–	■■■ + ■■■ + . . .
1.06	3.67		$M_{2,0}$	Nm	3.15	4.2	5.3	7.4	6	5	9.3	12.4	15.5	16.5	20	18	20	18	–	
			M_{2max}	Nm	10.9	14.6	18.3	13.5	10	8	26	32	29	32	32	29	32	29	–	

Planetary gearbox data																	
Gearbox type:			NRB040, 1-stage						NRB040, 2-stage								
1. Order code			A11						A12								
i			3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	11	15	14	8.5	6	5	16.5	20	18	20	20	18	20	18	7.5
	$M_{2max,G}$	Nm	17.5	24	22	13.5	10	8	26	32	29	32	32	29	32	29	12
	$M_{2Em.Off}$	Nm	22.5	30	36	26	27	27	33	40	36	40	40	36	40	36	27
	$J_{1,G}$	kg cm²	0.027	0.021	0.019	0.015	0.015	0.014	0.026	0.025	0.025	0.02	0.018	0.018	0.015	0.015	0.015
	$\varphi_{2,G}$	'	15						19								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB040

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB040 3-stage													
0.117 ... 0.124	0.521 ... 0.535	0.0245 (0.0285)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	1F.2102-0AG..-0.A0-Z
			M_{2N}	Nm	5.5	7.5	9.3	11	15	18	20	18	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7	9.3	11.6	14	18.6	18	20	18	
			M_{2max}	Nm	31	32	32	29	32	29	32	29	
0.247 ... 0.264	1.05 ... 1.08	0.036 (0.04)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	1F.2102-1AG..-0.A0-Z
			M_{2N}	Nm	12.2	16.5	20	18	20	18	20	18	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.8	19.8	20	18	20	18	20	18	
			M_{2max}	Nm	32	32	32	29	32	29	32	29	
0.466 ... 0.496	1.83 ... 1.89	0.1396 (0.1586)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	–	1F.2103-2AG..-2.A0-Z
			M_{2N}	Nm	20	20	20	18	20	18	20	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	20	20	20	18	20	18	20	–	
			M_{2max}	Nm	32	32	32	29	32	29	32	–	
0.452 ... 0.482	1.83 ... 1.89	0.1396 (0.1586)	n_{2N}	r/min	50	37.5	25	25	20	12.5	10	–	1F.2103-2AH..-2..0-Z
			M_{2N}	Nm	18.6	20	20	18	20	18	20	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	20	20	20	18	20	18	20	–	
			M_{2max}	Nm	32	32	32	29	32	29	32	–	
0.976 ... 1.04	3.85 ... 3.96	0.1856 (0.2046)	n_{2N}	r/min	50	37.5	30	–	–	–	–	–	1F.2103-4AG..-2.A0-Z
			M_{2N}	Nm	20	20	20	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	20	20	20	–	–	–	–	–	
			M_{2max}	Nm	32	32	32	–	–	–	–	–	
0.881 ... 0.933	3.85 ... 3.96	0.1856 (0.2046)	n_{2N}	r/min	50	37.5	25	–	–	–	–	–	1F.2103-4AH..-2..0-Z
			M_{2N}	Nm	20	20	20	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	20	20	20	–	–	–	–	–	
			M_{2max}	Nm	32	32	32	–	–	–	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB040 3-stage													
0.53 ... 0.566	1.74 ... 1.79	0.2466 (0.2666)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	–	1F.2203-2AG..-2.A0-Z
			M_{2N}	Nm	19.6	20	20	18	20	18	20	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	20	20	20	18	20	18	20	–	
			M_{2max}	Nm	32	32	32	29	32	29	32	–	
0.493 ... 0.527	1.74 ... 1.79	0.2466 (0.2666)	n_{2N}	r/min	37.5	37.5	30	25	20	15	12.5	–	1F.2203-2AK..-2..0-Z
			M_{2N}	Nm	18	17.1	20	18	20	18	20	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	20	20	20	18	20	18	20	–	
			M_{2max}	Nm	32	32	32	29	32	29	32	–	
1.13 ... 1.2	3.56 ... 3.67	0.3966 (0.4166)	n_{2N}	r/min	50	37.5	30	–	–	–	–	–	1F.2203-4AG..-2.A0-Z
			M_{2N}	Nm	20	20	20	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	20	20	20	–	–	–	–	–	
			M_{2max}	Nm	32	32	32	–	–	–	–	–	
1 ... 1.06	3.56 ... 3.67	0.3966 (0.4166)	n_{2N}	r/min	50	37.5	30	–	–	–	–	–	1F.2203-4AK..-2..0-Z
			M_{2N}	Nm	20	20	20	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	20	20	20	–	–	–	–	–	
			M_{2max}	Nm	32	32	32	–	–	–	–	–	

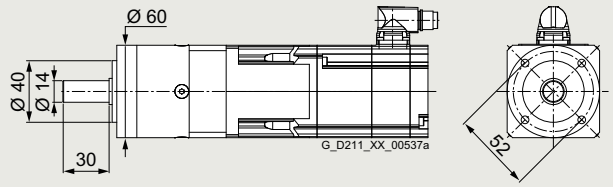
Planetary gearbox data									
Gearbox type:			**NRB040, 3-stage**						
1. Order code			**A13**						
i			**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**
$M_{2N,G}$		Nm	20	20	20	18	20	18	20	18
$M_{2max,G}$		Nm	32	32	32	29	32	29	32	29
$M_{2Em.Off}$		Nm	40	40	40	36	40	36	40	36
$J_{1,G}$		kg cm²	0.025	0.018	0.018	0.025	0.015	0.015	0.015	0.015
$\varphi_{2,G}$		'	22							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Selection and ordering data

NRB060



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	400 N at 100 r/min
Average axial force for 20000 h	$F_{A,eq}$	500 N at 100 r/min
Average radial force for 30000 h	$F_{R,eq}$	340 N at 100 r/min
Average axial force for 30000 h	$F_{A,eq}$	450 N at 100 r/min
Maximum radial force	$F_{R,max}$	700 N
Maximum axial force	$F_{A,max}$	800 N

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB060 1- and 2-stage																			
0.106	0.506	0.0245	n_{2N}	r/min	750	750	600	500	375	300	375	250	200	200	150	125	100	75	50	**1F.2102-0AG..-0.A0-Z**
...	...	(0.0285)	M_{2N}	Nm	0.194	0.255	0.365	0.52	0.67	0.87	0.54	0.85	1.25	1.25	1.7	2.1	2.8	3.6	5.7	■■■ + ■■■ + . . .
0.122	0.517		M_{2_0}	Nm	0.315	0.44	0.56	0.81	0.93	1.18	1.05	1.41	1.78	1.91	2.4	3	3.85	4.8	7.7	
			M_{2max}	Nm	1.51	2	2.55	3.6	4.1	5.1	4.6	6.1	7.6	8.2	10.2	12.8	16.4	20.5	29	
0.258	1.03	0.036	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	**1F.2102-1AG..-0.A0-Z**
...	...	(0.04)	M_{2N}	Nm	0.55	0.81	1.07	1.48	1.8	2.25	1.73	2.45	3.3	3.4	4.4	5.5	7.1	9	14.3	■■■ + ■■■ + . . .
0.271	1.06		M_{2_0}	Nm	0.77	1.05	1.32	1.87	2.15	2.7	2.4	3.2	4	4.3	5.4	6.7	8.6	10.8	17.3	
			M_{2max}	Nm	3.1	4.2	5.2	7.3	8.4	10.5	9.4	12.5	15.7	16.7	20.5	26	33.5	41.5	29	
0.525	1.83	0.093	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	**1F.2103-2AG..-2.A0-Z**
...	...	(0.112)	M_{2N}	Nm	1.13	1.61	2.05	2.8	3.45	4.35	3.35	4.8	6.2	6.4	8.4	10.3	13.3	17	18	■■■ + ■■■ + . . .
0.554	1.88		M_{2_0}	Nm	1.62	2.15	2.7	3.85	4.4	5.5	4.85	6.4	8.1	8.6	10.8	13.5	17.3	21.5	18	
			M_{2max}	Nm	5.6	7.5	9.4	13.1	15	18.8	16.8	22	27.5	29.5	37	46.5	59	64	29	
0.51	1.83	0.093	n_{2N}	r/min	1000	750	500	375	375	250	300	250	200	200	125	100	100	75	50	**1F.2103-2AH..-2..0-Z**
...	...	(0.112)	M_{2N}	Nm	1.06	1.53	2.1	2.95	3.25	4.35	3.5	4.5	5.9	6	8.4	10.5	12.5	16	18	■■■ + ■■■ + . . .
0.539	1.88		M_{2_0}	Nm	1.58	2.1	2.65	3.75	4.3	5.3	4.7	6.2	7.8	8.4	10.5	13.1	16.8	21	18	
			M_{2max}	Nm	5.6	7.5	9.4	13.1	15	18.8	16.8	22	27.5	29.5	37	46.5	59	64	29	
1.09	3.84	0.139	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	**1F.2103-4AG..-2.A0-Z**
...	...	(0.158)	M_{2N}	Nm	2.1	3.05	4	5.1	6.7	8.5	6.4	9.8	12.9	12.9	17.2	20.5	26.5	35	18	■■■ + ■■■ + . . .
1.16	3.95		M_{2_0}	Nm	3.45	4.6	5.7	8.1	9.2	11.6	10.1	13.5	16.9	18	22.5	28	36	40	18	
			M_{2max}	Nm	11.8	15.8	19.7	27.5	29	24	35	46.5	58	62	70	64	70	64	29	
0.972	3.84	0.139	n_{2N}	r/min	1000	750	500	375	375	250	300	250	200	200	125	100	100	75	50	**1F.2103-4AH..-2..0-Z**
...	...	(0.158)	M_{2N}	Nm	1.91	2.8	4.05	5.7	6.1	8.4	6.9	8.9	11.4	11.8	16.2	20	24	30.5	18	■■■ + ■■■ + . . .
1.03	3.95		M_{2_0}	Nm	3.05	4.05	5.1	7.1	8.2	10.2	9	12	15	16	20	25	32	40	18	
			M_{2max}	Nm	11.8	15.8	19.7	27.5	29	24	35	46.5	58	62	70	64	70	64	29	
1.17	3.56	0.371	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2104-4AF..-2..0-Z**
...	...	(0.451)	M_{2N}	Nm	3.35	4.5	5.7	7.9	9.1	11.5	9.7	13.3	16.8	17.7	22	28	35.5	40	18	■■■ + ■■■ + . . .
1.2	3.66		M_{2_0}	Nm	3.55	4.75	5.9	8.3	9.5	11.9	10.6	14.2	17.8	19	23.5	29.5	37.5	40	18	
			M_{2max}	Nm	10.9	14.6	18.2	25.5	29	24	32.5	43	54	57	70	64	70	64	29	

➥ Continued on the next page

Planetary gearbox data																
Gearbox type:			NRB060, 1-stage						NRB060, 2-stage							
1. Order code			A21						A22							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18
	$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29
	$M_{2Em.Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80
	$J_{1.G}$	kg cm²	0.128	0.092	0.08	0.069	0.067	0.065	0.121	0.118	0.076	0.085	0.075	0.075	0.066	0.066	0.066
	$\varphi_{2,G}$	'	10						12								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB060

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB060 1- and 2-stage (continued)																			
1.16 ... 1.19	3.65 ... 3.75	0.371 (0.451)	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1F.2104-4AK..-2..0-Z
			M_{2N}	Nm	3.1	4.25	5.4	7.3	8.8	11	8.9	12.5	16	16.6	21	26	33.5	40	18	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.55	4.7	5.9	8.3	9.5	11.9	10.6	14.1	17.7	18.8	23.5	29.5	37.5	40	18	
			M_{2max}	Nm	11.2	15	18.7	26	29	24	33	44.5	55	59	70	64	70	64	29	
2.25 ... 2.3	7.16 ... 7.36	0.581 (0.671)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	1F.2104-5AF..-2..0-Z
			M_{2N}	Nm	6.5	8.8	11	15.2	17.6	15	18.8	25.5	32	34	42.5	40	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.8	9.1	11.4	16	18	15	20.5	27	34	36	44	40	44	40	–	
			M_{2max}	Nm	22	29	36.5	40	29	24	65	70	70	70	70	64	70	64	–	
2.23 ... 2.28	7.25 ... 7.46	0.581 (0.671)	n_{2N}	r/min	1000	750	600	500	375	300	300	250	200	200	150	125	100	75	–	1F.2104-5AK..-2..0-Z
			M_{2N}	Nm	4.55	6.5	8.4	10.4	13.8	15	15.8	19.3	25	24.5	33.5	40	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.8	9.1	11.4	15.9	18	15	20	27	33.5	36	44	40	44	40	–	
			M_{2max}	Nm	22	29.5	37	40	29	24	66	70	70	70	70	64	70	64	–	
2.98 ... 3.05	9.56 ... 9.83	0.781 (0.861)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	1F.2104-6AF..-2..0-Z
			M_{2N}	Nm	8.2	11.1	14	18.8	18	15	23.5	33.5	42	43.5	44	40	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	9.1	12.1	15.2	21	18	15	27	36	44	44	44	40	44	40	–	
			M_{2max}	Nm	29	39	49	40	29	24	70	70	70	70	70	64	70	64	–	
4.59 ... 4.75	14.3 ... 14.7	1.98 (2.82)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	1F.2105-4AF..-0..0-Z
			M_{2N}	Nm	12.3	16.4	20.5	25	18	15	32.5	44	44	44	44	40	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.2	18.9	23.5	25	18	15	42	44	44	44	44	40	44	40	–	
			M_{2max}	Nm	44	58	64	40	29	24	70	70	70	70	70	64	70	64	–	
4.57 ... 4.75	14.3 ... 14.7	1.98 (2.82)	n_{2N}	r/min	600	500	375	250	300	250	200	150	150	125	125	100	75	75	–	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	10	12.1	16.5	24.5	17.9	15	29	38.5	36.5	44	38.5	40	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.2	19	23.5	25	18	15	42	44	44	44	44	40	44	40	–	
			M_{2max}	Nm	44	58	64	40	29	24	70	70	70	70	70	64	70	64	–	
7.1 ... 7.25	23.2 ... 23.6	2.92 (3.77)	n_{2N}	r/min	500	375	300	250	200	150	–	125	100	100	75	60	50	–	–	1F.2105-6AF..-0..0-Z
			M_{2N}	Nm	16.5	22	27.5	25	18	15	–	44	44	44	44	40	44	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21.5	28.5	36	25	18	15	–	44	44	44	44	40	44	–	–	
			M_{2max}	Nm	45	61	64	40	29	24	–	70	70	70	70	64	70	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB060 1- and 2-stage																			
0.561 ... 0.573	1.74 ... 1.79	0.2 (0.22)	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1F.2203-2AG..-2.A0-Z
			M_{2N}	Nm	1.14	1.64	2.1	2.75	3.55	4.5	3.25	4.9	6.4	6.5	8.6	10.5	13.5	17.5	18	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.68	2.25	2.8	3.95	4.55	5.7	5.1	6.8	8.5	9	11.3	14.2	18.2	22.5	18	
			M_{2max}	Nm	5.3	7.1	8.9	12.4	14.2	17.8	15.9	21	26.5	28	35	44	56	64	29	
0.527 ... 0.538	1.74 ... 1.79	0.2 (0.22)	n_{2N}	r/min	1000	750	600	375	375	300	300	250	200	200	150	125	100	75	50	1F.2203-2AK..-2..0-Z
			M_{2N}	Nm	0.85	1.26	1.66	2.7	2.8	3.55	3.1	3.75	5	4.9	6.7	8.1	10.3	13.9	18	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.57	2.1	2.65	3.7	4.25	5.3	4.75	6.3	8	8.5	10.6	13.3	17.1	21	18	
			M_{2max}	Nm	5.3	7.1	8.9	12.4	14.2	17.8	15.9	21	26.5	28	35	44	56	64	29	
1.17 ... 1.19	3.56 ... 3.66	0.35 (0.37)	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1F.2203-4AG..-2.A0-Z
			M_{2N}	Nm	2.8	3.95	5	6.6	8.2	10.3	8.1	11.5	14.7	15.2	19.7	24	30.5	39.5	18	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.55	4.75	5.9	8.3	9.5	11.9	10.6	14.1	17.7	18.9	23.5	29.5	37.5	40	18	
			M_{2max}	Nm	10.9	14.6	18.2	25.5	29	24	32.5	43	54	57	70	64	70	64	29	

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Planetary gearbox data																
Gearbox type:			NRB060, 1-stage						NRB060, 2-stage							
1. Order code			A21						A22							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18
	$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29
	$M_{2Em.Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80
	$J_{1,G}$	kg cm²	0.128	0.092	0.08	0.069	0.067	0.065	0.121	0.118	0.076	0.085	0.075	0.075	0.066	0.066	0.066
	$\varphi_{2,G}$	'	10						12								

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB060 1- and 2-stage (continued)																				
1.11 ... 1.15	3.56 ... 3.66	0.35 (0.37)	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	**1F.2203-4AK..-2..0-Z**
			M_{2N}	Nm	2.55	3.4	4.25	5.9	5.9	7.6	7	8.6	11.1	11	14.8	17.9	22.5	29.5	18	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.4	4.55	5.7	8	9.2	11.5	10.2	13.7	17.1	18.2	22.5	28.5	36.5	40	18	
			M_{2max}	Nm	10.9	14.6	18.2	25.5	29	24	32.5	43	54	57	70	64	70	64	29	
2.21 ... 2.26	6.78 ... 6.96	1.251 (1.331)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	**1F.2204-5AF..-2..0-Z**
			M_{2N}	Nm	6.2	8.4	10.5	14.4	16.7	15	17.8	24.5	30.5	32	41	40	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.7	9	11.2	15.7	18	15	20	26.5	33.5	35.5	44	40	44	40	–	
			M_{2max}	Nm	20.5	27.5	34.5	40	29	24	61	70	70	70	70	64	70	64	–	
2.22 ... 2.27	6.78 ... 6.96	1.251 (1.331)	n_{2N}	r/min	750	600	600	375	375	300	300	200	200	150	150	125	100	75	–	**1F.2204-5AK..-2..0-Z**
			M_{2N}	Nm	5.5	7.3	7.5	12.4	12.6	15	14.8	22	23	29.5	30.5	36.5	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.8	9	11.3	15.8	18	15	20	27	33.5	35.5	44	40	44	40	–	
			M_{2max}	Nm	20.5	27.5	34.5	40	29	24	61	70	70	70	70	64	70	64	–	
2.96 ... 3.03	9.08 ... 9.33	1.631 (1.711)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	**1F.2204-6AF..-2..0-Z**
			M_{2N}	Nm	8.7	11.8	14.8	19.7	18	15	24.5	34.5	43.5	44	44	40	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	9	12.1	15.1	21	18	15	27	36	44	44	44	40	44	40	–	
			M_{2max}	Nm	27.5	37	46.5	40	29	24	70	70	70	70	70	64	70	64	–	
2.73 ... 2.84	10.3 ... 10.6	3.42 (4.32)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	–	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	7.4	10.1	12.6	17.6	18	15	22.5	28.5	36	38	44	40	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.5	11.3	14.2	19.8	18	15	25	33	41.5	44	44	40	44	40	–	
			M_{2max}	Nm	31.5	42	52	40	29	24	70	70	70	70	70	64	70	64	–	
2.79 ... 2.9	10.3 ... 10.6	3.42 (4.32)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	**1F.2205-2AF..-0..0-Z**
			M_{2N}	Nm	7.7	10.3	12.9	17.6	18	15	21.5	30	37.5	39.5	44	40	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.7	11.6	14.5	20	18	15	25.5	34	42.5	44	44	40	44	40	–	
			M_{2max}	Nm	31.5	42	52	40	29	24	70	70	70	70	70	64	70	64	–	
2.77 ... 2.88	10.3 ... 10.6	3.42 (4.32)	n_{2N}	r/min	600	500	375	300	250	250	200	150	125	125	100	100	75	60	–	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	6.5	8	10.9	13.6	16.6	14.6	20	27	33	32.5	41	36	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.6	11.5	14.4	20	18	15	25	33.5	42.5	44	44	40	44	40	–	
			M_{2max}	Nm	31.5	42	52	40	29	24	70	70	70	70	70	64	70	64	–	
4.85 ... 4.95	17.4 ... 17.7	5.37 (6.27)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	**1F.2205-4AF..-0..0-Z**
			M_{2N}	Nm	11.2	15.1	19	23.5	18	15	28	43.5	44	44	44	40	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.8	19.8	24.5	25	18	15	43.5	44	44	44	44	40	44	40	–	
			M_{2max}	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	–	

Planetary gearbox data																
Gearbox type:			**NRB060, 1-stage**						**NRB060, 2-stage**							
1. Order code			**A21**						**A22**							
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
	$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18
	$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29
	$M_{2Em.Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80
	$J_{1,G}$	kg cm²	0.128	0.092	0.08	0.069	0.067	0.065	0.121	0.118	0.076	0.085	0.075	0.075	0.066	0.066	0.066
	$\varphi_{2,G}$	'	10						12								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB060

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB060 3-stage													
0.106 ... 0.122	0.506 ... 0.517	0.0245 (0.0285)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	1F.2102-0AG..-0.A0-Z
			M_{2N}	Nm	5.1	6.8	8.6	10.7	13.9	17.8	22	27.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.1	9.5	11.9	14.3	19.1	23.5	30.5	38	
			M_{2max}	Nm	30.5	40.5	50	61	70	64	70	64	
0.258 ... 0.271	1.03 ... 1.06	0.036 (0.04)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	1F.2102-1AG..-0.A0-Z
			M_{2N}	Nm	13	17.3	21.5	26	34.5	40	44	40	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	16.1	21	26.5	32	42.5	40	44	40	
			M_{2max}	Nm	62	70	70	70	70	64	70	64	
0.525 ... 0.554	1.83 ... 1.88	0.093 (0.112)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	1F.2103-2AG..-2.A0-Z
			M_{2N}	Nm	24.5	32.5	40.5	44	44	40	44	40	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31.5	42	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
0.51 ... 0.539	1.83 ... 1.88	0.093 (0.112)	n_{2N}	r/min	50	37.5	25	25	20	12.5	10	10	1F.2103-2AH..-2..0-Z
			M_{2N}	Nm	23	30.5	40.5	44	44	40	44	40	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30.5	40.5	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
1.09 ... 1.16	3.84 ... 3.95	0.139 (0.158)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	–	1F.2103-4AG..-2.A0-Z
			M_{2N}	Nm	44	44	44	44	44	40	44	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	–	
			M_{2max}	Nm	70	70	70	70	70	64	70	–	
0.972 ... 1.03	3.84 ... 3.95	0.139 (0.158)	n_{2N}	r/min	50	37.5	25	25	20	12.5	10	–	1F.2103-4AH..-2..0-Z
			M_{2N}	Nm	44	44	44	44	44	40	44	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	–	
			M_{2max}	Nm	70	70	70	70	70	64	70	–	
1.17 ... 1.2	3.56 ... 3.66	0.371 (0.451)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	–	1F.2104-4AF..-2..0-Z
			M_{2N}	Nm	44	44	44	44	44	40	44	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	–	
			M_{2max}	Nm	70	70	70	70	70	64	70	–	
1.16 ... 1.19	3.65 ... 3.75	0.371 (0.451)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	–	1F.2104-4AK..-2..0-Z
			M_{2N}	Nm	44	44	44	44	44	40	44	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	–	
			M_{2max}	Nm	70	70	70	70	70	64	70	–	
2.25 ... 2.3	7.16 ... 7.36	0.581 (0.671)	n_{2N}	r/min	25	20	15	12.5	–	–	–	–	1F.2104-5AF..-2..0-Z
			M_{2N}	Nm	44	44	44	44	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	–	–	–	–	
			M_{2max}	Nm	70	70	70	70	–	–	–	–	
2.23 ... 2.28	7.25 ... 7.46	0.581 (0.671)	n_{2N}	r/min	50	37.5	30	25	–	–	–	–	1F.2104-5AK..-2..0-Z
			M_{2N}	Nm	44	44	44	44	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	–	–	–	–	
			M_{2max}	Nm	70	70	70	70	–	–	–	–	

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Planetary gearbox data									
Gearbox type:		NRB060, 3-stage							
1. Order code		A23							
i		60	80	100	120	160	200	256	320
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23
$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40
$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64
$M_{2Em.Off}$	Nm	88	88	88	88	88	80	88	80
$J_{1,G}$	kg cm²	0.076	0.075	0.074	0.066	0.066	0.066	0.066	0.066
$\varphi_{2,G}$	'	15							

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB060 3-stage (continued)													
2.98 ... 3.05	9.56 ... 9.83	0.781 (0.861)	n_{2N}	r/min	25	20	–	–	–	–	–	–	1F.2104-6AF..-2..0-Z ■■■ + ■■■ + . . .
			M_{2N}	Nm	44	44	–	–	–	–	–	–	
			$M_{2,0}$	Nm	44	44	–	–	–	–	–	–	
			M_{2max}	Nm	70	70	–	–	–	–	–	–	
4.59 ... 4.75	14.3 ... 14.7	1.98 (2.82)	n_{2N}	r/min	25	–	–	–	–	–	–	–	1F.2105-4AF..-0..0-Z ■■■ + ■■■ + . . .
			M_{2N}	Nm	44	–	–	–	–	–	–	–	
			$M_{2,0}$	Nm	44	–	–	–	–	–	–	–	
			M_{2max}	Nm	70	–	–	–	–	–	–	–	
4.57 ... 4.75	14.3 ... 14.7	1.98 (2.82)	n_{2N}	r/min	50	–	–	–	–	–	–	–	1FT2105-4AH..-0..0-Z ■■■ + ■■■ + . . .
			M_{2N}	Nm	44	–	–	–	–	–	–	–	
			$M_{2,0}$	Nm	44	–	–	–	–	–	–	–	
			M_{2max}	Nm	70	–	–	–	–	–	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB060 3-stage													
0.561 ... 0.573	1.74 ... 1.79	0.2 (0.22)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	1F.2203-2AG..-2.A0-Z ■■■ + ■■■ + . . .
			M_{2N}	Nm	25	33	41.5	44	44	40	44	40	
			$M_{2,0}$	Nm	33.5	44	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
0.527 ... 0.538	1.74 ... 1.79	0.2 (0.22)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	1F.2203-2AK..-2..0-Z ■■■ + ■■■ + . . .
			M_{2N}	Nm	19.4	25.5	32	39.5	44	40	44	40	
			$M_{2,0}$	Nm	31.5	42	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
1.17 ... 1.19	3.56 ... 3.66	0.35 (0.37)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	–	1F.2203-4AG..-2.A0-Z ■■■ + ■■■ + . . .
			M_{2N}	Nm	44	44	44	44	44	40	44	–	
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	–	
			M_{2max}	Nm	70	70	70	70	70	64	70	–	
1.11 ... 1.15	3.56 ... 3.66	0.35 (0.37)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	–	1F.2203-4AK..-2..0-Z ■■■ + ■■■ + . . .
			M_{2N}	Nm	42.5	44	44	44	44	40	44	–	
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	–	
			M_{2max}	Nm	70	70	70	70	70	64	70	–	
2.21 ... 2.26	6.78 ... 6.96	1.251 (1.331)	n_{2N}	r/min	25	20	15	12.5	–	–	–	–	1F.2204-5AF..-2..0-Z ■■■ + ■■■ + . . .
			M_{2N}	Nm	44	44	44	44	–	–	–	–	
			$M_{2,0}$	Nm	44	44	44	44	–	–	–	–	
			M_{2max}	Nm	70	70	70	70	–	–	–	–	
2.22 ... 2.27	6.78 ... 6.96	1.251 (1.331)	n_{2N}	r/min	50	37.5	30	25	–	–	–	–	1F.2204-5AK..-2..0-Z ■■■ + ■■■ + . . .
			M_{2N}	Nm	44	44	44	44	–	–	–	–	
			$M_{2,0}$	Nm	44	44	44	44	–	–	–	–	
			M_{2max}	Nm	70	70	70	70	–	–	–	–	
2.96 ... 3.03	9.08 ... 9.33	1.631 (1.711)	n_{2N}	r/min	25	20	–	–	–	–	–	–	1F.2204-6AF..-2..0-Z ■■■ + ■■■ + . . .
			M_{2N}	Nm	44	44	–	–	–	–	–	–	
			$M_{2,0}$	Nm	44	44	–	–	–	–	–	–	
			M_{2max}	Nm	70	70	–	–	–	–	–	–	

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Planetary gearbox data									
Gearbox type:			NRB060, 3-stage						
1. Order code			A23						
	i		60	80	100	120	160	200	256	320
2. Order code			R60	R80	R01	R21	R61	R02	R52	R23
	$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40
	$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64
	$M_{2Em.Off}$	Nm	88	88	88	88	88	80	88	80
	$J_{1,G}$	kg cm²	0.076	0.075	0.074	0.066	0.066	0.066	0.066	0.066
	$\varphi_{2,G}$	'	15							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB060

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB060 3-stage (continued)													
2.73 ... 2.84	10.3 ... 10.6	3.42 (4.32)	n_{2N}	r/min	20	12.5	–	–	–	–	–	–	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	44	44	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	–	–	–	–	–	–	
			M_{2max}	Nm	70	70	–	–	–	–	–	–	
2.79 ... 2.9	10.3 ... 10.6	3.42 (4.32)	n_{2N}	r/min	25	20	–	–	–	–	–	–	**1F.2205-2AF..-0..0-Z**
			M_{2N}	Nm	44	44	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	–	–	–	–	–	–	
			M_{2max}	Nm	70	70	–	–	–	–	–	–	
2.77 ... 2.88	10.3 ... 10.6	3.42 (4.32)	n_{2N}	r/min	50	37.5	–	–	–	–	–	–	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	43	43.5	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	43.5	–	–	–	–	–	–	
			M_{2max}	Nm	70	70	–	–	–	–	–	–	

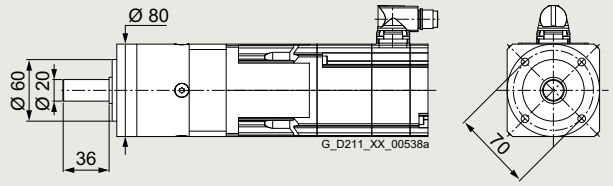
Planetary gearbox data									
Gearbox type:		**NRB060, 3-stage**							
1. Order code		**A23**							
i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**
2. Order code		**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**
$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40
$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64
$M_{2Em.Off}$	Nm	88	88	88	88	88	80	88	80
$J_{1,G}$	kg cm²	0.076	0.075	0.074	0.066	0.066	0.066	0.066	0.066
$\varphi_{2,G}$	'	15							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRB080



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	750 N at 100 r/min
Average axial force for 20000 h	$F_{A,eq}$	1000 N at 100 r/min
Average radial force for 30000 h	$F_{R,eq}$	650 N at 100 r/min
Average axial force for 30000 h	$F_{A,eq}$	900 N at 100 r/min
Maximum radial force	$F_{R,max}$	1250 N
Maximum axial force	$F_{A,max}$	1600 N

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB080 1- and 2-stage																			
0.517	1.8	0.093	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	**1F.2103-2AG..-0.A0-Z**
...	...	(0.112)	M_{2N}	Nm	0.85	1.25	1.73	2.4	3.1	3.95	2.8	4.2	5.3	5.4	7.5	9.2	12.3	15.9	24.5	■■■ + ■■■ + . . .
0.544	1.85		M_{2_0}	Nm	1.55	2.1	2.65	3.75	4.3	5.4	4.8	6.4	8.1	8.6	10.8	13.5	17.3	21.5	34.5	
			M_{2max}	Nm	5.4	7.3	9.1	12.9	14.7	18.4	16.4	21.5	27	29	36.5	45.5	58	73	80	
0.49	1.8	0.093	n_{2N}	r/min	750	750	500	375	375	250	300	250	200	200	125	100	100	75	50	**1F.2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	1.04	1.19	1.86	2.7	2.95	4.1	3.15	4	5.1	5.2	7.8	9.8	11.7	15.2	23.5	■■■ + ■■■ + . . .
0.516	1.85		M_{2_0}	Nm	1.46	1.99	2.5	3.55	4.05	5.1	4.55	6.1	7.6	8.2	10.2	12.8	16.4	20.5	33	
			M_{2max}	Nm	5.4	7.3	9.1	12.9	14.7	18.4	16.4	21.5	27	29	36.5	45.5	58	73	80	
1.13	3.81	0.139	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	**1F.2103-4AG..-0.A0-Z**
...	...	(0.158)	M_{2N}	Nm	2.6	3.45	4.45	6.5	6.8	8.7	7.9	9.8	12.4	12.1	17.3	21	27.5	35.5	50	■■■ + ■■■ + . . .
1.15	3.91		M_{2_0}	Nm	3.35	4.5	5.6	8	9.1	11.4	10.2	13.6	17.1	18.2	22.5	28.5	36.5	45.5	50	
			M_{2max}	Nm	11.7	15.6	19.5	27	31	39	34.5	46.5	58	61	77	96	123	154	80	
0.994	3.81	0.139	n_{2N}	r/min	750	600	500	375	375	250	300	250	200	200	125	100	100	75	50	**1F.2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	2.3	3.1	3.95	5.6	6.1	8.3	6.7	8.6	10.8	11.1	15.9	20	23.5	30.5	47.5	■■■ + ■■■ + . . .
1.06	3.91		M_{2_0}	Nm	3.05	4.15	5.2	7.3	8.4	10.5	9.2	12.3	15.3	16.4	20.5	25.5	32.5	41	50	
			M_{2max}	Nm	11.7	15.6	19.5	27	31	39	34.5	46.5	58	61	77	96	123	154	80	
1.14	3.52	0.35	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2104-4AF..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	3.25	4.4	5.6	7.8	9.1	11.4	9.7	13.3	16.7	17.6	22	28	35.5	45	50	■■■ + ■■■ + . . .
1.16	3.62		M_{2_0}	Nm	3.4	4.55	5.7	8.1	9.2	11.6	10.3	13.8	17.3	18.4	23	28.5	36.5	46	50	
			M_{2max}	Nm	10.8	14.4	18	25	28.5	36	32	42.5	53	57	71	89	114	142	80	
1.13	3.62	0.35	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	**1F.2104-4AK..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.65	3.9	5.1	7	8.6	10.8	8.6	12.1	15.2	15.8	20.5	25.5	33	42.5	50	■■■ + ■■■ + . . .
1.16	3.72		M_{2_0}	Nm	3.4	4.55	5.7	8	9.2	11.5	10.3	13.7	17.2	18.3	22.5	28.5	36.5	45.5	50	
			M_{2max}	Nm	11.1	14.8	18.5	25.5	29.5	37	33	44	55	58	73	91	117	146	80	
2.21	7.1	0.56	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2104-5AF..-2..0-Z**
...	...	(0.65)	M_{2N}	Nm	6.6	8.8	11.1	15.5	17.8	22	19.1	26	32.5	34.5	43.5	54	69	88	50	■■■ + ■■■ + . . .
2.26	7.31		M_{2_0}	Nm	6.7	9	11.2	15.8	18	22.5	20	26.5	33.5	35.5	44.5	55	71	89	50	
			M_{2max}	Nm	21.5	29	36.5	51	58	61	65	86	108	115	144	176	192	176	80	

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Planetary gearbox data																
Gearbox type:			**NRB080, 1-stage**						**NRB080, 2-stage**							
1. Order code			**A31**						**A32**							
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
	$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50
	$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190
	$J_{1,G}$	kg cm²	0.654	0.455	0.423	0.379	0.37	0.359	0.613	0.589	0.586	0.446	0.406	0.404	0.366	0.365	0.366
	$\varphi_{2,G}$	'	7						9								

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB080

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB080 1- and 2-stage (continued)																			
2.19 ... 2.25	7.19 ... 7.41	0.56 (0.65)	n_{2N}	r/min	750	600	600	375	375	300	300	250	200	150	150	125	100	75	50	1F.2104-5AK..-2..0-Z
			M_{2N}	Nm	5.8	7.6	8	13.8	14.3	18.3	16.8	20	25	32.5	35	41.5	55	73	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.6	8.9	11.1	15.7	17.9	22	20	26.5	33	35.5	44	55	71	88	50	
			M_{2max}	Nm	22	29.5	37	51	59	61	66	87	109	117	146	176	192	176	80	
2.93 ... 3.01	9.49 ... 9.78	0.76 (0.84)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1F.2104-6AF..-2..0-Z
			M_{2N}	Nm	8.8	11.8	14.8	20.5	23.5	29.5	26	35	44	46.5	58	73	94	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.9	12	15	21	24	30	26.5	35.5	44.5	47.5	59	74	95	110	50	
			M_{2max}	Nm	29	39	48.5	68	78	61	87	116	144	154	192	176	192	176	80	
4.62 ... 4.74	14.3 ... 14.7	1.71 (2.55)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1F.2105-4AF..-0..0-Z
			M_{2N}	Nm	12.8	17.2	21.5	29.5	34	38	36	50	63	66	83	104	120	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.1	18.9	23.5	33	37.5	38	42	56	70	74	93	110	120	110	50	
			M_{2max}	Nm	44	58	73	102	80	61	131	174	176	192	192	176	192	176	80	
4.65 ... 4.77	14.3 ... 14.7	1.71 (2.55)	n_{2N}	r/min	750	500	500	300	300	250	250	200	150	150	100	100	75	75	50	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	9.6	15	14.9	26	27	33	31	38	51	50	73	75	106	92	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.2	19	23.5	33	38	38	42.5	56	70	75	94	110	120	110	50	
			M_{2max}	Nm	44	58	73	102	80	61	131	174	176	192	192	176	192	176	80	
7.15 ... 7.5	22.9 ... 23.6	2.65 (3.5)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	1F.2105-6AF..-0..0-Z
			M_{2N}	Nm	19.2	25.5	32	42.5	50	38	51	74	93	96	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	29.5	37	52	50	38	66	88	110	117	120	110	120	110	–	
			M_{2max}	Nm	70	94	117	104	80	61	208	192	176	192	192	176	192	176	–	
7.25 ... 7.57	24.8 ... 25.5	5.476 (7.176)	n_{2N}	r/min	500	375	300	250	200	150	150	125	100	100	75	60	50	37.5	–	1F.2106-3AF..-0..0-Z
			M_{2N}	Nm	17.2	23	29	35.5	45	38	56	68	84	83	111	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30	37.5	52	50	38	66	89	110	119	120	110	120	110	–	
			M_{2max}	Nm	76	101	127	104	80	61	208	192	176	192	192	175	192	176	–	
9.39 ... 9.81	31.5 ... 32.4	6.876 (8.476)	n_{2N}	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	–	1F.2106-4AF..-0..0-Z
			M_{2N}	Nm	20.5	27	34.5	52	50	38	66	78	96	93	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29	39	49	65	50	38	86	115	110	120	120	110	120	110	–	
			M_{2max}	Nm	97	129	161	104	80	61	208	192	176	192	192	176	192	176	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 1- and 2-stage																			
0.511 ... 0.537	1.71 ... 1.75	0.2 (0.22)	n_{2N}	r/min	750	600	600	500	375	300	300	250	200	200	150	125	100	75	50	1F.2203-2AG..-0.A0-Z
			M_{2N}	Nm	1.16	1.57	1.75	2.3	3.2	4.1	3.45	4.25	5.4	5.4	7.7	9.3	12.5	16.4	25	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.53	2.05	2.6	3.7	4.25	5.3	4.75	6.3	8	8.5	10.6	13.3	17.1	21	34	
			M_{2max}	Nm	5.1	6.9	8.6	12.2	13.9	17.4	15.5	20.5	26	27.5	34.5	43	55	69	80	
0.476 ... 0.503	1.71 ... 1.75	0.2 (0.22)	n_{2N}	r/min	750	600	500	375	375	300	300	200	150	150	150	100	100	75	50	1F.2203-2AK..-0..0-Z
			M_{2N}	Nm	0.93	1.26	1.66	2.45	2.5	3.25	2.7	4.15	5.5	5.6	5.9	9	9.5	13	19.4	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.42	1.93	2.45	3.45	3.95	5	4.45	5.9	7.4	7.9	10	12.5	16	20	32	
			M_{2max}	Nm	5.1	6.9	8.6	12.2	13.9	17.4	15.5	20.5	26	27.5	34.5	43	55	69	80	
1.13 ... 1.16	3.52 ... 3.62	0.35 (0.37)	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1F.2203-4AG..-0.A0-Z
			M_{2N}	Nm	2.35	3.5	4.75	6.3	8	10.2	7.7	11.2	14.1	14.5	19.3	23.5	30.5	39.5	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.4	4.55	5.7	8	9.2	11.5	10.3	13.7	17.2	18.3	22.5	28.5	36.5	45.5	50	
			M_{2max}	Nm	10.8	14.4	18	25	28.5	36	32	42.5	53	57	71	89	114	142	80	

➥ Continued on the next page

Planetary gearbox data																
Gearbox type:		NRB080, 1-stage						NRB080, 2-stage								
1. Order code		A31						A32								
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50
$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80
$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190
$J_{1,G}$	kg cm²	0.654	0.455	0.423	0.379	0.37	0.359	0.613	0.589	0.586	0.446	0.406	0.404	0.366	0.365	0.366
$\varphi_{2,G}$	'	7						9								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 1- and 2-stage (continued)																				
1.09 ... 1.12	3.52 ... 3.62	0.35 (0.37)	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	**1F.2203-4AK..-0..0-Z**
			M_{2N}	Nm	2.5	3.25	4.15	5.9	6.1	7.8	6.9	8.4	10.6	10.5	14.6	17.7	22.5	30	46	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.25	4.4	5.5	7.7	8.9	11.1	9.9	13.2	16.6	17.7	22	27.5	35.5	44	50	
			M_{2max}	Nm	10.8	14.4	18	25	28.5	36	32	42.5	53	57	71	89	114	142	80	
2.17 ... 2.22	6.72 ... 6.91	1.23 (1.31)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2204-5AF..-2..0-Z**
			M_{2N}	Nm	6.3	8.4	10.7	14.7	17.1	21.5	18.1	25	31	33	41.5	52	66	84	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.6	8.8	11	15.5	17.7	22	19.8	26	33	35	43.5	54	70	87	50	
			M_{2max}	Nm	20.5	27.5	34.5	48	55	61	61	82	102	109	136	170	192	176	80	
2.18 ... 2.23	6.72 ... 6.91	1.23 (1.31)	n_{2N}	r/min	750	600	500	375	375	300	300	200	200	150	150	100	100	75	50	**1F.2204-5AK..-2..0-Z**
			M_{2N}	Nm	5.6	7.3	9.3	13.2	13.2	16.9	15.9	23	23	30.5	32.5	47.5	50	68	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.6	8.8	11.1	15.6	17.8	22	19.9	26.5	33	35	44	55	70	88	50	
			M_{2max}	Nm	20.5	27.5	34.5	48	55	61	61	82	102	109	136	170	192	176	80	
2.92 ... 3	9.01 ... 9.28	1.61 (1.69)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2204-6AF..-2..0-Z**
			M_{2N}	Nm	8.7	11.7	14.7	20.5	23.5	29.5	25.5	35	43.5	46.5	58	73	93	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.9	11.9	14.9	20.5	23.5	29.5	26.5	35.5	44.5	47	59	74	94	110	50	
			M_{2max}	Nm	27.5	37	46	64	74	61	82	110	137	146	183	176	192	176	80	
2.83 ... 2.98	10.3 ... 10.6	3.15 (4.05)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	7.8	10.6	13.3	18.7	21.5	26.5	23.5	30	38.5	40.5	52	61	81	104	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.8	11.8	14.8	20.5	23.5	29.5	26	34.5	43.5	46.5	58	72	92	110	50	
			M_{2max}	Nm	31.5	42	52	73	80	61	94	125	156	166	192	176	192	176	80	
2.87 ... 3.02	10.3 ... 10.6	3.15 (4.05)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2205-2AF..-0..0-Z**
			M_{2N}	Nm	8	10.7	13.5	18.6	21.5	27	23	31.5	39.5	41.5	52	66	84	106	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	9	12	15	21	24	30	26.5	35	44	47	59	73	94	110	50	
			M_{2max}	Nm	31.5	42	52	73	80	61	94	125	156	166	192	176	192	176	80	
2.85 ... 2.99	10.3 ... 10.6	3.15 (4.05)	n_{2N}	r/min	750	500	500	375	300	250	250	200	150	150	125	100	75	60	50	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	6.2	9.6	9.9	14	18.2	22	20.5	26.5	34	35	43.5	54	72	90	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.9	11.9	14.8	20.5	23.5	29.5	26	35	43.5	46.5	58	72	93	110	50	
			M_{2max}	Nm	31.5	42	52	73	80	61	94	125	156	166	192	176	192	176	80	
4.89 ... 5.12	17.2 ... 17.7	5.1 (6)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	**1F.2205-4AF..-0..0-Z**
			M_{2N}	Nm	13.1	17.6	22	29.5	35	38	37	51	64	67	85	107	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.3	20	25.5	35.5	40.5	38	45	60	75	80	100	110	120	110	–	
			M_{2max}	Nm	53	70	88	104	80	61	157	192	176	192	192	176	192	176	–	
5.11 ... 5.35	17.1 ... 17.6	8.676 (10.276)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	**1FT2206-2AC..-0..0-Z**
			M_{2N}	Nm	13	18.4	23	32	37	38	41	50	65	66	90	98	120	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	16	21	26.5	37	42.5	38	47	62	78	83	104	110	120	110	50	
			M_{2max}	Nm	52	70	87	104	80	61	156	192	176	192	192	176	192	176	80	
5.04 ... 5.26	17.1 ... 17.6	8.676 (10.276)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	**1F.2206-2AF..-0..0-Z**
			M_{2N}	Nm	12.9	17.3	21.5	27.5	34	38	33.5	51	63	66	84	106	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.7	21	26	36.5	42	38	46.5	61	77	82	103	110	120	110	–	
			M_{2max}	Nm	52	70	87	104	80	61	156	192	176	192	192	176	192	176	–	

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Planetary gearbox data																
Gearbox type:			NRB080, 1-stage						NRB080, 2-stage							
1. Order code			A31						A32							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50
	$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190
	$J_{1,G}$	kg cm²	0.654	0.455	0.423	0.379	0.37	0.359	0.613	0.589	0.586	0.446	0.406	0.404	0.366	0.365	0.366
	$\varphi_{2,G}$	'	7						9								

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB080

Servomotor data

$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
Nm	Nm	kg cm²																		
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 1- and 2-stage (continued)																				
4.9	17.1	8.676	n_{2N}	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	50	–	**1FT2206-2AH..-0..0-Z**
...	...	(10.276)	M_{2N}	Nm	10.9	14.8	18.8	28.5	29	38	37.5	46.5	58	57	77	96	117	100	–	■■■ + ■■■ + . . .
5.11	17.6		$M_{2,0}$	Nm	15.3	20	25.5	35.5	40.5	38	45	60	75	80	100	110	120	110	–	
			M_{2max}	Nm	52	70	87	104	80	61	156	192	176	192	192	176	192	176	–	
7.3	25.7	12.38	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	–	**1FT2206-3AB..-0..0-Z**
...	...	(13.976)	M_{2N}	Nm	20.5	27	34.5	48.5	50	38	55	73	101	106	120	110	120	110	–	■■■ + ■■■ + . . .
7.64	26.5		$M_{2,0}$	Nm	22.5	30.5	38	53	50	38	67	89	110	119	120	110	120	110	–	
			M_{2max}	Nm	79	105	132	104	80	61	208	192	176	192	192	176	192	176	–	
7.17	25.7	12.38	n_{2N}	r/min	500	375	300	200	200	150	150	125	100	75	75	60	50	37.5	–	**1FT2206-3AF..-0..0-Z**
...	...	(13.976)	M_{2N}	Nm	14.2	19.1	24	37	37	38	49.5	58	72	95	95	110	120	110	–	■■■ + ■■■ + . . .
7.5	26.5		$M_{2,0}$	Nm	22	29.5	37	52	50	38	66	88	110	117	120	110	120	110	–	
			M_{2max}	Nm	79	105	132	104	80	61	208	192	176	192	192	176	192	176	–	
9.95	36.3	15.98	n_{2N}	r/min	300	250	200	150	125	100	100	75	75	60	50	50	37.5	25	–	**1FT2206-4AC..-0..0-Z**
...	...	(17.676)	M_{2N}	Nm	22	27	33.5	45.5	50	38	69	90	91	113	120	110	120	110	–	■■■ + ■■■ + . . .
10.4	37.4		$M_{2,0}$	Nm	31	41.5	52	65	50	38	91	120	110	120	120	110	120	110	–	
			M_{2max}	Nm	112	149	176	104	80	61	208	192	176	192	192	176	192	176	–	
9.84	34.4	15.976	n_{2N}	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	–	**1F.2206-4AF..-0..0-Z**
...	...	(17.676)	M_{2N}	Nm	21	28	35.5	53	50	38	67	79	98	95	120	110	120	110	–	■■■ + ■■■ + . . .
10.3	35.4		$M_{2,0}$	Nm	30.5	41	51	65	50	38	90	120	110	120	120	110	120	110	–	
			M_{2max}	Nm	106	141	176	104	79	61	208	192	176	192	191	176	192	176	–	
9.45	34.4	15.976	n_{2N}	r/min	375	300	250	200	200	150	150	100	75	75	75	60	50	50	–	**1FT2206-4AH..-0..0-Z**
...	...	(17.676)	M_{2N}	Nm	21.5	27	33	41.5	39	38	54	81	106	106	102	110	120	102	–	■■■ + ■■■ + . . .
9.85	35.4		$M_{2,0}$	Nm	29.5	39	49	65	50	38	86	115	110	120	120	110	120	110	–	
			M_{2max}	Nm	106	141	176	104	79	61	208	192	176	192	191	176	192	176	–	

Planetary gearbox data

Gearbox type:		NRB080, 1-stage						NRB080, 2-stage								
1. Order code		A31						A32								
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50
$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80
$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190
$J_{1,G}$	kg cm²	0.654	0.455	0.423	0.379	0.37	0.359	0.613	0.589	0.586	0.446	0.406	0.404	0.366	0.365	0.366
$\varphi_{2,G}$	'	7						9								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB080 3-stage													
0.517 ... 0.544	1.8 ... 1.85	0.093 (0.112)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	6	**1F.2103-2AG..-0.A0-Z**
			M_{2N}	Nm	21	29.5	37	42.5	60	77	96	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31.5	42	52	63	84	105	120	110	50	
			M_{2max}	Nm	108	144	180	176	192	176	192	176	80	
0.49 ... 0.516	1.8 ... 1.85	0.093 (0.112)	n_{2N}	r/min	50	37.5	25	25	20	12.5	10	10	5	**1F.2103-2AH..-0..0-Z**
			M_{2N}	Nm	20	28	38	40.5	56	78	100	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30.5	40.5	51	61	81	102	120	110	49.5	
			M_{2max}	Nm	108	144	180	176	192	176	192	176	80	
1.13 ... 1.15	3.81 ... 3.91	0.139 (0.158)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	–	**1F.2103-4AG..-0.A0-Z**
			M_{2N}	Nm	49	66	83	98	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	67	90	112	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
0.994 ... 1.06	3.81 ... 3.91	0.139 (0.158)	n_{2N}	r/min	50	37.5	25	25	20	12.5	10	10	–	**1F.2103-4AH..-0..0-Z**
			M_{2N}	Nm	42	57	77	85	114	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	59	79	99	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
1.14 ... 1.16	3.52 ... 3.62	0.35 (0.43)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	–	**1F.2104-4AF..-2..0-Z**
			M_{2N}	Nm	65	86	109	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	68	91	114	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
1.13 ... 1.16	3.62 ... 3.72	0.35 (0.43)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	–	**1F.2104-4AK..-2..0-Z**
			M_{2N}	Nm	59	81	101	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	68	90	113	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.21 ... 2.26	7.1 ... 7.31	0.56 (0.65)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	–	**1F.2104-5AF..-2..0-Z**
			M_{2N}	Nm	110	120	120	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.19 ... 2.25	7.19 ... 7.41	0.56 (0.65)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	–	**1F.2104-5AK..-2..0-Z**
			M_{2N}	Nm	99	120	120	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.93 ... 3.01	9.49 ... 9.78	0.76 (0.84)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	–	–	**1F.2104-6AF..-2..0-Z**
			M_{2N}	Nm	110	120	120	110	120	110	120	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	–	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	–	–	
4.62 ... 4.74	14.3 ... 14.7	1.71 (2.55)	n_{2N}	r/min	25	20	15	12.5	10	–	–	–	–	**1F.2105-4AF..-0..0-Z**
			M_{2N}	Nm	110	120	120	110	120	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	–	–	–	–	
			M_{2max}	Nm	176	192	192	176	192	–	–	–	–	

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Planetary gearbox data										
Gearbox type:			**NRB080, 3-stage**							
1. Order code			**A33**							
i			**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
$M_{2N,G}$	Nm		110	120	120	110	120	110	120	110	50
$M_{2max,G}$	Nm		176	192	192	176	192	176	192	176	80
$M_{2Em.Off}$	Nm		220	240	240	220	240	220	240	220	190
$J_{1,G}$	kg cm²		0.584	0.405	0.404	0.59	0.365	0.365	0.366	0.366	0.366
$\varphi_{2,G}$	'		11							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB080

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB080 3-stage (continued)													
4.65 ... 4.77	14.3 ... 14.7	1.71 (2.55)	n_{2N} r/min	50	37.5	25	25	20	–	–	–	–	**1FT2105-4AH..-0..0-Z**
			M_{2N} Nm	110	120	120	110	120	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	120	–	–	–	–	
			M_{2max} Nm	176	192	192	176	192	–	–	–	–	
7.15 ... 7.5	22.9 ... 23.6	2.65 (3.5)	n_{2N} r/min	25	20	15	–	–	–	–	–	–	**1F.2105-6AF..-0..0-Z**
			M_{2N} Nm	110	120	120	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	–	–	–	–	–	–	
			M_{2max} Nm	176	192	192	–	–	–	–	–	–	
7.25 ... 7.57	24.8 ... 25.5	5.476 (7.176)	n_{2N} r/min	25	20	15	–	–	–	–	–	–	**1F.2106-3AF..-0..0-Z**
			M_{2N} Nm	110	120	120	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	–	–	–	–	–	–	
			M_{2max} Nm	176	192	192	–	–	–	–	–	–	
9.39 ... 9.81	31.5 ... 32.4	6.876 (8.476)	n_{2N} r/min	25	–	–	–	–	–	–	–	–	**1F.2106-4AF..-0..0-Z**
			M_{2N} Nm	110	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	–	–	–	–	–	–	–	–	
			M_{2max} Nm	176	–	–	–	–	–	–	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 3-stage													
0.511 ... 0.537	1.71 ... 1.75	0.2 (0.22)	n_{2N} r/min	50	37.5	30	25	20	15	12.5	10	6	**1F.2203-2AG..-0.A0-Z**
			M_{2N} Nm	21.5	30	38	43.5	60	79	97	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	31.5	42.5	53	63	85	106	120	110	50	
			M_{2max} Nm	102	137	171	176	192	176	192	176	80	
0.476 ... 0.503	1.71 ... 1.75	0.2 (0.22)	n_{2N} r/min	50	37.5	30	20	20	15	12.5	10	6	**1F.2203-2AK..-0..0-Z**
			M_{2N} Nm	16.4	23	29	41.5	46	62	73	92	49.5	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	29.5	39.5	49.5	59	79	99	120	110	50	
			M_{2max} Nm	102	137	171	176	192	176	192	176	80	
1.13 ... 1.16	3.52 ... 3.62	0.35 (0.37)	n_{2N} r/min	50	37.5	30	25	20	15	12.5	10	–	**1F.2203-4AG..-0.A0-Z**
			M_{2N} Nm	55	75	93	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	68	91	113	110	120	110	120	110	–	
			M_{2max} Nm	176	192	192	176	192	176	192	176	–	
1.09 ... 1.12	3.52 ... 3.62	0.35 (0.37)	n_{2N} r/min	50	37.5	30	25	20	15	12.5	10	–	**1F.2203-4AK..-0..0-Z**
			M_{2N} Nm	41	56	70	82	109	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	65	87	109	110	120	110	120	110	–	
			M_{2max} Nm	176	192	192	176	192	176	192	176	–	
2.17 ... 2.22	6.72 ... 6.91	1.23 (1.31)	n_{2N} r/min	25	20	15	12.5	10	7.5	6	5	–	**1F.2204-5AF..-2..0-Z**
			M_{2N} Nm	110	120	120	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	120	110	120	110	–	
			M_{2max} Nm	176	192	192	176	192	176	192	176	–	
2.18 ... 2.23	6.72 ... 6.91	1.23 (1.31)	n_{2N} r/min	50	37.5	30	25	20	15	12.5	10	–	**1F.2204-5AK..-2..0-Z**
			M_{2N} Nm	93	120	120	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	120	110	120	110	–	
			M_{2max} Nm	176	192	192	176	192	176	192	176	–	

➥ Continued on the next page

Planetary gearbox data										
Gearbox type:			**NRB080, 3-stage**							
1. Order code			**A33**							
	i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
	$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50
	$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80
	$M_{2Em.Off}$	Nm	220	240	240	220	240	220	240	220	190
	$J_{1,G}$	kg cm²	0.584	0.405	0.404	0.59	0.365	0.365	0.366	0.366	0.366
	$\varphi_{2,G}$	'	11								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 3-stage (continued)													
2.92 ... 3	9.01 ... 9.28	1.61 (1.69)	n_{2N} r/min	25	20	15	12.5	10	7.5	6	–	–	1F.2204-6AF..-2..0-Z
			M_{2N} Nm	110	120	120	110	120	110	120	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	120	110	120	–	–	
			M_{2max} Nm	176	192	192	176	192	176	192	–	–	
2.83 ... 2.98	10.3 ... 10.6	3.15 (4.05)	n_{2N} r/min	20	12.5	10	10	7.5	5	–	–	–	1FT2205-2AC..-0..0-Z
			M_{2N} Nm	110	120	120	110	120	110	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	120	109	–	–	–	
			M_{2max} Nm	176	192	192	176	192	176	–	–	–	
2.87 ... 3.02	10.3 ... 10.6	3.15 (4.05)	n_{2N} r/min	25	20	15	12.5	10	7.5	–	–	–	1F.2205-2AF..-0..0-Z
			M_{2N} Nm	110	120	120	110	120	110	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	120	110	–	–	–	
			M_{2max} Nm	176	192	192	176	192	176	–	–	–	
2.85 ... 2.99	10.3 ... 10.6	3.15 (4.05)	n_{2N} r/min	50	37.5	25	25	20	12.5	–	–	–	1FT2205-2AH..-0..0-Z
			M_{2N} Nm	83	116	120	109	120	110	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	120	109	–	–	–	
			M_{2max} Nm	176	192	192	176	192	176	–	–	–	
4.89 ... 5.12	17.2 ... 17.7	5.1 (6)	n_{2N} r/min	25	20	15	12.5	–	–	–	–	–	1F.2205-4AF..-0..0-Z
			M_{2N} Nm	110	120	120	110	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	–	–	–	–	–	
			M_{2max} Nm	176	192	192	176	–	–	–	–	–	
5.11 ... 5.35	17.1 ... 17.6	8.676 (10.276)	n_{2N} r/min	20	12.5	10	10	7.5	–	–	–	–	1FT2206-2AC..-0..0-Z
			M_{2N} Nm	110	120	120	110	120	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	120	–	–	–	–	
			M_{2max} Nm	176	192	192	176	192	–	–	–	–	
5.04 ... 5.26	17.1 ... 17.6	8.676 (10.276)	n_{2N} r/min	25	20	15	12.5	–	–	–	–	–	1F.2206-2AF..-0..0-Z
			M_{2N} Nm	110	120	120	110	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	–	–	–	–	–	
			M_{2max} Nm	176	192	192	176	–	–	–	–	–	
4.9 ... 5.11	17.1 ... 17.6	8.676 (10.276)	n_{2N} r/min	37.5	25	20	20	–	–	–	–	–	1FT2206-2AH..-0..0-Z
			M_{2N} Nm	95	119	120	109	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	119	119	109	–	–	–	–	–	
			M_{2max} Nm	176	192	192	176	–	–	–	–	–	
7.3 ... 7.64	25.7 ... 26.5	12.38 (13.976)	n_{2N} r/min	12.5	10	7.5	–	–	–	–	–	–	1FT2206-3AB..-0..0-Z
			M_{2N} Nm	110	120	120	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	–	–	–	–	–	–	
			M_{2max} Nm	176	192	192	–	–	–	–	–	–	
7.17 ... 7.5	25.7 ... 26.5	12.38 (13.976)	n_{2N} r/min	25	20	15	–	–	–	–	–	–	1FT2206-3AF..-0..0-Z
			M_{2N} Nm	110	120	120	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	–	–	–	–	–	–	
			M_{2max} Nm	176	192	192	–	–	–	–	–	–	

➥ Continued on the next page

Planetary gearbox data										
Gearbox type:			NRB080, 3-stage							
1. Order code			A33							
	i		60	80	100	120	160	200	256	320	512
2. Order code			R60	R80	R01	R21	R61	R02	R52	R23	R51
	$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50
	$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80
	$M_{2Em.Off}$	Nm	220	240	240	220	240	220	240	220	190
	$J_{1,G}$	kg cm²	0.584	0.405	0.404	0.59	0.365	0.365	0.366	0.366	0.366
	$\varphi_{2,G}$	'	11								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB080

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)											
Nm	Nm	kg cm²											
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 3-stage (continued)													
9.95 ... 10.4	36.3 ... 37.4	15.98 (17.676)	n_{2N}	r/min	20	–	–	–	–	–	–	–	–	**1FT2206-4AC..-0..0-Z**
			M_{2N}	Nm	110	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	176	–	–	–	–	–	–	–	–	
9.84 ... 10.3	34.4 ... 35.4	15.976 (17.676)	n_{2N}	r/min	25	–	–	–	–	–	–	–	–	**1F.2206-4AF..-0..0-Z**
			M_{2N}	Nm	110	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	176	–	–	–	–	–	–	–	–	
9.45 ... 9.85	34.4 ... 35.4	15.976 (17.676)	n_{2N}	r/min	30	–	–	–	–	–	–	–	–	**1FT2206-4AH..-0..0-Z**
			M_{2N}	Nm	110	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	176	–	–	–	–	–	–	–	–	

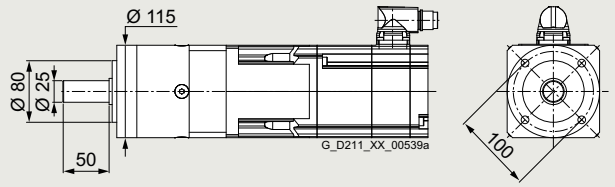
Planetary gearbox data										
Gearbox type:			**NRB080, 3-stage**							
1. Order code			**A33**							
i			**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
$M_{2N,G}$		Nm	110	120	120	110	120	110	120	110	50
$M_{2max,G}$		Nm	176	192	192	176	192	176	192	176	80
$M_{2Em.Off}$		Nm	220	240	240	220	240	220	240	220	190
$J_{1,G}$		kg cm²	0.584	0.405	0.404	0.59	0.365	0.365	0.366	0.366	0.366
$\varphi_{2,G}$		'	11							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRB120



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1750 N at 100 r/min
Average axial force for 20000 h	$F_{A,eq}$	2500 N at 100 r/min
Average radial force for 30000 h	$F_{R,eq}$	1500 N at 100 r/min
Average axial force for 30000 h	$F_{A,eq}$	2100 N at 100 r/min
Maximum radial force	$F_{R,max}$	2000 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 1- and 2-stage																				
0.408	1.72	0.093	n_{2N}	r/min	500	500	375	375	300	300	200	150	150	150	125	100	100	75	50	**1F.2103-2AG..-0.A0-Z**
...	...	(0.112)	M_{2N}	Nm	0.81	0.96	1.59	2	2.6	2.85	2.9	4	4.15	4.4	6.1	7.9	9.3	12.6	19.3	■■■ + ■■■ + . . .
0.478	1.77		M_{2_0}	Nm	1.22	1.71	2.2	3.15	3.65	4.6	4.1	5.5	7	7.4	9.4	11.8	15.1	19	30.5	
			M_{2max}	Nm	5.1	6.9	8.7	12.3	14.1	17.6	15.7	21	26	28	35	43.5	56	70	112	
0.379	1.72	0.093	n_{2N}	r/min	500	500	500	375	300	250	250	150	150	150	125	100	100	75	50	**1F.2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	0.81	0.98	1.19	2.05	2.6	3.35	2.3	3.95	4.2	4.4	6.1	7.8	9.4	12.7	19.4	■■■ + ■■■ + . . .
0.45	1.77		M_{2_0}	Nm	1.13	1.59	2.05	2.95	3.4	4.35	3.85	5.2	6.5	7	8.8	11.1	14.2	17.9	28.5	
			M_{2max}	Nm	5.1	6.9	8.7	12.3	14.1	17.6	15.7	21	26	28	35	43.5	56	70	112	
1.02	3.74	0.139	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	75	37.5	**1F.2103-4AG..-0.A0-Z**
...	...	(0.158)	M_{2N}	Nm	2.35	3.15	4.75	6.8	7.2	9.1	7.3	9.1	13	13.3	17.8	22.5	32	32.5	64	■■■ + ■■■ + . . .
1.07	3.83		M_{2_0}	Nm	3	4.1	5.2	7.4	8.5	10.7	9.5	12.7	15.9	17	21	26.5	34	42.5	68	
			M_{2max}	Nm	11.3	15.2	19	26.5	30.5	38	34	45.5	56	60	75	94	121	151	192	
1	3.74	0.139	n_{2N}	r/min	600	500	375	375	300	250	250	200	150	150	125	100	100	75	50	**1F.2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	2.05	2.75	4	4.85	6.3	8	6.4	8	11	11.6	15.1	19.1	21	29.5	43.5	■■■ + ■■■ + . . .
1.06	3.83		M_{2_0}	Nm	3	4.05	5.1	7.3	8.4	10.5	9.3	12.5	15.7	16.8	21	26	33.5	42	67	
			M_{2max}	Nm	11.3	15.2	19	26.5	30.5	38	34	45.5	56	60	75	94	121	151	192	
1.03	3.45	0.35	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2104-4AF..-0..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.75	3.8	4.9	7	8.2	10.3	8.6	11.8	14.8	15.9	20	25.5	33	41.5	66	■■■ + ■■■ + . . .
1.09	3.54		M_{2_0}	Nm	3.05	4.15	5.3	7.5	8.6	10.8	9.6	12.9	16.2	17.2	21.5	27	34.5	43	69	
			M_{2max}	Nm	10.4	14	17.5	24.5	28	35	31.5	42	52	56	70	87	112	140	192	
1.02	3.55	0.35	n_{2N}	r/min	750	600	500	375	375	300	300	200	150	150	150	125	100	75	50	**1F.2104-4AK..-0..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.35	3.45	4.7	6.8	7.8	9.9	7.5	11.2	14.2	15.2	18.9	22.5	31.5	40	63	■■■ + ■■■ + . . .
1.08	3.64		M_{2_0}	Nm	3.05	4.15	5.2	7.4	8.5	10.7	9.5	12.8	16	17.1	21.5	26.5	34.5	43	69	
			M_{2max}	Nm	10.7	14.4	18	25	29	36	32	43	54	57	72	90	115	144	192	
2.13	7.03	0.56	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2104-5AF..-0..0-Z**
...	...	(0.65)	M_{2N}	Nm	6	8.2	10.4	14.7	16.9	21	18.4	24.5	31	33	41.5	52	67	84	120	■■■ + ■■■ + . . .
2.18	7.23		M_{2_0}	Nm	6.4	8.6	10.8	15.2	17.4	21.5	19.4	25.5	32.5	34.5	43	54	69	86	120	
			M_{2max}	Nm	21.5	28.5	36	50	57	72	64	85	107	114	142	178	225	285	192	

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Planetary gearbox data																
Gearbox type:			NRB120, 1-stage						NRB120, 2-stage							
1. Order code			A41						A42							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414
	$\varphi_{2,G}$	'	7						9								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 1- and 2-stage (continued)																			
2.12 ... 2.17	7.12 ... 7.33	0.56 (0.65)	n_{2N}	r/min	600	500	500	375	300	250	250	200	150	150	125	100	75	75	50	**1F.2104-5AK..-0..0-Z**
			M_{2N}	Nm	5.8	7.6	8	12.4	16.1	20	16.8	20.5	28.5	29	38	48	66	68	100	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.3	8.5	10.7	15.1	17.3	21.5	19.3	25.5	32	34	43	53	68	86	120	
			M_{2max}	Nm	21.5	29	36.5	51	58	73	65	87	108	115	144	180	230	285	192	
2.87 ... 2.93	9.42 ... 9.69	0.76 (0.84)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2104-6AF..-0..0-Z**
			M_{2N}	Nm	8.3	11.2	14.1	19.9	22.5	28.5	25	33.5	42	45	56	70	91	114	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.6	11.6	14.5	20	23	29	26	34.5	43.5	46.5	58	72	93	116	120	
			M_{2max}	Nm	28.5	38.5	48	67	77	96	86	115	143	153	191	235	305	368	192	
4.55 ... 4.66	14.2 ... 14.6	1.71 (2.55)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2105-4AF..-0..0-Z**
			M_{2N}	Nm	13	17.7	22	30.5	36	45.5	37.5	52	66	69	89	111	141	179	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.8	18.5	23	32.5	37	46.5	41.5	55	69	73	92	115	147	184	120	
			M_{2max}	Nm	43.5	58	72	102	116	146	130	173	215	230	285	360	416	368	192	
4.58 ... 4.69	14.2 ... 14.6	1.71 (2.55)	n_{2N}	r/min	600	500	375	300	250	200	200	150	125	125	100	75	75	60	50	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	10.7	13.3	19.7	26.5	32	40.5	35.5	47.5	58	60	78	99	108	134	105	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.9	18.6	23	32.5	37	46.5	41.5	55	69	74	92	116	148	185	120	
			M_{2max}	Nm	43.5	58	72	102	116	146	130	173	215	230	285	360	416	368	192	
7.42 ... 7.62	22.8 ... 23.5	2.65 (3.5)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2105-6AF..-0..0-Z**
			M_{2N}	Nm	18.8	25.5	33	43.5	53	68	51	78	98	101	131	164	205	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30	38	53	60	76	68	90	113	120	150	188	240	230	120	
			M_{2max}	Nm	70	93	117	164	187	152	205	275	345	370	416	368	416	368	192	
7.8 ... 8.1	24.7 ... 25.5	4.6 (6.3)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2106-3AF..-0..0-Z**
			M_{2N}	Nm	19.4	26.5	34	45	54	69	52	79	99	103	133	166	210	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	24	32	40	56	64	81	71	95	119	127	159	198	255	230	120	
			M_{2max}	Nm	76	101	127	177	192	152	225	300	368	400	416	368	416	368	192	
10.1 ... 10.5	31.5 ... 32.4	6 (7.6)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2106-4AF..-0..0-Z**
			M_{2N}	Nm	23.5	32.5	41.5	53	66	85	60	97	121	123	163	200	255	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31.5	42	52	73	84	95	93	124	155	165	205	230	260	230	120	
			M_{2max}	Nm	97	129	161	216	192	152	285	380	368	416	416	368	416	368	192	
14.3 ... 14.9	43.4 ... 44.7	8.7 (10.4)	n_{2N}	r/min	500	375	300	250	200	150	150	125	100	100	75	60	50	37.5	–	**1F.2106-6AF..-0..0-Z**
			M_{2N}	Nm	31	42	54	69	85	95	101	122	151	152	200	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44.5	59	74	104	119	95	131	175	215	230	260	230	260	230	–	
			M_{2max}	Nm	134	178	220	216	192	152	336	416	368	416	416	365	416	368	–	
21.1 ... 21.5	84.1 ... 85.6	20.6 (24.7)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	–	**1FT2108-4AC..-0..0-Z**
			M_{2N}	Nm	40	60	76	104	120	95	143	145	193	190	260	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	64	85	107	135	120	95	190	250	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	
25.9 ... 26.4	101 ... 103	24.0 (27.0)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	–	**1FT2108-5AB..-0..0-Z**
			M_{2N}	Nm	64	83	107	135	120	95	170	220	230	260	260	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	79	105	131	135	120	95	210	260	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	
25.6 ... 26.2	102 ... 103	24.0 (28.0)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	60	50	50	37.5	25	–	**1FT2108-5AC..-0.B0-Z**
			M_{2N}	Nm	44.5	66	84	114	120	95	157	155	205	255	260	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	78	104	130	135	120	95	210	260	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	

Planetary gearbox data																
Gearbox type:			NRB120, 1-stage						NRB120, 2-stage							
1. Order code			A41						A42							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414
	$\varphi_{2,G}$	'	7						9								

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 1- and 2-stage																			
0.401 ... 0.471	1.62 ... 1.67	0.2 (0.22)	n_{2N}	r/min	600	500	375	375	300	250	250	150	150	150	125	100	75	75	50	**1F.2203-2AG..-0.A0-Z**
			M_{2N}	Nm	0.75	1.09	1.73	2.15	2.85	3.7	2.5	4.2	4.6	4.75	6.7	8.5	12.8	13.2	19.6	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.2	1.68	2.15	3.1	3.6	4.55	4.05	5.4	6.9	7.3	9.2	11.6	14.9	18.7	30	
			M_{2max}	Nm	4.85	6.5	8.2	11.6	13.3	16.7	14.8	19.8	24.5	26.5	33	41.5	53	66	106	
0.366 ... 0.437	1.62 ... 1.67	0.2 (0.22)	n_{2N}	r/min	500	375	375	300	250	250	200	150	125	125	100	100	75	60	37.5	**1F.2203-2AK..-0..0-Z**
			M_{2N}	Nm	0.79	1.19	1.5	2.25	2.85	3	2.75	3.85	4.75	4.95	7	6.9	10.9	13.8	22	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.09	1.54	1.99	2.85	3.3	4.2	3.7	5	6.3	6.8	8.5	10.7	13.8	17.3	27.5	
			M_{2max}	Nm	4.85	6.5	8.2	11.6	13.3	16.7	14.8	19.8	24.5	26.5	33	41.5	53	66	106	
1.02 ... 1.08	3.45 ... 3.54	0.35 (0.37)	n_{2N}	r/min	600	600	500	375	375	300	250	200	150	150	150	125	100	75	50	**1F.2203-4AG..-0.A0-Z**
			M_{2N}	Nm	2.65	3.1	4.6	6.8	7.1	9.6	8.4	11.2	14.2	15.2	17.8	20.5	29.5	39	60	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.05	4.15	5.2	7.4	8.5	10.7	9.5	12.8	16.1	17.2	21.5	26.5	34.5	43	69	
			M_{2max}	Nm	10.4	14	17.5	24.5	28	35	31.5	42	52	56	70	87	112	140	192	
0.985 ... 1.04	3.45 ... 3.54	0.35 (0.37)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	75	37.5	**1F.2203-4AK..-0..0-Z**
			M_{2N}	Nm	2.4	3.15	4.55	6.5	7	8.8	7.1	8.8	12.3	12.8	16.5	20.5	29	30.5	58	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.95	4	5	7.2	8.2	10.3	9.2	12.3	15.5	16.5	20.5	25.5	33	41.5	66	
			M_{2max}	Nm	10.4	14	17.5	24.5	28	35	31.5	42	52	56	70	87	112	140	192	
2.09 ... 2.14	6.64 ... 6.83	1.23 (1.31)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2204-5AF..-0..0-Z**
			M_{2N}	Nm	5.9	8	10.1	14.3	16.5	20.5	17.9	24	30	32	40.5	51	66	82	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.2	8.4	10.6	14.9	17	21	19	25	31.5	34	42.5	53	68	85	120	
			M_{2max}	Nm	20	27	34	47.5	54	68	60	81	101	108	135	168	215	265	192	
2.11 ... 2.16	6.64 ... 6.83	1.23 (1.31)	n_{2N}	r/min	600	500	375	375	300	250	250	200	150	150	125	100	75	60	37.5	**1F.2204-5AK..-0..0-Z**
			M_{2N}	Nm	5.7	7.4	10.1	11.7	15.6	19.4	16.3	20	28	28	36.5	46	65	82	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.3	8.4	10.6	15	17.2	21.5	19.2	25.5	32	34	42.5	53	68	85	120	
			M_{2max}	Nm	20	27	34	47.5	54	68	60	81	101	108	135	168	215	265	192	
2.85 ... 2.92	8.94 ... 9.19	1.61 (1.69)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2204-6AF..-0..0-Z**
			M_{2N}	Nm	8.2	11.1	14	19.7	22.5	28.5	24.5	33	41.5	44.5	56	70	90	113	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.6	11.5	14.4	20	23	29	26	34.5	43	46	57	72	92	115	120	
			M_{2max}	Nm	27.5	36.5	45.5	64	73	91	82	109	136	145	181	225	290	360	192	
3.08 ... 3.2	10.2 ... 10.5	3.15 (4.05)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	8	11.1	14	19.8	22.5	28.5	25	32	41	42.5	56	65	87	113	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	9.4	12.6	15.8	22	25.5	31.5	28	37.5	47	50	62	78	100	125	120	
			M_{2max}	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	330	368	192	
3.11 ... 3.23	10.2 ... 10.5	3.15 (4.05)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2205-2AF..-0..0-Z**
			M_{2N}	Nm	7.9	10.8	13.8	19.2	22	28.5	23	32.5	40.5	43	55	69	88	112	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	9.5	12.7	16	22.5	25.5	32	28.5	38	47.5	50	63	79	101	127	120	
			M_{2max}	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	330	368	192	
3.05 ... 3.16	10.2 ... 10.5	3.15 (4.05)	n_{2N}	r/min	600	500	375	300	250	250	200	150	150	125	100	100	75	60	37.5	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	6.6	8.4	12.4	17	20	20.5	22	29.5	30.5	38.5	49	49	73	92	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	9.3	12.5	15.6	22	25	31.5	27.5	37	46.5	49.5	62	77	99	124	120	
			M_{2max}	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	330	368	192	

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Planetary gearbox data																
Gearbox type:			NRB120, 1-stage						NRB120, 2-stage							
1. Order code			A41						A42							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414
	$\varphi_{2,G}$	'	7						9								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 1- and 2-stage (continued)																			
5.25 ... 5.46	17.1 ... 17.6	5.1 (6)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2205-4AF..-0..0-Z**
			M_{2N}	Nm	12.6	17.5	22.5	30	36.5	46.5	35.5	54	67	70	91	113	144	183	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	16.2	21.5	27	38	43.5	54	48	64	80	85	107	134	171	210	120	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	
5.31 ... 5.45	17.1 ... 17.6	7.8 (9.4)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	**1FT2206-2AC..-0..0-Z**
			M_{2N}	Nm	14.1	20	25	35.5	41	51	45.5	55	72	73	100	109	148	200	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	16.2	21.5	27	38	43.5	54	48.5	64	80	86	107	134	172	215	120	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	
5.41 ... 5.62	17.1 ... 17.6	7.8 (9.4)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2206-2AF..-0..0-Z**
			M_{2N}	Nm	13.6	18.4	23	31.5	37.5	47.5	39	55	68	72	92	115	147	186	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	16.7	22	27.5	39	44.5	56	49.5	66	82	88	110	138	176	220	119	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	
5.25 ... 5.45	17.1 ... 17.6	7.8 (9.4)	n_{2N}	r/min	500	375	300	250	250	200	200	150	125	100	100	75	60	50	37.5	**1FT2206-2AH..-0..0-Z**
			M_{2N}	Nm	12.4	17.3	22	29	29	37.5	34.5	46	55	70	72	97	127	152	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	16.2	21.5	27	38	43.5	54	48	64	80	85	107	133	171	210	120	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	
7.94 ... 8.26	25.7 ... 26.4	11.5 (13.1)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	12.5	**1FT2206-3AB..-0..0-Z**
			M_{2N}	Nm	22	29.5	37.5	53	59	75	59	79	110	116	147	184	230	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	24.5	32.5	41	57	66	82	73	97	121	129	162	200	255	230	120	
			M_{2max}	Nm	79	105	132	184	192	152	235	310	368	416	416	368	416	368	192	
7.81 ... 8.12	25.7 ... 26.4	11.5 (13.1)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2206-3AF..-0..0-Z**
			M_{2N}	Nm	16.4	22.5	29.5	38	47.5	63	43.5	71	89	90	121	151	189	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	24	32	40.5	56	64	81	71	95	119	127	159	199	255	230	120	
			M_{2max}	Nm	79	105	132	184	192	152	235	310	368	416	416	368	416	368	192	
10.8 ... 11.1	36.2 ... 37.3	15.1 (16.8)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	**1FT2206-4AC..-0..0-Z**
			M_{2N}	Nm	20	30.5	39	53	63	80	77	82	109	109	160	165	225	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	33	44	55	77	88	95	99	131	164	175	215	230	260	230	120	
			M_{2max}	Nm	111	149	186	216	192	152	330	416	368	416	416	368	416	368	192	
10.6 ... 11	34.3 ... 35.3	15.1 (16.8)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1F.2206-4AF..-0..0-Z**
			M_{2N}	Nm	24	33	42.5	54	67	89	62	99	123	125	167	205	255	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	32.5	43.5	54	76	87	95	97	129	162	172	215	230	260	230	120	
			M_{2max}	Nm	106	141	176	216	192	152	310	416	368	416	416	368	416	368	192	
10.1 ... 10.5	34.3 ... 35.3	15.1 (16.8)	n_{2N}	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	50	37.5	**1FT2206-4AH..-0..0-Z**
			M_{2N}	Nm	18.5	25.5	33.5	51	53	71	66	80	100	99	136	169	205	190	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31	41.5	52	73	83	95	93	123	154	165	205	230	260	230	120	
			M_{2max}	Nm	106	141	176	216	192	152	310	416	368	416	416	368	416	368	192	
10.3 ... 10.6	36.2 ... 37.3	24.86 (28.16)	n_{2N}	r/min	375	300	250	200	150	125	150	100	100	75	60	50	50	37.5	25	**1FT2208-2AF..-0..0-Z**
			M_{2N}	Nm	25.5	32.5	40.5	52	68	84	67	99	96	132	167	200	199	225	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31.5	42.5	53	74	85	95	94	125	157	167	205	230	260	225	120	
			M_{2max}	Nm	111	148	185	216	192	152	330	416	368	416	416	368	416	368	192	

➥ Continued on the next page

Planetary gearbox data																
Gearbox type:			NRB120, 1-stage						NRB120, 2-stage							
1. Order code			A41						A42							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414
	$\varphi_{2,G}$	'	7						9								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 1- and 2-stage (continued)																				
16.2 ... 16.6	48.6 ... 50.1	31.96 (34.96)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	–	**1FT2208-3AB..-0..0-Z**
			M_{2N}	Nm	38.5	49.5	64	94	101	95	106	140	194	200	255	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	49.5	66	82	116	120	95	148	197	230	260	260	230	260	230	–	
			M_{2max}	Nm	150	200	245	216	192	152	336	416	368	416	416	368	416	368	–	
15.2 ... 15.8	48.6 ... 50.1	31.96 (35.36)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	–	**1F.2208-3AC..-0..0-Z**
			M_{2N}	Nm	34.5	50	63	87	103	95	119	130	170	172	245	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	47	63	79	110	120	95	140	186	230	245	260	230	260	230	–	
			M_{2max}	Nm	150	200	245	216	192	152	336	416	368	416	416	368	416	368	–	
15.1 ... 15.7	48.6 ... 50.1	31.96 (35.36)	n_{2N}	r/min	375	300	250	200	150	150	125	100	75	75	60	50	50	37.5	–	**1FT2208-3AF..-0..0-Z**
			M_{2N}	Nm	32	41	50	64	86	84	98	123	162	162	205	230	225	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	47	62	78	109	120	95	139	185	230	245	260	230	260	230	–	
			M_{2max}	Nm	150	200	245	216	192	152	336	416	368	416	416	368	416	368	–	
19.7 ... 20.2	63.1 ... 64.9	41.16 (46.76)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	–	**1FT2208-4AB..-0..0-Z**
			M_{2N}	Nm	38	48.5	64	96	99	95	100	133	196	197	255	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	60	80	100	135	120	95	179	235	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	
18.9 ... 19.7	63.1 ... 64.9	41.16 (46.76)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	–	**1F.2208-4AC..-0..0-Z**
			M_{2N}	Nm	39.5	58	73	101	118	95	138	142	190	189	260	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	58	78	98	135	120	95	174	230	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	
18.2 ... 18.8	63.1 ... 64.9	41.16 (46.76)	n_{2N}	r/min	375	300	250	150	150	150	125	100	75	75	60	60	50	37.5	–	**1FT2208-4AF..-0..0-Z**
			M_{2N}	Nm	39.5	49.5	60	101	103	94	117	143	190	189	235	210	245	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	56	75	93	131	120	95	166	220	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	415	368	416	368	–	
22.9 ... 23.7	76.6 ... 78.7	50.46 (55.96)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	–	**1FT2208-5AB..-0..0-Z**
			M_{2N}	Nm	58	74	96	135	120	95	153	200	230	260	260	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	71	94	118	135	120	95	210	260	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	
22.7 ... 23.5	76.6 ... 78.7	50.46 (55.96)	n_{2N}	r/min	375	250	200	150	125	100	100	75	75	60	50	50	37.5	25	–	**1F.2208-5AC..-0..0-Z**
			M_{2N}	Nm	42.5	64	81	110	120	95	152	200	200	250	260	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	70	94	117	135	120	95	205	260	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	415	416	368	416	368	–	

Planetary gearbox data																
Gearbox type:			**NRB120, 1-stage**						**NRB120, 2-stage**							
1. Order code			**A41**						**A42**							
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414
	$\varphi_{2,G}$	'	7						9								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 3-stage													
0.408 ... 0.478	1.72 ... 1.77	0.093 (0.112)	n_{2N}	r/min	37.5	30	25	20	20	15	12.5	10	6	**1F.2103-2AG..-0.A0-Z**
			M_{2N}	Nm	17.8	26.5	32	34	48	64	77	97	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	28	37.5	47	56	75	94	121	151	120	
			M_{2max}	Nm	104	139	174	205	275	345	416	368	192	
0.379 ... 0.45	1.72 ... 1.77	0.093 (0.112)	n_{2N}	r/min	37.5	37.5	25	20	20	12.5	10	10	5	**1F.2103-2AH..-0..0-Z**
			M_{2N}	Nm	17.6	21	32	33.5	48	71	91	97	119	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	26.5	35.5	44.5	53	71	89	114	142	119	
			M_{2max}	Nm	104	139	174	205	275	345	416	368	191	
1.02 ... 1.07	3.74 ... 3.83	0.139 (0.158)	n_{2N}	r/min	37.5	30	25	20	20	15	10	10	6	**1F.2103-4AG..-0.A0-Z**
			M_{2N}	Nm	54	75	92	105	126	172	245	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	63	85	106	127	170	210	260	230	120	
			M_{2max}	Nm	225	300	375	368	416	368	416	368	192	
1 ... 1.06	3.74 ... 3.83	0.139 (0.158)	n_{2N}	r/min	37.5	37.5	25	20	20	12.5	10	10	5	**1F.2103-4AH..-0..0-Z**
			M_{2N}	Nm	44.5	52	76	86	113	160	200	225	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	62	83	104	125	167	205	260	230	119	
			M_{2max}	Nm	225	300	375	368	416	368	416	368	192	
1.03 ... 1.09	3.45 ... 3.54	0.35 (0.43)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	3	**1F.2104-4AF..-0..0-Z**
			M_{2N}	Nm	59	80	101	119	164	205	260	230	119	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	64	86	107	129	172	215	260	230	119	
			M_{2max}	Nm	205	275	345	368	416	368	416	368	192	
1.02 ... 1.08	3.55 ... 3.64	0.35 (0.43)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	6	**1F.2104-4AK..-0..0-Z**
			M_{2N}	Nm	47.5	76	95	98	157	198	250	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	64	85	107	128	171	210	260	230	119	
			M_{2max}	Nm	210	285	355	368	416	368	416	368	192	
2.13 ... 2.18	7.03 ... 7.23	0.56 (0.65)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	3	**1F.2104-5AF..-0..0-Z**
			M_{2N}	Nm	123	166	205	230	260	230	260	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	129	171	210	230	260	230	260	230	120	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	192	
2.12 ... 2.17	7.12 ... 7.33	0.56 (0.65)	n_{2N}	r/min	37.5	30	25	20	20	15	12.5	10	6	**1F.2104-5AK..-0..0-Z**
			M_{2N}	Nm	118	161	194	220	245	230	260	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	128	170	210	230	260	230	260	230	120	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	192	
2.87 ... 2.93	9.42 ... 9.69	0.76 (0.84)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	–	**1F.2104-6AF..-0..0-Z**
			M_{2N}	Nm	167	220	260	230	260	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	172	230	260	230	260	230	260	230	–	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	–	
4.55 ... 4.66	14.2 ... 14.6	1.71 (2.55)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	–	**1F.2105-4AF..-0..0-Z**
			M_{2N}	Nm	255	260	260	230	260	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	260	230	–	
			M_{2max}	Nm	416	416	415	368	416	368	416	368	–	

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Planetary gearbox data										
Gearbox type:			**NRB120, 3-stage**							
1. Order code			**A43**							
i			**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
$M_{2N,G}$		Nm	260	260	260	230	260	230	260	230	120
$M_{2max,G}$		Nm	416	416	416	368	416	368	416	368	192
$M_{2Em.Off}$		Nm	520	520	520	500	520	500	520	500	380
$J_{1,G}$		kg cm²	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413
$\varphi_{2,G}$		'	11							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 3-stage (continued)													
4.58 ... 4.69	14.2 ... 14.6	1.71 (2.55)	n_{2N}	r/min	30	30	25	20	20	12.5	10	10	–	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	230	240	260	230	255	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	260	230	–	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	–	
7.42 ... 7.62	22.8 ... 23.5	2.65 (3.5)	n_{2N}	r/min	25	20	15	12.5	10	7.5	–	–	–	**1F.2105-6AF..-0..0-Z**
			M_{2N}	Nm	260	260	260	230	260	230	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	–	–	–	
			M_{2max}	Nm	416	416	416	368	416	368	–	–	–	
7.8 ... 8.1	24.7 ... 25.5	4.6 (6.3)	n_{2N}	r/min	25	20	15	12.5	10	–	–	–	–	**1F.2106-3AF..-0..0-Z**
			M_{2N}	Nm	260	260	260	230	260	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	–	–	–	–	
			M_{2max}	Nm	410	415	416	368	416	–	–	–	–	
10.1 ... 10.5	31.5 ... 32.4	6 (7.6)	n_{2N}	r/min	25	20	15	12.5	–	–	–	–	–	**1F.2106-4AF..-0..0-Z**
			M_{2N}	Nm	260	260	260	230	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	–	–	–	–	–	
			M_{2max}	Nm	416	416	416	368	–	–	–	–	–	
14.3 ... 14.9	43.4 ... 44.7	8.7 (10.4)	n_{2N}	r/min	25	20	15	–	–	–	–	–	–	**1F.2106-6AF..-0..0-Z**
			M_{2N}	Nm	260	260	260	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	–	–	–	–	–	–	
			M_{2max}	Nm	416	416	416	–	–	–	–	–	–	
20.8 ... 20.8	83.2 ... 83.2	21.0 (25.0)	n_{2N}	r/min	20	–	–	–	–	–	–	–	–	**1FT2108-4AC..-0..0-Z**
			M_{2N}	Nm	260	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	416	–	–	–	–	–	–	–	–	
25.5 ... 25.5	101 ... 101	24.0 (28.0)	n_{2N}	r/min	12.5	–	–	–	–	–	–	–	–	**1FT2108-5AB..-0..0-Z**
			M_{2N}	Nm	260	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	416	–	–	–	–	–	–	–	–	
25.3 ... 25.3	101 ... 101	24.0 (28.0)	n_{2N}	r/min	20	–	–	–	–	–	–	–	–	**1FT2108-5AC..-0.B0-Z**
			M_{2N}	Nm	260	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	416	–	–	–	–	–	–	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 3-stage													
0.401 ... 0.471	1.62 ... 1.67	0.2 (0.22)	n_{2N}	r/min	37.5	30	25	20	20	15	10	10	6	**1F.2203-2AG..-0.A0-Z**
			M_{2N}	Nm	19.7	29	35	37	49.5	67	100	99	119	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	27.5	37	46.5	56	74	93	119	149	120	
			M_{2max}	Nm	98	131	164	197	260	325	416	368	192	
0.366 ... 0.437	1.62 ... 1.67	0.2 (0.22)	n_{2N}	r/min	30	30	20	15	15	12.5	10	7.5	6	**1F.2203-2AK..-0..0-Z**
			M_{2N}	Nm	20	24	36	41	55	66	83	111	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	25.5	34.5	43	52	69	86	111	138	120	
			M_{2max}	Nm	98	131	164	197	260	325	416	368	192	

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Planetary gearbox data										
Gearbox type:			**NRB120, 3-stage**							
1. Order code			**A43**							
i			**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
$M_{2N,G}$	Nm		260	260	260	230	260	230	260	230	120
$M_{2max,G}$	Nm		416	416	416	368	416	368	416	368	192
$M_{2Em.Off}$	Nm		520	520	520	500	520	500	520	500	380
$J_{1,G}$	kg cm²		2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413
$\varphi_{2,G}$	'		11							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 3-stage (continued)													
1.02 ... 1.08	3.45 ... 3.54	0.35 (0.37)	n_{2N} r/min	50	37.5	30	20	20	15	12.5	10	6	**1F.2203-4AG..-0.A0-Z**
			M_{2N} Nm	42.5	71	89	113	148	192	235	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	64	85	107	128	171	210	260	230	120	
			M_{2max} Nm	205	275	345	368	416	368	416	368	192	
0.985 ... 1.04	3.45 ... 3.54	0.35 (0.37)	n_{2N} r/min	37.5	30	25	20	20	15	12.5	10	6	**1F.2203-4AK..-0..0-Z**
			M_{2N} Nm	49	67	82	94	114	152	183	225	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	62	82	103	124	165	205	260	230	120	
			M_{2max} Nm	205	275	345	368	416	368	416	368	192	
2.09 ... 2.14	6.64 ... 6.83	1.23 (1.31)	n_{2N} r/min	25	20	15	12.5	10	7.5	6	5	3	**1F.2204-5AF..-0..0-Z**
			M_{2N} Nm	120	162	200	230	260	230	260	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	126	168	210	230	260	230	260	230	120	
			M_{2max} Nm	400	416	416	368	416	368	416	368	192	
2.11 ... 2.16	6.64 ... 6.83	1.23 (1.31)	n_{2N} r/min	37.5	30	25	20	20	15	12.5	10	6	**1F.2204-5AK..-0..0-Z**
			M_{2N} Nm	116	157	188	215	225	230	260	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	127	169	210	230	260	230	260	230	120	
			M_{2max} Nm	400	416	416	368	416	368	416	368	192	
2.85 ... 2.92	8.94 ... 9.19	1.61 (1.69)	n_{2N} r/min	25	20	15	12.5	10	7.5	6	5	–	**1F.2204-6AF..-0..0-Z**
			M_{2N} Nm	165	220	260	230	260	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	172	225	260	230	260	230	260	230	–	
			M_{2max} Nm	416	416	416	368	416	368	416	368	–	
3.08 ... 3.2	10.2 ... 10.5	3.15 (4.05)	n_{2N} r/min	20	12.5	10	10	7.5	5	5	3.75	–	**1FT2205-2AC..-0..0-Z**
			M_{2N} Nm	157	215	260	230	255	230	260	225	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	185	245	260	230	260	230	260	230	–	
			M_{2max} Nm	416	416	416	368	416	368	416	368	–	
3.11 ... 3.23	10.2 ... 10.5	3.15 (4.05)	n_{2N} r/min	25	20	15	12.5	10	7.5	6	5	–	**1F.2205-2AF..-0..0-Z**
			M_{2N} Nm	160	210	260	230	260	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	187	245	260	230	260	230	260	225	–	
			M_{2max} Nm	416	416	416	368	416	368	416	368	–	
3.05 ... 3.16	10.2 ... 10.5	3.15 (4.05)	n_{2N} r/min	37.5	30	25	20	15	12.5	10	10	–	**1FT2205-2AH..-0..0-Z**
			M_{2N} Nm	128	172	200	225	260	230	260	225	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	183	240	260	225	260	230	255	225	–	
			M_{2max} Nm	416	416	416	368	416	368	416	368	–	
5.25 ... 5.46	17.1 ... 17.6	5.1 (6)	n_{2N} r/min	25	20	15	12.5	10	7.5	6	–	–	**1F.2205-4AF..-0..0-Z**
			M_{2N} Nm	260	260	260	230	260	230	260	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	260	230	260	–	–	
			M_{2max} Nm	416	416	416	368	416	368	416	–	–	
5.31 ... 5.45	17.1 ... 17.6	7.8 (9.4)	n_{2N} r/min	20	12.5	10	10	7.5	5	5	–	–	**1FT2206-2AC..-0..0-Z**
			M_{2N} Nm	260	260	260	230	260	230	260	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	260	230	260	–	–	
			M_{2max} Nm	416	416	416	368	416	368	416	–	–	

➥ Continued on the next page

Planetary gearbox data										
Gearbox type:			**NRB120, 3-stage**							
1. Order code			**A43**							
	i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
	$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	120
	$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	192
	$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413
	$\varphi_{2,G}$	'	11								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 3-stage (continued)													
5.41 ... 5.62	17.1 ... 17.6	7.8 (9.4)	n_{2N} r/min	25	20	15	12.5	10	7.5	6	–	–	**1F.2206-2AF..-0..0-Z**
			M_{2N} Nm	260	260	260	230	260	230	260	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	255	225	255	–	–	
			M_{2max} Nm	416	416	416	368	416	368	416	–	–	
5.25 ... 5.45	17.1 ... 17.6	7.8 (9.4)	n_{2N} r/min	30	25	25	20	15	12.5	10	–	–	**1FT2206-2AH..-0..0-Z**
			M_{2N} Nm	230	255	230	225	255	230	260	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	225	255	225	255	–	–	
			M_{2max} Nm	416	416	416	368	416	368	416	–	–	
7.94 ... 8.26	25.7 ... 26.4	11.5 (13.1)	n_{2N} r/min	12.5	10	7.5	7.5	5	–	–	–	–	**1FT2206-3AB..-0..0-Z**
			M_{2N} Nm	260	260	260	230	260	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	260	–	–	–	–	
			M_{2max} Nm	416	416	416	368	416	–	–	–	–	
7.81 ... 8.12	25.7 ... 26.4	11.5 (13.1)	n_{2N} r/min	25	20	15	12.5	10	–	–	–	–	**1FT2206-3AF..-0..0-Z**
			M_{2N} Nm	260	260	260	230	260	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	260	–	–	–	–	
			M_{2max} Nm	416	416	416	368	416	–	–	–	–	
10.8 ... 11.1	36.2 ... 37.3	15.1 (16.8)	n_{2N} r/min	20	12.5	10	10	–	–	–	–	–	**1FT2206-4AC..-0..0-Z**
			M_{2N} Nm	260	260	260	230	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	–	–	–	–	–	
			M_{2max} Nm	416	416	416	368	–	–	–	–	–	
10.6 ... 11	34.3 ... 35.3	15.1 (16.8)	n_{2N} r/min	25	20	15	12.5	–	–	–	–	–	**1F.2206-4AF..-0..0-Z**
			M_{2N} Nm	260	260	260	230	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	–	–	–	–	–	
			M_{2max} Nm	416	416	416	368	–	–	–	–	–	
10.1 ... 10.5	34.3 ... 35.3	15.1 (16.8)	n_{2N} r/min	30	25	25	20	–	–	–	–	–	**1FT2206-4AH..-0..0-Z**
			M_{2N} Nm	260	260	210	225	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	–	–	–	–	–	
			M_{2max} Nm	416	416	416	368	–	–	–	–	–	
10.3 ... 10.6	36.2 ... 37.3	24.86 (28.16)	n_{2N} r/min	25	20	15	12.5	–	–	–	–	–	**1FT2208-2AF..-0..0-Z**
			M_{2N} Nm	255	260	255	230	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	255	260	255	225	–	–	–	–	–	
			M_{2max} Nm	416	416	416	368	–	–	–	–	–	
16.2 ... 16.6	48.6 ... 50.1	31.96 (34.96)	n_{2N} r/min	12.5	10	7.5	–	–	–	–	–	–	**1FT2208-3AB..-0..0-Z**
			M_{2N} Nm	260	260	260	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	–	–	–	–	–	–	
			M_{2max} Nm	416	416	416	–	–	–	–	–	–	
15.2 ... 15.8	48.6 ... 50.1	31.96 (35.36)	n_{2N} r/min	20	12.5	10	–	–	–	–	–	–	**1F.2208-3AC..-0..0-Z**
			M_{2N} Nm	260	260	260	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	–	–	–	–	–	–	
			M_{2max} Nm	416	416	416	–	–	–	–	–	–	

➥ Continued on the next page

Planetary gearbox data										
Gearbox type:			**NRB120, 3-stage**							
1. Order code			**A43**							
	i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
	$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	120
	$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	192
	$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413
	$\varphi_{2,G}$	'	11								

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB120

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)											
Nm	Nm	kg cm²											
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 3-stage (continued)													
15.1	48.6	31.96	n_{2N}	r/min	25	20	15	–	–	–	–	–	–	**1FT2208-3AF..-0..0-Z**
...	...	(35.36)	M_{2N}	Nm	260	260	260	–	–	–	–	–	–	■■■ + ■■■ + . . .
15.7	50.1		$M_{2,0}$	Nm	260	260	260	–	–	–	–	–	–	
			M_{2max}	Nm	416	416	416	–	–	–	–	–	–	
19.7	63.1	41.16	n_{2N}	r/min	12.5	10	–	–	–	–	–	–	–	**1FT2208-4AB..-0..0-Z**
...	...	(46.76)	M_{2N}	Nm	260	260	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
20.2	64.9		$M_{2,0}$	Nm	260	260	–	–	–	–	–	–	–	
			M_{2max}	Nm	416	416	–	–	–	–	–	–	–	
18.9	63.1	41.16	n_{2N}	r/min	20	12.5	–	–	–	–	–	–	–	**1F.2208-4AC..-0..0-Z**
...	...	(46.76)	M_{2N}	Nm	260	260	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
19.7	64.9		$M_{2,0}$	Nm	260	260	–	–	–	–	–	–	–	
			M_{2max}	Nm	416	416	–	–	–	–	–	–	–	
18.2	63.1	41.16	n_{2N}	r/min	25	20	–	–	–	–	–	–	–	**1FT2208-4AF..-0..0-Z**
...	...	(46.76)	M_{2N}	Nm	260	260	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
18.8	64.9		$M_{2,0}$	Nm	260	255	–	–	–	–	–	–	–	
			M_{2max}	Nm	416	416	–	–	–	–	–	–	–	
22.9	76.6	50.46	n_{2N}	r/min	12.5	–	–	–	–	–	–	–	–	**1FT2208-5AB..-0..0-Z**
...	...	(55.96)	M_{2N}	Nm	260	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
23.7	78.7		$M_{2,0}$	Nm	260	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	416	–	–	–	–	–	–	–	–	
22.7	76.6	50.46	n_{2N}	r/min	20	–	–	–	–	–	–	–	–	**1F.2208-5AC..-0..0-Z**
...	...	(55.96)	M_{2N}	Nm	260	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
23.5	78.7		$M_{2,0}$	Nm	260	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	416	–	–	–	–	–	–	–	–	

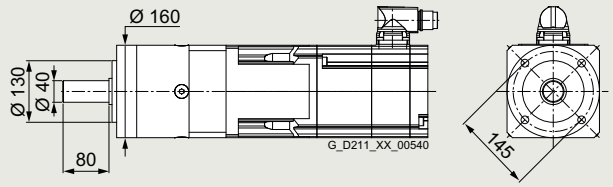
Planetary gearbox data										
Gearbox type:			**NRB120, 3-stage**							
1. Order code			**A43**							
	i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
	$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	120
	$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	192
	$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413
	$\varphi_{2,G}$	'	11								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRB160



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5000 N at 100 r/min
Average axial force for 20000 h	$F_{A,eq}$	7000 N at 100 r/min
Average radial force for 30000 h	$F_{R,eq}$	4200 N at 100 r/min
Average axial force for 30000 h	$F_{A,eq}$	6000 N at 100 r/min
Maximum radial force	$F_{R,max}$	5000 N
Maximum axial force	$F_{A,max}$	11000 N

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)															
Nm	Nm	kg cm²															
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB160 1- and 2-stage																	
4.16	14.1	1.71	n_{2N}	r/min	300	250	200	150	100	75	75	60	50	50	37.5	20	**1F.2105-4AF..-0..0-Z**
...	...	(2.55)	M_{2N}	Nm	11.2	14.8	19.5	31	44	57	60	76	95	96	136	245	■■■ + ■■■ + . . .
4.28	14.2		M_{2_0}	Nm	12.4	16.8	21	34	51	63	68	85	106	136	170	270	
			M_{2max}	Nm	42	56	70	113	169	210	225	280	350	450	560	720	
4.19	14.1	1.71	n_{2N}	r/min	300	250	200	150	100	75	75	60	50	37.5	37.5	20	**1FT2105-4AH..-0..0-Z**
...	...	(2.55)	M_{2N}	Nm	10.6	13.8	18.8	28.5	41	55	56	73	90	120	122	235	■■■ + ■■■ + . . .
4.31	14.2		M_{2_0}	Nm	12.5	16.9	21	34	51	64	68	85	107	137	172	275	
			M_{2max}	Nm	42	56	70	113	169	210	225	280	350	450	560	720	
7.13	22.8	2.65	n_{2N}	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	**1F.2105-6AF..-0..0-Z**
...	...	(3.5)	M_{2N}	Nm	16.5	21	29	43	60	83	82	110	132	187	230	350	■■■ + ■■■ + . . .
7.24	23.1		M_{2_0}	Nm	21	28.5	36	57	86	107	114	143	179	230	285	450	
			M_{2max}	Nm	69	92	115	184	270	340	365	455	570	720	910	720	
7.5	24.7	4.6	n_{2N}	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	**1F.2106-3AF..-0..0-Z**
...	...	(6.3)	M_{2N}	Nm	17.5	22.5	30.5	45.5	63	88	86	115	139	195	240	365	■■■ + ■■■ + . . .
7.65	25		M_{2_0}	Nm	22.5	30	38	61	90	112	120	150	187	240	300	450	
			M_{2max}	Nm	75	100	125	200	295	370	395	495	610	790	980	720	
9.84	31.5	6	n_{2N}	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	**1F.2106-4AF..-0..0-Z**
...	...	(7.6)	M_{2N}	Nm	22.5	28.5	39	56	76	108	104	140	167	235	295	435	■■■ + ■■■ + . . .
10	31.9		M_{2_0}	Nm	29.5	39.5	50	80	118	147	157	196	245	310	390	450	
			M_{2max}	Nm	95	127	159	255	375	470	500	630	780	1000	1120	720	
14.1	43.6	8.7	n_{2N}	r/min	300	200	200	125	75	60	60	50	37.5	37.5	25	20	**1F.2106-6AF..-0..0-Z**
...	...	(10.4)	M_{2N}	Nm	30	47	51	88	137	172	173	215	285	290	440	450	■■■ + ■■■ + . . .
14.4	44.3		M_{2_0}	Nm	42.5	57	71	114	168	210	225	280	350	450	560	450	
			M_{2max}	Nm	132	176	220	350	520	650	690	870	1090	1280	1120	720	
20.6	83.8	18.2	n_{2N}	r/min	250	200	150	100	75	60	50	37.5	37.5	30	20	20	**1FT2108-4AC..-0..0-Z**
...	...	(22.3)	M_{2N}	Nm	43	55	77	123	155	196	235	315	315	405	600	445	■■■ + ■■■ + . . .
21.1	85.2		M_{2_0}	Nm	63	84	105	168	245	310	330	410	510	660	700	450	
			M_{2max}	Nm	255	340	425	680	1010	1120	1280	1280	1120	1280	1120	720	

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Planetary gearbox data														
Gearbox type:			NRB160, 1-stage				NRB160, 2-stage							
1. Order code			A51				A52							
	i		3	4	5	8	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R08	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	400	450	450	450	800	700	800	800	700	800	700	450
	$M_{2max,G}$	Nm	640	720	720	720	1280	1120	1280	1280	1120	1280	1120	720
	$M_{2Em.Off}$	Nm	800	900	900	900	1600	1400	1600	1600	1400	1600	1400	900
	$J_{1,G}$	kg cm²	11.999	6.912	5.188	3.726	10.087	9.913	6.059	4.695	4.632	3.549	3.524	3.502
	$\varphi_{2,G}$	'	6				9							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB160

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB160 1- and 2-stage (continued)																	
25.4 ... 26	101 ... 103	21.6 (25.6)	n_{2N} r/min	250	200	150	100	75	50	50	37.5	30	25	20	12.5	**1FT2108-5AB..-0..0-Z**
			M_{2N} Nm	53	69	94	150	186	275	275	370	465	570	700	450	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	77	103	129	205	305	380	405	500	630	800	700	450	
			M_{2max} Nm	305	410	510	720	1220	1120	1280	1280	1120	1280	1120	720	
25.1 ... 25.7	101 ... 103	21.6 (25.6)	n_{2N} r/min	250	200	150	100	60	50	50	37.5	30	25	20	20	**1FT2108-5AC..-0.B0-Z**
			M_{2N} Nm	48.5	62	87	138	215	260	255	350	435	530	660	450	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	77	102	128	205	300	375	400	500	620	800	700	450	
			M_{2max} Nm	305	410	510	720	1220	1120	1280	1280	1120	1280	1120	720	
32.1 ... 32.8	135 ... 138	28.2 (32.2)	n_{2N} r/min	250	200	150	100	60	50	50	37.5	30	25	20	12.5	**1FT2108-7AB..-0..0-Z**
			M_{2N} Nm	62	80	110	175	260	315	315	425	520	650	700	450	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	98	131	164	260	385	480	510	640	700	800	700	450	
			M_{2max} Nm	410	540	680	720	1280	1120	1280	1280	1120	1280	1120	720	
31.5 ... 32.3	135 ... 138	28.2 (32.2)	n_{2N} r/min	250	200	150	100	60	50	50	37.5	30	25	25	20	**1FT2108-7AC..-0.B0-Z**
			M_{2N} Nm	60	77	107	170	255	310	305	415	510	630	600	450	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	96	128	161	255	375	470	500	630	700	800	700	450	
			M_{2max} Nm	410	540	680	720	1280	1120	1280	1280	1120	1280	1120	720	
31.3 ... 32	135 ... 138	28.2 (32.2)	n_{2N} r/min	250	200	150	100	60	50	50	37.5	30	25	20	20	**1FT2108-7AE..-0.B0-Z**
			M_{2N} Nm	55	71	100	158	240	290	285	390	490	590	690	445	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	95	127	160	255	375	470	500	620	700	800	700	450	
			M_{2max} Nm	410	540	680	720	1280	1120	1280	1280	1120	1280	1120	720	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB160 1- and 2-stage																	
2.65 ... 2.78	9.99 ... 10.1	3.15 (4.05)	n_{2N} r/min	300	250	200	125	100	75	75	50	50	37.5	25	20	**1FT2205-2AC..-0..0-Z**
			M_{2N} Nm	5.5	7.1	10.3	17.6	22.5	30.5	31	43.5	49.5	68	90	127	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	7.9	10.8	13.6	22	32.5	40.5	43.5	54	68	87	110	176	
			M_{2max} Nm	29.5	40	50	80	120	150	160	200	250	320	400	630	
2.68 ... 2.81	9.99 ... 10.1	3.15 (4.05)	n_{2N} r/min	300	250	250	150	100	75	75	75	60	50	37.5	25	**1F.2205-2AF..-0..0-Z**
			M_{2N} Nm	5.9	8.1	8.9	17.6	25	32	33.5	36.5	47	61	85	127	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	8	10.9	13.8	22	33	41	44	55	69	88	111	178	
			M_{2max} Nm	29.5	40	50	80	120	150	160	200	250	320	400	630	
2.62 ... 2.74	9.99 ... 10.1	3.15 (4.05)	n_{2N} r/min	300	250	200	150	100	75	75	60	50	37.5	37.5	20	**1FT2205-2AH..-0..0-Z**
			M_{2N} Nm	5.8	7.7	10.5	16.9	24	31	32.5	42.5	53	70	77	139	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	7.8	10.6	13.4	21.5	32	40.5	43	54	67	87	108	174	
			M_{2max} Nm	29.5	40	50	80	120	150	160	200	250	320	400	630	
4.91 ... 5.02	17 ... 17.2	5.1 (6)	n_{2N} r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	**1F.2205-4AF..-0..0-Z**
			M_{2N} Nm	10.4	13.4	18.8	28	40	56	55	74	89	127	160	240	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	14.7	19.8	24.5	40	59	74	78	98	123	158	197	315	
			M_{2max} Nm	51	68	85	137	200	255	270	335	420	540	670	720	
4.94 ... 5.06	17 ... 17.2	7.8 (9.4)	n_{2N} r/min	250	200	200	125	75	60	60	50	37.5	37.5	25	15	**1FT2206-2AC..-0..0-Z**
			M_{2N} Nm	12.2	16.4	17.5	32	52	65	67	85	110	116	176	280	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	14.8	19.9	25	40	60	75	80	100	126	161	200	320	
			M_{2max} Nm	51	68	85	137	200	255	270	335	420	540	670	720	

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Planetary gearbox data													
Gearbox type:		**NRB160, 1-stage**				**NRB160, 2-stage**							
1. Order code		**A51**				**A52**							
i		**3**	**4**	**5**	**8**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code		**R03**	**R04**	**R05**	**R08**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
$M_{2N,G}$	Nm	400	450	450	450	800	700	800	800	700	800	700	450
$M_{2max,G}$	Nm	640	720	720	720	1280	1120	1280	1280	1120	1280	1120	720
$M_{2Em.Off}$	Nm	800	900	900	900	1600	1400	1600	1600	1400	1600	1400	900
$J_{1,G}$	kg cm²	11.999	6.912	5.188	3.726	10.087	9.913	6.059	4.695	4.632	3.549	3.524	3.502
$\varphi_{2,G}$	'	6				9							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB160

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB160 1- and 2-stage (continued)																	
5.07 ... 5.18	17 ... 17.2	7.8 (9.4)	n_{2N}	r/min	300	250	200	150	100	75	75	60	50	37.5	37.5	20	**1F.2206-2AF..-0..0-Z**
			M_{2N}	Nm	12.1	16.1	21	33	47.5	61	64	82	102	134	143	260	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.2	20	25.5	41	61	76	81	102	127	163	200	325	
			M_{2max}	Nm	51	68	85	137	200	255	270	335	420	540	670	720	
4.9 ... 5.02	17 ... 17.2	7.8 (9.4)	n_{2N}	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	**1FT2206-2AH..-0..0-Z**
			M_{2N}	Nm	10.8	13.8	19.4	28	40.5	57	56	76	91	129	161	240	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.7	19.7	24.5	40	59	74	79	98	123	158	197	315	
			M_{2max}	Nm	51	68	85	137	200	255	270	335	420	540	670	720	
7.64 ... 7.79	25.7 ... 26	11.5 (13.1)	n_{2N}	r/min	250	200	150	100	75	50	50	37.5	30	25	20	12.5	**1FT2206-3AB..-0..0-Z**
			M_{2N}	Nm	18.8	25	33	53	70	99	104	133	167	210	265	425	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	23	30.5	38.5	62	91	114	122	152	191	240	305	450	
			M_{2max}	Nm	77	103	130	205	305	385	410	510	640	820	1020	720	
7.51 ... 7.66	25.7 ... 26	11.5 (13.1)	n_{2N}	r/min	250	200	200	125	75	75	60	50	37.5	37.5	30	20	**1FT2206-3AF..-0..0-Z**
			M_{2N}	Nm	18.2	24	26	47	74	76	96	121	157	170	210	315	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30	38	61	90	112	120	150	187	240	300	450	
			M_{2max}	Nm	77	103	130	205	305	385	410	510	640	820	1020	720	
10.6 ... 10.7	36.3 ... 36.9	15.1 (16.8)	n_{2N}	r/min	250	200	150	100	75	60	50	37.5	37.5	30	25	15	**1FT2206-4AC..-0..0-Z**
			M_{2N}	Nm	19.8	26	37	59	80	101	122	164	168	215	255	430	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31.5	42.5	53	85	127	159	169	210	265	340	420	450	
			M_{2max}	Nm	110	147	184	290	435	540	580	720	910	1160	1120	720	
10.3 ... 10.5	34.4 ... 34.9	15.1 (16.8)	n_{2N}	r/min	300	250	200	150	75	75	60	60	50	37.5	30	20	**1F.2206-4AF..-0..0-Z**
			M_{2N}	Nm	23	29	39.5	57	106	110	137	143	170	240	300	445	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31	41.5	52	84	123	154	164	205	255	325	410	450	
			M_{2max}	Nm	104	139	174	275	410	510	550	680	860	1100	1120	720	
9.83 ... 10	34.4 ... 34.9	15.1 (16.8)	n_{2N}	r/min	250	200	200	125	75	60	60	50	37.5	30	25	20	**1FT2206-4AH..-0..0-Z**
			M_{2N}	Nm	22.5	29.5	31.5	56	91	115	115	143	191	245	295	350	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29.5	39.5	49.5	80	117	147	157	196	245	310	390	450	
			M_{2max}	Nm	104	139	174	275	410	510	550	680	860	1100	1120	720	
10.1 ... 10.3	36.3 ... 36.9	22.5 (25.8)	n_{2N}	r/min	250	200	200	125	75	60	60	50	37.5	30	25	20	**1FT2208-2AF..-0..0-Z**
			M_{2N}	Nm	25	33.5	35	62	98	123	126	158	205	260	320	370	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30.5	40.5	51	82	121	151	161	200	250	320	400	450	
			M_{2max}	Nm	110	147	184	290	435	540	580	720	910	1160	1120	720	
16.1 ... 16.3	48.9 ... 49.7	29.6 (32.6)	n_{2N}	r/min	250	200	150	100	60	50	50	37.5	30	25	20	12.5	**1FT2208-3AB..-0..0-Z**
			M_{2N}	Nm	29.5	38.5	55	87	143	174	173	235	295	360	455	450	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	48.5	64	81	130	193	240	255	320	400	510	640	450	
			M_{2max}	Nm	149	198	245	395	580	730	780	980	1120	1280	1120	720	
15 ... 15.3	48.9 ... 49.7	29.6 (33)	n_{2N}	r/min	250	200	200	125	75	60	60	50	37.5	30	25	20	**1F.2208-3AC..-0..0-Z**
			M_{2N}	Nm	35	46	48.5	85	134	169	167	205	275	355	425	450	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	45.5	61	76	122	180	225	240	300	375	480	590	450	
			M_{2max}	Nm	149	198	245	395	580	730	780	980	1120	1280	1120	720	

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Planetary gearbox data													
Gearbox type:			**NRB160, 1-stage**				**NRB160, 2-stage**						
1. Order code			**A51**				**A52**						
i			**3**	**4**	**5**	**8**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R08**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
$M_{2N,G}$		Nm	400	450	450	450	800	700	800	800	700	800	700	450
$M_{2max,G}$		Nm	640	720	720	720	1280	1120	1280	1280	1120	1280	1120	720
$M_{2Em.Off}$		Nm	800	900	900	900	1600	1400	1600	1600	1400	1600	1400	900
$J_{1,G}$		kg cm²	11.999	6.912	5.188	3.726	10.087	9.913	6.059	4.695	4.632	3.549	3.524	3.502
$\varphi_{2,G}$		'	6				9							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB160

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB160 1- and 2-stage (continued)																	
14.9 ... 15.2	48.9 ... 49.7	29.6 (33)	n_{2N} r/min	250	200	150	125	75	60	60	50	37.5	30	25	20	**1FT2208-3AF..-0..0-Z**
			M_{2N} Nm	34	44.5	61	80	129	163	161	198	265	340	410	440	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	45	60	76	121	179	220	235	295	370	475	590	450	
			M_{2max} Nm	149	198	245	395	580	730	780	980	1120	1280	1120	720	
19.4 ... 19.8	63.5 ... 64.5	38.8 (44.4)	n_{2N} r/min	200	150	125	75	60	50	37.5	37.5	30	25	20	12.5	**1FT2208-4AB..-0..0-Z**
			M_{2N} Nm	37.5	51	64	111	143	171	225	230	290	350	440	450	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	59	79	99	158	230	290	310	385	480	620	700	450	
			M_{2max} Nm	193	255	320	510	760	950	1010	1270	1120	1280	1120	720	
18.7 ... 19.1	63.5 ... 64.5	38.8 (44.4)	n_{2N} r/min	250	200	150	125	75	60	50	50	37.5	30	25	20	**1F.2208-4AC..-0..0-Z**
			M_{2N} Nm	42	54	75	97	154	194	230	230	315	400	480	450	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	57	76	95	153	220	280	295	370	465	590	700	450	
			M_{2max} Nm	193	255	320	510	760	950	1010	1270	1120	1280	1120	720	
18 ... 18.3	63.5 ... 64.5	38.8 (44.4)	n_{2N} r/min	250	200	150	125	75	60	50	50	37.5	30	25	20	**1FT2208-4AF..-0..0-Z**
			M_{2N} Nm	42.5	55	74	97	155	195	230	230	315	405	480	450	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	54	73	91	146	215	270	285	355	445	570	700	450	
			M_{2max} Nm	193	255	320	510	760	950	1010	1270	1120	1280	1120	720	
22.7 ... 23.3	77 ... 78.3	48.1 (53.6)	n_{2N} r/min	250	200	150	100	60	50	50	37.5	30	25	20	12.5	**1FT2208-5AB..-0..0-Z**
			M_{2N} Nm	47	61	84	134	205	250	250	340	425	520	650	450	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	69	92	116	186	270	340	360	455	560	720	700	450	
			M_{2max} Nm	230	310	390	620	920	1120	1230	1280	1120	1280	1120	720	
22.4 ... 23	77 ... 78.3	48.1 (53.6)	n_{2N} r/min	250	200	150	100	60	50	50	37.5	30	25	20	20	**1F.2208-5AC..-0..0-Z**
			M_{2N} Nm	47.5	61	85	135	210	255	250	340	425	520	650	450	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	68	91	114	183	270	335	355	445	560	710	700	450	
			M_{2max} Nm	230	310	390	620	920	1120	1230	1280	1120	1280	1120	720	

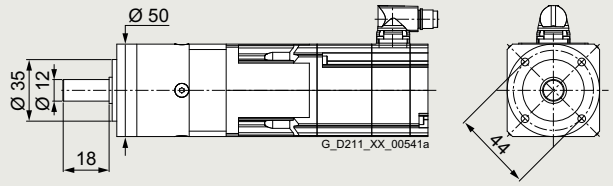
Planetary gearbox data													
Gearbox type:			**NRB160, 1-stage**				**NRB160, 2-stage**						
1. Order code			**A51**				**A52**						
i			**3**	**4**	**5**	**8**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R08**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
	$M_{2N,G}$	Nm	400	450	450	450	800	700	800	800	700	800	700	450
	$M_{2max,G}$	Nm	640	720	720	720	1280	1120	1280	1280	1120	1280	1120	720
	$M_{2Em.Off}$	Nm	800	900	900	900	1600	1400	1600	1600	1400	1600	1400	900
	$J_{1,G}$	kg cm²	11.999	6.912	5.188	3.726	10.087	9.913	6.059	4.695	4.632	3.549	3.524	3.502
	$\varphi_{2,G}$	'	6				9							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRK050



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	800 N at 100 r/min
Average axial force for 20000 h	$F_{A,eq}$	1000 N at 100 r/min
Average radial force for 30000 h	$F_{R,eq}$	700 N at 100 r/min
Average axial force for 30000 h	$F_{A,eq}$	800 N at 100 r/min
Maximum radial force	$F_{R,max}$	1300 N
Maximum axial force	$F_{A,max}$	1000 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK050 1- and 2-stage																					
0.12	0.525	0.0245	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	30	**1F.2102-0AG..-0.A0-Z**
...	...	(0.0285)	M_{2N}	Nm	0.235	0.355	0.47	0.66	0.81	1.04	0.84	1.21	1.53	1.62	2.1	2.6	3.35	4.3	6.8	5	■■■ + ■■■ + . . .
0.131	0.533		M_{2_0}	Nm	0.355	0.49	0.62	0.89	1.02	1.29	1.14	1.54	1.93	2.05	2.55	3.25	4.15	5.2	7.5	5	
			M_{2max}	Nm	1.57	2.1	2.6	3.7	4.25	5.3	4.7	6.3	7.9	8.4	10.5	13.2	16.9	21	12	8	
0.27	1.06	0.036	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	30	**1F.2102-1AG..-0.A0-Z**
...	...	(0.04)	M_{2N}	Nm	0.63	0.88	1.13	1.56	1.87	2.35	1.98	2.75	3.45	3.65	4.65	5.8	7.4	9.5	7.5	5	■■■ + ■■■ + . . .
0.28	1.07		M_{2_0}	Nm	0.81	1.09	1.37	1.94	2.2	2.75	2.45	3.3	4.15	4.4	5.5	6.9	8.8	11.1	7.5	5	
			M_{2max}	Nm	3.2	4.25	5.3	7.5	8.5	8	9.5	12.7	15.9	17	21	21	24	21	12	8	
0.515	1.86	0.1396	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	–	**1F.2103-2AG..-2.A0-Z**
...	...	(0.1586)	M_{2N}	Nm	1.05	1.46	1.87	2.45	3.05	3.85	3.15	4.55	5.7	5.9	7.7	9.4	12	13	7.5	–	■■■ + ■■■ + . . .
0.524	1.89		M_{2_0}	Nm	1.54	2.05	2.55	3.65	4.15	5	4.65	6.2	7.7	8.2	10.3	12.9	15	13	7.5	–	
			M_{2max}	Nm	5.6	7.5	9.4	13.1	9.5	8	16.8	22	21	24	24	21	24	21	12	–	
0.5	1.86	0.1396	n_{2N}	r/min	750	600	500	375	375	250	300	250	200	200	125	100	100	75	50	–	**1F.2103-2AH..-2..0-Z**
...	...	(0.1586)	M_{2N}	Nm	1.11	1.47	1.85	2.55	2.65	3.9	3.3	4.15	5.2	5.2	7.7	9.7	10.9	13	7.5	–	■■■ + ■■■ + . . .
0.509	1.89		M_{2_0}	Nm	1.5	2	2.5	3.5	4.05	5	4.5	6	7.5	8	10	12.5	15	13	7.5	–	
			M_{2max}	Nm	5.6	7.5	9.4	13.1	9.5	8	16.8	22	21	24	24	21	24	21	12	–	
1.08	3.9	0.1856	n_{2N}	r/min	750	600	600	375	375	300	–	250	200	200	150	125	100	75	–	–	**1F.2103-4AG..-2.A0-Z**
...	...	(0.2046)	M_{2N}	Nm	2.2	2.9	3	5	5	5	–	7.6	9.6	9.5	13	13	15	13	–	–	■■■ + ■■■ + . . .
1.1	3.96		M_{2_0}	Nm	3.25	4.35	5.4	7.6	6	5	–	12.9	13	15	15	13	15	13	–	–	
			M_{2max}	Nm	11.8	15.8	19.7	13.5	9.5	8	–	24	21	24	24	21	24	21	–	–	
0.964	3.9	0.1856	n_{2N}	r/min	750	600	500	375	375	250	300	250	200	200	125	100	100	75	–	–	**1F.2103-4AH..-2..0-Z**
...	...	(0.2046)	M_{2N}	Nm	1.99	2.6	3.25	4.5	4.55	5	5.7	6.9	8.8	8.7	13.7	13	15	13	–	–	■■■ + ■■■ + . . .
0.978	3.96		M_{2_0}	Nm	2.9	3.85	4.85	6.8	6	5	8.6	11.5	13	15	15	13	15	13	–	–	
			M_{2max}	Nm	11.8	15.8	19.7	13.5	9.5	8	19	24	21	24	24	21	24	21	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK050 1- and 2-stage																					
0.566	1.76	0.2466	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	–	**1F.2203-2AG..-2.A0-Z**
...	...	(0.2666)	M_{2N}	Nm	1.02	1.43	1.84	2.25	3.05	3.85	3	4.5	5.6	5.7	7.6	9.3	11.7	13	7.5	–	■■■ + ■■■ + . . .
0.574	1.79		M_{2_0}	Nm	1.69	2.25	2.85	4	4.55	5	5.1	6.8	8.5	9	11.3	13	15	13	7.5	–	
			M_{2max}	Nm	5.3	7.1	8.9	12.4	9.5	8	15.9	21	21	24	24	21	24	21	12	–	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:			NRK050, 1-stage						NRK050, 2-stage								
1. Order code			B11						B12								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	11	15	13	8.5	6	5	12	15	13	15	15	13	15	13	7.5	5
	$M_{2max,G}$	Nm	17.5	24	21	13.5	9.5	8	19	24	21	24	24	21	24	21	12	8
	$M_{2Em.Off}$	Nm	22.5	30	36	26	27	27	33	40	36	40	40	36	40	36	27	27
	$J_{1,G}$	kg cm²	0.03	0.022	0.02	0.016	0.015	0.015	0.026	0.026	0.025	0.02	0.018	0.018	0.015	0.015	0.015	0.014
	$\varphi_{2,G}$	'	15						19									

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRK050

Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK050 1- and 2-stage (continued)																					
0.531 ... 0.539	1.76 ... 1.79	0.2466 (0.2666)	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	150	150	100	75	75	50	–	**1F.2203-2AK..-2..0-Z**
			M_{2N}	Nm	1	1.32	1.63	2.25	2.2	2.85	2.75	3.3	4.15	5.5	5.6	8.5	11.2	11.5	7.5	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.59	2.1	2.65	3.75	4.3	5	4.8	6.4	8	8.5	10.6	13	15	13	7.5	–	
			M_{2max}	Nm	5.3	7.1	8.9	12.4	9.5	8	15.9	21	21	24	24	21	24	21	12	–	
1.18 ... 1.2	3.61 ... 3.66	0.3966 (0.4166)	n_{2N}	r/min	1000	750	600	375	375	300	–	250	200	200	150	125	100	75	–	–	**1F.2203-4AG..-2.A0-Z**
			M_{2N}	Nm	2.2	3.1	4.05	6.5	6	5	–	9.9	12.5	12.4	15	13	15	13	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.55	4.75	5.9	8.3	6	5	–	14.2	13	15	15	13	15	13	–	–	
			M_{2max}	Nm	10.9	14.6	18.2	13.5	9.5	8	–	24	21	24	24	21	24	21	–	–	
1.1 ... 1.12	3.61 ... 3.66	0.3966 (0.4166)	n_{2N}	r/min	750	500	500	300	300	300	250	200	150	150	125	125	100	75	–	–	**1F.2203-4AK..-2..0-Z**
			M_{2N}	Nm	1.96	3	3.05	5.3	5.3	4.7	6.6	8.3	11.1	11.1	13.4	11.4	14.2	13	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.3	4.4	5.5	7.7	6	5	9.9	13.2	13	15	15	13	15	13	–	–	
			M_{2max}	Nm	10.9	14.6	18.2	13.5	9.5	8	19	24	21	24	24	21	24	21	–	–	

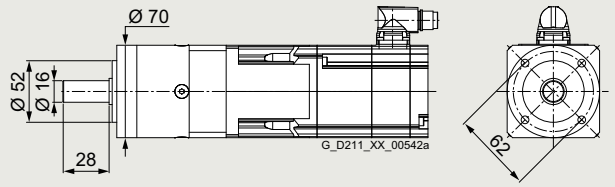
Planetary gearbox data																	
Gearbox type:			**NRK050, 1-stage**						**NRK050, 2-stage**								
1. Order code			**B11**						**B12**								
i			**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**	**100**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**	**R00**
$M_{2N,G}$		Nm	11	15	13	8.5	6	5	12	15	13	15	15	13	15	13	7.5	5
$M_{2max,G}$		Nm	17.5	24	21	13.5	9.5	8	19	24	21	24	24	21	24	21	12	8
$M_{2Em.Off}$		Nm	22.5	30	36	26	27	27	33	40	36	40	40	36	40	36	27	27
$J_{1,G}$		kg cm²	0.03	0.022	0.02	0.016	0.015	0.015	0.026	0.026	0.025	0.02	0.018	0.018	0.015	0.015	0.015	0.014
$\varphi_{2,G}$		'	15						19									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRK070



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1050 N at 100 r/min
Average axial force for 20000 h	$F_{A,eq}$	1350 N at 100 r/min
Average radial force for 30000 h	$F_{R,eq}$	900 N at 100 r/min
Average axial force for 30000 h	$F_{A,eq}$	1000 N at 100 r/min
Maximum radial force	$F_{R,max}$	1650 N
Maximum axial force	$F_{A,max}$	2100 N

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK070 1- and 2-stage																					
0.068	0.468	0.0245	n_{2N}	r/min	375	375	375	375	375	300	300	250	200	200	150	125	100	75	50	30	**1F.2102-0AG..-0.A0-Z**
...	...	(0.0285)	M_{2N}	Nm	0.107	0.199	0.28	0.415	0.47	0.68	0.53	0.75	1.14	1.14	1.62	2.05	2.75	3.6	5.7	9.4	■■■ + ■■■ + . . .
0.121	0.512		M_{2_0}	Nm	0.2	0.325	0.45	0.7	0.82	1.07	0.94	1.31	1.68	1.8	2.25	2.9	3.75	4.7	7.6	12	
			M_{2max}	Nm	1.4	1.92	2.4	3.45	4	5	4.45	6	7.5	8	10.1	12.7	16.3	20	29	24	
0.221	1.01	0.036	n_{2N}	r/min	750	600	600	500	375	300	375	250	200	200	150	125	100	75	50	30	**1F.2102-1AG..-0.A0-Z**
...	...	(0.04)	M_{2N}	Nm	0.415	0.67	0.84	1.25	1.61	2.1	1.62	2.4	3.25	3.35	4.45	5.5	7.2	9.3	14.7	15	■■■ + ■■■ + . . .
0.27	1.05		M_{2_0}	Nm	0.66	0.93	1.21	1.76	2	2.55	2.25	3.1	3.9	4.2	5.2	6.6	8.5	10.7	17.2	15	
			M_{2max}	Nm	3	4.05	5.1	7.2	8.3	10.4	9.3	12.4	15.6	16.6	20.5	26	33	41.5	29	24	
0.515	1.84	0.093	n_{2N}	r/min	750	750	600	500	375	300	375	250	200	200	150	125	100	75	50	30	**1F.2103-2AG..-2.A0-Z**
...	...	(0.112)	M_{2N}	Nm	1	1.28	1.77	2.45	3.15	4.1	3.2	4.75	6.2	6.4	8.5	10.5	13.6	17.4	18	15	■■■ + ■■■ + . . .
0.558	1.87		M_{2_0}	Nm	1.54	2.1	2.65	3.8	4.35	5.5	4.9	6.5	8.2	8.8	11	13.8	17.7	22	18	15	
			M_{2max}	Nm	5.5	7.4	9.2	13	14.9	18.7	16.6	22	27.5	29.5	37	46	53	48	29	24	
0.5	1.84	0.093	n_{2N}	r/min	600	600	500	375	375	250	300	250	200	200	125	100	100	75	50	25	**1F.2103-2AH..-2..0-Z**
...	...	(0.112)	M_{2N}	Nm	1.09	1.36	1.84	2.75	2.95	4.2	3.45	4.55	5.9	6.1	8.5	10.8	12.9	16.6	18	15	■■■ + ■■■ + . . .
0.543	1.87		M_{2_0}	Nm	1.5	2.05	2.6	3.7	4.25	5.3	4.75	6.4	8	8.5	10.7	13.5	17.3	21.5	18	15	
			M_{2max}	Nm	5.5	7.4	9.2	13	14.9	18.7	16.6	22	27.5	29.5	37	46	53	48	29	24	
1.14	3.89	0.139	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	–	**1F.2103-4AG..-2.A0-Z**
...	...	(0.158)	M_{2N}	Nm	1.91	2.8	3.7	5.4	5.7	7.5	7	8.8	11.8	11.8	16	19.6	25	30	18	–	■■■ + ■■■ + . . .
1.17	3.94		M_{2_0}	Nm	3.4	4.55	5.7	8.1	9.3	11.7	10.4	13.9	17.4	18.6	23	29	33	30	18	–	
			M_{2max}	Nm	11.7	15.6	19.6	27.5	29	24	35	46.5	53	53	53	48	53	48	29	–	
0.997	3.89	0.139	n_{2N}	r/min	600	600	500	375	375	250	300	250	200	200	125	100	100	75	50	–	**1F.2103-4AH..-2..0-Z**
...	...	(0.158)	M_{2N}	Nm	2.1	2.5	3.3	4.95	5.2	7.7	6.4	8.1	10.8	10.8	16.4	20.5	23	30	18	–	■■■ + ■■■ + . . .
1.03	3.94		M_{2_0}	Nm	2.95	4	5	7.1	8.2	10.3	9.1	12.2	15.3	16.4	20.5	25.5	32.5	30	18	–	
			M_{2max}	Nm	11.7	15.6	19.6	27.5	29	24	35	46.5	53	53	53	48	53	48	29	–	
1.15	3.6	0.371	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	**1F.2104-4AF..-2..0-Z**
...	...	(0.451)	M_{2N}	Nm	3.1	4.3	5.5	7.7	9	11.4	9.8	13.5	17	18	22.5	28.5	33	30	18	–	■■■ + ■■■ + . . .
1.19	3.64		M_{2_0}	Nm	3.45	4.65	5.8	8.2	9.4	11.8	10.5	14.1	17.7	18.9	23.5	29.5	33	30	18	–	
			M_{2max}	Nm	10.8	14.5	18.1	25	29	24	32	43	53	53	53	48	53	48	29	–	

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Planetary gearbox data																	
Gearbox type:		NRK070, 1-stage						NRK070, 2-stage									
1. Order code		B21						B22									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$ Nm	28	33	30	25	18	15	33	33	33	33	33	30	33	30	18	15
	$M_{2max,G}$ Nm	45	53	48	40	29	24	53	53	53	53	53	48	53	48	29	24
	$M_{2Em.Off}$ Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
	$J_{1,G}$ kg cm²	0.174	0.117	0.095	0.078	0.074	0.069	0.126	0.121	0.078	0.087	0.076	0.075	0.067	0.066	0.066	0.064
	$\varphi_{2,G}$ '	10						12									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRK070

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK070 1- and 2-stage (continued)																				
1.15 ... 1.18	3.7 ... 3.74	0.371 (0.451)	n_{2N}	r/min	750	600	600	500	375	300	375	250	200	200	150	125	100	75	50	–	1F.2104-4AK..-2..0-Z
			M_{2N}	Nm	2.85	4.1	4.6	6.1	8.3	10.8	8.1	12.5	16	16.7	21.5	26.5	33	30	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.4	4.6	5.8	8.2	9.4	11.8	10.5	14	17.6	18.7	23.5	29	33	30	18	–	
			M_{2max}	Nm	11.1	14.9	18.6	26	29	24	33	44	53	53	53	48	53	48	29	–	
2.26 ... 2.29	7.24 ... 7.33	0.581 (0.671)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	1F.2104-5AF..-2..0-Z
			M_{2N}	Nm	5.9	8.3	10.7	14.6	17.3	15	18.6	26	32.5	33	33	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.7	9	11.3	15.9	18	15	20	27	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	21.5	29	36.5	40	29	24	53	53	53	53	53	48	53	48	–	–	
2.24 ... 2.27	7.34 ... 7.43	0.581 (0.671)	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	–	–	1F.2104-5AK..-2..0-Z
			M_{2N}	Nm	4.45	6.3	8.1	11.6	12	15	14.4	17.7	23	23	31	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.7	9	11.3	15.8	18	15	20	27	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	22	29.5	37	40	29	24	53	53	53	53	53	48	53	48	–	–	
3.01 ... 3.04	9.66 ... 9.79	0.781 (0.861)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	–	–	60	50	37.5	–	–	1F.2104-6AF..-2..0-Z
			M_{2N}	Nm	7.2	10.1	12.9	17.6	18	15	22	31.5	33	–	–	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	9	12	15.1	21	18	15	27	33	33	–	–	30	33	30	–	–	
			M_{2max}	Nm	29	39	48	40	29	24	53	53	53	–	–	48	53	48	–	–	
4.68 ... 4.73	14.5 ... 14.7	1.98 (2.82)	n_{2N}	r/min	500	375	300	250	200	150	–	–	100	100	75	60	50	37.5	–	–	1F.2105-4AF..-0..0-Z
			M_{2N}	Nm	10.8	15.1	19.3	24.5	18	15	–	–	33	33	33	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.1	18.8	23.5	25	18	15	–	–	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	44	53	48	40	29	24	–	–	53	53	53	48	53	48	–	–	
4.71 ... 4.77	14.5 ... 14.7	1.98 (2.82)	n_{2N}	r/min	500	375	300	250	250	250	200	150	150	150	125	100	75	75	–	–	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	9.6	13.5	17.4	21.5	18	15	26	33	32	30	33	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.2	19	23.5	25	18	15	33	33	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	44	53	48	40	29	24	53	53	53	53	53	48	53	48	–	–	
7.21 ... 7.3	23.2 ... 23.6	2.92 (3.77)	n_{2N}	r/min	500	375	–	250	200	150	200	125	100	100	75	60	–	–	–	–	1F.2105-6AF..-0..0-Z
			M_{2N}	Nm	14	19.5	–	25	18	15	33	33	33	33	33	30	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21.5	29	–	25	18	15	33	33	33	33	33	30	–	–	–	–	
			M_{2max}	Nm	45	53	–	40	29	24	53	53	53	53	53	48	–	–	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK070 1- and 2-stage																				
0.524 ... 0.567	1.74 ... 1.77	0.2 (0.22)	n_{2N}	r/min	750	600	600	500	375	300	375	250	200	200	150	125	100	75	50	30	1F.2203-2AG..-2.A0-Z
			M_{2N}	Nm	1.04	1.55	1.75	2.35	3.2	4.2	3.1	4.85	6.4	6.5	8.7	10.7	13.8	18	18	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.57	2.1	2.7	3.85	4.45	5.6	4.95	6.7	8.4	8.9	11.2	14.1	18	22.5	18	15	
			M_{2max}	Nm	5.2	7	8.8	12.3	14.1	17.7	15.8	21	26	28	35	44	53	48	29	24	
0.489 ... 0.533	1.74 ... 1.77	0.2 (0.22)	n_{2N}	r/min	600	600	500	375	375	300	300	250	200	200	150	125	100	75	50	30	1F.2203-2AK..-2..0-Z
			M_{2N}	Nm	1.01	1.21	1.62	2.4	2.5	3.3	3	3.8	5.1	5	6.9	8.5	10.8	14.5	18	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.46	2	2.55	3.6	4.15	5.2	4.65	6.2	7.8	8.4	10.5	13.2	16.9	21	18	15	
			M_{2max}	Nm	5.2	7	8.8	12.3	14.1	17.7	15.8	21	26	28	35	44	53	48	29	24	
1.15 ... 1.18	3.6 ... 3.64	0.35 (0.37)	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	–	1F.2203-4AG..-2.A0-Z
			M_{2N}	Nm	2.55	3.75	4.9	7.1	7.6	9.9	9	11.5	14.9	15.3	20	24.5	31.5	30	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.4	4.6	5.8	8.2	9.4	11.8	10.5	14	17.6	18.8	23.5	29	33	30	18	–	
			M_{2max}	Nm	10.8	14.5	18.1	25	29	24	32	43	53	53	53	48	53	48	29	–	

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Planetary gearbox data																	
Gearbox type:		NRK070, 1-stage						NRK070, 2-stage									
1. Order code		B21						B22									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	28	33	30	25	18	15	33	33	33	33	33	30	33	30	18	15
$M_{2max,G}$	Nm	45	53	48	40	29	24	53	53	53	53	53	48	53	48	29	24
$M_{2Em.Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm²	0.174	0.117	0.095	0.078	0.074	0.069	0.126	0.121	0.078	0.087	0.076	0.075	0.067	0.066	0.066	0.064
$\varphi_{2,G}$	'	10						12									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK070 1- and 2-stage (continued)																				
1.11 ... 1.14	3.6 ... 3.64	0.35 (0.37)	n_{2N}	r/min	600	500	375	375	300	250	250	200	200	150	150	100	100	75	50	–	1F.2203-4AK..-2..0-Z
			M_{2N}	Nm	2.25	3.1	4.35	4.85	6.3	7.9	7.6	9.9	10.3	13.8	14.2	21.5	21.5	29.5	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.3	4.45	5.6	7.9	9.1	11.4	10.1	13.6	17	18.1	22.5	28	33	30	18	–	
			M_{2max}	Nm	10.8	14.5	18.1	25	29	24	32	43	53	53	53	48	53	48	29	–	
2.22 ... 2.25	6.85 ... 6.94	1.251 (1.331)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	1F.2204-5AF..-2..0-Z
			M_{2N}	Nm	5.7	8	10.2	13.8	16.5	15	17.7	24.5	31	32.5	33	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.6	8.9	11.1	15.6	17.9	15	20	26.5	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	20.5	27.5	34.5	40	29	24	53	53	53	53	53	48	53	48	–	–	
2.23 ... 2.26	6.85 ... 6.94	1.251 (1.331)	n_{2N}	r/min	600	600	500	375	300	300	300	200	200	150	150	125	100	75	–	–	1F.2204-5AK..-2..0-Z
			M_{2N}	Nm	5.2	5.8	7.5	10.7	13.6	13.8	13.2	20	21	27.5	28	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.6	8.9	11.2	15.7	18	15	20	26.5	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	20.5	27.5	34.5	40	29	24	53	53	53	53	53	48	53	48	–	–	
2.99 ... 3.02	9.18 ... 9.3	1.631 (1.711)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	–	75	60	50	37.5	–	–	1F.2204-6AF..-2..0-Z
			M_{2N}	Nm	7.6	10.6	13.6	18.4	18	15	23	33	33	–	33	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.9	12	15	21	18	15	26.5	33	33	–	33	30	33	30	–	–	
			M_{2max}	Nm	27.5	37	46	40	29	24	53	53	53	–	53	48	53	48	–	–	
2.84 ... 2.87	10.4 ... 10.5	3.42 (4.32)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	–	–	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	7	10	12.5	17.6	18	15	22.5	29	33	33	33	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.5	11.4	14.2	20	18	15	25.5	33	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	31.5	42	48	40	29	24	53	53	53	53	53	48	53	48	–	–	
2.89 ... 2.93	10.4 ... 10.5	3.42 (4.32)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	1F.2205-2AF..-0..0-Z
			M_{2N}	Nm	7	9.9	12.6	16.6	18	15	20.5	30	33	33	33	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.6	11.6	14.5	20	18	15	26	33	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	31.5	42	48	40	29	24	53	53	53	53	53	48	53	48	–	–	
2.87 ... 2.9	10.4 ... 10.5	3.42 (4.32)	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	100	75	60	–	–	1FT2205-2AH..-0..0-Z
			M_{2N}	Nm	6.1	8.7	9	14.4	14.4	15	18.2	24.5	30	29.5	33	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.6	11.5	14.4	20	18	15	25.5	33	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	31.5	42	48	40	29	24	53	53	53	53	53	48	53	48	–	–	
4.93 ... 4.99	17.4 ... 17.7	5.37 (6.27)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	–	–	–	1F.2205-4AF..-0..0-Z
			M_{2N}	Nm	9.3	13.1	16.9	21	18	15	25.5	33	33	33	33	30	33	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.9	19.9	24.5	25	18	15	33	33	33	33	33	30	33	–	–	–	
			M_{2max}	Nm	45	53	48	40	29	24	53	53	53	53	53	48	53	–	–	–	

Planetary gearbox data																	
Gearbox type:			NRK070, 1-stage						NRK070, 2-stage								
1. Order code			B21						B22								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	28	33	30	25	18	15	33	33	33	33	33	30	33	30	18	15
	$M_{2max,G}$	Nm	45	53	48	40	29	24	53	53	53	53	53	48	53	48	29	24
	$M_{2Em.Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
	$J_{1,G}$	kg cm²	0.174	0.117	0.095	0.078	0.074	0.069	0.126	0.121	0.078	0.087	0.076	0.075	0.067	0.066	0.066	0.064
	$\varphi_{2,G}$	'	10						12									

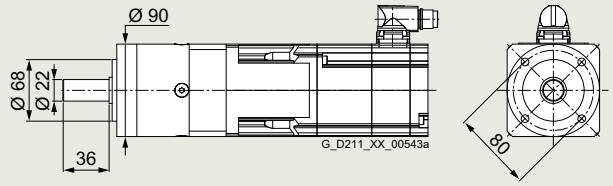
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRK090

Selection and ordering data

NRK090



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1900 N at 100 r/min
Average axial force for 20000 h	$F_{A,eq}$	2000 N at 100 r/min
Average radial force for 30000 h	$F_{R,eq}$	1700 N at 100 r/min
Average axial force for 30000 h	$F_{A,eq}$	1500 N at 100 r/min
Maximum radial force	$F_{R,max}$	3100 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK090 1- and 2-stage																					
0.473	1.78	0.093	n_{2N}	r/min	600	600	600	500	375	300	375	250	200	200	150	125	100	75	50	30	**1F.2103-2AG..-0.A0-Z**
...	...	(0.112)	M_{2N}	Nm	0.88	1.13	1.33	1.94	2.7	3.6	2.45	3.95	5.1	5.4	7.4	9.2	12.2	15.9	25	38	■■■ + ■■■ + . . .
0.543	1.83		$M_{2.0}$	Nm	1.42	1.97	2.5	3.6	4.15	5.2	4.7	6.3	7.9	8.5	10.7	13.4	17.2	21.5	34.5	38	
			M_{2max}	Nm	5.3	7.2	9	12.7	14.6	18.3	16.3	21.5	27	29	36	45.5	58	73	80	61	
0.445	1.78	0.093	n_{2N}	r/min	600	500	500	375	375	250	300	250	200	200	125	100	100	75	50	25	**1F.2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	0.86	1.28	1.54	2.4	2.6	3.85	2.95	3.85	4.95	5.2	7.8	9.9	11.8	15.3	24	38	■■■ + ■■■ + . . .
0.515	1.83		$M_{2.0}$	Nm	1.33	1.86	2.35	3.4	3.95	5	4.45	6	7.5	8	10.1	12.7	16.3	20.5	32.5	38	
			M_{2max}	Nm	5.3	7.2	9	12.7	14.6	18.3	16.3	21.5	27	29	36	45.5	58	73	80	61	
1.08	3.86	0.139	n_{2N}	r/min	600	500	500	375	300	300	300	200	200	150	150	125	100	75	50	30	**1F.2103-4AG..-0.A0-Z**
...	...	(0.158)	M_{2N}	Nm	2.2	3.1	3.45	5.4	6.9	7.4	6.8	10.7	10.8	14.9	16	19.5	25.5	34.5	50	38	■■■ + ■■■ + . . .
1.14	3.9		$M_{2.0}$	Nm	3.2	4.4	5.5	7.8	9	11.3	10.1	13.5	16.9	18.1	22.5	28	36	45.5	50	38	
			M_{2max}	Nm	11.5	15.4	19.3	27	31	38.5	34.5	46	57	61	77	96	123	131	80	61	
0.998	3.86	0.139	n_{2N}	r/min	600	500	500	375	300	250	300	200	200	200	125	100	100	75	50	25	**1F.2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	1.96	2.75	3.05	4.85	6.2	7.9	6.1	9.4	9.8	10	16.1	20	23.5	31	48.5	38	■■■ + ■■■ + . . .
1.05	3.9		$M_{2.0}$	Nm	2.95	4.05	5.1	7.2	8.3	10.5	9.3	12.4	15.6	16.6	20.5	26	33.5	41.5	50	38	
			M_{2max}	Nm	11.5	15.4	19.3	27	31	38.5	34.5	46	57	61	77	96	123	131	80	61	
1.1	3.56	0.35	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	**1F.2104-4AF..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.95	4.15	5.3	7.5	8.8	11.2	9.5	13.3	16.7	17.7	22	28	36	45	50	38	■■■ + ■■■ + . . .
1.15	3.6		$M_{2.0}$	Nm	3.25	4.45	5.6	7.9	9.1	11.4	10.2	13.7	17.1	18.3	22.5	28.5	36.5	46	50	38	
			M_{2max}	Nm	10.6	14.3	17.9	25	28.5	36	32	42.5	53	57	71	89	114	131	80	61	
1.09	3.66	0.35	n_{2N}	r/min	600	600	500	375	375	300	300	250	200	200	150	125	100	75	50	30	**1F.2104-4AK..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	3.05	3.7	5	7.4	8.1	10.4	9.2	11.9	15.1	15.8	20.5	25.5	33	42.5	50	38	■■■ + ■■■ + . . .
1.15	3.7		$M_{2.0}$	Nm	3.25	4.4	5.6	7.9	9.1	11.4	10.1	13.6	17	18.2	22.5	28.5	36.5	45.5	50	38	
			M_{2max}	Nm	10.9	14.6	18.4	25.5	29.5	37	33	44	55	58	73	91	117	131	80	61	
2.2	7.19	0.56	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	**1F.2104-5AF..-2..0-Z**
...	...	(0.65)	M_{2N}	Nm	6.1	8.5	10.9	15.2	17.7	22	19.1	26	32.5	35	44	55	70	82	50	38	■■■ + ■■■ + . . .
2.25	7.29		$M_{2.0}$	Nm	6.6	8.8	11.1	15.6	17.9	22	20	26.5	33	35.5	44.5	55	71	82	50	38	
			M_{2max}	Nm	21.5	29	36	50	58	61	65	86	108	115	144	131	144	131	80	61	

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Planetary gearbox data																	
Gearbox type:			NRK090, 1-stage						NRK090, 2-stage								
1. Order code			B31						B32								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	85	90	82	65	50	38	97	90	82	90	90	82	90	82	50	38
	$M_{2max,G}$	Nm	136	144	131	104	80	61	155	144	131	144	144	131	144	131	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
	$J_{1,G}$	kg cm²	0.789	0.557	0.476	0.409	0.394	0.374	0.625	0.601	0.592	0.453	0.41	0.406	0.368	0.366	0.367	0.356
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRK090

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK090 1- and 2-stage (continued)																				
2.19 ... 2.23	7.29 ... 7.39	0.56 (0.65)	n_{2N}	r/min	600	500	500	375	300	300	300	200	150	150	150	125	100	75	50	30	1F.2104-5AK..-2..0-Z
			M_{2N}	Nm	5.3	7.2	7.8	11.8	15	15.8	14.4	22	29.5	30.5	32	38.5	50	68	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.5	8.8	11	15.5	17.8	22	19.9	26.5	33	35	44	55	71	82	50	38	
			M_{2max}	Nm	22	29	36.5	51	59	61	65	87	109	117	144	131	144	131	80	61	
2.95 ... 3	9.62 ... 9.75	0.76 (0.84)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	1F.2104-6AF..-2..0-Z
			M_{2N}	Nm	7.5	10.7	13.8	18.9	22.5	29	24	34.5	43.5	45.5	58	73	90	82	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.8	11.8	14.8	20.5	23.5	29.5	26.5	35.5	44.5	47.5	59	74	90	82	50	–	
			M_{2max}	Nm	29	38.5	48.5	68	77	61	86	115	131	144	144	131	144	131	80	–	
4.67 ... 4.72	14.5 ... 14.7	1.71 (2.55)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	1F.2105-4AF..-0..0-Z
			M_{2N}	Nm	12.3	16.8	21	29	34	38	36	50	63	66	84	82	90	82	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14	18.7	23.5	33	37.5	38	42	56	70	74	90	82	90	82	50	–	
			M_{2max}	Nm	44	58	73	102	80	61	130	144	131	144	144	131	144	131	80	–	
4.7 ... 4.76	14.5 ... 14.7	1.71 (2.55)	n_{2N}	r/min	500	500	375	300	250	200	200	150	125	125	100	100	75	75	50	–	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	11.4	11.9	17.5	23	28.5	36.5	34	45.5	55	56	71	68	90	79	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.1	18.9	23.5	33	38	38	42	56	70	75	90	82	90	82	50	–	
			M_{2max}	Nm	44	58	73	102	80	61	130	144	131	144	144	131	144	131	80	–	
7.4 ... 7.52	23.2 ... 23.6	2.65 (3.5)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	1F.2105-6AF..-0..0-Z
			M_{2N}	Nm	16.5	23	29.5	38.5	47.5	38	46	71	82	89	90	82	90	82	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22	29.5	37.5	52	50	38	66	89	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	70	94	117	104	80	61	155	144	131	144	144	131	144	131	–	–	
7.47 ... 7.58	25.1 ... 25.5	5.476 (7.176)	n_{2N}	r/min	375	375	300	200	200	150	150	125	100	100	75	60	50	37.5	–	–	1F.2106-3AF..-0..0-Z
			M_{2N}	Nm	18.6	19.9	25.5	40	40.5	38	51	62	78	77	90	82	90	82	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30	37.5	53	50	38	67	90	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	76	101	127	104	80	61	155	144	131	144	143	131	144	131	–	–	
9.67 ... 9.82	31.8 ... 32.4	6.876 (8.476)	n_{2N}	r/min	375	300	250	200	200	150	–	125	100	100	75	60	50	37.5	–	–	1F.2106-4AF..-0..0-Z
			M_{2N}	Nm	23	30	36.5	48	47	38	–	71	82	86	90	82	90	82	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29	39	49	65	50	38	–	90	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	97	129	131	104	80	61	–	144	131	144	144	131	144	131	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK090 1- and 2-stage																				
0.467 ... 0.537	1.68 ... 1.74	0.2 (0.22)	n_{2N}	r/min	600	500	500	375	375	300	300	250	200	200	150	125	100	75	50	30	1F.2203-2AG..-0.A0-Z
			M_{2N}	Nm	0.96	1.42	1.65	2.6	2.7	3.65	3.15	3.95	5.1	5.3	7.6	9.3	12.4	16.5	25.5	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.4	1.94	2.45	3.55	4.1	5.2	4.6	6.2	7.8	8.4	10.5	13.2	17	21	34	38	
			M_{2max}	Nm	5	6.8	8.5	12	13.8	17.3	15.4	20.5	25.5	27.5	34.5	43	55	69	80	61	
0.432 ... 0.502	1.68 ... 1.74	0.2 (0.22)	n_{2N}	r/min	500	500	375	375	300	250	250	200	150	150	150	100	100	75	50	30	1F.2203-2AK..-0..0-Z
			M_{2N}	Nm	0.92	1.14	1.73	2	2.7	3.45	3	3.95	5.4	5.6	6	9.1	9.6	13.2	19.8	34	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.29	1.8	2.3	3.3	3.85	4.85	4.3	5.8	7.3	7.8	9.8	12.4	15.9	19.9	32	38	
			M_{2max}	Nm	5	6.8	8.5	12	13.8	17.3	15.4	20.5	25.5	27.5	34.5	43	55	69	80	61	
1.09 ... 1.15	3.56 ... 3.6	0.35 (0.37)	n_{2N}	r/min	600	600	500	375	375	300	300	250	200	200	150	125	100	75	50	30	1F.2203-4AG..-0.A0-Z
			M_{2N}	Nm	2.9	3.35	4.65	6.9	7.3	9.7	8.6	10.9	14	14.4	19.4	23.5	31	40	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.25	4.4	5.6	7.9	9.1	11.4	10.1	13.6	17.1	18.2	22.5	28.5	36.5	45.5	50	38	
			M_{2max}	Nm	10.6	14.3	17.9	25	28.5	36	32	42.5	53	57	71	89	114	131	80	61	

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Planetary gearbox data																	
Gearbox type:		NRK090, 1-stage						NRK090, 2-stage									
1. Order code		B31						B32									
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	85	90	82	65	50	38	97	90	82	90	90	82	90	82	50	38
$M_{2max,G}$	Nm	136	144	131	104	80	61	155	144	131	144	144	131	144	131	80	61
$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
$J_{1,G}$	kg cm²	0.789	0.557	0.476	0.409	0.394	0.374	0.625	0.601	0.592	0.453	0.41	0.406	0.368	0.366	0.367	0.356
$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRK090

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK090 1- and 2-stage (continued)																				
1.05 ... 1.11	3.56 ... 3.6	0.35 (0.37)	n_{2N}	r/min	500	500	375	300	300	250	250	200	150	150	150	125	100	75	50	30	1F.2203-4AK..-0..0-Z
			M_{2N}	Nm	2.55	3	4.4	6.2	6.6	8.4	7.6	10	13.1	13.6	14.5	17.3	23	31	47	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.15	4.25	5.4	7.6	8.7	11	9.8	13.1	16.5	17.6	22	27.5	35	44	50	38	
			M_{2max}	Nm	10.6	14.3	17.9	25	28.5	36	32	42.5	53	57	71	89	114	131	80	61	
2.16 ... 2.21	6.8 ... 6.9	1.23 (1.31)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2204-5AF..-2..0-Z
			M_{2N}	Nm	5.9	8.1	10.4	14.4	16.8	21.5	18.1	25	31.5	33	42	52	67	82	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.4	8.7	10.9	15.4	17.6	22	19.6	26	32.5	35	43.5	54	70	82	50	38	
			M_{2max}	Nm	20.5	27.5	34	48	55	61	61	82	102	109	136	131	144	131	80	61	
2.17 ... 2.22	6.8 ... 6.9	1.23 (1.31)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	75	50	30	1F.2204-5AK..-2..0-Z
			M_{2N}	Nm	5.2	7	9.9	13.7	14.4	18	16.8	21.5	28.5	29.5	36.5	46	62	62	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.5	8.7	10.9	15.4	17.7	22	19.7	26	33	35	44	55	70	82	50	38	
			M_{2max}	Nm	20.5	27.5	34	48	55	61	61	82	102	109	136	131	144	131	80	61	
2.94 ... 2.98	9.13 ... 9.26	1.61 (1.69)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	1F.2204-6AF..-2..0-Z
			M_{2N}	Nm	8	11.4	14.5	20	23	29	25	34.5	43.5	46.5	58	72	90	82	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.8	11.8	14.8	20.5	23.5	29.5	26.5	35	44	47	59	73	90	82	50	–	
			M_{2max}	Nm	27.5	36.5	46	64	74	61	82	110	131	144	144	131	144	131	80	–	
2.94 ... 2.98	10.4 ... 10.5	3.15 (4.05)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	–	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	7.5	10.4	13.1	18.5	21	26.5	23.5	30.5	38.5	41	52	62	82	82	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.8	11.8	14.8	20.5	23.5	29.5	26	35	44	47	58	73	90	82	49.5	–	
			M_{2max}	Nm	31.5	42	52	73	80	61	94	125	131	144	144	131	144	131	80	–	
2.98 ... 3.02	10.4 ... 10.5	3.15 (4.05)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	1F.2205-2AF..-0..0-Z
			M_{2N}	Nm	7.6	10.4	13.2	18.3	21	27	22.5	31.5	39.5	42	53	66	84	82	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.9	11.9	15	21	24	30	26.5	35.5	44.5	47.5	59	74	90	82	50	–	
			M_{2max}	Nm	31.5	42	52	73	80	61	94	125	131	144	144	131	144	131	80	–	
2.94 ... 2.99	10.4 ... 10.5	3.15 (4.05)	n_{2N}	r/min	500	500	375	300	250	200	250	200	150	125	100	100	75	60	50	–	1FT2205-2AH..-0..0-Z
			M_{2N}	Nm	7.2	7.7	11.4	15.4	18.9	24	18.4	22.5	31.5	38	48	48.5	68	82	49	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.8	11.8	14.8	20.5	23.5	29.5	26.5	35	44	47	59	73	90	82	50	–	
			M_{2max}	Nm	31.5	42	52	73	80	61	94	125	131	144	144	131	144	131	80	–	
5.06 ... 5.13	17.4 ... 17.6	5.1 (6)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	1F.2205-4AF..-0..0-Z
			M_{2N}	Nm	11.1	15.7	20	26.5	32.5	38	33	50	63	65	84	82	90	82	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.2	20	25.5	35.5	41	38	45.5	60	76	81	90	82	90	82	–	–	
			M_{2max}	Nm	52	70	88	104	80	61	155	144	131	144	144	131	144	131	–	–	
5.27 ... 5.3	17.3 ... 17.6	8.676 (10.276)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	–	1FT2206-2AC..-0..0-Z
			M_{2N}	Nm	10.8	16.7	21	29.5	35	38	41.5	46	62	62	89	82	90	82	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.8	21	26	37	42	38	47.5	63	79	84	90	82	90	82	50	–	
			M_{2max}	Nm	52	70	87	104	80	61	155	144	131	144	144	131	144	131	80	–	
5.19 ... 5.27	17.3 ... 17.6	8.676 (10.276)	n_{2N}	r/min	500	375	300	200	200	150	200	125	100	100	75	60	50	37.5	–	–	1F.2206-2AF..-0..0-Z
			M_{2N}	Nm	10.6	15.3	20	30.5	31.5	38	29	49.5	62	62	84	82	90	82	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.6	20.5	26	36.5	42	38	46.5	62	78	83	90	82	90	82	–	–	
			M_{2max}	Nm	52	70	87	104	80	61	155	144	131	144	144	131	144	131	–	–	

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Planetary gearbox data																	
Gearbox type:			NRK090, 1-stage						NRK090, 2-stage								
1. Order code			B31						B32								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	85	90	82	65	50	38	97	90	82	90	90	82	90	82	50	38
	$M_{2max,G}$	Nm	136	144	131	104	80	61	155	144	131	144	144	131	144	131	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
	$J_{1,G}$	kg cm²	0.789	0.557	0.476	0.409	0.394	0.374	0.625	0.601	0.592	0.453	0.41	0.406	0.368	0.366	0.367	0.356
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRK090

Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK090 1- and 2-stage (continued)																					
5.05	17.3	8.676 (10.276)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	60	50	–	–	1FT2206-2AH..-0..0-Z
...	...		M_{2N}	Nm	12	15.8	19.7	25.5	25	35	34.5	41.5	52	51	71	82	77	81	–	–	■■■ + ■■■ + . . .
5.12	17.6		$M_{2,0}$	Nm	15.2	20	25	35.5	40.5	38	45.5	60	75	80	90	82	90	82	–	–	
			M_{2max}	Nm	52	70	87	104	80	61	155	144	131	144	144	131	144	131	–	–	
7.54	26	12.38 (13.976)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	–	–	1FT2206-3AB..-0..0-Z
...	...		M_{2N}	Nm	20	27	34	48.5	50	38	55	74	82	90	90	82	90	82	–	–	■■■ + ■■■ + . . .
7.66	26.5		$M_{2,0}$	Nm	22.5	30.5	38	53	50	38	68	90	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	79	105	131	104	80	61	155	144	131	144	144	131	144	131	–	–	
7.41	26	12.38 (13.976)	n_{2N}	r/min	375	300	250	200	150	150	150	100	100	75	75	60	50	37.5	–	–	1FT2206-3AF..-0..0-Z
...	...		M_{2N}	Nm	15.9	20.5	25.5	33	44	38	44	65	64	87	86	82	90	82	–	–	■■■ + ■■■ + . . .
7.52	26.5		$M_{2,0}$	Nm	22	30	37.5	52	50	38	66	89	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	79	105	131	104	80	61	155	144	131	144	144	131	144	131	–	–	
10.3	36.7	15.98 (17.676)	n_{2N}	r/min	300	250	200	150	125	100	100	75	75	75	50	50	37.5	25	–	–	1FT2206-4AC..-0..0-Z
...	...		M_{2N}	Nm	18.9	23	29.5	40	49	38	61	81	79	76	90	82	90	82	–	–	■■■ + ■■■ + . . .
10.5	37.3		$M_{2,0}$	Nm	31	41.5	52	65	50	38	94	90	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	111	144	131	104	80	61	155	144	131	144	144	131	144	131	–	–	
10.1	34.7	15.976 (17.676)	n_{2N}	r/min	375	300	250	200	200	150	–	125	100	100	75	60	50	37.5	–	–	1F.2206-4AF..-0..0-Z
...	...		M_{2N}	Nm	23.5	30.5	37.5	49	48.5	38	–	73	82	88	90	82	90	82	–	–	■■■ + ■■■ + . . .
10.3	35.3		$M_{2,0}$	Nm	30.5	41	51	65	50	38	–	90	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	106	141	131	104	79	61	–	144	131	144	144	131	144	131	–	–	
9.7	34.7	15.976 (17.676)	n_{2N}	r/min	375	300	250	150	150	150	125	100	100	75	75	60	60	50	–	–	1FT2206-4AH..-0..0-Z
...	...		M_{2N}	Nm	18.3	23.5	28.5	49	49.5	38	59	73	68	90	90	82	77	80	–	–	■■■ + ■■■ + . . .
9.86	35.3		$M_{2,0}$	Nm	29.5	39	49	65	50	38	87	90	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	106	141	131	104	79	61	155	144	131	144	144	131	144	131	–	–	

Planetary gearbox data																	
Gearbox type:			NRK090, 1-stage						NRK090, 2-stage								
1. Order code			B31						B32								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	85	90	82	65	50	38	97	90	82	90	90	82	90	82	50	38
	$M_{2max,G}$	Nm	136	144	131	104	80	61	155	144	131	144	144	131	144	131	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
	$J_{1,G}$	kg cm²	0.789	0.557	0.476	0.409	0.394	0.374	0.625	0.601	0.592	0.453	0.41	0.406	0.368	0.366	0.367	0.356
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

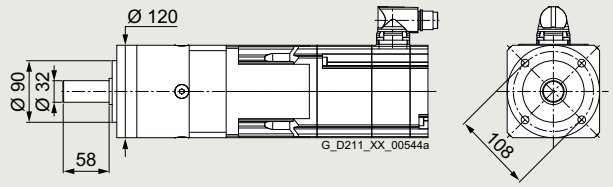
8.1

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Gearbox type NRK120

Selection and ordering data

NRK120



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	2500 N at 100 r/min
Average axial force for 20000 h	$F_{A,eq}$	4000 N at 100 r/min
Average radial force for 30000 h	$F_{R,eq}$	2150 N at 100 r/min
Average axial force for 30000 h	$F_{A,eq}$	3000 N at 100 r/min
Maximum radial force	$F_{R,max}$	4000 N
Maximum axial force	$F_{A,max}$	5900 N

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK120 1- and 2-stage																				
0.346 ... 0.477	1.66 ... 1.76	0.093 (0.112)	n_{2N}	r/min	300	300	300	300	250	250	200	150	125	125	125	100	75	75	50	30	**1F.2103-2AG..-0.A0-Z**
			M_{2N}	Nm	0.7	0.99	1.3	1.71	2.25	2.5	2.35	3.45	4.4	4.6	5.2	6.8	10.2	10.5	16	28.5	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	1.03	1.52	2	2.95	3.45	4.45	3.9	5.3	6.8	7.3	9.2	11.6	15	18.8	30	47.5	
			M_{2max}	Nm	4.95	6.7	8.5	12.1	13.9	17.5	15.5	20.5	26	27.5	34.5	43.5	56	70	112	152	
0.318 ... 0.449	1.66 ... 1.76	0.093 (0.112)	n_{2N}	r/min	375	300	300	300	250	250	200	150	125	125	125	100	75	75	37.5	25	**1F.2103-2AH..-0..0-Z**
			M_{2N}	Nm	0.55	0.98	1.29	1.73	2.2	2.45	2.35	3.4	4.35	4.55	5.3	6.8	10.1	10.6	21	33	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	0.95	1.41	1.87	2.75	3.25	4.15	3.65	5	6.4	6.8	8.6	10.9	14.1	17.7	28.5	44.5	
			M_{2max}	Nm	4.95	6.7	8.5	12.1	13.9	17.5	15.5	20.5	26	27.5	34.5	43.5	56	70	112	152	
0.955 ... 1.07	3.73 ... 3.82	0.139 (0.158)	n_{2N}	r/min	375	375	300	250	250	200	200	150	125	125	100	100	75	60	37.5	25	**1F.2103-4AG..-0.A0-Z**
			M_{2N}	Nm	2.45	2.95	4.3	6.1	6.4	8.7	7.7	10.8	13.5	13.8	18.7	18.5	27.5	35	57	87	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.85	3.95	5	7.2	8.3	10.5	9.3	12.5	15.8	16.8	21	26.5	34	42.5	68	95	
			M_{2max}	Nm	11.1	15	18.8	26.5	30	38	33.5	45	56	60	75	94	121	151	192	152	
0.941 ... 1.06	3.73 ... 3.82	0.139 (0.158)	n_{2N}	r/min	375	375	300	250	250	200	200	150	125	125	125	100	75	60	37.5	25	**1F.2103-4AH..-0..0-Z**
			M_{2N}	Nm	2	2.55	3.7	5.3	5.7	7.7	6.5	8.9	11.2	11.8	12.7	16.5	24	30	49	76	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.8	3.9	4.95	7.1	8.2	10.3	9.2	12.4	15.5	16.6	20.5	26	33.5	42	67	95	
			M_{2max}	Nm	11.1	15	18.8	26.5	30	38	33.5	45	56	60	75	94	121	151	192	152	
0.969 ... 1.09	3.43 ... 3.52	0.35 (0.43)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	**1F.2104-4AF..-0..0-Z**
			M_{2N}	Nm	2.25	3.45	4.65	6.7	7.9	10.1	8.2	11.7	14.8	15.8	20	25	32.5	41	66	95	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.9	4	5.1	7.3	8.4	10.6	9.4	12.7	16	17.1	21	26.5	34.5	43	69	95	
			M_{2max}	Nm	10.2	13.8	17.4	24.5	28	35	31	41.5	52	55	69	87	112	139	192	152	
0.963 ... 1.08	3.53 ... 3.62	0.35 (0.43)	n_{2N}	r/min	500	500	375	300	300	250	250	200	150	150	125	100	100	75	50	30	**1F.2104-4AK..-0..0-Z**
			M_{2N}	Nm	2.45	2.65	4.55	6.7	7.4	9.7	8.1	10.5	14.2	15	19.4	24.5	25	37	53	95	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.85	3.95	5	7.2	8.3	10.6	9.4	12.6	15.9	17	21	26.5	34	43	69	95	
			M_{2max}	Nm	10.5	14.2	17.8	25	28.5	36	32	43	53	57	71	89	115	143	192	152	
2.07 ... 2.17	7.13 ... 7.21	0.56 (0.65)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	**1F.2104-5AF..-0..0-Z**
			M_{2N}	Nm	4.9	7.6	10.1	14.4	16.7	21	18.1	24.5	31	33	41.5	52	67	84	120	95	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	6.2	8.4	10.6	15	17.2	21.5	19.2	25.5	32	34.5	43	54	69	86	120	95	
			M_{2max}	Nm	21	28.5	35.5	50	57	72	64	85	107	114	142	178	225	275	192	152	

➥ Continued on the next page

Planetary gearbox data																
Gearbox type:		NRK120, 1-stage						NRK120, 2-stage								
1. Order code		B41						B42								
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$ Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$ Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$ Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$ kg cm²	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376
	$\varphi_{2,G}$ '	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK120 1- and 2-stage (continued)																				
2.06 ... 2.15	7.23 ... 7.31	0.56 (0.65)	n_{2N}	r/min	500	375	375	300	250	200	200	150	125	125	100	100	75	60	37.5	30	1F.2104-5AK..-0..0-Z
			M_{2N}	Nm	4.8	7.5	8.3	12	15.1	19.8	17.7	24	30	30.5	40.5	40.5	59	74	119	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.1	8.3	10.5	14.9	17.1	21	19.1	25.5	32	34	42.5	53	68	85	120	95	
			M_{2max}	Nm	21.5	29	36	51	58	73	65	86	108	115	144	180	230	275	192	152	
2.82 ... 2.92	9.55 ... 9.67	0.76 (0.84)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2104-6AF..-0..0-Z
			M_{2N}	Nm	6.2	9.5	12.9	17.7	21.5	28.5	22	33.5	42	44.5	56	70	91	113	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.4	11.4	14.3	20	23	29	25.5	34.5	43	46	57	72	92	116	120	95	
			M_{2max}	Nm	28.5	38	48	67	77	96	86	114	143	153	191	235	305	275	192	152	
4.56 ... 4.64	14.4 ... 14.6	1.71 (2.55)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2105-4AF..-0..0-Z
			M_{2N}	Nm	10.5	15.8	20.5	28	33.5	43.5	34.5	50	63	66	85	106	135	171	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.6	18.3	23	32	37	46	41	55	69	73	92	115	147	172	120	95	
			M_{2max}	Nm	43.5	58	72	102	116	145	130	173	215	230	285	275	312	275	192	152	
4.59 ... 4.67	14.4 ... 14.6	1.71 (2.55)	n_{2N}	r/min	500	375	300	250	200	200	200	150	125	100	100	75	60	50	37.5	25	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	9.3	14.4	19.6	25.5	32	34	31	42.5	51	63	67	91	119	143	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.7	18.4	23	32.5	37	46.5	41.5	55	69	74	92	115	148	172	120	95	
			M_{2max}	Nm	43.5	58	72	102	116	145	130	173	215	230	285	275	312	275	192	152	
7.52 ... 7.6	23.1 ... 23.4	2.65 (3.5)	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	1F.2105-6AF..-0..0-Z
			M_{2N}	Nm	18.8	21	28	36.5	46.5	62	43	71	89	90	121	152	190	172	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30	37.5	53	60	76	67	90	112	120	150	172	195	172	120	–	
			M_{2max}	Nm	70	93	117	163	187	152	205	275	275	312	312	275	312	275	192	–	
7.76 ... 7.88	25 ... 25.4	4.6 (6.3)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	1F.2106-3AF..-0..0-Z
			M_{2N}	Nm	14.8	22	29.5	38	48.5	65	45	73	93	94	126	157	194	172	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	23	31	39	55	62	78	70	93	116	124	155	172	195	172	120	–	
			M_{2max}	Nm	76	101	126	177	192	152	225	300	275	312	312	275	312	270	192	–	
10.1 ... 10.2	31.8 ... 32.3	6 (7.6)	n_{2N}	r/min	375	375	300	200	200	150	150	125	100	100	75	60	50	37.5	25	–	1F.2106-4AF..-0..0-Z
			M_{2N}	Nm	24.5	26	35.5	56	58	79	71	87	109	109	148	172	195	172	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30.5	40.5	50	71	81	95	90	121	151	161	195	172	195	172	120	–	
			M_{2max}	Nm	96	129	161	216	192	152	251	312	275	312	312	275	312	275	192	–	
14.3 ... 14.5	43.9 ... 44.7	8.7 (10.4)	n_{2N}	r/min	375	300	300	200	200	150	150	125	100	100	75	60	50	37.5	–	–	1F.2106-6AF..-0..0-Z
			M_{2N}	Nm	32	43	45	72	73	95	89	106	134	132	181	172	195	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	43	57	72	101	116	95	128	171	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	133	178	220	216	192	152	251	312	275	312	312	275	312	275	–	–	
20.7 ... 21	84.1 ... 85.6	20.6 (24.7)	n_{2N}	r/min	300	250	200	150	125	100	100	75	75	75	50	50	37.5	25	–	–	1FT2108-4AC..-0..0-Z
			M_{2N}	Nm	41.5	51	66	92	110	95	129	171	168	165	195	172	195	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	62	83	104	135	120	95	157	195	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	–	–	
25.4 ... 25.8	101.6 ... 103.3	24.0 (28.0)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	–	–	–	1FT2108-5AB..-0..0-Z
			M_{2N}	Nm	58	76	99	135	120	95	154	195	172	195	195	172	195	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	77	103	129	135	120	95	157	195	172	195	195	172	195	–	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	–	–	–	

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Planetary gearbox data																	
Gearbox type:			NRK120, 1-stage						NRK120, 2-stage								
1. Order code			B41						B42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$	kg cm²	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRK120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK120 1- and 2-stage (continued)																				
25.2 ... 25.6	101.6 ... 103.3	24.0 (28.0)	n_{2N}	r/min	300	250	200	150	125	100	100	75	75	75	50	50	37.5	–	–	–	1FT2108-5AC..-0.B0-Z
			M_{2N}	Nm	46.5	57	73	101	120	95	141	187	172	175	195	172	195	–	–	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	76	102	127	135	120	95	157	195	172	195	195	172	195	–	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	–	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK120 1- and 2-stage																				
0.34 ... 0.471	1.56 ... 1.66	0.2 (0.22)	n_{2N}	r/min	375	375	300	250	250	200	200	150	125	125	100	100	75	60	37.5	25	1F.2203-2AG..-0.A0-Z
			M_{2N}	Nm	0.69	0.92	1.51	2.3	2.45	3.4	2.7	3.9	4.95	5.1	7.2	7.2	11.1	14.1	23	35.5	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	1.01	1.5	1.98	2.9	3.4	4.35	3.85	5.3	6.7	7.2	9.1	11.4	14.8	18.5	29.5	47	
			M_{2max}	Nm	4.65	6.3	8	11.4	13.1	16.5	14.6	19.7	24.5	26	33	41	53	66	106	152	
0.304 ... 0.436	1.56 ... 1.66	0.2 (0.22)	n_{2N}	r/min	375	300	300	250	200	200	150	125	100	100	100	75	75	50	37.5	25	1F.2203-2AK..-0..0-Z
			M_{2N}	Nm	0.54	0.98	1.22	1.89	2.5	2.8	2.9	3.85	5	5.2	5.9	8.1	8.9	13.7	18.8	29	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	0.91	1.36	1.8	2.7	3.1	4	3.55	4.85	6.2	6.6	8.4	10.6	13.6	17.2	27.5	43.5	
			M_{2max}	Nm	4.65	6.3	8	11.4	13.1	16.5	14.6	19.7	24.5	26	33	41	53	66	106	152	
0.963 ... 1.08	3.43 ... 3.52	0.35 (0.37)	n_{2N}	r/min	500	375	375	300	300	250	250	200	150	150	125	100	75	75	37.5	30	1F.2203-4AG..-0.A0-Z
			M_{2N}	Nm	2.45	3.55	4.5	6.6	6.7	8.9	7.5	9.5	13.7	14.2	18.4	23	31.5	33.5	64	90	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.85	3.95	5	7.2	8.4	10.6	9.4	12.6	15.9	17	21	26.5	34	43	69	95	
			M_{2max}	Nm	10.2	13.8	17.4	24.5	28	35	31	41.5	52	55	69	87	112	139	192	152	
0.924 ... 1.04	3.43 ... 3.52	0.35 (0.37)	n_{2N}	r/min	375	375	300	250	250	200	200	150	125	125	100	100	75	60	37.5	25	1F.2203-4AK..-0..0-Z
			M_{2N}	Nm	2.35	3	4.2	6	6.4	8.5	7.3	10	12.5	13.1	17.2	17.3	26	33	53	82	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.75	3.8	4.85	7	8	10.2	9	12.2	15.3	16.3	20.5	25.5	33	41.5	66	95	
			M_{2max}	Nm	10.2	13.8	17.4	24.5	28	35	31	41.5	52	55	69	87	112	139	192	152	
2.03 ... 2.13	6.74 ... 6.82	1.23 (1.31)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2204-5AF..-0..0-Z
			M_{2N}	Nm	4.65	7.3	9.9	13.7	16.3	20.5	17.1	24	30	32	40.5	51	65	82	120	95	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	6	8.2	10.4	14.7	16.9	21	18.9	25	31.5	33.5	42	53	67	84	120	95	
			M_{2max}	Nm	20	27	33.5	47.5	54	68	60	81	101	107	134	168	215	265	192	152	
2.05 ... 2.14	6.74 ... 6.82	1.23 (1.31)	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	100	75	60	37.5	30	1F.2204-5AK..-0..0-Z
			M_{2N}	Nm	4.8	7.5	8.1	14	14.8	19.4	17.6	24	29.5	30	40	38	57	71	116	95	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	6.1	8.3	10.4	14.8	17	21	19	25	31.5	34	42.5	53	68	85	120	95	
			M_{2max}	Nm	20	27	33.5	47.5	54	68	60	81	101	107	134	168	215	265	192	152	
2.81 ... 2.9	9.06 ... 9.18	1.61 (1.69)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2204-6AF..-0..0-Z
			M_{2N}	Nm	6.5	10.1	13.7	18.8	22	28	23	33	41.5	44.5	56	70	90	112	120	95	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	8.4	11.3	14.3	20	23	29	25.5	34.5	43	46	57	72	92	115	120	95	
			M_{2max}	Nm	27	36.5	45.5	64	73	91	81	109	136	145	181	225	290	275	192	152	
2.98 ... 3.07	10.3 ... 10.5	3.15 (4.05)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	10	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	7.1	10.2	13	18.6	21.5	27	24	30.5	39	41	53	62	83	108	120	94	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	8.9	12	15.1	21	24.5	30.5	27	36	45.5	48.5	60	76	97	121	120	95	
			M_{2max}	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	312	275	192	152	
3.02 ... 3.11	10.3 ... 10.5	3.15 (4.05)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2205-2AF..-0..0-Z
			M_{2N}	Nm	6.5	9.8	12.6	17.7	20.5	26.5	22	31	39	41	52	66	84	107	120	95	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	9	12.1	15.3	21.5	24.5	31	27.5	36.5	46	49	61	76	98	123	120	95	
			M_{2max}	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	312	275	192	152	

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Planetary gearbox data																	
Gearbox type:		NRK120, 1-stage						NRK120, 2-stage									
1. Order code		B41						B42									
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95
$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152
$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
$J_{1,G}$	kg cm²	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376
$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK120 1- and 2-stage (continued)																					
2.96	10.3	3.15	n_{2N}	r/min	500	375	300	250	250	200	200	150	125	125	100	75	60	50	37.5	25	1FT2205-2AH..-0..0-Z
...	...	(4.05)	M_{2N}	Nm	5.6	8.9	12.2	16.4	16.5	22	20	28	34	34	45.5	60	77	95	120	95	■■■ + ■■■ + ...
3.05	10.5		$M_{2,0}$	Nm	8.8	11.9	15	21	24	30.5	27	36	45	48	60	75	96	120	120	95	
			M_{2max}	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	312	275	192	152	
5.21	17.3	5.1	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2205-4AF..-0..0-Z
...	...	(6)	M_{2N}	Nm	12.5	14	19.1	25	31.5	43	30	49.5	62	64	86	108	135	172	120	95	■■■ + ■■■ + ...
5.29	17.5		$M_{2,0}$	Nm	15.6	20.5	26	36.5	42	52	46.5	62	78	83	104	130	167	172	120	95	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	312	275	312	275	192	152	
5.34	17.3	7.8	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	10	1FT2206-2AC..-0..0-Z
...	...	(9.4)	M_{2N}	Nm	11.6	18.1	23.5	33	39	49	43.5	52	70	70	96	105	143	172	120	95	■■■ + ■■■ + ...
5.42	17.5		$M_{2,0}$	Nm	16	21	26.5	37.5	43	54	48	64	80	86	107	134	172	172	120	95	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	312	275	312	275	192	152	
5.38	17.3	7.8	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2206-2AF..-0..0-Z
...	...	(9.4)	M_{2N}	Nm	11.2	16.8	22	29.5	35.5	45.5	35.5	53	66	69	89	111	141	172	120	95	■■■ + ■■■ + ...
5.46	17.5		$M_{2,0}$	Nm	16.1	21.5	27	38	43.5	54	48.5	64	80	86	107	134	172	172	120	95	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	312	275	312	275	192	152	
5.22	17.3	7.8	n_{2N}	r/min	375	300	300	200	200	150	150	125	100	100	75	60	50	50	37.5	25	1FT2206-2AH..-0..0-Z
...	...	(9.4)	M_{2N}	Nm	12.7	17.3	18.7	30	31	42.5	39	49.5	62	63	86	107	134	130	120	95	■■■ + ■■■ + ...
5.3	17.5		$M_{2,0}$	Nm	15.6	20.5	26	36.5	42	53	47	62	78	83	104	130	167	172	120	94	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	312	275	312	275	192	152	
7.89	26	11.5	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	12.5	–	1FT2206-3AB..-0..0-Z
...	...	(13.1)	M_{2N}	Nm	21	28	36	51	57	72	57	77	107	112	142	172	195	172	120	–	■■■ + ■■■ + ...
8.01	26.4		$M_{2,0}$	Nm	23.5	31.5	39.5	55	64	80	71	94	118	126	157	172	195	172	120	–	
			M_{2max}	Nm	79	105	131	184	192	152	235	312	275	312	312	275	312	275	192	–	
7.76	26	11.5	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	–	1FT2206-3AF..-0..0-Z
...	...	(13.1)	M_{2N}	Nm	17	23	29	39.5	40	55	51	63	79	79	109	136	169	172	120	–	■■■ + ■■■ + ...
7.88	26.4		$M_{2,0}$	Nm	23	31	39	55	62	78	69	93	116	124	155	172	195	172	120	–	
			M_{2max}	Nm	79	105	131	184	192	152	235	312	275	312	312	275	312	275	192	–	
11	36.6	15.1	n_{2N}	r/min	300	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	–	1FT2206-4AC..-0..0-Z
...	...	(16.8)	M_{2N}	Nm	20.5	26	34	47.5	57	73	70	72	98	97	146	146	195	172	120	–	■■■ + ■■■ + ...
11.1	37.2		$M_{2,0}$	Nm	33	44	55	77	88	95	98	131	164	175	195	172	195	172	120	–	
			M_{2max}	Nm	111	148	186	216	192	152	251	312	275	312	312	275	312	275	192	–	
10.5	34.7	15.1	n_{2N}	r/min	375	375	300	200	200	150	150	125	100	100	75	60	50	37.5	25	–	1F.2206-4AF..-0..0-Z
...	...	(16.8)	M_{2N}	Nm	25	27	36	57	59	80	73	88	111	111	151	172	195	172	120	–	■■■ + ■■■ + ...
10.7	35.3		$M_{2,0}$	Nm	31.5	42.5	53	74	85	95	95	126	158	168	195	172	195	172	120	–	
			M_{2max}	Nm	105	141	176	216	192	152	251	312	275	312	312	275	310	275	192	–	
10.1	34.7	15.1	n_{2N}	r/min	375	300	250	200	150	150	150	100	100	75	75	60	50	50	37.5	–	1FT2206-4AH..-0..0-Z
...	...	(16.8)	M_{2N}	Nm	20	26.5	33.5	44.5	59	62	58	87	87	117	120	150	183	152	117	–	■■■ + ■■■ + ...
10.2	35.3		$M_{2,0}$	Nm	30	40.5	50	71	81	95	90	121	151	161	195	172	195	172	120	–	
			M_{2max}	Nm	105	141	176	216	192	152	251	312	275	312	312	275	310	275	192	–	

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Planetary gearbox data																	
Gearbox type:			NRK120, 1-stage						NRK120, 2-stage								
1. Order code			B41						B42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$	kg cm²	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRK120

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK120 1- and 2-stage (continued)																				
10.3 ... 10.4	36.6 ... 37.2	24.86 (28.16)	n_{2N}	r/min	300	250	200	150	150	125	125	100	75	75	60	50	50	37.5	25	–	**1FT2208-2AF..-0..0-Z**
			M_{2N}	Nm	25.5	33	42.5	59	61	75	71	89	119	120	152	172	164	172	119	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31	41.5	51	72	83	95	92	123	154	164	195	171	195	172	120	–	
			M_{2max}	Nm	111	148	185	216	192	152	251	312	275	312	312	275	312	275	192	–	
16.3 ... 16.6	49.2 ... 50	31.96 (34.96)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	–	–	**1FT2208-3AB..-0..0-Z**
			M_{2N}	Nm	34	44.5	59	87	93	95	95	127	172	184	195	172	195	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	49.5	66	82	115	120	95	146	195	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	150	199	245	216	192	152	251	312	275	312	312	275	312	275	–	–	
15.1 ... 15.4	49.2 ... 50	31.96 (35.36)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	–	–	**1F.2208-3AC..-0..0-Z**
			M_{2N}	Nm	28	44	57	79	94	95	110	115	154	153	195	172	195	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	45.5	61	76	107	120	95	136	181	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	150	199	245	216	192	152	251	312	275	312	312	275	312	275	–	–	
15.1 ... 15.3	49.2 ... 50	31.96 (35.36)	n_{2N}	r/min	300	250	200	150	150	125	125	100	75	75	60	60	50	37.5	–	–	**1FT2208-3AF..-0..0-Z**
			M_{2N}	Nm	33	42	54	75	76	92	87	108	146	144	183	159	185	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	45.5	61	76	107	120	95	136	181	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	150	199	245	216	192	152	251	312	275	312	312	275	312	275	–	–	
19.3 ... 19.7	63.8 ... 64.9	41.16 (46.76)	n_{2N}	r/min	250	200	150	100	100	75	75	60	50	50	37.5	30	25	20	–	–	**1FT2208-4AB..-0..0-Z**
			M_{2N}	Nm	32.5	41.5	57	87	89	95	117	148	172	177	195	172	195	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	59	78	98	135	120	95	157	195	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	–	–	
18.8 ... 19.1	63.8 ... 64.9	41.16 (46.76)	n_{2N}	r/min	300	250	200	150	125	100	100	75	75	75	50	50	37.5	25	–	–	**1F.2208-4AC..-0..0-Z**
			M_{2N}	Nm	40.5	51	65	90	108	95	126	167	168	165	195	172	195	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	57	76	95	134	120	95	157	195	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	312	270	310	312	275	312	275	–	–	
18.1 ... 18.4	63.8 ... 64.9	41.16 (46.76)	n_{2N}	r/min	300	250	200	150	125	125	125	75	75	75	60	60	50	37.5	–	–	**1FT2208-4AF..-0..0-Z**
			M_{2N}	Nm	41	51	65	90	108	95	102	169	168	166	195	168	192	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	55	73	92	128	120	95	157	195	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	312	270	312	312	275	312	275	–	–	
22.8 ... 23.2	77.3 ... 78.7	50.46 (55.96)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	–	–	**1FT2208-5AB..-0..0-Z**
			M_{2N}	Nm	52	67	89	131	120	95	139	183	172	195	195	172	195	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	69	92	115	135	120	95	157	195	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	–	–	
22.5 ... 22.9	77.3 ... 78.7	50.46 (55.96)	n_{2N}	r/min	300	250	200	150	125	100	100	75	75	75	50	50	37.5	25	–	–	**1F.2208-5AC..-0..0-Z**
			M_{2N}	Nm	45	55	71	98	118	95	138	183	170	170	195	172	195	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	68	91	114	135	120	95	157	195	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	310	275	312	312	275	312	275	–	–	

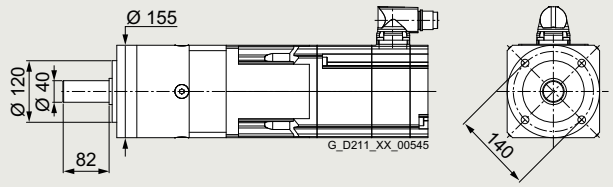
Planetary gearbox data																	
Gearbox type:			NRK120, 1-stage						NRK120, 2-stage								
1. Order code			B41						B42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$	kg cm²	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Selection and ordering data

NRK155



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5200 N at 100 r/min
Average axial force for 20000 h	$F_{A,eq}$	7000 N at 100 r/min
Average radial force for 30000 h	$F_{R,eq}$	4600 N at 100 r/min
Average axial force for 30000 h	$F_{A,eq}$	6000 N at 100 r/min
Maximum radial force	$F_{R,max}$	8400 N
Maximum axial force	$F_{A,max}$	11000 N

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)											
Nm	Nm	kg cm²											
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK155 1- and 2-stage													
4.5	14.3	1.71	n_{2N}	r/min	375	300	150	100	75	60	37.5	30	15	**1F.2105-4AF..-0..0-Z**
...	...	(2.55)	M_{2N}	Nm	15.1	20.5	44	65	84	106	174	215	210	■■■ + ■■■ + . . .
4.58	14.5		M_{2_0}	Nm	18	22.5	45.5	72	91	113	182	225	210	
			M_{2max}	Nm	57	72	145	225	285	355	570	712	336	
4.53	14.3	1.71	n_{2N}	r/min	375	300	200	100	100	75	50	37.5	25	**1FT2105-4AH..-0..0-Z**
...	...	(2.55)	M_{2N}	Nm	13.6	19.6	35	61	63	90	150	195	210	■■■ + ■■■ + . . .
4.62	14.5		M_{2_0}	Nm	18.1	22.5	46	73	91	114	183	225	210	
			M_{2max}	Nm	57	72	145	225	285	355	570	712	336	
7.47	23	2.65	n_{2N}	r/min	300	300	150	100	75	60	37.5	30	15	**1F.2105-6AF..-0..0-Z**
...	...	(3.5)	M_{2N}	Nm	25.5	28.5	66	87	124	156	260	325	210	■■■ + ■■■ + . . .
7.54	23.4		M_{2_0}	Nm	29.5	37	75	119	149	187	295	370	210	
			M_{2max}	Nm	93	116	230	365	460	570	736	712	336	
7.89	25	4.6	n_{2N}	r/min	375	300	150	100	75	60	37.5	30	15	**1F.2106-3AF..-0..0-Z**
...	...	(6.3)	M_{2N}	Nm	21	29.5	67	91	128	161	260	325	210	■■■ + ■■■ + . . .
8.04	25.3		M_{2_0}	Nm	31.5	39.5	80	126	158	197	315	395	210	
			M_{2max}	Nm	101	126	250	400	500	620	736	712	336	
10.3	31.7	6	n_{2N}	r/min	300	300	150	100	75	60	37.5	30	15	**1F.2106-4AF..-0..0-Z**
...	...	(7.6)	M_{2N}	Nm	33	36	82	106	153	192	320	400	210	■■■ + ■■■ + . . .
10.5	32.2		M_{2_0}	Nm	41.5	52	104	164	205	255	410	445	210	
			M_{2max}	Nm	128	161	320	500	630	712	736	712	336	
14.5	43.9	8.7	n_{2N}	r/min	300	250	150	75	75	60	37.5	30	–	**1F.2106-6AF..-0..0-Z**
...	...	(10.4)	M_{2N}	Nm	43.5	56	107	179	189	235	400	445	–	■■■ + ■■■ + . . .
14.8	44.5		M_{2_0}	Nm	59	73	148	230	290	360	460	445	–	
			M_{2max}	Nm	178	220	336	700	736	712	736	712	–	
21.2	84.1	18.2	n_{2N}	r/min	250	200	100	60	50	50	25	20	–	**1FT2108-4AC..-0..0-Z**
...	...	(22.3)	M_{2N}	Nm	56	74	157	235	290	285	460	445	–	■■■ + ■■■ + . . .
21.6	85.4		M_{2_0}	Nm	86	107	210	335	420	445	460	445	–	
			M_{2max}	Nm	340	425	336	736	736	712	736	712	–	

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Planetary gearbox data										
Gearbox type:			NRK155, 1-stage			NRK155, 2-stage					
1. Order code			B51			B52					
	i		4	5	10	16	20	25	40	50	100
2. Order code			R04	R05	R10	R16	R20	R25	R40	R50	R00
	$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210
	$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336
	$M_{2Em.Off}$	Nm	920	890	420	920	920	890	920	890	420
	$J_{1,G}$	kg cm²	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
	$\varphi_{2,G}$	'	6			9					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRK155

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK155 1- and 2-stage (continued)														
26 ... 26.5	102 ... 103	21.6 (25.6)	n_{2N}	r/min	200	150	75	50	37.5	30	20	15	–	**1FT2108-5AB..-0..0-Z**
			M_{2N}	Nm	81	107	210	315	410	445	460	445	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	105	132	210	415	460	445	460	445	–	
			M_{2max}	Nm	410	510	336	736	736	712	736	712	–	
25.8 ... 26.3	102 ... 103	21.6 (25.6)	n_{2N}	r/min	250	200	100	60	50	37.5	25	20	–	**1FT2108-5AC..-0.B0-Z**
			M_{2N}	Nm	63	82	175	255	315	415	460	445	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	104	131	210	410	460	445	460	445	–	
			M_{2max}	Nm	410	510	336	736	736	712	736	712	–	
32.8 ... 33.4	135 ... 138	28.2 (32.2)	n_{2N}	r/min	200	150	75	50	37.5	30	20	15	–	**1FT2108-7AB..-0..0-Z**
			M_{2N}	Nm	95	126	210	360	460	445	460	445	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	133	167	210	460	460	445	460	445	–	
			M_{2max}	Nm	550	680	336	736	736	712	736	712	–	
32.2 ... 32.8	135 ... 138	28.2 (32.2)	n_{2N}	r/min	250	200	100	60	50	50	25	20	–	**1FT2108-7AC..-0.B0-Z**
			M_{2N}	Nm	77	100	205	300	365	340	460	445	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	131	164	210	460	460	445	460	445	–	
			M_{2max}	Nm	550	680	336	736	736	712	736	712	–	
32 ... 32.6	135 ... 138	28.2 (32.2)	n_{2N}	r/min	200	200	100	60	50	37.5	30	25	–	**1FT2108-7AE..-0.B0-Z**
			M_{2N}	Nm	87	91	193	275	340	440	460	445	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	130	162	210	460	460	445	460	445	–	
			M_{2max}	Nm	550	680	336	736	736	712	736	712	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1- and 2-stage														
3.04 ... 3.12	10.3 ... 10.4	3.15 (4.05)	n_{2N}	r/min	250	200	100	75	50	50	25	20	10	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	9.9	12.9	27	40	53	61	109	137	205	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	12.1	15.3	31	49	61	77	123	154	210	
			M_{2max}	Nm	41	51	103	164	205	255	410	510	336	
3.07 ... 3.15	10.3 ... 10.4	3.15 (4.05)	n_{2N}	r/min	375	300	150	100	75	60	37.5	30	15	**1F.2205-2AF..-0..0-Z**
			M_{2N}	Nm	9.2	12.3	26.5	39	51	65	107	135	210	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	12.2	15.4	31.5	49.5	62	77	124	156	210	
			M_{2max}	Nm	41	51	103	164	205	255	410	510	336	
3 ... 3.08	10.3 ... 10.4	3.15 (4.05)	n_{2N}	r/min	375	300	200	100	100	75	50	37.5	25	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	8.2	11.8	22.5	37.5	42	58	96	122	183	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	11.9	15.1	30.5	48.5	60	76	122	152	205	
			M_{2max}	Nm	41	51	103	164	205	255	410	510	336	
5.3 ... 5.39	17.2 ... 17.5	5.1 (6)	n_{2N}	r/min	300	300	150	100	75	60	37.5	30	15	**1F.2205-4AF..-0..0-Z**
			M_{2N}	Nm	17.1	19.2	45	61	87	109	179	220	210	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	21	26.5	53	84	106	132	210	265	210	
			M_{2max}	Nm	69	87	174	275	345	430	690	712	336	
5.29 ... 5.37	17.2 ... 17.5	7.8 (9.4)	n_{2N}	r/min	250	200	100	75	50	50	25	20	10	**1FT2206-2AC..-0..0-Z**
			M_{2N}	Nm	18.5	24	50	70	97	106	198	245	210	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	21	26.5	53	85	106	133	210	265	210	
			M_{2max}	Nm	69	87	174	275	345	430	690	712	336	

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Planetary gearbox data										
Gearbox type:			NRK155, 1-stage			NRK155, 2-stage				
1. Order code			B51			B52				
	i		4	5	10	16	20	25	40	50	100
2. Order code			R04	R05	R10	R16	R20	R25	R40	R50	R00
	$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210
	$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336
	$M_{2Em.Off}$	Nm	920	890	420	920	920	890	920	890	420
	$J_{1,G}$	kg cm²	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
	$\varphi_{2,G}$	'	6			9					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1- and 2-stage (continued)													
5.46 ... 5.54	17.2 ... 17.5	7.8 (9.4)	n_{2N} r/min	375	300	150	100	75	60	37.5	30	15	**1F.2206-2AF..-0..0-Z**
			M_{2N} Nm	16	21.5	45.5	68	88	111	182	225	205	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	21.5	27	55	87	109	136	215	270	205	
			M_{2max} Nm	69	87	174	275	345	430	690	712	336	
5.29 ... 5.37	17.2 ... 17.5	7.8 (9.4)	n_{2N} r/min	300	300	150	100	75	60	50	37.5	25	**1FT2206-2AH..-0..0-Z**
			M_{2N} Nm	17.2	18.8	44.5	60	86	108	138	189	200	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	21	26.5	53	84	105	132	210	265	210	
			M_{2max} Nm	69	87	174	275	345	430	690	712	336	
8.04 ... 8.19	25.9 ... 26.3	11.5 (13.1)	n_{2N} r/min	200	150	75	50	37.5	30	20	15	7.5	**1FT2206-3AB..-0..0-Z**
			M_{2N} Nm	28	36.5	74	113	145	181	285	365	210	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	32	40.5	81	128	161	200	320	400	210	
			M_{2max} Nm	105	131	260	415	520	650	736	712	336	
7.91 ... 8.06	25.9 ... 26.3	11.5 (13.1)	n_{2N} r/min	300	250	150	75	75	60	37.5	30	15	**1FT2206-3AF..-0..0-Z**
			M_{2N} Nm	23	30	59	103	111	140	235	295	210	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	31.5	40	80	126	158	198	315	395	210	
			M_{2max} Nm	105	131	260	415	520	650	736	712	336	
10.9 ... 11	36.6 ... 37.1	15.1 (16.8)	n_{2N} r/min	250	200	100	60	50	50	25	20	10	**1FT2206-4AC..-0..0-Z**
			M_{2N} Nm	27.5	36.5	79	125	156	157	320	400	210	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	43.5o	54	110	174	215	270	435	445	210	
			M_{2max} Nm	148	185	336	580	730	712	736	712	336	
10.7 ... 10.9	34.6 ... 35.2	15.1 (16.8)	n_{2N} r/min	300	300	150	100	75	60	37.5	30	15	**1F.2206-4AF..-0..0-Z**
			M_{2N} Nm	34	37	84	108	155	195	325	405	210	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	43	54	109	171	210	265	425	445	210	
			M_{2max} Nm	140	175	336	550	690	712	736	712	336	
10.2 ... 10.4	34.6 ... 35.2	15.1 (16.8)	n_{2N} r/min	300	250	150	75	75	50	37.5	30	20	**1FT2206-4AH..-0..0-Z**
			M_{2N} Nm	27	35	67	119	124	188	265	330	210	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	41	51	104	164	205	255	410	445	210	
			M_{2max} Nm	140	175	336	550	690	712	736	712	336	
10.5 ... 10.7	36.6 ... 37.1	22.5 (25.8)	n_{2N} r/min	300	250	125	75	60	50	37.5	30	15	**1FT2208-2AF..-0..0-Z**
			M_{2N} Nm	29.5	38	85	129	166	200	280	350	210	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	42	53	106	167	205	260	415	445	210	
			M_{2max} Nm	148	185	336	580	730	712	736	712	336	
16.4 ... 16.6	49.2 ... 49.9	29.6 (32.6)	n_{2N} r/min	200	150	75	50	37.5	30	20	15	–	**1FT2208-3AB..-0..0-Z**
			M_{2N} Nm	48	64	134	199	260	325	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	66	82	165	260	325	405	460	445	–	
			M_{2max} Nm	199	245	336	736	736	712	736	712	–	
15.5 ... 15.8	49.2 ... 49.9	29.6 (33)	n_{2N} r/min	250	200	100	75	50	50	25	20	–	**1F.2208-3AC..-0..0-Z**
			M_{2N} Nm	48	63	132	169	250	260	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	63	78	158	245	310	385	460	445	–	
			M_{2max} Nm	199	245	336	736	736	712	736	712	–	

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Planetary gearbox data										
Gearbox type:			NRK155, 1-stage			NRK155, 2-stage					
1. Order code			B51			B52					
	i		4	5	10	16	20	25	40	50	100
2. Order code			R04	R05	R10	R16	R20	R25	R40	R50	R00
	$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210
	$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336
	$M_{2Em.Off}$	Nm	920	890	420	920	920	890	920	890	420
	$J_{1,G}$	kg cm²	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
	$\varphi_{2,G}$	'	6			9					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRK155

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1- and 2-stage (continued)														
15.4 ... 15.7	49.2 ... 49.9	29.6 (33)	n_{2N}	r/min	250	250	125	75	60	50	30	30	–	1FT2208-3AF..-0..0-Z
			M_{2N}	Nm	45.5	48	108	160	205	245	425	410	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	62	78	156	245	305	385	460	445	–	
			M_{2max}	Nm	199	245	336	736	736	712	736	712	–	
19.9 ... 20.1	63.8 ... 64.7	38.8 (44.4)	n_{2N}	r/min	200	150	75	50	37.5	30	20	15	–	1FT2208-4AB..-0..0-Z
			M_{2N}	Nm	46.5	64	136	197	260	325	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	80	100	200	315	395	445	460	445	–	
			M_{2max}	Nm	255	320	336	736	736	712	736	712	–	
19.2 ... 19.6	63.8 ... 64.7	38.8 (44.4)	n_{2N}	r/min	250	200	100	75	50	50	25	20	–	1F.2208-4AC..-0..0-Z
			M_{2N}	Nm	56	73	154	186	285	285	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	78	98	196	305	385	445	460	445	–	
			M_{2max}	Nm	255	320	336	736	736	712	730	712	–	
18.4 ... 18.8	63.8 ... 64.7	38.8 (44.4)	n_{2N}	r/min	250	200	125	75	60	50	37.5	30	–	1FT2208-4AF..-0..0-Z
			M_{2N}	Nm	56	73	128	186	240	285	370	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	74	93	187	295	365	445	460	445	–	
			M_{2max}	Nm	255	320	336	736	736	712	730	712	–	
23.3 ... 23.8	77.3 ... 78.5	48.1 (53.6)	n_{2N}	r/min	200	150	75	50	37.5	30	20	15	–	1FT2208-5AB..-0..0-Z
			M_{2N}	Nm	73	96	198	285	370	445	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	95	118	210	370	460	445	460	445	–	
			M_{2max}	Nm	310	390	336	736	736	712	736	712	–	
23.1 ... 23.5	77.3 ... 78.5	48.1 (53.6)	n_{2N}	r/min	250	200	100	60	50	37.5	25	20	–	1F.2208-5AC..-0..0-Z
			M_{2N}	Nm	61	80	170	250	310	405	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	94	117	210	365	455	445	460	445	–	
			M_{2max}	Nm	310	390	336	736	736	712	736	712	–	
18.2 ... 18.6	57.9 ... 58.7	66.7 (72.7)	n_{2N}	r/min	250	200	100	60	50	37.5	25	20	–	1FT2210-2AC..-0..0-Z
			M_{2N}	Nm	57	75	153	235	290	370	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	74	92	185	290	365	445	460	445	–	
			M_{2max}	Nm	230	290	336	736	736	712	736	712	–	
18 ... 18.3	57.9 ... 58.7	66.7 (72.7)	n_{2N}	r/min	250	200	100	60	50	37.5	30	25	–	1FT2210-2AF..-0..0-Z
			M_{2N}	Nm	53	69	148	220	270	360	445	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	73	91	183	285	360	445	460	445	–	
			M_{2max}	Nm	230	290	336	736	736	712	736	712	–	
28.3 ... 28.7	86.9 ... 88.3	93.8 (99.8)	n_{2N}	r/min	200	150	75	50	37.5	30	20	15	–	1F.2210-3AB..-0..0-Z
			M_{2N}	Nm	90	119	210	340	450	445	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	114	143	210	450	460	445	460	445	–	
			M_{2max}	Nm	350	440	336	736	736	712	736	712	–	
28.3 ... 28.7	86.9 ... 88.3	93.8 (99.8)	n_{2N}	r/min	250	200	100	60	50	37.5	25	20	–	1F.2210-3AC..-0..0-Z
			M_{2N}	Nm	73	95	200	285	350	445	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	114	143	210	450	460	445	460	445	–	
			M_{2max}	Nm	350	440	336	736	736	710	736	712	–	

➥ Continued on the next page

Planetary gearbox data										
Gearbox type:			NRK155, 1-stage			NRK155, 2-stage				
1. Order code			B51			B52				
i			4	5	10	16	20	25	40	50	100
2. Order code			R04	R05	R10	R16	R20	R25	R40	R50	R00
$M_{2N,G}$		Nm	460	445	210	460	460	445	460	445	210
$M_{2max,G}$		Nm	736	712	336	736	736	712	736	712	336
$M_{2Em.Off}$		Nm	920	890	420	920	920	890	920	890	420
$J_{1,G}$		kg cm²	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
$\varphi_{2,G}$		'	6			9					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)											
Nm	Nm	kg cm²											
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1- and 2-stage (continued)													
27.8 ... 28.2	86.9 ... 88.3	93.8 (99.8)	n_{2N}	r/min	200	200	100	50	37.5	37.5	30	25	–	**1FT2210-3AF..-0..0-Z**
			M_{2N}	Nm	85	86	184	325	435	435	455	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	112	140	210	445	460	445	455	440	–	
			M_{2max}	Nm	350	440	336	736	736	712	736	712	–	
37.6 ... 38.5	116 ... 118	122 (138)	n_{2N}	r/min	200	150	75	50	37.5	30	20	15	–	**1F.2210-4AB..-0..0-Z**
			M_{2N}	Nm	105	140	210	385	460	445	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	153	192	210	460	460	445	460	445	–	
			M_{2max}	Nm	470	580	335	736	736	712	736	712	–	
37 ... 37.8	116 ... 118	122 (138)	n_{2N}	r/min	200	200	100	50	50	37.5	25	20	–	**1F.2210-4AC..-0..0-Z**
			M_{2N}	Nm	104	106	210	380	375	445	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	151	188	210	460	460	445	460	445	–	
			M_{2max}	Nm	470	580	335	736	736	712	736	712	–	
35.5 ... 36.2	116 ... 118	122 (138)	n_{2N}	r/min	200	150	100	50	50	37.5	30	25	–	**1FT2210-4AF..-0.B0-Z**
			M_{2N}	Nm	102	138	205	375	360	445	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	144	180	210	460	460	445	460	440	–	
			M_{2max}	Nm	470	580	335	736	736	712	736	712	–	
42.9 ... 43.7	145 ... 147	19.5 (21.1)	n_{2N}	r/min	200	150	75	50	37.5	30	20	15	–	**1FT2210-5AB..-0..0-Z**
			M_{2N}	Nm	125	168	210	440	460	445	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	174	215	210	460	460	445	460	445	–	
			M_{2max}	Nm	580	712	336	736	736	712	736	712	–	
43.9 ... 44.9	145 ... 147	150 (166)	n_{2N}	r/min	200	150	100	50	50	37.5	25	20	–	**1F.2210-5AC..-0.B0-Z**
			M_{2N}	Nm	114	154	210	410	390	445	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	179	220	210	460	460	445	460	445	–	
			M_{2max}	Nm	580	712	336	736	736	712	736	712	–	

Planetary gearbox data										
Gearbox type:			**NRK155, 1-stage**			**NRK155, 2-stage**				
1. Order code			**B51**			**B52**				
	i		**4**	**5**	**10**	**16**	**20**	**25**	**40**	**50**	**100**
2. Order code			**R04**	**R05**	**R10**	**R16**	**R20**	**R25**	**R40**	**R50**	**R00**
	$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210
	$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336
	$M_{2Em.Off}$	Nm	920	890	420	920	920	890	920	890	420
	$J_{1,G}$	kg cm²	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
	$\varphi_{2,G}$	'	6			9					

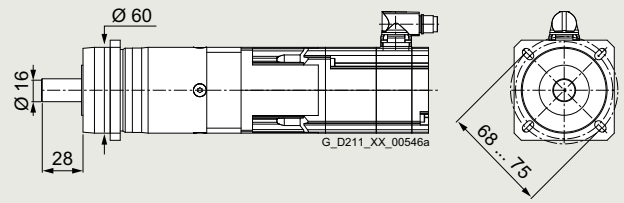
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NLC060

Selection and ordering data

NLC060



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	3200 N at 100 r/min
Average axial force for 20000 h	$F_{A,eq}$	4400 N at 100 r/min
Average radial force for 30000 h	$F_{R,eq}$	3200 N at 100 r/min
Average axial force for 30000 h	$F_{A,eq}$	3900 N at 100 r/min
Maximum radial force	$F_{R,max}$	3200 N
Maximum axial force	$F_{A,max}$	4400 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC060 1- and 2-stage																				
0.038	0.439	0.0245	n_{2N}	r/min	–	–	–	100	150	150	125	150	150	150	150	125	100	75	50	30	**1F.2102-0AG..-0.A0-Z**
...	...	(0.0285)	M_{2N}	Nm	–	–	–	0.143	0.175	0.34	0.25	0.4	0.65	0.68	0.89	1.29	1.96	2.75	4.75	8.1	■■■ + ■■■ + . . .
0.112	0.508		$M_{2.0}$	Nm	–	–	–	0.265	0.385	0.63	0.485	0.84	1.19	1.31	1.79	2.35	3.2	4.15	6.9	11.2	
			M_{2max}	Nm	–	–	–	3.05	3.55	4.6	4.05	5.6	7.1	7.6	9.7	12.3	15.9	20	29	24	
0.128	0.918	0.036	n_{2N}	r/min	–	300	375	375	300	300	300	250	200	200	150	125	100	75	50	30	**1F.2102-1AG..-0.A0-Z**
...	...	(0.04)	M_{2N}	Nm	–	0.265	0.38	0.7	1.01	1.31	1.03	1.56	2.35	2.4	3.45	4.45	6	7.9	12.9	15	■■■ + ■■■ + . . .
0.26	1.04		$M_{2.0}$	Nm	–	0.51	0.78	1.33	1.61	2.15	1.82	2.6	3.4	3.65	4.75	6.1	7.9	10	16.4	15	
			M_{2max}	Nm	–	3.65	4.7	6.8	7.9	10	8.9	12	15.1	16.2	20	25.5	32.5	41	29	24	
0.341	1.7	0.093	n_{2N}	r/min	375	375	375	375	375	300	300	250	200	200	150	125	100	75	50	30	**1F.2103-2AG..-2.A0-Z**
...	...	(0.112)	M_{2N}	Nm	0.63	1.01	1.35	1.93	2.15	3	2.6	3.6	5	5.1	7.1	9	11.8	15.5	18	15	■■■ + ■■■ + . . .
0.515	1.85		$M_{2.0}$	Nm	1.02	1.55	2.05	3.15	3.7	4.75	4.1	5.7	7.2	7.7	9.8	12.4	16.1	20	18	15	
			M_{2max}	Nm	5	6.9	8.8	12.6	14.5	18.3	16.2	21.5	27	29	36.5	46	59	64	29	24	
0.326	1.7	0.093	n_{2N}	r/min	375	375	375	300	300	250	300	250	200	200	125	100	100	75	50	25	**1F.2103-2AH..-2..0-Z**
...	...	(0.112)	M_{2N}	Nm	0.6	0.96	1.28	2.1	2.35	3.15	2.4	3.35	4.65	4.8	7.1	9.2	11	14.4	18	15	■■■ + ■■■ + . . .
0.5	1.85		$M_{2.0}$	Nm	0.97	1.49	2	3.05	3.55	4.6	4	5.5	7	7.5	9.5	12.1	15.6	19.6	18	15	
			M_{2max}	Nm	5	6.9	8.8	12.6	14.5	18.3	16.2	21.5	27	29	36.5	46	59	64	28.5	24	
0.922	3.77	0.139	n_{2N}	r/min	375	375	375	300	300	250	250	200	200	200	150	125	100	75	50	–	**1F.2103-4AG..-2.A0-Z**
...	...	(0.158)	M_{2N}	Nm	2.05	2.7	3.25	5.2	5.6	7.6	7	9.6	11.3	11.1	15.6	19.5	25	32.5	18	–	■■■ + ■■■ + . . .
1.07	3.9		$M_{2.0}$	Nm	2.75	3.85	4.95	7.2	8.3	10.5	9.2	12.4	15.7	16.8	21	26.5	34	40	18	–	
			M_{2max}	Nm	11.3	15.2	19.2	27	29	24	34.5	46	58	61	70	64	70	64	29	–	
0.801	3.77	0.139	n_{2N}	r/min	375	375	375	300	300	250	250	250	200	200	125	100	100	75	50	–	**1F.2103-4AH..-2..0-Z**
...	...	(0.158)	M_{2N}	Nm	1.79	2.35	2.8	4.65	5	6.8	6.1	6.8	9.9	10.1	14.6	18.6	22	28.5	18	–	■■■ + ■■■ + . . .
0.958	3.9		$M_{2.0}$	Nm	2.4	3.35	4.35	6.3	7.3	9.3	8.1	11	13.9	14.9	18.8	23.5	30	38	18	–	
			M_{2max}	Nm	11.3	15.2	19.2	27	29	24	34.5	46	58	61	70	64	70	64	29	–	
1.01	3.48	0.371	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	**1F.2104-4AF..-2..0-Z**
...	...	(0.451)	M_{2N}	Nm	2	3.45	4.6	6.7	7.9	10.3	8.6	12.2	15.5	16.5	21	26.5	34	40	18	–	■■■ + ■■■ + . . .
1.18	3.6		$M_{2.0}$	Nm	3	4.2	5.4	7.8	9	11.4	10.1	13.7	17.3	18.4	23	29	37	40	18	–	
			M_{2max}	Nm	10.4	14	17.7	25	28.5	24	32	42.5	53	57	70	64	70	64	29	–	

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Planetary gearbox data																	
Gearbox type:		NLC060, 1-stage						NLC060, 2-stage									
1. Order code		C21						C22									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$ Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18	15
	$M_{2max,G}$ Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29	24
	$M_{2Em.Off}$ Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
	$J_{1,G}$ kg cm²	0.178	0.12	0.097	0.078	0.074	0.069	0.135	0.129	0.081	0.091	0.079	0.078	0.068	0.067	0.067	0.064
	$\varphi_{2,G}$ '	10						12									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC060 1- and 2-stage (continued)																					
1.01 ... 1.17	3.58 ... 3.7	0.371 (0.451)	n_{2N}	r/min	500	375	375	375	300	300	300	250	200	200	150	125	100	75	50	–	1F.2104-4AK..-2..0-Z
			M_{2N}	Nm	2.15	3.75	4.75	5.8	7.8	9.1	8.2	11	14.4	15	19.7	24.5	31.5	40	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3	4.2	5.4	7.8	9	11.3	10.1	13.6	17.1	18.3	23	28.5	37	40	18	–	
			M_{2max}	Nm	10.7	14.4	18.2	25.5	29	24	32.5	44	55	58	70	64	70	64	29	–	
2.12 ... 2.26	7.18 ... 7.29	0.581 (0.671)	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	1F.2104-5AF..-2..0-Z
			M_{2N}	Nm	5.4	6.8	9.6	13.6	16	15	17.3	24	30.5	32	41	40	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.3	8.6	10.9	15.5	17.8	15	19.9	26.5	33.5	35.5	44	40	44	40	–	–	
			M_{2max}	Nm	21.5	28.5	36	40	29	24	64	70	70	70	70	64	70	64	–	–	
2.1 ... 2.24	7.28 ... 7.39	0.581 (0.671)	n_{2N}	r/min	375	375	375	300	300	300	250	200	200	150	150	125	100	75	–	–	1F.2104-5AK..-2..0-Z
			M_{2N}	Nm	5.3	6.7	7.8	11.8	12.6	12.9	15.2	20.5	22.5	30	32	39.5	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.3	8.5	10.8	15.4	17.7	15	19.8	26.5	33	35.5	44	40	44	40	–	–	
			M_{2max}	Nm	21.5	29	36.5	40	29	24	65	70	70	70	70	64	70	64	–	–	
2.87 ... 3	9.65 ... 9.75	0.781 (0.861)	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	1F.2104-6AF..-2..0-Z
			M_{2N}	Nm	6.7	8.4	11.8	16.8	18	15	22	33	41.5	44	44	40	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.6	11.6	14.7	20.5	18	15	26.5	35.5	44	44	44	40	44	40	–	–	
			M_{2max}	Nm	28.5	38.5	48.5	40	29	24	70	70	70	70	70	64	70	64	–	–	
4.51 ... 4.63	14.5 ... 14.6	1.98 (2.82)	n_{2N}	r/min	375	300	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	1F.2105-4AF..-0..0-Z
			M_{2N}	Nm	10.6	15.4	17.1	22.5	18	15	28.5	44	44	44	44	40	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.5	18.2	22.5	25	18	15	41	44	44	44	44	40	44	40	–	–	
			M_{2max}	Nm	43.5	58	64	40	29	24	70	70	70	70	70	64	70	64	–	–	
4.49 ... 4.61	14.5 ... 14.6	1.98 (2.82)	n_{2N}	r/min	375	300	250	200	250	200	200	150	125	125	125	100	75	75	–	–	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	9.6	14.3	18.7	25	17.7	15	25	36.5	44	43.5	36.5	40	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.4	18.1	22.5	25	18	15	40.5	44	44	44	44	40	44	40	–	–	
			M_{2max}	Nm	43.5	58	64	40	29	24	70	70	70	70	70	64	70	64	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC060 1- and 2-stage																					
0.383 ... 0.563	1.6 ... 1.76	0.2 (0.22)	n_{2N}	r/min	375	375	375	375	300	300	300	250	200	200	150	125	100	75	50	30	1F.2203-2AG..-2.A0-Z
			M_{2N}	Nm	0.73	1.11	1.43	1.87	2.55	2.9	2.55	3.45	4.95	4.95	7	8.9	11.7	15.7	18	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.14	1.72	2.3	3.45	4	5.1	4.55	6.2	7.9	8.5	10.8	13.6	17.6	22	18	15	
			M_{2max}	Nm	4.8	6.5	8.3	11.9	13.7	17.3	15.3	20.5	25.5	27.5	34.5	43.5	55	64	29	24	
0.348 ... 0.529	1.6 ... 1.76	0.2 (0.22)	n_{2N}	r/min	375	375	300	300	250	250	250	200	150	150	125	100	100	75	50	30	1F.2203-2AK..-2..0-Z
			M_{2N}	Nm	0.55	0.83	1.32	1.74	2.25	2.55	2.25	3.2	4.75	4.8	6.2	8	8.3	11.7	17.9	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.04	1.58	2.1	3.2	3.75	4.8	4.25	5.8	7.4	8	10.1	12.8	16.5	20.5	18	15	
			M_{2max}	Nm	4.8	6.5	8.3	11.9	13.7	17.3	15.3	20.5	25.5	27.5	34.5	43.5	55	64	29	24	
1.01 ... 1.17	3.48 ... 3.6	0.35 (0.37)	n_{2N}	r/min	375	375	375	300	300	300	300	250	200	200	150	125	100	75	50	–	1F.2203-4AG..-2.A0-Z
			M_{2N}	Nm	2.55	3.5	4.3	6.4	7.1	7.9	7.3	9.7	13	13.3	17.8	22	28.5	37	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3	4.2	5.4	7.8	9	11.4	10.1	13.6	17.2	18.3	23	29	37	40	18	–	
			M_{2max}	Nm	10.4	14	17.7	25	28.5	24	32	42.5	53	57	70	64	70	64	29	–	
0.942 ... 1.09	3.48 ... 3.6	0.35 (0.37)	n_{2N}	r/min	375	375	300	300	250	250	250	200	200	200	150	125	100	75	50	–	1F.2203-4AK..-2..0-Z
			M_{2N}	Nm	2.05	2.6	3.8	4.85	6.1	6.9	6.3	8.5	9.2	9	12.7	15.6	20	27	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.8	3.95	5	7.3	8.4	10.7	9.4	12.7	16	17.1	21.5	27	34.5	40	18	–	
			M_{2max}	Nm	10.4	14	17.7	25	28.5	24	32	42.5	53	57	70	64	70	64	29	–	

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Planetary gearbox data																	
Gearbox type:		NLC060, 1-stage						NLC060, 2-stage									
1. Order code		C21						C22									
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18	15
$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29	24
$M_{2Em.Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm²	0.178	0.12	0.097	0.078	0.074	0.069	0.135	0.129	0.081	0.091	0.079	0.078	0.068	0.067	0.067	0.064
$\varphi_{2,G}$	'	10						12									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NLC060

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC060 1- and 2-stage (continued)																					
2.08 ... 2.22	6.78 ... 6.89	1.251 (1.331)	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	**1F.2204-5AF..-2..0-Z**
			M_{2N}	Nm	5.2	6.5	9.1	12.9	15.2	15	16.4	23	29	30.5	39	40	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.2	8.4	10.7	15.2	17.5	15	19.6	26	33	35	44	40	44	40	–	–	
			M_{2max}	Nm	20	27	34	40	29	24	61	70	70	70	70	64	70	64	–	–	
2.09 ... 2.23	6.78 ... 6.89	1.251 (1.331)	n_{2N}	r/min	375	375	300	300	250	250	250	200	150	150	125	125	100	75	–	–	**1F.2204-5AK..-2..0-Z**
			M_{2N}	Nm	5.3	6.6	9.4	11.4	14.5	15	14.6	19.9	27.5	28.5	35.5	36	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.2	8.5	10.8	15.3	17.6	15	19.7	26	33	35	44	40	44	40	–	–	
			M_{2max}	Nm	20	27	34	40	29	24	61	70	70	70	70	64	70	64	–	–	
2.85 ... 2.98	9.15 ... 9.26	1.631 (1.711)	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	**1F.2204-6AF..-2..0-Z**
			M_{2N}	Nm	7.1	8.7	12.4	17.5	18	15	22.5	33	41.5	43.5	44	40	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.5	11.5	14.6	20.5	18	15	26.5	35.5	44	44	44	40	44	40	–	–	
			M_{2max}	Nm	27	36.5	46	40	29	24	70	70	70	70	70	64	70	64	–	–	
2.6 ... 2.73	10.4 ... 10.5	3.42 (4.32)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	–	–	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	5.4	8.9	11.4	16.3	18	15	21	27	34.5	36.5	44	40	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.7	10.5	13.3	18.9	18	15	24	32	40	43	44	40	44	40	–	–	
			M_{2max}	Nm	31	41.5	52	40	29	24	70	70	70	70	70	64	70	64	–	–	
2.66 ... 2.79	10.4 ... 10.5	3.42 (4.32)	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	**1F.2205-2AF..-0..0-Z**
			M_{2N}	Nm	6.7	7.6	11.3	15.5	18	15	20.5	28.5	36	38	44	40	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.9	10.8	13.6	19.3	18	15	24.5	33	41.5	43.5	44	40	44	40	–	–	
			M_{2max}	Nm	31	41.5	52	40	29	24	70	70	70	70	70	64	70	64	–	–	
2.65 ... 2.77	10.4 ... 10.5	3.42 (4.32)	n_{2N}	r/min	375	300	300	250	200	200	200	150	125	125	100	100	75	75	–	–	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	6	9	9.9	13.4	17.9	15	18.2	26	33	32.5	42.5	37.5	44	35	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.9	10.7	13.6	19.2	18	15	24.5	32.5	41	43.5	44	40	44	40	–	–	
			M_{2max}	Nm	31	41.5	52	40	29	24	70	70	70	70	70	64	70	64	–	–	
4.69 ... 4.81	17.4 ... 17.6	5.37 (6.27)	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	75	60	50	37.5	–	–	**1F.2205-4AF..-0..0-Z**
			M_{2N}	Nm	11.9	13.9	18.4	24.5	18	15	35	43.5	44	44	44	40	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14	18.9	23.5	25	18	15	42.5	44	44	44	44	40	44	40	–	–	
			M_{2max}	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	–	–	

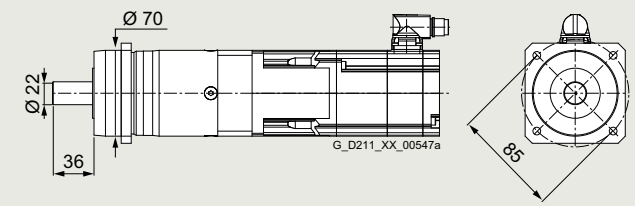
Planetary gearbox data																	
Gearbox type:		**NLC060, 1-stage**						**NLC060, 2-stage**									
1. Order code		**C21**						**C22**									
i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**	**100**
2. Order code		**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**	**R00**
$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18	15
$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29	24
$M_{2Em.Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm²	0.178	0.12	0.097	0.078	0.074	0.069	0.135	0.129	0.081	0.091	0.079	0.078	0.068	0.067	0.067	0.064
$\varphi_{2,G}$	'	10						12									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Selection and ordering data

NLC080



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5500 N at 100 r/min
Average axial force for 20000 h	$F_{A,eq}$	6400 N at 100 r/min
Average radial force for 30000 h	$F_{R,eq}$	4800 N at 100 r/min
Average axial force for 30000 h	$F_{A,eq}$	5700 N at 100 r/min
Maximum radial force	$F_{R,max}$	5500 N
Maximum axial force	$F_{A,max}$	6400 N

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC080 1- and 2-stage																				
0.243	1.56	0.093	n_{2N}	r/min	250	300	300	300	300	300	250	250	200	200	150	125	100	75	50	30	**1F.2103-2AG..-0.A0-Z**
...	...	(0.112)	M_{2N}	Nm	0.375	0.66	1.02	1.65	1.91	2.3	2.25	2.65	3.8	3.85	5.9	7.6	10.6	14.1	22.5	37.5	■■■ + ■■■ + . . .
0.517	1.82		M_{2_0}	Nm	0.72	1.27	1.81	2.9	3.45	4.5	3.85	5.4	7	7.5	9.6	12.2	15.9	20	32.5	38	
			M_{2max}	Nm	4.65	6.5	8.3	12.1	13.9	17.6	15.6	21	26.5	28	35.5	44.5	57	72	80	61	
0.224	1.56	0.093	n_{2N}	r/min	250	300	300	300	300	250	250	250	200	200	125	100	100	75	50	25	**1F.2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	0.35	0.63	0.98	1.59	1.83	2.6	2.1	2.5	3.6	3.65	6.3	8.2	10	13.3	21.5	38	■■■ + ■■■ + . . .
0.501	1.82		M_{2_0}	Nm	0.67	1.19	1.72	2.75	3.3	4.35	3.7	5.2	6.7	7.3	9.3	11.8	15.4	19.5	31.5	38	
			M_{2max}	Nm	4.65	6.5	8.3	12.1	13.9	17.6	15.6	21	26.5	28	35.5	44.5	57	72	80	61	
0.862	3.64	0.139	n_{2N}	r/min	375	375	300	300	250	250	250	200	200	150	150	125	100	75	50	30	**1F.2103-4AG..-0.A0-Z**
...	...	(0.158)	M_{2N}	Nm	1.82	2.35	3.7	5	6.4	7.5	6.7	9.2	10	12.8	15.1	18.9	25	32.5	50	38	■■■ + ■■■ + . . .
1.12	3.85		M_{2_0}	Nm	2.55	3.7	4.9	7.2	8.3	10.7	9.3	12.6	16	17.1	21.5	27	35	44	50	38	
			M_{2max}	Nm	10.9	14.8	18.7	26.5	30	38	34	45.5	57	61	76	95	122	153	80	61	
0.727	3.64	0.139	n_{2N}	r/min	375	375	300	300	300	250	250	200	200	200	125	100	100	75	50	25	**1F.2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	1.5	2	3.1	4.35	4.65	6.6	5.7	7.8	8.9	8.5	14.1	18	21.5	28	44.5	38	■■■ + ■■■ + . . .
0.984	3.85		M_{2_0}	Nm	2.15	3.2	4.2	6.2	7.3	9.3	8.1	11	14	15	19	23.5	30.5	38.5	50	38	
			M_{2max}	Nm	10.9	14.8	18.7	26.5	30	38	34	45.5	57	61	76	95	122	153	80	61	
0.875	3.34	0.35	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	**1F.2104-4AF..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.1	3	4.15	6.2	7.5	10	8.2	11.8	15.1	16	20.5	26	33.5	43	50	38	■■■ + ■■■ + . . .
1.15	3.56		M_{2_0}	Nm	2.6	3.75	4.95	7.3	8.4	10.8	9.5	13	16.5	17.6	22	28	36	45	50	38	
			M_{2max}	Nm	10	13.6	17.2	24.5	28	35	31	42	52	56	70	88	113	142	80	61	
0.869	3.44	0.35	n_{2N}	r/min	375	375	375	300	300	300	300	250	200	200	150	125	100	75	50	30	**1F.2104-4AK..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.35	3.3	4.25	6.5	7.3	8.2	7.6	10.1	13.4	13.9	18.9	23.5	31	40	50	38	■■■ + ■■■ + . . .
1.14	3.66		M_{2_0}	Nm	2.6	3.75	4.9	7.2	8.4	10.7	9.5	12.9	16.4	17.5	22	27.5	35.5	45	50	38	
			M_{2max}	Nm	10.3	14	17.7	25	28.5	36	32	43	54	58	72	91	116	145	80	61	
1.98	7.04	0.56	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	**1F.2104-5AF..-2..0-Z**
...	...	(0.65)	M_{2N}	Nm	5.3	6.6	9.4	13.5	16	20.5	17.3	24	30.5	32.5	41.5	52	67	84	50	38	■■■ + ■■■ + . . .
2.23	7.22		M_{2_0}	Nm	5.9	8.2	10.4	15	17.2	21.5	19.3	26	32.5	35	44	55	70	88	50	38	
			M_{2max}	Nm	21	28	35.5	50	57	61	64	86	107	114	143	176	192	176	80	61	

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Planetary gearbox data																	
Gearbox type:			NLC080, 1-stage						NLC080, 2-stage								
1. Order code			C31						C32								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50	38
	$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
	$J_{1.G}$	kg cm²	0.775	0.54	0.466	0.401	0.387	0.37	0.641	0.615	0.607	0.46	0.415	0.412	0.37	0.368	0.369	0.357
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NLC080

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC080 1- and 2-stage (continued)																				
1.96 ... 2.21	7.14 ... 7.32	0.56 (0.65)	n_{2N}	r/min	375	375	300	300	250	250	250	200	150	150	150	100	100	75	50	30	**1F.2104-5AK..-2..0-Z**
			M_{2N}	Nm	5.3	6.5	9.7	12	15.5	17.1	16	22	29.5	31	33	49.5	56	77	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.8	8.1	10.4	14.9	17.1	21.5	19.2	25.5	32.5	34.5	43.5	54	70	88	50	38	
			M_{2max}	Nm	21	28.5	36	51	58	61	65	87	109	116	145	176	192	176	80	61	
2.73 ... 2.96	9.51 ... 9.68	0.76 (0.84)	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	**1F.2104-6AF..-2..0-Z**
			M_{2N}	Nm	6.8	8.3	12.2	17.8	22	28.5	24	33.5	42	44.5	56	71	91	110	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.1	11.2	14.2	20	23	29	26	35	43.5	46.5	58	73	94	110	50	–	
			M_{2max}	Nm	28.5	38	48	67	77	61	86	115	144	153	192	176	192	176	80	–	
4.47 ... 4.66	14.4 ... 14.6	1.71 (2.55)	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	**1F.2105-4AF..-0..0-Z**
			M_{2N}	Nm	11.5	14	19.3	27	31.5	38	34	48	60	63	81	102	120	110	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.4	18.1	22.5	32	37	38	41	55	69	74	92	110	120	110	50	–	
			M_{2max}	Nm	43	57	72	101	80	61	130	173	176	192	192	176	192	176	80	–	
4.5 ... 4.69	14.4 ... 14.6	1.71 (2.55)	n_{2N}	r/min	375	375	300	250	250	200	200	200	150	150	125	100	75	75	50	–	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	11	12.5	18.3	25	27	35.5	32	32.5	49.5	48	61	79	107	104	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.4	18.2	23	32.5	37	38	41.5	55	70	74	93	110	120	110	50	–	
			M_{2max}	Nm	43	57	72	101	80	61	130	173	176	192	192	176	192	176	80	–	
7.08 ... 7.26	23.2 ... 23.4	2.65 (3.5)	n_{2N}	r/min	375	300	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	**1F.2105-6AF..-0..0-Z**
			M_{2N}	Nm	16.7	24	26.5	37	48	38	47	72	90	95	120	110	120	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21	28.5	35.5	50	50	38	64	85	107	114	120	110	120	110	–	–	
			M_{2max}	Nm	70	93	116	104	80	61	208	192	176	192	192	176	192	176	–	–	
7.18 ... 7.36	25 ... 25.3	5.476 (7.176)	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	75	60	50	37.5	–	–	**1F.2106-3AF..-0..0-Z**
			M_{2N}	Nm	18.7	21	28.5	39.5	39.5	38	54	67	86	85	118	110	120	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21.5	28.5	36	51	50	38	65	87	109	116	120	110	120	110	–	–	
			M_{2max}	Nm	75	101	126	104	80	61	208	192	176	192	192	175	192	176	–	–	
9.37 ... 9.55	31.8 ... 32.2	6.876 (8.476)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	–	–	**1F.2106-4AF..-0..0-Z**
			M_{2N}	Nm	23.5	31.5	34	47	45	38	64	76	98	94	120	110	120	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	28	37.5	47	65	50	38	84	112	110	120	120	110	120	110	–	–	
			M_{2max}	Nm	96	128	160	104	80	61	208	192	176	192	192	176	192	176	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC080 1- and 2-stage																				
0.246 ... 0.53	1.46 ... 1.72	0.2 (0.22)	n_{2N}	r/min	250	300	300	300	250	250	250	200	150	150	150	125	100	75	50	30	**1F.2203-2AG..-0.A0-Z**
			M_{2N}	Nm	0.53	0.82	1.18	1.76	2.35	2.8	2.35	3.5	5.1	5.2	5.9	7.5	10.5	14.4	23	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	0.73	1.28	1.83	2.9	3.45	4.55	3.95	5.6	7.2	7.7	9.9	12.6	16.4	20.5	33.5	38	
			M_{2max}	Nm	4.35	6.1	7.9	11.4	13.1	16.6	14.8	20	25	26.5	33.5	42.5	54	68	80	61	
0.286 ... 0.496	1.54 ... 1.72	0.2 (0.22)	n_{2N}	r/min	–	250	250	250	200	200	200	150	150	125	125	100	75	75	37.5	30	**1F.2203-2AK..-0..0-Z**
			M_{2N}	Nm	–	0.73	1.07	1.61	2.2	2.65	2.25	3.5	3.9	4.75	5.3	7.1	10.4	10.8	22	30	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	–	1.14	1.65	2.65	3.15	4.2	3.65	5.1	6.7	7.2	9.2	11.7	15.3	19.3	31	38	
			M_{2max}	Nm	–	6.1	7.9	11.4	13.1	16.6	14.8	20	25	26.5	33.5	42.5	54	68	80	61	
0.87 ... 1.14	3.34 ... 3.56	0.35 (0.37)	n_{2N}	r/min	375	375	375	300	300	250	300	250	200	200	150	125	100	75	50	30	**1F.2203-4AG..-0.A0-Z**
			M_{2N}	Nm	2.2	3.1	3.9	6	6.7	8.8	6.7	8.9	12	12.3	17.1	21	28	37	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.6	3.75	4.9	7.2	8.4	10.7	9.5	12.9	16.4	17.5	22	27.5	36	45	50	38	
			M_{2max}	Nm	10	13.6	17.2	24.5	28	35	31	42	52	56	70	88	113	142	80	61	

➥ Continued on the next page

Planetary gearbox data																
Gearbox type:		NLC080, 1-stage						NLC080, 2-stage								
1. Order code		C31						C32								
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50	38
$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80	61
$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
$J_{1,G}$	kg cm²	0.775	0.54	0.466	0.401	0.387	0.37	0.641	0.615	0.607	0.46	0.415	0.412	0.37	0.368	0.369	0.357
$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC080 1- and 2-stage (continued)																				
0.83 ... 1.1	3.34 ... 3.56	0.35 (0.37)	n_{2N}	r/min	375	375	300	300	250	250	250	200	200	150	150	125	100	75	50	30	**1F.2203-4AK..-0..0-Z**
			M_{2N}	Nm	1.74	2.3	3.45	4.7	5.8	6.7	5.9	8.1	8.4	11.4	12.3	15.1	20	27.5	42	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.45	3.6	4.7	7	8.1	10.3	9.1	12.5	15.8	16.9	21	26.5	34.5	43.5	50	38	
			M_{2max}	Nm	10	13.6	17.2	24.5	28	35	31	42	52	56	70	88	113	142	80	61	
1.94 ... 2.19	6.65 ... 6.83	1.23 (1.31)	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	**1F.2204-5AF..-2..0-Z**
			M_{2N}	Nm	5	6.3	8.9	12.7	15.2	19.7	16.3	23	29	30.5	39.5	49.5	63	80	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.8	8	10.2	14.7	16.9	21	19	25.5	32	34	43	54	69	87	50	38	
			M_{2max}	Nm	19.9	26.5	33.5	47.5	54	61	60	81	101	108	135	169	192	176	80	61	
1.95 ... 2.2	6.65 ... 6.83	1.23 (1.31)	n_{2N}	r/min	375	375	300	300	250	250	250	200	150	150	150	125	100	75	50	30	**1F.2204-5AK..-2..0-Z**
			M_{2N}	Nm	5.2	6.4	9.2	11.6	14.8	16.2	15.4	20.5	27	28.5	30.5	37.5	52	68	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.8	8	10.3	14.8	17	21.5	19.1	25.5	32	34.5	43	54	70	87	50	38	
			M_{2max}	Nm	19.9	26.5	33.5	47.5	54	61	60	81	101	108	135	169	192	176	80	61	
2.72 ... 2.95	9.02 ... 9.19	1.61 (1.69)	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	**1F.2204-6AF..-2..0-Z**
			M_{2N}	Nm	7.3	8.7	12.9	18.6	22	28.5	23.5	33.5	42	44.5	56	71	91	110	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.1	11.1	14.1	20	23	29	25.5	34.5	43.5	46.5	58	73	94	110	50	–	
			M_{2max}	Nm	27	36	45.5	64	73	61	81	109	136	145	182	176	192	176	80	–	
2.62 ... 2.82	10.3 ... 10.5	3.15 (4.05)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	–	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	6.2	9	11.7	16.9	19.7	25	22	28.5	36.5	38	49.5	59	78	101	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.8	10.7	13.6	19.5	22	28	24.5	33	41.5	44.5	56	70	90	110	50	–	
			M_{2max}	Nm	30.5	41	51	73	80	61	93	124	155	166	192	176	192	176	80	–	
2.67 ... 2.87	10.3 ... 10.5	3.15 (4.05)	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	**1F.2205-2AF..-0..0-Z**
			M_{2N}	Nm	6.7	8.8	11.7	16.6	19.6	25	21	29.5	37.5	39.5	50	63	81	103	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8	10.9	13.9	19.8	22.5	28.5	25	33.5	42.5	45	57	71	91	110	50	–	
			M_{2max}	Nm	30.5	41	51	73	80	61	93	124	155	166	192	176	192	176	80	–	
2.64 ... 2.85	10.3 ... 10.5	3.15 (4.05)	n_{2N}	r/min	375	375	300	250	250	200	250	200	150	150	125	100	75	60	50	–	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	6.5	7.8	11.2	15.8	17.6	22.5	17.4	23.5	32	33.5	41.5	52	69	87	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.9	10.8	13.7	19.6	22.5	28	25	33.5	42	45	56	70	90	110	50	–	
			M_{2max}	Nm	30.5	41	51	73	80	61	93	124	155	166	192	176	192	176	80	–	
4.75 ... 4.94	17.4 ... 17.5	5.1 (6)	n_{2N}	r/min	375	300	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	**1F.2205-4AF..-0..0-Z**
			M_{2N}	Nm	11	16.2	18.3	25.5	32.5	38	34	49	62	65	83	104	120	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.2	19.2	24	34	39	38	43.5	58	73	77	97	110	120	110	–	–	
			M_{2max}	Nm	52	69	87	104	80	61	156	192	176	192	192	176	192	176	–	–	
4.98 ... 5.17	17.3 ... 17.5	8.676 (10.276)	n_{2N}	r/min	300	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	–	**1FT2206-2AC..-0..0-Z**
			M_{2N}	Nm	11.8	16.2	21	30	35	38	39.5	48.5	63	64	87	96	120	110	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.9	20	25	35.5	41	38	45.5	61	76	81	102	110	120	110	50	–	
			M_{2max}	Nm	52	69	87	104	80	61	155	192	176	192	192	176	192	176	80	–	
4.9 ... 5.09	17.3 ... 17.5	8.676 (10.276)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	–	–	**1F.2206-2AF..-0..0-Z**
			M_{2N}	Nm	10.9	16.2	20.5	29	31	38	37.5	49	62	64	83	104	120	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.7	19.8	25	35	40.5	38	45	60	75	80	100	110	120	110	–	–	
			M_{2max}	Nm	52	69	87	104	80	61	155	192	176	192	192	176	192	176	–	–	

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Planetary gearbox data																
Gearbox type:			NLC080, 1-stage						NLC080, 2-stage							
1. Order code			C31						C32							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50	38
	$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
	$J_{1,G}$	kg cm²	0.775	0.54	0.466	0.401	0.387	0.37	0.641	0.615	0.607	0.46	0.415	0.412	0.37	0.368	0.369	0.357
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NLC080

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC080 1- and 2-stage (continued)																					
4.76 ... 4.95	17.3 ... 17.5	8.676 (10.276)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	60	50	–	–	1FT2206-2AH..-0..0-Z
			M_{2N}	Nm	12.2	16.5	18.6	26	25	38	36	47.5	59	60	80	100	101	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.2	19.2	24	34	39	38	43.5	58	73	78	97	110	120	110	–	–	
			M_{2max}	Nm	52	69	87	104	80	61	155	192	176	192	192	176	192	176	–	–	
7.23 ... 7.41	26 ... 26.3	12.38 (13.976)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	–	–	1FT2206-3AB..-0..0-Z
			M_{2N}	Nm	19	25.5	32.5	46.5	50	38	53	71	98	104	120	110	120	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21.5	29	36.5	51	50	38	65	87	109	117	120	110	120	110	–	–	
			M_{2max}	Nm	78	105	131	104	80	61	208	192	176	192	192	176	192	176	–	–	
7.09 ... 7.28	26 ... 26.3	12.38 (13.976)	n_{2N}	r/min	300	250	200	200	150	150	150	100	100	100	75	60	50	37.5	–	–	1FT2206-3AF..-0..0-Z
			M_{2N}	Nm	17.1	23	30	33.5	47.5	38	48	70	75	72	104	110	120	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21	28.5	35.5	50	50	38	64	85	107	114	120	110	120	110	–	–	
			M_{2max}	Nm	78	105	131	104	80	61	208	192	176	192	192	176	192	176	–	–	
9.93 ... 10.1	36.7 ... 37.1	15.98 (17.676)	n_{2N}	r/min	250	200	200	125	125	100	100	100	75	75	50	50	37.5	25	–	–	1FT2206-4AC..-0..0-Z
			M_{2N}	Nm	22	30.5	31.5	56	50	38	73	74	103	101	120	110	120	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29.5	39.5	50	65	50	38	89	119	110	120	120	110	120	110	–	–	
			M_{2max}	Nm	111	148	176	104	80	61	208	192	176	192	192	176	192	176	–	–	
9.84 ... 10	34.7 ... 35.2	15.976 (17.676)	n_{2N}	r/min	300	250	250	200	200	150	150	100	100	100	75	60	50	37.5	–	–	1F.2206-4AF..-0..0-Z
			M_{2N}	Nm	24.5	33	35	48	46	38	65	100	100	96	120	110	120	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29.5	39.5	49.5	65	50	38	88	118	110	120	120	110	120	110	–	–	
			M_{2max}	Nm	105	140	175	104	79	61	208	192	176	192	191	176	192	176	–	–	
9.42 ... 9.6	34.7 ... 35.2	15.976 (17.676)	n_{2N}	r/min	300	250	200	150	150	150	125	100	75	75	75	60	60	50	–	–	1FT2206-4AH..-0..0-Z
			M_{2N}	Nm	20	27	37	54	50	38	67	86	110	116	112	110	115	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	28	37.5	47.5	65	50	38	84	113	110	120	120	110	120	110	–	–	
			M_{2max}	Nm	105	140	175	104	79	61	208	192	176	192	191	176	192	176	–	–	

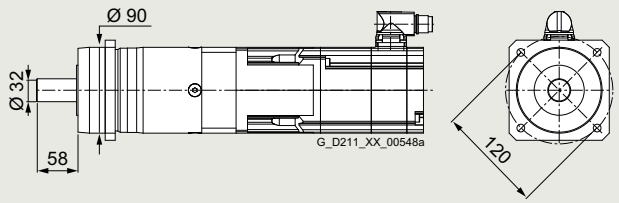
Planetary gearbox data																	
Gearbox type:			NLC080, 1-stage						NLC080, 2-stage								
1. Order code			C31						C32								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50	38
	$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
	$J_{1,G}$	kg cm²	0.775	0.54	0.466	0.401	0.387	0.37	0.641	0.615	0.607	0.46	0.415	0.412	0.37	0.368	0.369	0.357
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NLC120



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	6000 N at 100 r/min
Average axial force for 20000 h	$F_{A,eq}$	8000 N at 100 r/min
Average radial force for 30000 h	$F_{R,eq}$	5400 N at 100 r/min
Average axial force for 30000 h	$F_{A,eq}$	7000 N at 100 r/min
Maximum radial force	$F_{R,max}$	6000 N
Maximum axial force	$F_{A,max}$	8000 N

Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC120 1- and 2-stage																					
0.176	1.48	0.093	n_{2N}	r/min	–	150	200	200	200	200	150	125	100	100	100	75	75	60	50	30	1F.2103-2AG..-0.A0-Z
...	...	(0.112)	M_{2N}	Nm	–	0.475	0.7	1.37	1.64	2.05	1.94	2.85	4.1	4.35	5.4	7.7	9.6	12.6	16.2	29.5	■■■ + ■■■ + . . .
0.468	1.75		$M_{2,0}$	Nm	–	0.7	1.19	2.15	2.65	3.6	3.1	4.55	6	6.4	8.4	10.8	14.1	18	29.5	46.5	
			M_{2max}	Nm	–	5.9	7.7	11.3	13	16.6	14.7	20	25	27	34	42.5	55	69	111	152	
0.211	1.55	0.093	n_{2N}	r/min	–	–	200	200	200	200	150	125	100	100	100	100	75	75	50	25	1F.2103-2AH..-0..0-Z
...	...	(0.112)	M_{2N}	Nm	–	–	0.7	1.38	1.65	2.1	1.92	2.85	4.05	4.3	5.4	5.8	9.6	10.2	16.5	33.5	■■■ + ■■■ + . . .
0.441	1.75		$M_{2,0}$	Nm	–	–	1.05	1.97	2.4	3.35	2.85	4.2	5.5	6	7.8	10.1	13.3	16.9	27.5	44	
			M_{2max}	Nm	–	–	7.7	11.3	13	16.6	14.7	20	25	27	34	42.5	55	69	111	152	
0.681	3.45	0.139	n_{2N}	r/min	300	250	250	200	200	200	150	150	125	100	100	75	75	60	37.5	25	1F.2103-4AG..-0.A0-Z
...	...	(0.158)	M_{2N}	Nm	1.51	2.65	3.35	5.7	6.2	6.9	7.7	9	11.8	14.6	17.5	23.5	27.5	35.5	59	94	■■■ + ■■■ + . . .
1.07	3.78		$M_{2,0}$	Nm	2	3.1	4.2	6.4	7.5	9.7	8.5	11.7	15	16	20	25.5	33	41.5	67	95	
			M_{2max}	Nm	10.3	14.2	18	25.5	29.5	37	33	44.5	55	59	74	93	120	150	192	152	
0.666	3.45	0.139	n_{2N}	r/min	300	250	250	200	200	200	200	150	125	125	100	100	75	60	37.5	25	1F.2103-4AH..-0..0-Z
...	...	(0.158)	M_{2N}	Nm	1.18	2.15	2.85	4.8	5.4	6	4.9	7.8	10.1	10.6	14.6	15	23.5	30	49.5	78	■■■ + ■■■ + . . .
1.05	3.78		$M_{2,0}$	Nm	1.99	3.05	4.15	6.3	7.3	9.5	8.3	11.5	14.7	15.8	20	25	32.5	41	66	95	
			M_{2max}	Nm	10.3	14.2	18	25.5	29.5	37	33	44.5	55	59	74	93	120	150	192	152	
0.695	3.16	0.35	n_{2N}	r/min	375	300	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2104-4AF..-0..0-Z
...	...	(0.43)	M_{2N}	Nm	1.51	2.6	3.5	5.5	7	9.3	7	10.8	13.8	14.8	19.3	24.5	32	40.5	65	95	■■■ + ■■■ + . . .
1.08	3.49		$M_{2,0}$	Nm	2.05	3.15	4.3	6.5	7.6	9.8	8.6	11.9	15.2	16.3	20.5	26	33.5	42	68	95	
			M_{2max}	Nm	9.4	13	16.5	23.5	27	34	30.5	41	51	55	69	86	111	139	192	152	
0.688	3.26	0.35	n_{2N}	r/min	375	300	300	250	250	200	200	150	150	150	125	100	100	75	50	30	1F.2104-4AK..-0..0-Z
...	...	(0.43)	M_{2N}	Nm	1.69	2.75	3.8	5.9	7	9.1	7.5	10.5	12.7	12.7	18.2	23.5	24.5	37.5	57	95	■■■ + ■■■ + . . .
1.07	3.59		$M_{2,0}$	Nm	2.05	3.15	4.25	6.4	7.5	9.7	8.5	11.8	15.1	16.1	20.5	25.5	33.5	42	68	95	
			M_{2max}	Nm	9.7	13.4	17	24	28	35	31	42	53	56	71	89	114	143	192	152	
1.8	6.86	0.56	n_{2N}	r/min	300	300	250	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2104-5AF..-0..0-Z
...	...	(0.65)	M_{2N}	Nm	5.1	6.6	9.3	11.8	15.7	20	15.2	23.5	30	32	40.5	51	66	83	120	95	■■■ + ■■■ + . . .
2.16	7.13		$M_{2,0}$	Nm	5.3	7.6	9.8	14.2	16.4	20.5	18.4	25	31.5	33.5	42	53	68	85	120	95	
			M_{2max}	Nm	20.5	27.5	35	49.5	56	71	63	84	106	113	141	177	225	280	192	152	

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Planetary gearbox data																	
Gearbox type:			NLC120, 1-stage						NLC120, 2-stage								
1. Order code			C41						C42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$	kg cm²	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NLC120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC120 1- and 2-stage (continued)																				
1.78 ... 2.15	6.96 ... 7.23	0.56 (0.65)	n_{2N}	r/min	300	300	250	250	200	200	200	150	125	125	100	100	75	60	37.5	30	**1F.2104-5AK..-0..0-Z**
			M_{2N}	Nm	5	6.5	9.2	11.5	15.5	17.2	14.9	21.5	27.5	28	39	38.5	60	76	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.3	7.5	9.7	14.1	16.3	20.5	18.3	24.5	31	33	42	52	68	85	120	95	
			M_{2max}	Nm	20.5	28	35.5	50	57	72	64	86	107	114	143	179	230	285	192	152	
2.55 ... 2.9	9.33 ... 9.59	0.76 (0.84)	n_{2N}	r/min	300	300	250	250	200	150	200	125	100	100	75	60	50	37.5	25	15	**1F.2104-6AF..-0..0-Z**
			M_{2N}	Nm	6.8	8.4	11.8	14.6	19.5	27	18.6	32	41	43	55	69	90	113	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.6	10.6	13.5	19.4	22	28	25	33.5	42.5	45.5	57	71	92	115	120	95	
			M_{2max}	Nm	27.5	37.5	47	66	76	95	85	114	142	152	190	235	305	368	192	152	
4.29 ... 4.6	14.3 ... 14.5	1.71 (2.55)	n_{2N}	r/min	375	300	250	250	200	150	200	125	100	100	75	60	50	37.5	25	15	**1F.2105-4AF..-0..0-Z**
			M_{2N}	Nm	9.8	15	20	23.5	32	42.5	29.5	49	62	65	84	106	136	173	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	12.8	17.5	22	31.5	36	45.5	40.5	54	68	72	91	114	146	183	120	95	
			M_{2max}	Nm	42.5	57	71	101	115	145	129	172	215	230	285	355	416	368	192	152	
4.32 ... 4.63	14.3 ... 14.5	1.71 (2.55)	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	100	75	60	50	37.5	25	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	11.5	13.7	18.9	27.5	29	40.5	35.5	47	59	62	65	91	123	149	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	12.9	17.6	22	31.5	36.5	45.5	40.5	54	68	73	91	115	147	184	120	95	
			M_{2max}	Nm	42.5	57	71	101	115	145	129	172	215	230	285	355	416	368	192	152	
7.26 ... 7.52	23.1 ... 23.4	2.65 (3.5)	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	–	**1F.2105-6AF..-0..0-Z**
			M_{2N}	Nm	17.6	20.5	27.5	40	42	59	53	67	87	88	122	154	195	230	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21.5	29	37	52	59	75	66	89	112	119	149	187	240	230	120	–	
			M_{2max}	Nm	69	92	116	163	186	152	205	275	345	365	416	368	416	368	192	–	
7.64 ... 7.9	25 ... 25.3	4.6 (6.3)	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	–	**1F.2106-3AF..-0..0-Z**
			M_{2N}	Nm	18.6	21.5	29	42	43.5	62	56	70	90	91	126	159	200	230	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30.5	38.5	54	62	78	70	93	117	125	156	195	250	230	120	–	
			M_{2max}	Nm	75	100	126	176	192	152	225	300	368	400	416	368	416	368	192	–	
10 ... 10.3	31.8 ... 32.2	6 (7.6)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	25	–	**1F.2106-4AF..-0..0-Z**
			M_{2N}	Nm	23.5	32.5	36	51	52	75	67	83	107	106	149	189	235	230	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30	40	50	71	81	95	91	121	152	162	200	230	260	230	120	–	
			M_{2max}	Nm	96	128	160	216	192	152	285	380	368	416	416	368	416	368	192	–	
14.3 ... 14.6	43.9 ... 44.5	8.7 (10.4)	n_{2N}	r/min	300	250	250	200	150	150	150	100	100	75	75	60	50	37.5	–	–	**1F.2106-6AF..-0..0-Z**
			M_{2N}	Nm	31.5	42.5	46.5	65	88	95	84	128	131	174	183	230	260	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	43	57	72	101	116	95	129	172	215	230	260	230	260	230	–	–	
			M_{2max}	Nm	133	177	220	216	192	152	336	416	368	416	416	365	416	368	–	–	
20.8 ... 21.1	84.1 ... 85.3	20.6 (24.7)	n_{2N}	r/min	250	200	200	150	125	100	100	75	60	60	50	50	37.5	25	–	–	**1FT2108-4AC..-0..0-Z**
			M_{2N}	Nm	42	56	59	86	107	95	127	172	215	215	255	230	260	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	62	84	105	135	120	95	187	250	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	–	
25.6 ... 26	102 ... 103	24.0 (28.0)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	–	–	**1FT2108-5AB..-0..0-Z**
			M_{2N}	Nm	52	70	95	135	120	95	152	205	230	260	260	230	260	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	77	103	129	135	120	95	210	260	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	–	

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Planetary gearbox data																	
Gearbox type:			NLC120, 1-stage						NLC120, 2-stage								
1. Order code			C41						C42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$	kg cm²	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378
	$\varphi_{2,G}$	'	7						9									

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC120 1- and 2-stage (continued)																				
25.4 ... 25.8	102 ... 103	24.0 (28.0)	n_{2N}	r/min	250	200	150	125	125	100	100	75	75	60	50	50	37.5	25	–	–	1FT2108-5AC..-0.B0-Z
			M_{2N}	Nm	47	63	87	114	117	95	140	188	183	235	260	230	260	230	–	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	76	102	128	135	120	95	210	260	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC120 1- and 2-stage																				
0.169 ... 0.462	1.39 ... 1.66	0.2 (0.22)	n_{2N}	r/min	–	250	200	200	200	150	150	125	100	100	100	75	75	60	37.5	25	1F.2203-2AG..-0.A0-Z
			M_{2N}	Nm	–	0.325	0.84	1.67	1.93	3.05	2.25	3.35	4.55	4.95	6.1	8.6	10.5	13.7	23	37	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	–	0.67	1.16	2.1	2.6	3.55	3.05	4.45	5.9	6.3	8.2	10.6	13.9	17.7	29	46	
			M_{2max}	Nm	–	5.5	7.2	10.6	12.3	15.7	13.8	18.8	23.5	25.5	32	40.5	52	65	105	152	
0.198 ... 0.428	1.45 ... 1.66	0.2 (0.22)	n_{2N}	r/min	–	–	200	200	200	150	150	125	100	100	100	75	60	50	37.5	25	1F.2203-2AK..-0..0-Z
			M_{2N}	Nm	–	–	0.68	1.29	1.48	2.6	1.88	2.75	3.95	4.15	4.85	7.2	10.6	13.4	19.2	30.5	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	–	–	0.98	1.88	2.3	3.2	2.7	4.05	5.3	5.8	7.5	9.7	12.8	16.3	26.5	42.5	
			M_{2max}	Nm	–	–	7.2	10.6	12.3	15.7	13.8	18.8	23.5	25.5	32	40.5	52	65	105	152	
0.689 ... 1.07	3.16 ... 3.49	0.35 (0.37)	n_{2N}	r/min	375	300	300	250	250	200	200	150	150	125	125	100	75	75	50	30	1F.2203-4AG..-0.A0-Z
			M_{2N}	Nm	1.51	2.75	3.7	5.9	6.3	9.1	7.5	10.5	11.6	14.4	17.1	22	31	34.5	52	93	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.05	3.15	4.25	6.4	7.5	9.7	8.6	11.8	15.1	16.2	20.5	25.5	33.5	42	68	95	
			M_{2max}	Nm	9.4	13	16.5	23.5	27	34	30.5	41	51	55	69	86	111	139	192	152	
0.649 ... 1.03	3.16 ... 3.49	0.35 (0.37)	n_{2N}	r/min	300	250	250	200	200	200	200	150	125	125	100	75	75	60	37.5	25	1F.2203-4AK..-0..0-Z
			M_{2N}	Nm	1.58	2.6	3.45	5.5	6.2	6.7	5.7	8.8	11.4	12	16.3	21.5	26	33	54	84	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	1.94	3	4.05	6.1	7.2	9.3	8.2	11.3	14.5	15.5	19.7	24.5	32	40.5	65	95	
			M_{2max}	Nm	9.4	13	16.5	23.5	27	34	30.5	41	51	55	69	86	111	139	192	152	
1.76 ... 2.12	6.47 ... 6.74	1.23 (1.31)	n_{2N}	r/min	300	300	250	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2204-5AF..-0..0-Z
			M_{2N}	Nm	4.95	6.3	9	11	15.1	19.7	14.3	23	29	31	39.5	50	65	81	120	95	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	5.2	7.4	9.5	13.9	16	20	18	24.5	30.5	33	41.5	52	67	84	120	95	
			M_{2max}	Nm	19.3	26	33	46.5	53	67	59	80	100	107	134	167	215	265	192	152	
1.77 ... 2.14	6.47 ... 6.74	1.23 (1.31)	n_{2N}	r/min	300	300	250	250	200	200	200	150	125	125	100	75	75	60	37.5	30	1F.2204-5AK..-0..0-Z
			M_{2N}	Nm	5	6.5	9.1	11.3	15.4	16.7	14.6	21.5	27.5	27.5	38.5	50	58	74	120	95	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	5.3	7.4	9.6	14	16.2	20.5	18.2	24.5	31	33	41.5	52	67	84	120	95	
			M_{2max}	Nm	19.3	26	33	46.5	53	67	59	80	100	107	134	167	215	265	192	152	
2.54 ... 2.88	8.84 ... 9.09	1.61 (1.69)	n_{2N}	r/min	300	300	250	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2204-6AF..-0..0-Z
			M_{2N}	Nm	7.2	9.1	12.8	15.3	20.5	27.5	19.4	32	40.5	43.5	55	69	89	112	120	95	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	7.6	10.5	13.4	19.3	22	28	25	33.5	42	45	56	71	91	114	120	95	
			M_{2max}	Nm	26.5	35.5	44.5	63	72	90	81	108	135	144	180	225	285	360	192	152	
2.76 ... 3.09	10.1 ... 10.4	3.15 (4.05)	n_{2N}	r/min	300	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	10	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	6.3	9	12	17.6	20.5	26	23	29.5	38	40	53	62	84	109	120	95	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	8.2	11.4	14.6	20.5	24	30	26.5	36	45	48.5	60	76	98	122	120	95	
			M_{2max}	Nm	30	40.5	51	72	82	103	92	123	154	164	205	255	325	368	192	152	
2.79 ... 3.12	10.1 ... 10.4	3.15 (4.05)	n_{2N}	r/min	375	300	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2205-2AF..-0..0-Z
			M_{2N}	Nm	5.7	9	10.3	15.1	19.7	25.5	19.3	30	38	40	52	66	85	108	120	94	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	8.3	11.5	14.7	21	24	30.5	27	36.5	45.5	49	61	77	99	124	120	94	
			M_{2max}	Nm	30	40.5	51	72	82	103	92	123	154	164	205	255	325	368	192	152	

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Planetary gearbox data																	
Gearbox type:		NLC120, 1-stage						NLC120, 2-stage									
1. Order code		C41						C42									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$ Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95
	$M_{2max,G}$ Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152
	$M_{2Em.Off}$ Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$ kg cm²	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378
	$\varphi_{2,G}$ '	7						9									

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NLC120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC120 1- and 2-stage (continued)																				
2.73 ... 3.06	10.1 ... 10.4	3.15 (4.05)	n_{2N}	r/min	300	300	250	200	200	150	200	150	125	100	100	75	60	50	37.5	25	1FT2205-2AH..-0..0-Z
			M_{2N}	Nm	6.5	8.1	11.4	16.8	18.2	24.5	16.6	25	31	38.5	43.5	59	77	96	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.1	11.3	14.4	20.5	23.5	30	26.5	35.5	45	48	60	75	97	121	119	95	
			M_{2max}	Nm	30	40.5	51	72	82	103	92	123	154	164	205	255	325	368	192	152	
5.01 ... 5.28	17.2 ... 17.5	5.1 (6)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	25	15	1F.2205-4AF..-0..0-Z
			M_{2N}	Nm	11.4	16	18.4	27	28	40.5	37	47	61	62	86	109	139	178	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15	20	25.5	36.5	42	52	46.5	62	78	83	104	131	168	210	120	95	
			M_{2max}	Nm	51	69	86	121	139	152	155	205	255	275	345	368	416	368	192	152	
5.07 ... 5.37	17.2 ... 17.5	7.8 (9.4)	n_{2N}	r/min	300	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	10	1FT2206-2AC..-0..0-Z
			M_{2N}	Nm	10.7	15	20.5	31	37.5	48	43	50	69	69	96	106	144	195	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.2	20.5	26	37	42	53	47.5	63	79	85	106	133	171	210	120	95	
			M_{2max}	Nm	51	69	86	121	139	152	155	205	255	275	345	368	416	368	192	152	
5.18 ... 5.45	17.2 ... 17.5	7.8 (9.4)	n_{2N}	r/min	375	300	250	200	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2206-2AF..-0..0-Z
			M_{2N}	Nm	10.9	16.3	21.5	30.5	33.5	44.5	30	51	65	68	88	111	142	181	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.5	21	26.5	37.5	43	54	48	64	81	86	108	135	173	215	120	95	
			M_{2max}	Nm	51	69	86	121	139	152	155	205	255	275	345	368	416	368	192	152	
5.01 ... 5.28	17.2 ... 17.5	7.8 (9.4)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	50	37.5	25	1FT2206-2AH..-0..0-Z
			M_{2N}	Nm	11.8	16.4	18.4	26.5	27	39.5	37	46.5	60	61	85	108	137	136	119	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15	20	25.5	36.5	42	52	46.5	62	78	83	105	131	168	210	119	95	
			M_{2max}	Nm	51	69	86	121	139	152	155	205	255	275	345	368	416	368	192	152	
7.78 ... 8.04	26 ... 26.3	11.5 (13.1)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	12.5	–	1FT2206-3AB..-0..0-Z
			M_{2N}	Nm	19.1	26.5	35	50	56	72	57	76	107	112	143	179	225	230	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	23	31	39.5	55	64	80	71	95	119	127	159	198	255	230	120	–	
			M_{2max}	Nm	78	104	131	183	192	152	230	310	368	416	416	368	416	368	192	–	
7.64 ... 7.91	26 ... 26.3	11.5 (13.1)	n_{2N}	r/min	300	250	250	200	150	150	150	125	100	100	75	60	50	37.5	25	–	1FT2206-3AF..-0..0-Z
			M_{2N}	Nm	16.1	22	24	35	48	52	48	59	77	77	109	138	174	230	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30.5	38.5	54	63	79	70	93	117	125	156	195	250	230	120	–	
			M_{2max}	Nm	78	104	131	183	192	152	230	310	368	416	416	368	416	368	192	–	
10.8 ... 11	36.6 ... 37.1	15.1 (16.8)	n_{2N}	r/min	250	200	200	150	125	100	100	75	75	75	50	50	37.5	25	20	–	1FT2206-4AC..-0..0-Z
			M_{2N}	Nm	20	27.5	29.5	44	55	71	68	93	97	96	149	150	210	230	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	32	43	54	76	87	95	98	130	163	174	215	230	260	230	120	–	
			M_{2max}	Nm	110	148	185	216	192	152	330	416	368	416	416	368	416	368	192	–	
10.5 ... 10.7	34.7 ... 35.2	15.1 (16.8)	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	–	1F.2206-4AF..-0..0-Z
			M_{2N}	Nm	24	27.5	36.5	52	53	76	68	84	109	108	152	191	240	230	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31	42	53	74	85	95	95	127	159	169	210	230	260	230	120	–	
			M_{2max}	Nm	104	140	175	216	192	152	310	416	368	416	416	368	416	368	192	–	
10 ... 10.3	34.7 ... 35.2	15.1 (16.8)	n_{2N}	r/min	300	250	200	150	150	125	125	100	75	75	75	60	50	37.5	37.5	–	1FT2206-4AH..-0..0-Z
			M_{2N}	Nm	19.4	26.5	36	52	56	70	66	85	114	117	121	153	191	230	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30	40	50	71	81	95	90	121	152	162	200	230	260	230	120	–	
			M_{2max}	Nm	104	140	175	216	192	152	310	416	368	416	416	368	416	368	192	–	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:			NLC120, 1-stage						NLC120, 2-stage								
1. Order code			C41						C42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$	kg cm²	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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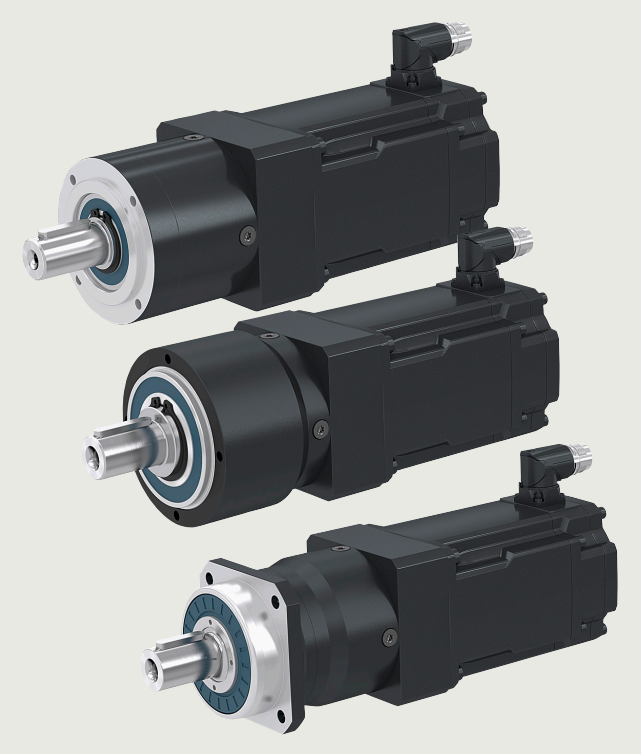
Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC120 1- and 2-stage (continued)																				
10.2 ... 10.4	36.6 ... 37.1	24.86 (28.16)	n_{2N}	r/min	250	250	200	150	150	125	125	100	75	75	60	50	37.5	37.5	25	–	1FT2208-2AF..-0..0-Z
			M_{2N}	Nm	25	27.5	38	56	57	72	68	87	119	120	154	186	255	225	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30.5	41	51	72	83	95	92	123	154	165	205	230	255	225	119	–	
			M_{2max}	Nm	110	147	184	216	192	152	330	416	368	416	416	368	416	368	192	–	
16.3 ... 16.5	49.2 ... 49.9	31.96 (34.96)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	–	–	1FT2208-3AB..-0..0-Z
			M_{2N}	Nm	28.5	39.5	55	85	91	95	93	127	183	188	245	230	260	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	48.5	65	81	115	120	95	147	196	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	149	199	245	216	192	152	336	416	368	416	416	368	416	368	–	–	
15.3 ... 15.5	49.2 ... 49.9	31.96 (35.36)	n_{2N}	r/min	300	250	200	150	125	100	100	100	75	75	50	50	37.5	25	–	–	1F.2208-3AC..-0..0-Z
			M_{2N}	Nm	28.5	38	51	75	91	95	108	113	154	154	230	230	260	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	45.5	61	76	108	120	95	137	183	225	240	260	230	260	230	–	–	
			M_{2max}	Nm	149	199	245	216	192	152	336	416	368	416	416	368	416	368	–	–	
15.2 ... 15.4	49.2 ... 49.9	31.96 (35.36)	n_{2N}	r/min	250	200	200	150	125	125	125	100	75	75	60	50	50	37.5	–	–	1FT2208-3AF..-0..0-Z
			M_{2N}	Nm	33	45	48.5	70	86	89	84	106	146	145	186	220	197	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	45.5	61	76	107	120	95	136	182	225	240	260	230	260	230	–	–	
			M_{2max}	Nm	149	199	245	216	192	152	336	416	368	416	416	368	416	368	–	–	
19.6 ... 20.1	63.7 ... 64.6	41.16 (46.76)	n_{2N}	r/min	200	150	125	100	100	75	75	60	50	50	37.5	30	25	20	–	–	1FT2208-4AB..-0..0-Z
			M_{2N}	Nm	35	50	63	85	86	95	117	149	182	182	245	230	260	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	59	79	99	135	120	95	176	235	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	–	
19 ... 19.3	63.7 ... 64.6	41.16 (46.76)	n_{2N}	r/min	250	200	200	150	125	100	100	75	75	60	50	50	37.5	25	–	–	1F.2208-4AC..-0..0-Z
			M_{2N}	Nm	40.5	55	59	85	105	95	124	168	170	210	255	230	260	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	57	76	95	134	120	95	170	225	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	–	
18.3 ... 18.5	63.7 ... 64.6	41.16 (46.76)	n_{2N}	r/min	250	200	200	150	125	125	100	75	75	60	50	50	50	37.5	–	–	1FT2208-4AF..-0..0-Z
			M_{2N}	Nm	41	55	59	85	105	95	125	169	170	215	255	230	205	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	54	73	92	129	120	95	164	215	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	415	368	416	368	–	–	
23 ... 23.3	77.3 ... 78.4	50.46 (55.96)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	–	–	1FT2208-5AB..-0..0-Z
			M_{2N}	Nm	45.5	62	85	129	120	95	137	184	230	260	260	230	260	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	69	92	116	135	120	95	205	260	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	–	
22.7 ... 23.1	77.3 ... 78.4	50.46 (55.96)	n_{2N}	r/min	250	200	200	125	125	100	100	75	60	60	50	50	37.5	25	–	–	1F.2208-5AC..-0..0-Z
			M_{2N}	Nm	46	62	63	111	114	95	136	183	225	230	260	230	260	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	68	91	115	135	120	95	205	260	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	415	416	368	416	368	–	–	

Planetary gearbox data																		
Gearbox type:		**NLC120, 1-stage**						**NLC120, 2-stage**										
1. Order code		**C41**						**C42**										
i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**	**100**	
2. Order code		**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**	**R00**	
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95	
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152	
$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480	
$J_{1,G}$	kg cm²	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378	
$\varphi_{2,G}$	'	7						9										

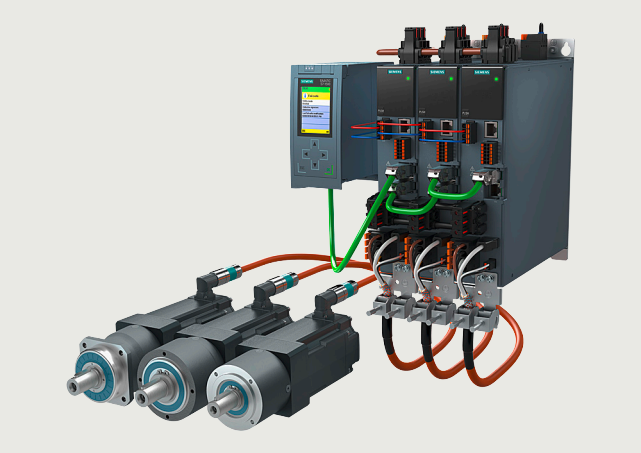
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Selection and ordering data



SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors with economy gear units



Example: SINAMICS S210 servo converter with SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

The following pages show the permissible combinations of **servo motors for 400 V 3 AC** converters

and coaxial economy planetary geared motors **NRB, NRK and NLC** geared motors.

They show the most important component data of the motor and gearbox as well as the rating of the system geared motor.

The rated operating points of the geared motors are adapted to the converter supply voltage.

More information on selection is provided in the section "Information on Selection".

Economy gearboxes have straight gearing, are grease-lubricated and have a low torsional backlash.

NRB

NRB is the lightest gearbox with the highest power density. Thanks to its low-friction bearing design it is suitable for high speeds and generates very little heat.

NRK

The NRK series gearbox is suitable for higher radial and axial forces due to the large output bearing. This gearbox is also suitable for higher speeds thanks to low internal friction.

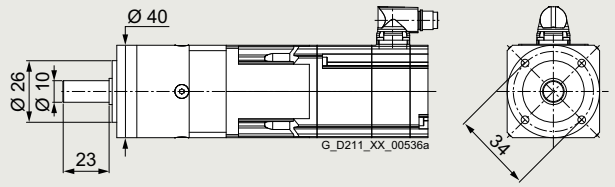
NLC

Thanks to the preloaded tapered roller bearing, the NLC gearbox has a high degree of stiffness and is perfectly suited for high radial and axial loads. The IP65 seal provides protection against dust and water.

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Selection and ordering data

NRB040



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	200 N
Average axial force for 20000 h	$F_{A,eq}$	200 N
Average radial force for 30000 h	$F_{R,eq}$	160 N
Average axial force for 30000 h	$F_{A,eq}$	160 N
Maximum radial force	$F_{R,max}$	200 N
Maximum axial force	$F_{A,max}$	240 N

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB040 1- and 2-stage																			
0.452	1.83	0.1396	n_{2N}	r/min	1000	750	600	375	375	300	375	300	200	200	150	125	100	75	60	1F.2103-2AH..-2..0-Z
...	...	(0.1586)	M_{2N}	Nm	0.86	1.21	1.59	2.45	2.65	3.35	2.65	3.2	4.8	4.9	6.4	7.9	10	13	7.5	■■■ + ■■■ + . . .
0.482	1.89		$M_{2.0}$	Nm	1.43	1.91	2.35	3.35	3.8	4.8	4.2	5.6	7	7.4	9.3	11.6	14.9	18	7.5	
			M_{2max}	Nm	5.6	7.5	9.4	13.2	10	8	16.8	22	28	29.5	32	29	32	29	12	
0.881	3.85	0.1856	n_{2N}	r/min	750	600	600	375	375	375	300	250	200	200	150	125	100	100	–	1F.2103-4AH..-2..0-Z
...	...	(0.2046)	M_{2N}	Nm	2.05	2.65	2.75	4.55	4.6	4	5.9	7	8.8	8.6	11.9	14.2	17.9	14.6	–	■■■ + ■■■ + . . .
0.933	3.96		$M_{2.0}$	Nm	2.75	3.7	4.65	6.5	6	5	8.1	10.8	13.6	14.5	18.1	18	20	18	–	
			M_{2max}	Nm	11.8	15.8	19.7	13.5	10	8	26	32	29	32	32	29	32	29	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB040 1- and 2-stage																			
0.493	1.74	0.2466	n_{2N}	r/min	750	600	500	375	300	250	300	200	150	150	125	100	75	60	50	1F.2203-2AK..-2..0-Z
...	...	(0.2666)	M_{2N}	Nm	0.93	1.2	1.47	2	2.5	3.05	2.35	3.55	4.7	4.75	5.7	7.2	9.6	12.1	7.5	■■■ + ■■■ + . . .
0.527	1.79		$M_{2.0}$	Nm	1.56	2.05	2.6	3.65	4.2	5	4.6	6.1	7.6	8.1	10.2	12.7	16.3	18	7.5	
			M_{2max}	Nm	5.3	7.1	8.9	12.5	10	8	15.9	21	26.5	28	32	29	32	29	12	
1	3.56	0.3966	n_{2N}	r/min	750	500	500	300	300	300	300	200	150	150	125	100	75	75	–	1F.2203-4AK..-2..0-Z
...	...	(0.4166)	M_{2N}	Nm	2.05	3.15	3.15	5.4	5.5	4.75	5.5	8.4	11	11.2	13.7	17.1	20	18	–	■■■ + ■■■ + . . .
1.06	3.67		$M_{2.0}$	Nm	3.15	4.2	5.3	7.4	6	5	9.3	12.4	15.5	16.5	20	18	20	18	–	
			M_{2max}	Nm	10.9	14.6	18.3	13.5	10	8	26	32	29	32	32	29	32	29	–	

Planetary gearbox data																
Gearbox type:			NRB040, 1-stage						NRB040, 2-stage							
1. Order code			A11						A12							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	11	15	14	8.5	6	5	16.5	20	18	20	20	18	20	18	7.5
	$M_{2max,G}$	Nm	17.5	24	22	13.5	10	8	26	32	29	32	32	29	32	29	12
	$M_{2Em.Off}$	Nm	22.5	30	36	26	27	27	33	40	36	40	40	36	40	36	27
	$J_{1,G}$	kg cm²	0.027	0.021	0.019	0.015	0.015	0.014	0.026	0.025	0.025	0.02	0.018	0.018	0.015	0.015	0.015
	$\varphi_{2,G}$	'	15						19								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB040

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox								Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB040 3-stage											
0.452 ... 0.482	1.83 ... 1.89	0.1396 (0.1586)	n_{2N}	r/min	60	50	37.5	37.5	25	20	15	1F.2103-2AH..-2..0-Z
			M_{2N}	Nm	16.4	19.3	20	17.2	20	18	20	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	20	20	20	18	20	18	20	
			M_{2max}	Nm	32	32	32	29	32	29	32	
0.881 ... 0.933	3.85 ... 3.96	0.1856 (0.2046)	n_{2N}	r/min	60	50	37.5	–	–	–	–	1F.2103-4AH..-2..0-Z
			M_{2N}	Nm	20	20	20	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	20	20	20	–	–	–	–	
			M_{2max}	Nm	32	32	32	–	–	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB040 3-stage											
0.493 ... 0.527	1.74 ... 1.79	0.2466 (0.2666)	n_{2N}	r/min	37.5	37.5	30	25	20	15	12.5	1F.2203-2AK..-2..0-Z
			M_{2N}	Nm	18	17.1	20	18	20	18	20	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	20	20	20	18	20	18	20	
			M_{2max}	Nm	32	32	32	29	32	29	32	
1 ... 1.06	3.56 ... 3.67	0.3966 (0.4166)	n_{2N}	r/min	60	37.5	37.5	–	–	–	–	1F.2203-4AK..-2..0-Z
			M_{2N}	Nm	18.2	20	20	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	20	20	20	–	–	–	–	
			M_{2max}	Nm	32	32	32	–	–	–	–	

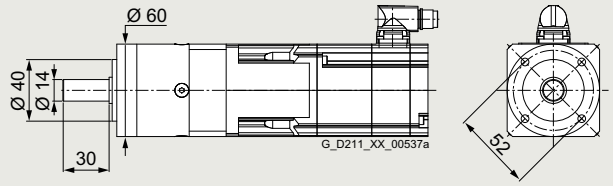
Planetary gearbox data								
Gearbox type:		**NRB040, 3-stage**						
1. Order code		**A13**						
i		**60**	**80**	**100**	**120**	**160**	**200**	**256**
2. Order code		**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**
$M_{2N,G}$	Nm	20	20	20	18	20	18	20
$M_{2max,G}$	Nm	32	32	32	29	32	29	32
$M_{2Em.Off}$	Nm	40	40	40	36	40	36	40
$J_{1,G}$	kg cm²	0.025	0.018	0.018	0.025	0.015	0.015	0.015
$\varphi_{2,G}$	'	22						

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRB060



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	400 N
Average axial force for 20000 h	$F_{A,eq}$	500 N
Average radial force for 30000 h	$F_{R,eq}$	340 N
Average axial force for 30000 h	$F_{A,eq}$	450 N
Maximum radial force	$F_{R,max}$	700 N
Maximum axial force	$F_{A,max}$	800 N

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB060 1- and 2-stage																			
0.51	1.83	0.093 (0.112)	n_{2N}	r/min	1000	750	750	500	500	375	375	300	300	250	200	150	125	100	60	1F.2103-2AH..-2..0-Z
...	...		M_{2N}	Nm	1.06	1.53	1.68	2.65	2.75	3.7	3.15	4.1	4.6	5.3	6.8	8.9	11.2	14	18	■■■ + ■■■ + . . .
0.539	1.88		$M_{2.0}$	Nm	1.58	2.1	2.65	3.75	4.3	5.3	4.7	6.2	7.8	8.4	10.5	13.1	16.8	21	18	
			M_{2max}	Nm	5.6	7.5	9.4	13.1	15	18.8	16.8	22	27.5	29.5	37	46.5	59	64	29	
0.972	3.84	0.139 (0.158)	n_{2N}	r/min	1000	750	600	500	500	375	375	250	250	200	200	150	125	100	60	1F.2103-4AH..-2..0-Z
...	...		M_{2N}	Nm	1.91	2.8	3.65	4.7	4.65	6.5	5.9	8.9	9.8	11.8	12.1	16.4	20	25	18	■■■ + ■■■ + . . .
1.03	3.95		$M_{2.0}$	Nm	3.05	4.05	5.1	7.1	8.2	10.2	9	12	15	16	20	25	32	40	18	
			M_{2max}	Nm	11.8	15.8	19.7	27.5	29	24	35	46.5	58	62	70	64	70	64	29	
1.17	3.56	0.371 (0.451)	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1F.2104-4AF..-2..0-Z
...	...		M_{2N}	Nm	2.85	3.95	5	6.7	8.1	10.2	8.3	11.6	14.8	15.4	19.7	24	31	39.5	18	■■■ + ■■■ + . . .
1.2	3.66		$M_{2.0}$	Nm	3.55	4.75	5.9	8.3	9.5	11.9	10.6	14.2	17.8	19	23.5	29.5	37.5	40	18	
			M_{2max}	Nm	10.9	14.6	18.2	25.5	29	24	32.5	43	54	57	70	64	70	64	29	
1.16	3.65	0.371 (0.451)	n_{2N}	r/min	1000	1000	750	600	500	375	375	300	250	250	200	150	125	100	60	1F.2104-4AK..-2..0-Z
...	...		M_{2N}	Nm	3.1	3.3	4.8	6.2	7.7	10.2	8.9	11.6	14.7	14.6	18.9	24.5	30.5	38.5	18	■■■ + ■■■ + . . .
1.19	3.75		$M_{2.0}$	Nm	3.55	4.7	5.9	8.3	9.5	11.9	10.6	14.1	17.7	18.8	23.5	29.5	37.5	40	18	
			M_{2max}	Nm	11.2	15	18.7	26	29	24	33	44.5	55	59	70	64	70	64	29	
2.25	7.16	0.581 (0.671)	n_{2N}	r/min	1000	750	600	500	375	300	300	250	200	200	150	125	100	75	–	1F.2104-5AF..-2..0-Z
...	...		M_{2N}	Nm	4.6	6.6	8.5	10.6	14	15	16	19.5	25.5	25	33.5	40	44	40	–	■■■ + ■■■ + . . .
2.3	7.36		$M_{2.0}$	Nm	6.8	9.1	11.4	16	18	15	20.5	27	34	36	44	40	44	40	–	
			M_{2max}	Nm	22	29	36.5	40	29	24	65	70	70	70	70	64	70	64	–	
2.23	7.25	0.581 (0.671)	n_{2N}	r/min	1000	750	600	500	375	375	300	250	200	200	150	125	125	100	–	1F.2104-5AK..-2..0-Z
...	...		M_{2N}	Nm	4.55	6.5	8.4	10.4	13.8	14	15.8	19.3	25	24.5	33.5	40	38.5	40	–	■■■ + ■■■ + . . .
2.28	7.46		$M_{2.0}$	Nm	6.8	9.1	11.4	15.9	18	15	20	27	33.5	36	44	40	44	40	–	
			M_{2max}	Nm	22	29.5	37	40	29	24	66	70	70	70	70	64	70	64	–	
2.98	9.56	0.781 (0.861)	n_{2N}	r/min	1000	750	600	500	375	300	300	250	200	200	150	125	100	75	–	1F.2104-6AF..-2..0-Z
...	...		M_{2N}	Nm	5.5	7.8	10.1	12.3	16.5	15	18.8	22.5	29.5	28.5	39	40	44	40	–	■■■ + ■■■ + . . .
3.05	9.83		$M_{2.0}$	Nm	9.1	12.1	15.2	21	18	15	27	36	44	44	44	40	44	40	–	
			M_{2max}	Nm	29	39	49	40	29	24	70	70	70	70	70	64	70	64	–	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:			NRB060, 1-stage						NRB060, 2-stage								
1. Order code			A21						A22								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18
	$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29
	$M_{2Em.Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80
	$J_{1.G}$	kg cm²	0.128	0.092	0.08	0.069	0.067	0.065	0.121	0.118	0.076	0.085	0.075	0.075	0.066	0.066	0.066
	$\varphi_{2,G}$	'	10						12								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB060

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB060 1- and 2-stage (continued)																				
4.59 ... 4.75	14.3 ... 14.7	1.98 (2.82)	n_{2N}	r/min	600	500	375	300	300	300	200	150	150	150	125	125	100	75	–	**1F.2105-4AF..-0..0-Z**
			M_{2N}	Nm	11.3	14	18.6	23.5	18	15	32.5	43	43	41	44	33	39.5	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.2	18.9	23.5	25	18	15	42	44	44	44	44	40	44	40	–	
			M_{2max}	Nm	44	58	64	40	29	24	70	70	70	70	70	64	70	64	–	
4.57 ... 4.75	14.3 ... 14.7	1.98 (2.82)	n_{2N}	r/min	600	500	375	250	300	250	200	150	150	125	125	100	75	75	–	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	10	12.1	16.5	24.5	17.9	15	29	38.5	36.5	44	38.5	40	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.2	19	23.5	25	18	15	42	44	44	44	44	40	44	40	–	
			M_{2max}	Nm	44	58	64	40	29	24	70	70	70	70	70	64	70	64	–	
7.1 ... 7.25	23.2 ... 23.6	2.92 (3.77)	n_{2N}	r/min	600	500	375	300	300	300	–	150	150	150	125	100	75	–	–	**1F.2105-6AF..-0..0-Z**
			M_{2N}	Nm	14.1	16.8	23	25	18	13	–	44	44	42	44	40	44	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21.5	28.5	36	25	18	15	–	44	44	44	44	40	44	–	–	
			M_{2max}	Nm	45	61	64	40	29	24	–	70	70	70	70	64	70	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB060 1- and 2-stage																				
0.527 ... 0.538	1.74 ... 1.79	0.2 (0.22)	n_{2N}	r/min	1000	750	600	375	375	300	300	250	200	200	150	125	100	75	60	**1F.2203-2AK..-2..0-Z**
			M_{2N}	Nm	0.85	1.26	1.66	2.7	2.8	3.55	3.1	3.75	5	4.9	6.7	8.1	10.3	13.9	15.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.57	2.1	2.65	3.7	4.25	5.3	4.75	6.3	8	8.5	10.6	13.3	17.1	21	18	
			M_{2max}	Nm	5.3	7.1	8.9	12.4	14.2	17.8	15.9	21	26.5	28	35	44	56	64	29	
1.11 ... 1.15	3.56 ... 3.66	0.35 (0.37)	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	60	**1F.2203-4AK..-2..0-Z**
			M_{2N}	Nm	2.55	3.4	4.25	5.9	5.9	7.6	7	8.6	11.1	11	14.8	17.9	22.5	29.5	18	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.4	4.55	5.7	8	9.2	11.5	10.2	13.7	17.1	18.2	22.5	28.5	36.5	40	18	
			M_{2max}	Nm	10.9	14.6	18.2	25.5	29	24	32.5	43	54	57	70	64	70	64	29	
2.21 ... 2.26	6.78 ... 6.96	1.251 (1.331)	n_{2N}	r/min	750	600	600	375	375	300	300	200	200	150	150	125	100	75	–	**1F.2204-5AF..-2..0-Z**
			M_{2N}	Nm	5.4	7.1	7.4	12.2	12.3	15	14.6	21.5	22.5	29	30	35.5	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.7	9	11.2	15.7	18	15	20	26.5	33.5	35.5	44	40	44	40	–	
			M_{2max}	Nm	20.5	27.5	34.5	40	29	24	61	70	70	70	70	64	70	64	–	
2.22 ... 2.27	6.78 ... 6.96	1.251 (1.331)	n_{2N}	r/min	750	600	600	375	375	300	300	200	200	150	150	125	100	100	–	**1F.2204-5AK..-2..0-Z**
			M_{2N}	Nm	5.5	7.3	7.5	12.4	12.6	15	14.8	22	23	29.5	30.5	36.5	44	36.5	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.8	9	11.3	15.8	18	15	20	27	33.5	35.5	44	40	44	40	–	
			M_{2max}	Nm	20.5	27.5	34.5	40	29	24	61	70	70	70	70	64	70	64	–	
2.96 ... 3.03	9.08 ... 9.33	1.631 (1.711)	n_{2N}	r/min	750	600	500	375	375	300	300	200	200	150	150	125	100	75	–	**1F.2204-6AF..-2..0-Z**
			M_{2N}	Nm	7.1	9.4	11.6	15.8	15.8	15	18.3	27	28	37	37	40	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	9	12.1	15.1	21	18	15	27	36	44	44	44	40	44	40	–	
			M_{2max}	Nm	27.5	37	46.5	40	29	24	70	70	70	70	70	64	70	64	–	
2.73 ... 2.84	10.3 ... 10.6	3.42 (4.32)	n_{2N}	r/min	600	500	375	250	250	200	200	150	125	100	100	100	75	50	–	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	5.9	7.1	9.9	15.1	15	15	18.9	25	30.5	36	37.5	31.5	43.5	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.5	11.3	14.2	19.8	18	15	25	33	41.5	44	44	40	44	40	–	
			M_{2max}	Nm	31.5	42	52	40	29	24	70	70	70	70	70	64	70	64	–	
2.79 ... 2.9	10.3 ... 10.6	3.42 (4.32)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	125	100	100	75	75	–	**1F.2205-2AF..-0..0-Z**
			M_{2N}	Nm	7.4	9.3	12.4	16	15.8	15	18.2	22	31	37	44	40	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.7	11.6	14.5	20	18	15	25.5	34	42.5	44	44	40	44	40	–	
			M_{2max}	Nm	31.5	42	52	40	29	24	70	70	70	70	70	64	70	64	–	

➥ Continued on the next page

Planetary gearbox data																
Gearbox type:		NRB060, 1-stage						NRB060, 2-stage								
1. Order code		A21						A22								
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18
	$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29
	$M_{2Em.Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80
	$J_{1,G}$	kg cm²	0.128	0.092	0.08	0.069	0.067	0.065	0.121	0.118	0.076	0.085	0.075	0.075	0.066	0.066	0.066
	$\varphi_{2,G}$	'	10						12								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB060

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB060 1- and 2-stage (continued)																			
2.77 ... 2.88	10.3 ... 10.6	3.42 (4.32)	n_{2N}	r/min	600	500	375	300	250	250	200	150	125	125	100	100	75	75	–	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	6.5	8	10.9	13.6	16.6	14.6	20	27	33	32.5	41	36	44	32	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.6	11.5	14.4	20	18	15	25	33.5	42.5	44	44	40	44	40	–	
			M_{2max}	Nm	31.5	42	52	40	29	24	70	70	70	70	70	64	70	64	–	
4.85 ... 4.95	17.4 ... 17.7	5.37 (6.27)	n_{2N}	r/min	600	500	375	250	300	250	200	150	125	125	125	100	75	75	–	**1F.2205-4AF..-0..0-Z**
			M_{2N}	Nm	9.6	11.5	15.8	23.5	17	15	28	37.5	44	43	35.5	40	44	32.5	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.8	19.8	24.5	25	18	15	43.5	44	44	44	44	40	44	40	–	
			M_{2max}	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	–	

Planetary gearbox data																	
Gearbox type:			**NRB060, 1-stage**						**NRB060, 2-stage**								
1. Order code			**A21**						**A22**								
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
	$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18
	$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29
	$M_{2Em.Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80
	$J_{1,G}$	kg cm²	0.128	0.092	0.08	0.069	0.067	0.065	0.121	0.118	0.076	0.085	0.075	0.075	0.066	0.066	0.066
	$\varphi_{2,G}$	'	10						12								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB060

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox									Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB060 3-stage												
0.51 ... 0.539	1.83 ... 1.88	0.093 (0.112)	n_{2N}	r/min	75	50	37.5	37.5	25	20	15	12.5	**1F.2103-2AH..-2..0-Z**
			M_{2N}	Nm	18.1	26.5	34.5	37	44	40	44	40	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30.5	40.5	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
0.972 ... 1.03	3.84 ... 3.95	0.139 (0.158)	n_{2N}	r/min	60	50	37.5	37.5	25	20	15	–	**1F.2103-4AH..-2..0-Z**
			M_{2N}	Nm	40.5	44	44	44	44	40	44	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	–	
			M_{2max}	Nm	70	70	70	70	70	64	70	–	
1.17 ... 1.2	3.56 ... 3.66	0.371 (0.451)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	–	**1F.2104-4AF..-2..0-Z**
			M_{2N}	Nm	44	44	44	44	44	40	44	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	–	
			M_{2max}	Nm	70	70	70	70	70	64	70	–	
1.16 ... 1.19	3.65 ... 3.75	0.371 (0.451)	n_{2N}	r/min	75	50	37.5	37.5	25	20	15	–	**1F.2104-4AK..-2..0-Z**
			M_{2N}	Nm	44	44	44	44	44	40	44	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	–	
			M_{2max}	Nm	70	70	70	70	70	64	70	–	
2.25 ... 2.3	7.16 ... 7.36	0.581 (0.671)	n_{2N}	r/min	50	37.5	30	25	–	–	–	–	**1F.2104-5AF..-2..0-Z**
			M_{2N}	Nm	44	44	44	44	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	–	–	–	–	
			M_{2max}	Nm	70	70	70	70	–	–	–	–	
2.23 ... 2.28	7.25 ... 7.46	0.581 (0.671)	n_{2N}	r/min	75	50	37.5	37.5	–	–	–	–	**1F.2104-5AK..-2..0-Z**
			M_{2N}	Nm	44	44	44	44	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	–	–	–	–	
			M_{2max}	Nm	70	70	70	70	–	–	–	–	
2.98 ... 3.05	9.56 ... 9.83	0.781 (0.861)	n_{2N}	r/min	50	37.5	–	–	–	–	–	–	**1F.2104-6AF..-2..0-Z**
			M_{2N}	Nm	44	44	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	–	–	–	–	–	–	
			M_{2max}	Nm	70	70	–	–	–	–	–	–	
4.59 ... 4.75	14.3 ... 14.7	1.98 (2.82)	n_{2N}	r/min	50	–	–	–	–	–	–	–	**1F.2105-4AF..-0..0-Z**
			M_{2N}	Nm	44	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	–	–	–	–	–	–	–	
			M_{2max}	Nm	70	–	–	–	–	–	–	–	
4.57 ... 4.75	14.3 ... 14.7	1.98 (2.82)	n_{2N}	r/min	50	–	–	–	–	–	–	–	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	44	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	–	–	–	–	–	–	–	
			M_{2max}	Nm	70	–	–	–	–	–	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB060 3-stage												
0.527 ... 0.538	1.74 ... 1.79	0.2 (0.22)	n_{2N}	r/min	50	37.5	30	25	20	20	15	12.5	**1F.2203-2AK..-2..0-Z**
			M_{2N}	Nm	19.4	25.5	32	39.5	44	39.5	44	40	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31.5	42	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	

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Planetary gearbox data									
Gearbox type:		**NRB060, 3-stage**							
1. Order code		**A23**							
i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**
2. Order code		**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**
$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40
$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64
$M_{2Em.Off}$	Nm	88	88	88	88	88	80	88	80
$J_{1,G}$	kg cm²	0.076	0.075	0.074	0.066	0.066	0.066	0.066	0.066
$\varphi_{2,G}$	'	15							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox									Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB060 3-stage (continued)												
1.11 ... 1.15	3.56 ... 3.66	0.35 (0.37)	n_{2N} r/min	50	50	37.5	37.5	25	20	15	–	**1F.2203-4AK..-2..0-Z**
			M_{2N} Nm	42.5	38	44	40.5	44	40	44	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	44	44	44	44	40	44	–	
			M_{2max} Nm	70	70	70	70	70	64	70	–	
2.21 ... 2.26	6.78 ... 6.96	1.251 (1.331)	n_{2N} r/min	50	37.5	30	25	–	–	–	–	**1F.2204-5AF..-2..0-Z**
			M_{2N} Nm	44	44	44	44	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	44	44	44	–	–	–	–	
			M_{2max} Nm	70	70	70	70	–	–	–	–	
2.22 ... 2.27	6.78 ... 6.96	1.251 (1.331)	n_{2N} r/min	60	50	37.5	37.5	–	–	–	–	**1F.2204-5AK..-2..0-Z**
			M_{2N} Nm	44	44	44	44	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	44	44	44	–	–	–	–	
			M_{2max} Nm	70	70	70	70	–	–	–	–	
2.96 ... 3.03	9.08 ... 9.33	1.631 (1.711)	n_{2N} r/min	50	37.5	–	–	–	–	–	–	**1F.2204-6AF..-2..0-Z**
			M_{2N} Nm	44	44	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	44	–	–	–	–	–	–	
			M_{2max} Nm	70	70	–	–	–	–	–	–	
2.73 ... 2.84	10.3 ... 10.6	3.42 (4.32)	n_{2N} r/min	37.5	25	–	–	–	–	–	–	**1FT2205-2AC..-0..0-Z**
			M_{2N} Nm	44	44	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	44	–	–	–	–	–	–	
			M_{2max} Nm	70	70	–	–	–	–	–	–	
2.79 ... 2.9	10.3 ... 10.6	3.42 (4.32)	n_{2N} r/min	50	37.5	–	–	–	–	–	–	**1F.2205-2AF..-0..0-Z**
			M_{2N} Nm	44	44	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	44	–	–	–	–	–	–	
			M_{2max} Nm	70	70	–	–	–	–	–	–	
2.77 ... 2.88	10.3 ... 10.6	3.42 (4.32)	n_{2N} r/min	50	37.5	–	–	–	–	–	–	**1FT2205-2AH..-0..0-Z**
			M_{2N} Nm	44	44	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	43.5	–	–	–	–	–	–	
			M_{2max} Nm	70	70	–	–	–	–	–	–	

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Planetary gearbox data									
Gearbox type:		**NRB060, 3-stage**							
1. Order code		**A23**							
i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**
2. Order code		**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**
$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40
$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64
$M_{2Em.Off}$	Nm	88	88	88	88	88	80	88	80
$J_{1,G}$	kg cm²	0.076	0.075	0.074	0.066	0.066	0.066	0.066	0.066
$\varphi_{2,G}$	'	15							

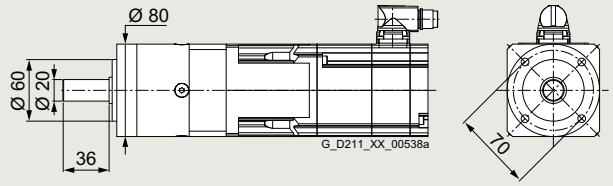
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB080

Selection and ordering data

NRB080



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	750 N
Average axial force for 20000 h	$F_{A,eq}$	1000 N
Average radial force for 30000 h	$F_{R,eq}$	650 N
Average axial force for 30000 h	$F_{A,eq}$	900 N
Maximum radial force	$F_{R,max}$	1250 N
Maximum axial force	$F_{A,max}$	1600 N

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB080 1- and 2-stage																			
0.49	1.8	0.093	n_{2N}	r/min	750	750	600	500	375	375	375	300	250	200	200	150	125	100	60	**1F.2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	1.04	1.19	1.68	2.3	2.95	3.3	2.7	3.4	4.2	5.2	5.7	7.7	10.1	12.7	21	■■■ + ■■■ + . . .
0.516	1.85		M_{2_0}	Nm	1.46	1.99	2.5	3.55	4.05	5.1	4.55	6.1	7.6	8.2	10.2	12.8	16.4	20.5	33	
			M_{2max}	Nm	5.4	7.3	9.1	12.9	14.7	18.4	16.4	21.5	27	29	36.5	45.5	58	73	80	
0.994	3.81	0.139	n_{2N}	r/min	750	600	600	500	375	300	375	250	200	200	150	125	125	100	60	**1F.2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	2.3	3.1	3.35	4.35	6.1	7.8	5.4	8.6	10.8	11.1	14.8	18.2	19.9	24.5	42.5	■■■ + ■■■ + . . .
1.06	3.91		M_{2_0}	Nm	3.05	4.15	5.2	7.3	8.4	10.5	9.2	12.3	15.3	16.4	20.5	25.5	32.5	41	50	
			M_{2max}	Nm	11.7	15.6	19.5	27	31	39	34.5	46.5	58	61	77	96	123	154	80	
1.14	3.52	0.35	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	**1F.2104-4AF..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.55	3.6	4.7	6.4	7.9	10	7.8	11.2	14	14.5	19.1	23.5	30.5	39	50	■■■ + ■■■ + . . .
1.16	3.62		M_{2_0}	Nm	3.4	4.55	5.7	8.1	9.2	11.6	10.3	13.8	17.3	18.4	23	28.5	36.5	46	50	
			M_{2max}	Nm	10.8	14.4	18	25	28.5	36	32	42.5	53	57	71	89	114	142	80	
1.13	3.62	0.35	n_{2N}	r/min	1000	750	600	500	500	375	375	300	250	200	200	150	125	100	60	**1F.2104-4AK..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.65	3.9	5.1	7	6.8	9.9	8.6	10.7	12.6	15.8	16.8	23.5	30	37.5	50	■■■ + ■■■ + . . .
1.16	3.72		M_{2_0}	Nm	3.4	4.55	5.7	8	9.2	11.5	10.3	13.7	17.2	18.3	22.5	28.5	36.5	45.5	50	
			M_{2max}	Nm	11.1	14.8	18.5	25.5	29.5	37	33	44	55	58	73	91	117	146	80	
2.21	7.1	0.56	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	**1F.2104-5AF..-2..0-Z**
...	...	(0.65)	M_{2N}	Nm	5.9	7.7	9.8	14	14.6	18.6	17	20	25.5	24.5	35.5	42	56	74	50	■■■ + ■■■ + . . .
2.26	7.31		M_{2_0}	Nm	6.7	9	11.2	15.8	18	22.5	20	26.5	33.5	35.5	44.5	55	71	89	50	
			M_{2max}	Nm	21.5	29	36.5	51	58	61	65	86	108	115	144	176	192	176	80	
2.19	7.19	0.56	n_{2N}	r/min	750	600	600	375	375	300	300	250	200	150	150	125	100	75	60	**1F.2104-5AK..-2..0-Z**
...	...	(0.65)	M_{2N}	Nm	5.8	7.6	8	13.8	14.3	18.3	16.8	20	25	32.5	35	41.5	55	73	50	■■■ + ■■■ + . . .
2.25	7.41		M_{2_0}	Nm	6.6	8.9	11.1	15.7	17.9	22	20	26.5	33	35.5	44	55	71	88	50	
			M_{2max}	Nm	22	29.5	37	51	59	61	66	87	109	117	146	176	192	176	80	
2.93	9.49	0.76	n_{2N}	r/min	750	600	500	375	375	300	300	200	200	150	150	125	100	75	50	**1F.2104-6AF..-2..0-Z**
...	...	(0.84)	M_{2N}	Nm	7.1	9.3	11.8	16.8	17.3	22	20	29.5	29.5	39.5	41	48.5	64	86	50	■■■ + ■■■ + . . .
3.01	9.78		M_{2_0}	Nm	8.9	12	15	21	24	30	26.5	35.5	44.5	47.5	59	74	95	110	50	
			M_{2max}	Nm	29	39	48.5	68	78	61	87	116	144	154	192	176	192	176	80	

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Planetary gearbox data																
Gearbox type:			NRB080, 1-stage						NRB080, 2-stage							
1. Order code			A31						A32							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50
	$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190
	$J_{1,G}$	kg cm²	0.654	0.455	0.423	0.379	0.37	0.359	0.613	0.589	0.586	0.446	0.406	0.404	0.366	0.365	0.366
	$\varphi_{2,G}$	'	7						9								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB080 1- and 2-stage (continued)																			
4.62 ... 4.74	14.3 ... 14.7	1.71 (2.55)	n_{2N}	r/min	750	600	500	375	300	250	250	200	150	150	125	100	75	75	50	**1F.2105-4AF..-0..0-Z**
			M_{2N}	Nm	11	14	17.4	24	30.5	37	33.5	42.5	56	56	68	85	117	108	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.1	18.9	23.5	33	37.5	38	42	56	70	74	93	110	120	110	50	
			M_{2max}	Nm	44	58	73	102	80	61	131	174	176	192	192	176	192	176	80	
4.65 ... 4.77	14.3 ... 14.7	1.71 (2.55)	n_{2N}	r/min	750	500	500	300	300	250	250	200	150	150	100	100	75	75	60	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	9.6	15	14.9	26	27	33	31	38	51	50	73	75	106	92	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.2	19	23.5	33	38	38	42.5	56	70	75	94	110	120	110	50	
			M_{2max}	Nm	44	58	73	102	80	61	131	174	176	192	192	176	192	176	80	
7.15 ... 7.5	22.9 ... 23.6	2.65 (3.5)	n_{2N}	r/min	600	500	375	300	250	250	200	150	125	125	100	100	75	75	–	**1F.2105-6AF..-0..0-Z**
			M_{2N}	Nm	17.3	21	28	37	44	38	51	67	81	80	101	94	120	107	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	29.5	37	52	50	38	66	88	110	117	120	110	120	110	–	
			M_{2max}	Nm	70	94	117	104	80	61	208	192	176	192	192	176	192	176	–	
7.25 ... 7.57	24.8 ... 25.5	5.476 (7.176)	n_{2N}	r/min	500	375	300	250	200	200	150	125	100	100	75	75	60	60	–	**1F.2106-3AF..-0..0-Z**
			M_{2N}	Nm	17.2	23	29	35.5	45	38	56	68	84	83	111	104	120	93	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30	37.5	52	50	38	66	89	110	119	120	110	120	110	–	
			M_{2max}	Nm	76	101	127	104	80	61	208	192	176	192	192	175	192	176	–	
9.39 ... 9.81	31.5 ... 32.4	6.876 (8.476)	n_{2N}	r/min	500	375	300	200	200	200	150	125	100	100	75	75	60	50	–	**1F.2106-4AF..-0..0-Z**
			M_{2N}	Nm	20.5	27	34.5	52	50	38	66	78	96	93	120	108	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29	39	49	65	50	38	86	115	110	120	120	110	120	110	–	
			M_{2max}	Nm	97	129	161	104	80	61	208	192	176	192	192	176	192	176	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 1- and 2-stage																			
0.476 ... 0.503	1.71 ... 1.75	0.2 (0.22)	n_{2N}	r/min	750	600	500	375	375	300	300	200	150	150	150	100	100	75	50	**1F.2203-2AK..-0..0-Z**
			M_{2N}	Nm	0.93	1.26	1.66	2.45	2.5	3.25	2.7	4.15	5.5	5.6	5.9	9	9.5	13	19.4	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.42	1.93	2.45	3.45	3.95	5	4.45	5.9	7.4	7.9	10	12.5	16	20	32	
			M_{2max}	Nm	5.1	6.9	8.6	12.2	13.9	17.4	15.5	20.5	26	27.5	34.5	43	55	69	80	
1.09 ... 1.12	3.52 ... 3.62	0.35 (0.37)	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	**1F.2203-4AK..-0..0-Z**
			M_{2N}	Nm	2.5	3.25	4.15	5.9	6.1	7.8	6.9	8.4	10.6	10.5	14.6	17.7	22.5	30	46	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.25	4.4	5.5	7.7	8.9	11.1	9.9	13.2	16.6	17.7	22	27.5	35.5	44	50	
			M_{2max}	Nm	10.8	14.4	18	25	28.5	36	32	42.5	53	57	71	89	114	142	80	
2.17 ... 2.22	6.72 ... 6.91	1.23 (1.31)	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	150	150	100	100	75	50	**1F.2204-5AF..-2..0-Z**
			M_{2N}	Nm	5.5	7.1	9.1	12.9	12.9	16.6	15.7	18	22.5	29.5	32	46	50	67	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.6	8.8	11	15.5	17.7	22	19.8	26	33	35	43.5	54	70	87	50	
			M_{2max}	Nm	20.5	27.5	34.5	48	55	61	61	82	102	109	136	170	192	176	80	
2.18 ... 2.23	6.72 ... 6.91	1.23 (1.31)	n_{2N}	r/min	750	600	500	375	375	300	300	200	200	150	150	100	100	75	60	**1F.2204-5AK..-2..0-Z**
			M_{2N}	Nm	5.6	7.3	9.3	13.2	13.2	16.9	15.9	23	23	30.5	32.5	47.5	50	68	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.6	8.8	11.1	15.6	17.8	22	19.9	26.5	33	35	44	55	70	88	50	
			M_{2max}	Nm	20.5	27.5	34.5	48	55	61	61	82	102	109	136	170	192	176	80	
2.92 ... 3	9.01 ... 9.28	1.61 (1.69)	n_{2N}	r/min	750	600	500	375	300	250	250	200	150	150	125	100	75	75	50	**1F.2204-6AF..-2..0-Z**
			M_{2N}	Nm	7.3	9.5	12	17	21	25.5	24	30	40	40	49.5	61	84	84	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.9	11.9	14.9	20.5	23.5	29.5	26.5	35.5	44.5	47	59	74	94	110	50	
			M_{2max}	Nm	27.5	37	46	64	74	61	82	110	137	146	183	176	192	176	80	

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Planetary gearbox data																
Gearbox type:			**NRB080, 1-stage**						**NRB080, 2-stage**							
1. Order code			**A31**						**A32**							
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
	$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50
	$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190
	$J_{1,G}$	kg cm²	0.654	0.455	0.423	0.379	0.37	0.359	0.613	0.589	0.586	0.446	0.406	0.404	0.366	0.365	0.366
	$\varphi_{2,G}$	'	7						9								

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB080

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 1- and 2-stage (continued)																			
2.83 ... 2.98	10.3 ... 10.6	3.15 (4.05)	n_{2N}	r/min	600	500	500	300	250	200	250	200	150	125	100	100	75	50	37.5	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	7.1	9.1	9	16.2	19	23.5	19.2	24.5	32	36	45.5	50	66	91	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.8	11.8	14.8	20.5	23.5	29.5	26	34.5	43.5	46.5	58	72	92	110	50	
			M_{2max}	Nm	31.5	42	52	73	80	61	94	125	156	166	192	176	192	176	80	
2.87 ... 3.02	10.3 ... 10.6	3.15 (4.05)	n_{2N}	r/min	750	600	500	375	375	250	300	200	200	150	125	100	100	75	50	**1F.2205-2AF..-0..0-Z**
			M_{2N}	Nm	7.2	9.3	11.7	16.6	15.9	24.5	19.7	28.5	27	38	47	59	59	81	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	9	12	15	21	24	30	26.5	35	44	47	59	73	94	110	50	
			M_{2max}	Nm	31.5	42	52	73	80	61	94	125	156	166	192	176	192	176	80	
2.85 ... 2.99	10.3 ... 10.6	3.15 (4.05)	n_{2N}	r/min	750	500	500	375	300	250	250	200	150	150	125	100	75	60	60	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	6.2	9.6	9.9	14	18.2	22	20.5	26.5	34	35	43.5	54	72	90	45.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.9	11.9	14.8	20.5	23.5	29.5	26	35	43.5	46.5	58	72	93	110	50	
			M_{2max}	Nm	31.5	42	52	73	80	61	94	125	156	166	192	176	192	176	80	
4.89 ... 5.12	17.2 ... 17.7	5.1 (6)	n_{2N}	r/min	600	500	375	300	250	250	250	150	125	125	100	75	75	60	–	**1F.2205-4AF..-0..0-Z**
			M_{2N}	Nm	11.7	14.4	19.7	25.5	31	30.5	29.5	49	59	59	75	98	100	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.3	20	25.5	35.5	40.5	38	45	60	75	80	100	110	120	110	–	
			M_{2max}	Nm	53	70	88	104	80	61	157	192	176	192	192	176	192	176	–	
5.11 ... 5.35	17.1 ... 17.6	8.676 (10.276)	n_{2N}	r/min	375	300	250	200	150	150	150	125	100	75	75	50	50	37.5	30	**1FT2206-2AC..-0..0-Z**
			M_{2N}	Nm	13	16.6	20	26	34	35	36	42.5	53	69	70	105	104	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	16	21	26.5	37	42.5	38	47	62	78	83	104	110	120	110	50	
			M_{2max}	Nm	52	70	87	104	80	61	156	192	176	192	192	176	192	176	80	
5.04 ... 5.26	17.1 ... 17.6	8.676 (10.276)	n_{2N}	r/min	500	375	300	250	200	200	200	150	100	100	75	75	60	50	–	**1F.2206-2AF..-0..0-Z**
			M_{2N}	Nm	12.9	17.3	21.5	27.5	34	33	33.5	44	63	66	84	86	109	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.7	21	26	36.5	42	38	46.5	61	77	82	103	110	120	110	–	
			M_{2max}	Nm	52	70	87	104	80	61	156	192	176	192	192	176	192	176	–	
4.9 ... 5.11	17.1 ... 17.6	8.676 (10.276)	n_{2N}	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	50	–	**1FT2206-2AH..-0..0-Z**
			M_{2N}	Nm	10.9	14.8	18.8	28.5	29	38	37.5	46.5	58	57	77	96	117	100	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.3	20	25.5	35.5	40.5	38	45	60	75	80	100	110	120	110	–	
			M_{2max}	Nm	52	70	87	104	80	61	156	192	176	192	192	176	192	176	–	
7.3 ... 7.64	25.7 ... 26.5	12.38 (13.976)	n_{2N}	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	–	**1FT2206-3AB..-0..0-Z**
			M_{2N}	Nm	15.3	20.5	26	39.5	40	38	51	61	76	75	101	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30.5	38	53	50	38	67	89	110	119	120	110	120	110	–	
			M_{2max}	Nm	79	105	132	104	80	61	208	192	176	192	192	176	192	176	–	
7.17 ... 7.5	25.7 ... 26.5	12.38 (13.976)	n_{2N}	r/min	500	375	300	200	200	200	150	125	100	75	75	60	60	50	–	**1FT2206-3AF..-0..0-Z**
			M_{2N}	Nm	14.2	19.1	24	37.5	37	29.5	49.5	58	72	94	95	110	102	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22	29.5	37	52	50	38	66	88	110	117	120	110	120	110	–	
			M_{2max}	Nm	79	105	132	104	80	61	208	192	176	192	192	176	192	176	–	
9.95 ... 10.4	36.3 ... 37.4	15.98 (17.676)	n_{2N}	r/min	300	250	200	150	150	150	125	75	75	60	60	50	50	37.5	–	**1FT2206-4AC..-0..0-Z**
			M_{2N}	Nm	22	27	33.5	45.5	44.5	34	56	91	91	113	110	110	94	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31	41.5	52	65	50	38	91	120	110	120	120	110	120	110	–	
			M_{2max}	Nm	112	149	176	104	80	61	208	192	176	192	192	176	192	176	–	

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Planetary gearbox data																
Gearbox type:			**NRB080, 1-stage**						**NRB080, 2-stage**							
1. Order code			**A31**						**A32**							
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
	$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50
	$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190
	$J_{1,G}$	kg cm²	0.654	0.455	0.423	0.379	0.37	0.359	0.613	0.589	0.586	0.446	0.406	0.404	0.366	0.365	0.366
	$\varphi_{2,G}$	'	7						9								

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 1- and 2-stage (continued)																			
9.84	34.4	15.976	n_{2N}	r/min	500	375	300	200	200	200	150	125	100	100	75	75	60	50	–	**1F.2206-4AF..-0..0-Z**
...	...	(17.676)	M_{2N}	Nm	21	28	35.5	53	50	38	67	79	98	95	120	109	120	110	–	■■■ + ■■■ + . . .
10.3	35.4		$M_{2,0}$	Nm	30.5	41	51	65	50	38	90	120	110	120	120	110	120	110	–	
			M_{2max}	Nm	106	141	176	104	79	61	208	192	176	192	191	176	192	176	–	
9.45	34.4	15.976	n_{2N}	r/min	375	300	250	200	200	150	150	100	75	75	75	60	50	50	–	**1FT2206-4AH..-0..0-Z**
...	...	(17.676)	M_{2N}	Nm	21.5	27	33	41.5	39	38	54	81	106	106	102	110	120	102	–	■■■ + ■■■ + . . .
9.85	35.4		$M_{2,0}$	Nm	29.5	39	49	65	50	38	86	115	110	120	120	110	120	110	–	
			M_{2max}	Nm	106	141	176	104	79	61	208	192	176	192	191	176	192	176	–	

Planetary gearbox data																
Gearbox type:			**NRB080, 1-stage**						**NRB080, 2-stage**							
1. Order code			**A31**						**A32**							
i			**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
$M_{2N,G}$		Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50
$M_{2max,G}$		Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80
$M_{2Em.Off}$		Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190
$J_{1,G}$		kg cm²	0.654	0.455	0.423	0.379	0.37	0.359	0.613	0.589	0.586	0.446	0.406	0.404	0.366	0.365	0.366
$\varphi_{2,G}$		'	7						9								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB080

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB080 3-stage													
0.49 ... 0.516	1.8 ... 1.85	0.093 (0.112)	n_{2N}	r/min	60	50	37.5	30	25	20	15	12.5	7.5	**1F.2103-2AH..-0..0-Z**
			M_{2N}	Nm	17.5	22.5	30	35.5	49	61	81	98	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30.5	40.5	51	61	81	102	120	110	49.5	
			M_{2max}	Nm	108	144	180	176	192	176	192	176	80	
0.994 ... 1.06	3.81 ... 3.91	0.139 (0.158)	n_{2N}	r/min	60	50	37.5	30	25	20	15	12.5	–	**1F.2103-4AH..-0..0-Z**
			M_{2N}	Nm	37	45	63	75	101	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	59	79	99	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
1.14 ... 1.16	3.52 ... 3.62	0.35 (0.43)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	–	**1F.2104-4AF..-2..0-Z**
			M_{2N}	Nm	55	74	93	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	68	91	114	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
1.13 ... 1.16	3.62 ... 3.72	0.35 (0.43)	n_{2N}	r/min	60	50	37.5	30	25	20	15	12.5	–	**1F.2104-4AK..-2..0-Z**
			M_{2N}	Nm	54	69	91	109	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	68	90	113	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.21 ... 2.26	7.1 ... 7.31	0.56 (0.65)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	–	**1F.2104-5AF..-2..0-Z**
			M_{2N}	Nm	101	120	120	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.19 ... 2.25	7.19 ... 7.41	0.56 (0.65)	n_{2N}	r/min	50	37.5	37.5	30	25	20	15	12.5	–	**1F.2104-5AK..-2..0-Z**
			M_{2N}	Nm	99	120	120	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.93 ... 3.01	9.49 ... 9.78	0.76 (0.84)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	–	–	**1F.2104-6AF..-2..0-Z**
			M_{2N}	Nm	110	120	120	110	120	110	120	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	–	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	–	–	
4.62 ... 4.74	14.3 ... 14.7	1.71 (2.55)	n_{2N}	r/min	50	37.5	30	25	20	–	–	–	–	**1F.2105-4AF..-0..0-Z**
			M_{2N}	Nm	110	120	120	110	120	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	–	–	–	–	
			M_{2max}	Nm	176	192	192	176	192	–	–	–	–	
4.65 ... 4.77	14.3 ... 14.7	1.71 (2.55)	n_{2N}	r/min	50	37.5	30	30	25	–	–	–	–	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	110	120	120	109	120	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	–	–	–	–	
			M_{2max}	Nm	176	192	192	176	192	–	–	–	–	
7.15 ... 7.5	22.9 ... 23.6	2.65 (3.5)	n_{2N}	r/min	50	37.5	30	–	–	–	–	–	–	**1F.2105-6AF..-0..0-Z**
			M_{2N}	Nm	110	120	120	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	–	–	–	–	–	–	
			M_{2max}	Nm	176	192	192	–	–	–	–	–	–	

➥ Continued on the next page

Planetary gearbox data										
Gearbox type:			**NRB080, 3-stage**							
1. Order code			**A33**							
i			**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
$M_{2N,G}$	Nm		110	120	120	110	120	110	120	110	50
$M_{2max,G}$	Nm		176	192	192	176	192	176	192	176	80
$M_{2Em.Off}$	Nm		220	240	240	220	240	220	240	220	190
$J_{1,G}$	kg cm²		0.584	0.405	0.404	0.59	0.365	0.365	0.366	0.366	0.366
$\varphi_{2,G}$	'		11								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB080 3-stage (continued)														
7.25 ... 7.57	24.8 ... 25.5	5.476 (7.176)	n_{2N}	r/min	37.5	30	25	–	–	–	–	–	–	**1F.2106-3AF..-0..0-Z**
			M_{2N}	Nm	110	120	120	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	–	–	–	–	–	–	
			M_{2max}	Nm	176	192	192	–	–	–	–	–	–	
9.39 ... 9.81	31.5 ... 32.4	6.876 (8.476)	n_{2N}	r/min	37.5	–	–	–	–	–	–	–	–	**1F.2106-4AF..-0..0-Z**
			M_{2N}	Nm	110	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	176	–	–	–	–	–	–	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 3-stage														
0.476 ... 0.503	1.71 ... 1.75	0.2 (0.22)	n_{2N}	r/min	50	37.5	30	20	20	15	12.5	10	7.5	**1F.2203-2AK..-0..0-Z**
			M_{2N}	Nm	16.4	23	29	41.5	46	62	73	92	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29.5	39.5	49.5	59	79	99	120	110	50	
			M_{2max}	Nm	102	137	171	176	192	176	192	176	80	
1.09 ... 1.12	3.52 ... 3.62	0.35 (0.37)	n_{2N}	r/min	50	37.5	30	25	20	20	15	12.5	–	**1F.2203-4AK..-0..0-Z**
			M_{2N}	Nm	41	56	70	82	109	98	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	65	87	109	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.17 ... 2.22	6.72 ... 6.91	1.23 (1.31)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	–	**1F.2204-5AF..-2..0-Z**
			M_{2N}	Nm	91	120	120	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.18 ... 2.23	6.72 ... 6.91	1.23 (1.31)	n_{2N}	r/min	50	37.5	37.5	30	25	20	15	12.5	–	**1F.2204-5AK..-2..0-Z**
			M_{2N}	Nm	93	120	100	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.92 ... 3	9.01 ... 9.28	1.61 (1.69)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	–	–	**1F.2204-6AF..-2..0-Z**
			M_{2N}	Nm	109	120	120	110	120	110	120	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	–	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	–	–	
2.83 ... 2.98	10.3 ... 10.6	3.15 (4.05)	n_{2N}	r/min	37.5	25	20	20	12.5	10	–	–	–	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	110	120	120	110	120	110	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	109	–	–	–	
			M_{2max}	Nm	176	192	192	176	192	176	–	–	–	
2.87 ... 3.02	10.3 ... 10.6	3.15 (4.05)	n_{2N}	r/min	50	37.5	30	25	20	15	–	–	–	**1F.2205-2AF..-0..0-Z**
			M_{2N}	Nm	107	120	120	110	120	110	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	–	–	–	
			M_{2max}	Nm	176	192	192	176	192	176	–	–	–	
2.85 ... 2.99	10.3 ... 10.6	3.15 (4.05)	n_{2N}	r/min	50	37.5	30	25	25	20	–	–	–	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	91	120	120	110	104	110	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	109	–	–	–	
			M_{2max}	Nm	176	192	192	176	192	176	–	–	–	

➥ Continued on the next page

Planetary gearbox data										
Gearbox type:			**NRB080, 3-stage**							
1. Order code			**A33**							
i			**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
$M_{2N,G}$		Nm	110	120	120	110	120	110	120	110	50
$M_{2max,G}$		Nm	176	192	192	176	192	176	192	176	80
$M_{2Em.Off}$		Nm	220	240	240	220	240	220	240	220	190
$J_{1,G}$		kg cm²	0.584	0.405	0.404	0.59	0.365	0.365	0.366	0.366	0.366
$\varphi_{2,G}$		'	11							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB080

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 3-stage (continued)													
4.89 ... 5.12	17.2 ... 17.7	5.1 (6)	n_{2N}	r/min	50	37.5	30	25	–	–	–	–	–	**1F.2205-4AF..-0..0-Z**
			M_{2N}	Nm	103	120	120	110	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	–	–	–	–	–	
			M_{2max}	Nm	176	192	192	176	–	–	–	–	–	
5.11 ... 5.35	17.1 ... 17.6	8.676 (10.276)	n_{2N}	r/min	30	25	20	15	12.5	–	–	–	–	**1FT2206-2AC..-0..0-Z**
			M_{2N}	Nm	110	120	120	110	120	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	–	–	–	–	
			M_{2max}	Nm	176	192	192	176	192	–	–	–	–	
5.04 ... 5.26	17.1 ... 17.6	8.676 (10.276)	n_{2N}	r/min	37.5	30	25	20	–	–	–	–	–	**1F.2206-2AF..-0..0-Z**
			M_{2N}	Nm	110	120	120	110	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	–	–	–	–	–	
			M_{2max}	Nm	176	192	192	176	–	–	–	–	–	
4.9 ... 5.11	17.1 ... 17.6	8.676 (10.276)	n_{2N}	r/min	37.5	25	20	20	–	–	–	–	–	**1FT2206-2AH..-0..0-Z**
			M_{2N}	Nm	95	119	120	109	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	119	119	109	–	–	–	–	–	
			M_{2max}	Nm	176	192	192	176	–	–	–	–	–	
7.3 ... 7.64	25.7 ... 26.5	12.38 (13.976)	n_{2N}	r/min	25	20	15	–	–	–	–	–	–	**1FT2206-3AB..-0..0-Z**
			M_{2N}	Nm	110	120	120	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	–	–	–	–	–	–	
			M_{2max}	Nm	176	192	192	–	–	–	–	–	–	
7.17 ... 7.5	25.7 ... 26.5	12.38 (13.976)	n_{2N}	r/min	37.5	25	20	–	–	–	–	–	–	**1FT2206-3AF..-0..0-Z**
			M_{2N}	Nm	99	120	120	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	–	–	–	–	–	–	
			M_{2max}	Nm	176	192	192	–	–	–	–	–	–	
9.95 ... 10.4	36.3 ... 37.4	15.98 (17.676)	n_{2N}	r/min	30	–	–	–	–	–	–	–	–	**1FT2206-4AC..-0..0-Z**
			M_{2N}	Nm	105	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	176	–	–	–	–	–	–	–	–	
9.84 ... 10.3	34.4 ... 35.4	15.976 (17.676)	n_{2N}	r/min	37.5	–	–	–	–	–	–	–	–	**1F.2206-4AF..-0..0-Z**
			M_{2N}	Nm	110	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	176	–	–	–	–	–	–	–	–	
9.45 ... 9.85	34.4 ... 35.4	15.976 (17.676)	n_{2N}	r/min	30	–	–	–	–	–	–	–	–	**1FT2206-4AH..-0..0-Z**
			M_{2N}	Nm	110	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	176	–	–	–	–	–	–	–	–	

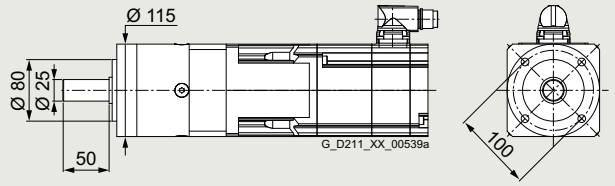
Planetary gearbox data										
Gearbox type:			**NRB080, 3-stage**							
1. Order code			**A33**							
i			**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
	$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50
	$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80
	$M_{2Em.Off}$	Nm	220	240	240	220	240	220	240	220	190
	$J_{1,G}$	kg cm²	0.584	0.405	0.404	0.59	0.365	0.365	0.366	0.366	0.366
	$\varphi_{2,G}$	'	11								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRB120



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1750 N
Average axial force for 20000 h	$F_{A,eq}$	2500 N
Average radial force for 30000 h	$F_{R,eq}$	1500 N
Average axial force for 30000 h	$F_{A,eq}$	2100 N
Maximum radial force	$F_{R,max}$	2000 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 1- and 2-stage																				
0.379	1.72	0.093	n_{2N}	r/min	500	500	500	375	300	300	250	150	150	150	125	100	100	75	50	**1F.2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	0.81	0.98	1.19	2.05	2.6	2.9	2.3	3.95	4.2	4.4	6.1	7.8	9.4	12.7	19.4	■■■ + ■■■ + . . .
0.45	1.77		M_{2_0}	Nm	1.13	1.59	2.05	2.95	3.4	4.35	3.85	5.2	6.5	7	8.8	11.1	14.2	17.9	28.5	
			M_{2max}	Nm	5.1	6.9	8.7	12.3	14.1	17.6	15.7	21	26	28	35	43.5	56	70	112	
1	3.74	0.139	n_{2N}	r/min	600	500	375	375	300	250	250	200	150	150	125	100	100	75	50	**1F.2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	2.05	2.75	4	4.85	6.3	8	6.4	8	11	11.6	15.1	19.1	21	29.5	43.5	■■■ + ■■■ + . . .
1.06	3.83		M_{2_0}	Nm	3	4.05	5.1	7.3	8.4	10.5	9.3	12.5	15.7	16.8	21	26	33.5	42	67	
			M_{2max}	Nm	11.3	15.2	19	26.5	30.5	38	34	45.5	56	60	75	94	121	151	192	
1.03	3.45	0.35	n_{2N}	r/min	750	600	500	375	375	300	300	200	150	150	150	125	100	75	50	**1F.2104-4AF..-0..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.2	3.2	4.35	6.5	7.1	9.2	7	10.6	13.9	14.7	17.1	21	28.5	37.5	58	■■■ + ■■■ + . . .
1.09	3.54		M_{2_0}	Nm	3.05	4.15	5.3	7.5	8.6	10.8	9.6	12.9	16.2	17.2	21.5	27	34.5	43	69	
			M_{2max}	Nm	10.4	14	17.5	24.5	28	35	31.5	42	52	56	70	87	112	140	192	
1.02	3.55	0.35	n_{2N}	r/min	750	600	500	375	375	300	300	200	150	150	150	125	100	75	50	**1F.2104-4AK..-0..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.35	3.45	4.7	6.8	7.8	9.9	7.5	11.2	14.2	15.2	18.9	22.5	31.5	40	63	■■■ + ■■■ + . . .
1.08	3.64		M_{2_0}	Nm	3.05	4.15	5.2	7.4	8.5	10.7	9.5	12.8	16	17.1	21.5	26.5	34.5	43	69	
			M_{2max}	Nm	10.7	14.4	18	25	29	36	32	43	54	57	72	90	115	144	192	
2.13	7.03	0.56	n_{2N}	r/min	600	500	500	375	300	250	250	200	150	150	125	100	75	75	50	**1F.2104-5AF..-0..0-Z**
...	...	(0.65)	M_{2N}	Nm	5.9	7.7	8.2	12.6	16.4	20.5	17.1	21	29.5	30	38.5	49	67	69	101	■■■ + ■■■ + . . .
2.18	7.23		M_{2_0}	Nm	6.4	8.6	10.8	15.2	17.4	21.5	19.4	25.5	32.5	34.5	43	54	69	86	120	
			M_{2max}	Nm	21.5	28.5	36	50	57	72	64	85	107	114	142	178	225	285	192	
2.12	7.12	0.56	n_{2N}	r/min	600	500	500	375	300	250	250	200	150	150	125	100	75	75	50	**1F.2104-5AK..-0..0-Z**
...	...	(0.65)	M_{2N}	Nm	5.8	7.6	8	12.4	16.1	20	16.8	20.5	28.5	29	38	48	66	68	100	■■■ + ■■■ + . . .
2.17	7.33		M_{2_0}	Nm	6.3	8.5	10.7	15.1	17.3	21.5	19.3	25.5	32	34	43	53	68	86	120	
			M_{2max}	Nm	21.5	29	36.5	51	58	73	65	87	108	115	144	180	230	285	192	
2.87	9.42	0.76	n_{2N}	r/min	600	500	375	375	300	250	250	200	150	150	125	100	75	60	50	**1F.2104-6AF..-0..0-Z**
...	...	(0.84)	M_{2N}	Nm	7.3	9.5	13.6	15.3	19.8	24.5	20.5	25.5	35	35.5	46	58	83	104	117	■■■ + ■■■ + . . .
2.93	9.69		M_{2_0}	Nm	8.6	11.6	14.5	20	23	29	26	34.5	43.5	46.5	58	72	93	116	120	
			M_{2max}	Nm	28.5	38.5	48	67	77	96	86	115	143	153	191	235	305	368	192	

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Planetary gearbox data																
Gearbox type:			NRB120, 1-stage						NRB120, 2-stage							
1. Order code			A41						A42							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414
	$\varphi_{2,G}$	'	7						9								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 1- and 2-stage (continued)																			
4.55 ... 4.66	14.2 ... 14.6	1.71 (2.55)	n_{2N}	r/min	600	500	375	300	300	250	250	150	150	125	100	100	75	60	50	**1F.2105-4AF..-0..0-Z**
			M_{2N}	Nm	11.9	15	21	29	29.5	36.5	30.5	50	52	64	82	82	120	150	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.8	18.5	23	32.5	37	46.5	41.5	55	69	73	92	115	147	184	120	
			M_{2max}	Nm	43.5	58	72	102	116	146	130	173	215	230	285	360	416	368	192	
4.58 ... 4.69	14.2 ... 14.6	1.71 (2.55)	n_{2N}	r/min	600	500	375	300	250	200	200	150	125	125	100	75	75	60	50	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	10.7	13.3	19.7	26.5	32	40.5	35.5	47.5	58	60	78	99	108	134	105	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.9	18.6	23	32.5	37	46.5	41.5	55	69	74	92	116	148	185	120	
			M_{2max}	Nm	43.5	58	72	102	116	146	130	173	215	230	285	360	416	368	192	
7.42 ... 7.62	22.8 ... 23.5	2.65 (3.5)	n_{2N}	r/min	500	375	375	300	250	200	200	150	125	125	100	75	60	50	50	**1F.2105-6AF..-0..0-Z**
			M_{2N}	Nm	18.8	25.5	27.5	37	45	57	51	68	81	81	106	141	184	220	119	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30	38	53	60	76	68	90	113	120	150	188	240	230	120	
			M_{2max}	Nm	70	93	117	164	187	152	205	275	345	370	416	368	416	368	192	
7.8 ... 8.1	24.7 ... 25.5	4.6 (6.3)	n_{2N}	r/min	500	375	375	300	250	200	200	150	125	100	100	75	60	50	50	**1F.2106-3AF..-0..0-Z**
			M_{2N}	Nm	19.4	26.5	28.5	38	46.5	59	52	70	84	103	109	145	189	225	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	24	32	40	56	64	81	71	95	119	127	159	198	255	230	120	
			M_{2max}	Nm	76	101	127	177	192	152	225	300	368	400	416	368	416	368	192	
10.1 ... 10.5	31.5 ... 32.4	6 (7.6)	n_{2N}	r/min	500	375	375	250	250	200	200	125	100	100	75	75	60	50	37.5	**1F.2106-4AF..-0..0-Z**
			M_{2N}	Nm	23.5	32.5	33.5	53	53	68	60	97	121	123	163	165	210	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31.5	42	52	73	84	95	93	124	155	165	205	230	260	230	120	
			M_{2max}	Nm	97	129	161	216	192	152	285	380	368	416	416	368	416	368	192	
14.3 ... 14.9	43.4 ... 44.7	8.7 (10.4)	n_{2N}	r/min	500	375	300	250	200	200	150	125	100	100	75	75	60	60	–	**1F.2106-6AF..-0..0-Z**
			M_{2N}	Nm	31	42	54	69	85	87	101	122	151	152	200	199	255	215	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44.5	59	74	104	119	95	131	175	215	230	260	230	260	230	–	
			M_{2max}	Nm	134	178	220	216	192	152	336	416	368	416	416	365	416	368	–	
21.1 ... 21.5	84.1 ... 85.6	20.6 (24.7)	n_{2N}	r/min	375	300	250	150	150	150	125	100	75	75	60	60	50	37.5	–	**1FT2108-4AC..-0..0-Z**
			M_{2N}	Nm	40	50	61	104	106	95	118	144	193	190	240	210	245	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	64	85	107	135	120	95	190	250	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	
25.9 ... 26.4	102 ... 103	24.0 (28.0)	n_{2N}	r/min	375	300	250	200	200	150	125	100	75	75	75	60	50	37.5	–	**1FT2108-5AB..-0..0-Z**
			M_{2N}	Nm	50	63	77	96	90	95	142	174	225	230	210	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	79	105	131	135	120	95	210	260	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	
25.6 ... 26.2	102 ... 103	24.0 (28.0)	n_{2N}	r/min	375	250	200	150	150	150	125	100	75	60	60	60	50	37.5	–	**1FT2108-5AC..-0.B0-Z**
			M_{2N}	Nm	44.5	67	84	114	115	95	128	155	205	255	250	215	250	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	78	104	130	135	120	95	210	260	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 1- and 2-stage																			
0.366 ... 0.437	1.62 ... 1.67	0.2 (0.22)	n_{2N}	r/min	500	375	375	300	250	250	200	150	125	125	100	100	75	60	37.5	**1F.2203-2AK..-0..0-Z**
			M_{2N}	Nm	0.79	1.19	1.5	2.25	2.85	3	2.75	3.85	4.75	4.95	7	6.9	10.9	13.8	22	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.09	1.54	1.99	2.85	3.3	4.2	3.7	5	6.3	6.8	8.5	10.7	13.8	17.3	27.5	
			M_{2max}	Nm	4.85	6.5	8.2	11.6	13.3	16.7	14.8	19.8	24.5	26.5	33	41.5	53	66	106	

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Planetary gearbox data																
Gearbox type:			NRB120, 1-stage						NRB120, 2-stage							
1. Order code			A41						A42							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414
	$\varphi_{2,G}$	'	7						9								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 1- and 2-stage (continued)																			
0.985 ... 1.04	3.45 ... 3.54	0.35 (0.37)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	75	37.5	**1F.2203-4AK..-0..0-Z**
			M_{2N}	Nm	2.4	3.15	4.55	6.5	7	8.8	7.1	8.8	12.3	12.8	16.5	20.5	29	30.5	58	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.95	4	5	7.2	8.2	10.3	9.2	12.3	15.5	16.5	20.5	25.5	33	41.5	66	
			M_{2max}	Nm	10.4	14	17.5	24.5	28	35	31.5	42	52	56	70	87	112	140	192	
2.09 ... 2.14	6.64 ... 6.83	1.23 (1.31)	n_{2N}	r/min	600	500	375	375	300	250	250	200	150	150	125	100	75	60	37.5	**1F.2204-5AF..-0..0-Z**
			M_{2N}	Nm	5.6	7.3	10	11.4	15.2	18.9	15.9	19.5	27.5	27.5	36	45	63	79	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.2	8.4	10.6	14.9	17	21	19	25	31.5	34	42.5	53	68	85	120	
			M_{2max}	Nm	20	27	34	47.5	54	68	60	81	101	108	135	168	215	265	192	
2.11 ... 2.16	6.64 ... 6.83	1.23 (1.31)	n_{2N}	r/min	600	500	375	375	300	250	250	200	150	150	125	100	75	60	37.5	**1F.2204-5AK..-0..0-Z**
			M_{2N}	Nm	5.7	7.4	10.1	11.7	15.6	19.4	16.3	20	28	28	36.5	46	65	82	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.3	8.4	10.6	15	17.2	21.5	19.2	25.5	32	34	42.5	53	68	85	120	
			M_{2max}	Nm	20	27	34	47.5	54	68	60	81	101	108	135	168	215	265	192	
2.85 ... 2.92	8.94 ... 9.19	1.61 (1.69)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	125	100	100	75	60	50	**1F.2204-6AF..-0..0-Z**
			M_{2N}	Nm	7.8	10	13.9	19.7	20.5	25	21	25.5	36.5	44	55	59	86	108	111	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.6	11.5	14.4	20	23	29	26	34.5	43	46	57	72	92	115	120	
			M_{2max}	Nm	27.5	36.5	45.5	64	73	91	82	109	136	145	181	225	290	360	192	
3.08 ... 3.2	10.2 ... 10.5	3.15 (4.05)	n_{2N}	r/min	500	500	375	300	250	200	200	150	125	125	100	75	75	50	37.5	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	7.4	7.6	11.8	16.1	19.8	25	21.5	29	36	37.5	48.5	62	70	99	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	9.4	12.6	15.8	22	25.5	31.5	28	37.5	47	50	62	78	100	125	120	
			M_{2max}	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	330	368	192	
3.11 ... 3.23	10.2 ... 10.5	3.15 (4.05)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	50	**1F.2205-2AF..-0..0-Z**
			M_{2N}	Nm	7.4	9.7	13.1	18.3	19.6	24	20.5	24.5	35.5	35	45	57	80	101	100	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	9.5	12.7	16	22.5	25.5	32	28.5	38	47.5	50	63	79	101	127	120	
			M_{2max}	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	330	368	192	
3.05 ... 3.16	10.2 ... 10.5	3.15 (4.05)	n_{2N}	r/min	600	500	375	300	250	250	200	150	150	125	100	100	75	60	37.5	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	6.6	8.4	12.4	17	20	20.5	22	29.5	30.5	38.5	49	49	73	92	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	9.3	12.5	15.6	22	25	31.5	27.5	37	46.5	49.5	62	77	99	124	120	
			M_{2max}	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	330	368	192	
5.25 ... 5.46	17.1 ... 17.6	5.1 (6)	n_{2N}	r/min	500	375	375	300	250	200	200	150	125	125	100	75	60	50	37.5	**1F.2205-4AF..-0..0-Z**
			M_{2N}	Nm	12.6	17.5	19.1	25.5	31	40	35.5	48	57	58	76	101	132	159	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	16.2	21.5	27	38	43.5	54	48	64	80	85	107	134	171	210	120	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	
5.31 ... 5.45	17.1 ... 17.6	7.8 (9.4)	n_{2N}	r/min	500	375	300	250	200	150	150	125	100	100	75	60	50	37.5	37.5	**1FT2206-2AC..-0..0-Z**
			M_{2N}	Nm	11	15.5	20	25.5	32.5	43.5	41	50	63	64	87	109	136	178	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	16.2	21.5	27	38	43.5	54	48.5	64	80	86	107	134	172	215	120	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	
5.41 ... 5.62	17.1 ... 17.6	7.8 (9.4)	n_{2N}	r/min	600	500	375	300	250	200	200	150	125	125	100	75	75	60	37.5	**1F.2206-2AF..-0..0-Z**
			M_{2N}	Nm	12.2	15	21.5	29	35	44	39	52	64	66	84	108	115	143	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	16.7	22	27.5	39	44.5	56	49.5	66	82	88	110	138	176	220	119	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	

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Planetary gearbox data																
Gearbox type:			NRB120, 1-stage						NRB120, 2-stage							
1. Order code			A41						A42							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414
	$\varphi_{2,G}$	'	7						9								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 1- and 2-stage (continued)																			
5.25 ... 5.45	17.1 ... 17.6	7.8 (9.4)	n_{2N}	r/min	500	375	300	250	250	200	200	150	125	100	100	75	60	50	37.5	**1FT2206-2AH..-0..0-Z**
			M_{2N}	Nm	12.4	17.3	22	29	29	37.5	34.5	46	55	70	72	97	127	152	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	16.2	21.5	27	38	43.5	54	48	64	80	85	107	133	171	210	120	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	
7.94 ... 8.26	25.7 ... 26.4	11.5 (13.1)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2206-3AB..-0..0-Z**
			M_{2N}	Nm	17.5	24	31	40.5	50	66	47	74	93	95	127	158	199	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	24.5	32.5	41	57	66	82	73	97	121	129	162	200	255	230	120	
			M_{2max}	Nm	79	105	132	184	192	152	235	310	368	416	416	368	416	368	192	
7.81 ... 8.12	25.7 ... 26.4	11.5 (13.1)	n_{2N}	r/min	500	375	300	250	200	200	200	125	100	100	75	75	60	50	37.5	**1FT2206-3AF..-0..0-Z**
			M_{2N}	Nm	16.4	22.5	29.5	38	47.5	48	43.5	71	89	90	121	122	159	188	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	24	32	40.5	56	64	81	71	95	119	127	159	199	255	230	120	
			M_{2max}	Nm	79	105	132	184	192	152	235	310	368	416	416	368	416	368	192	
10.8 ... 11.1	36.2 ... 37.3	15.1 (16.8)	n_{2N}	r/min	375	300	250	150	150	125	125	100	75	75	60	50	37.5	37.5	30	**1FT2206-4AC..-0..0-Z**
			M_{2N}	Nm	20	25.5	31.5	54	55	67	66	82	109	109	138	165	225	210	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	33	44	55	77	88	95	99	131	164	175	215	230	260	230	120	
			M_{2max}	Nm	111	149	186	216	192	152	330	416	368	416	416	368	416	368	192	
10.6 ... 11	34.3 ... 35.3	15.1 (16.8)	n_{2N}	r/min	500	375	375	250	250	200	200	125	100	100	75	75	60	50	37.5	**1F.2206-4AF..-0..0-Z**
			M_{2N}	Nm	24	33	34	54	54	70	62	99	123	125	167	168	215	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	32.5	43.5	54	76	87	95	97	129	162	172	215	230	260	230	120	
			M_{2max}	Nm	106	141	176	216	192	152	310	416	368	416	416	368	416	368	192	
10.1 ... 10.5	34.3 ... 35.3	15.1 (16.8)	n_{2N}	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	50	37.5	**1FT2206-4AH..-0..0-Z**
			M_{2N}	Nm	18.5	25.5	33.5	51	53	71	66	80	100	99	136	169	205	190	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31	41.5	52	73	83	95	93	123	154	165	205	230	260	230	120	
			M_{2max}	Nm	106	141	176	216	192	152	310	416	368	416	416	368	416	368	192	
10.3 ... 10.6	36.2 ... 37.3	24.86 (28.16)	n_{2N}	r/min	375	300	250	200	150	125	150	100	100	75	60	50	50	37.5	30	**1FT2208-2AF..-0..0-Z**
			M_{2N}	Nm	25.5	32.5	40.5	52	68	84	67	99	96	132	167	200	199	225	119	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31.5	42.5	53	74	85	95	94	125	157	167	205	230	260	225	120	
			M_{2max}	Nm	111	148	185	216	192	152	330	416	368	416	416	368	416	368	192	
16.2 ... 16.6	48.6 ... 50.1	31.96 (34.96)	n_{2N}	r/min	375	250	200	150	150	125	125	100	75	60	50	50	37.5	37.5	–	**1FT2208-3AB..-0..0-Z**
			M_{2N}	Nm	27.5	42.5	54	74	74	89	87	106	143	176	210	205	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	49.5	66	82	116	120	95	148	197	230	260	260	230	260	230	–	
			M_{2max}	Nm	150	200	245	216	192	152	336	416	368	416	416	368	416	368	–	
15.2 ... 15.8	48.6 ... 50.1	31.96 (35.36)	n_{2N}	r/min	375	300	250	200	150	150	150	100	75	75	60	60	50	50	–	**1F.2208-3AC..-0..0-Z**
			M_{2N}	Nm	34.5	44	54	70	92	93	87	130	170	172	215	205	245	177	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	47	63	79	110	120	95	140	186	230	245	260	230	260	230	–	
			M_{2max}	Nm	150	200	245	216	192	152	336	416	368	416	416	368	416	368	–	
15.1 ... 15.7	48.6 ... 50.1	31.96 (35.36)	n_{2N}	r/min	375	300	250	200	150	150	125	100	75	75	60	50	50	37.5	–	**1FT2208-3AF..-0..0-Z**
			M_{2N}	Nm	32	41	50	64	86	84	98	123	162	162	205	230	225	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	47	62	78	109	120	95	139	185	230	245	260	230	260	230	–	
			M_{2max}	Nm	150	200	245	216	192	152	336	416	368	416	416	368	416	368	–	

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Planetary gearbox data																
Gearbox type:			**NRB120, 1-stage**						**NRB120, 2-stage**							
1. Order code			**A41**						**A42**							
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414
	$\varphi_{2,G}$	'	7						9								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 1- and 2-stage (continued)																				
19.7 ... 20.2	63.1 ... 64.9	41.16 (46.76)	n_{2N}	r/min	250	200	150	125	100	100	100	75	60	50	50	37.5	37.5	30	–	**1FT2208-4AB..-0..0-Z**
			M_{2N}	Nm	38	48.5	64	80	99	94	100	133	165	197	194	230	230	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	60	80	100	135	120	95	179	235	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	
18.9 ... 19.7	63.1 ... 64.9	41.16 (46.76)	n_{2N}	r/min	375	300	250	150	150	150	125	100	75	75	60	60	50	37.5	–	**1F.2208-4AC..-0..0-Z**
			M_{2N}	Nm	39.5	49.5	60	101	104	94	116	142	190	189	235	210	245	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	58	78	98	135	120	95	174	230	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	
18.2 ... 18.8	63.1 ... 64.9	41.16 (46.76)	n_{2N}	r/min	375	300	250	150	150	150	125	100	75	75	60	60	50	37.5	–	**1FT2208-4AF..-0..0-Z**
			M_{2N}	Nm	39.5	49.5	60	101	103	94	117	143	190	189	235	210	245	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	56	75	93	131	120	95	166	220	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	415	368	416	368	–	
22.9 ... 23.7	76.6 ... 78.7	50.46 (55.96)	n_{2N}	r/min	375	250	250	150	150	150	125	100	75	60	60	60	50	37.5	–	**1FT2208-5AB..-0..0-Z**
			M_{2N}	Nm	43	64	65	111	112	95	126	152	205	250	250	215	250	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	71	94	118	135	120	95	210	260	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	
22.7 ... 23.5	76.6 ... 78.7	50.46 (55.96)	n_{2N}	r/min	375	250	200	150	150	150	125	75	75	60	60	60	50	37.5	–	**1F.2208-5AC..-0..0-Z**
			M_{2N}	Nm	42.5	64	81	110	111	92	124	200	200	250	245	200	230	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	70	94	117	135	120	95	205	260	230	260	260	230	260	230	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	415	416	368	416	368	–	

Planetary gearbox data																
Gearbox type:			**NRB120, 1-stage**						**NRB120, 2-stage**							
1. Order code			**A41**						**A42**							
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414
	$\varphi_{2,G}$	'	7						9								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 3-stage													
0.379 ... 0.45	1.72 ... 1.77	0.093 (0.112)	n_{2N}	r/min	37.5	37.5	30	20	20	15	12.5	10	6	**1F.2103-2AH..-0..0-Z**
			M_{2N}	Nm	17.6	21	26.5	33.5	48	63	77	97	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	26.5	35.5	44.5	53	71	89	114	142	119	
			M_{2max}	Nm	104	139	174	205	275	345	416	368	191	
1 ... 1.06	3.74 ... 3.83	0.139 (0.158)	n_{2N}	r/min	37.5	37.5	30	20	20	15	12.5	10	6	**1F.2103-4AH..-0..0-Z**
			M_{2N}	Nm	44.5	52	66	86	113	147	181	225	119	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	62	83	104	125	167	205	260	230	119	
			M_{2max}	Nm	225	300	375	368	416	368	416	368	192	
1.03 ... 1.09	3.45 ... 3.54	0.35 (0.43)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	6	**1F.2104-4AF..-0..0-Z**
			M_{2N}	Nm	45	69	86	93	143	185	225	225	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	64	86	107	129	172	215	260	230	119	
			M_{2max}	Nm	205	275	345	368	416	368	416	368	192	
1.02 ... 1.08	3.55 ... 3.64	0.35 (0.43)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	6	**1F.2104-4AK..-0..0-Z**
			M_{2N}	Nm	47.5	76	95	98	157	198	250	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	64	85	107	128	171	210	260	230	119	
			M_{2max}	Nm	210	285	355	368	416	368	416	368	192	
2.13 ... 2.18	7.03 ... 7.23	0.56 (0.65)	n_{2N}	r/min	37.5	30	25	20	20	15	12.5	10	6	**1F.2104-5AF..-0..0-Z**
			M_{2N}	Nm	120	162	197	225	250	230	260	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	129	171	210	230	260	230	260	230	120	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	192	
2.12 ... 2.17	7.12 ... 7.33	0.56 (0.65)	n_{2N}	r/min	37.5	30	25	20	20	15	12.5	10	6	**1F.2104-5AK..-0..0-Z**
			M_{2N}	Nm	118	161	194	220	245	230	260	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	128	170	210	230	260	230	260	230	120	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	192	
2.87 ... 2.93	9.42 ... 9.69	0.76 (0.84)	n_{2N}	r/min	37.5	30	25	20	20	15	12.5	10	–	**1F.2104-6AF..-0..0-Z**
			M_{2N}	Nm	143	194	230	230	260	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	172	230	260	230	260	230	260	230	–	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	–	
4.55 ... 4.66	14.2 ... 14.6	1.71 (2.55)	n_{2N}	r/min	37.5	30	25	25	20	15	12.5	10	–	**1F.2105-4AF..-0..0-Z**
			M_{2N}	Nm	205	260	260	185	260	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	260	230	–	
			M_{2max}	Nm	416	416	415	368	416	368	416	368	–	
4.58 ... 4.69	14.2 ... 14.6	1.71 (2.55)	n_{2N}	r/min	30	30	25	20	20	15	12.5	10	–	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	230	240	260	230	255	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	260	230	–	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	–	
7.42 ... 7.62	22.8 ... 23.5	2.65 (3.5)	n_{2N}	r/min	37.5	30	25	20	20	15	–	–	–	**1F.2105-6AF..-0..0-Z**
			M_{2N}	Nm	235	260	260	230	260	230	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	–	–	–	
			M_{2max}	Nm	416	416	416	368	416	368	–	–	–	

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Planetary gearbox data										
Gearbox type:			**NRB120, 3-stage**							
1. Order code			**A43**							
i			**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
$M_{2N,G}$		Nm	260	260	260	230	260	230	260	230	120
$M_{2max,G}$		Nm	416	416	416	368	416	368	416	368	192
$M_{2Em.Off}$		Nm	520	520	520	500	520	500	520	500	380
$J_{1,G}$		kg cm²	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413
$\varphi_{2,G}$		'	11							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 3-stage (continued)														
7.8 ... 8.1	24.7 ... 25.5	4.6 (6.3)	n_{2N}	r/min	37.5	30	25	20	20	–	–	–	–	**1F.2106-3AF..-0..0-Z**
			M_{2N}	Nm	240	260	260	230	260	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	–	–	–	–	
			M_{2max}	Nm	410	415	416	368	416	–	–	–	–	
10.1 ... 10.5	31.5 ... 32.4	6 (7.6)	n_{2N}	r/min	37.5	30	25	20	–	–	–	–	–	**1F.2106-4AF..-0..0-Z**
			M_{2N}	Nm	245	260	260	230	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	–	–	–	–	–	
			M_{2max}	Nm	416	416	416	368	–	–	–	–	–	
14.3 ... 14.9	43.4 ... 44.7	8.7 (10.4)	n_{2N}	r/min	37.5	30	25	–	–	–	–	–	–	**1F.2106-6AF..-0..0-Z**
			M_{2N}	Nm	260	260	260	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	–	–	–	–	–	–	
			M_{2max}	Nm	416	416	416	–	–	–	–	–	–	
20.8 ... 20.8	83.3 ... 83.3	20.6 (24.7)	n_{2N}	r/min	30	–	–	–	–	–	–	–	–	**1FT2108-4AC..-0..0-Z**
			M_{2N}	Nm	255	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	416	–	–	–	–	–	–	–	–	
25.5 ... 25.5	101 ... 101	24.0 (28.0)	n_{2N}	r/min	25	–	–	–	–	–	–	–	–	**1FT2108-5AB..-0..0-Z**
			M_{2N}	Nm	260	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	416	–	–	–	–	–	–	–	–	
25.3 ... 25.3	101 ... 101	24.0 (28.0)	n_{2N}	r/min	30	–	–	–	–	–	–	–	–	**1FT2108-5AC..-0.B0-Z**
			M_{2N}	Nm	250	–	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	–	–	–	–	–	–	–	–	
			M_{2max}	Nm	416	–	–	–	–	–	–	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 3-stage														
0.366 ... 0.437	1.62 ... 1.67	0.2 (0.22)	n_{2N}	r/min	30	30	20	15	15	12.5	10	7.5	6	**1F.2203-2AK..-0..0-Z**
			M_{2N}	Nm	20	24	36	41	55	66	83	111	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	25.5	34.5	43	52	69	86	111	138	120	
			M_{2max}	Nm	98	131	164	197	260	325	416	368	192	
0.985 ... 1.04	3.45 ... 3.54	0.35 (0.37)	n_{2N}	r/min	37.5	30	25	20	20	15	12.5	10	6	**1F.2203-4AK..-0..0-Z**
			M_{2N}	Nm	49	67	82	94	114	152	183	225	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	62	82	103	124	165	205	260	230	120	
			M_{2max}	Nm	205	275	345	368	416	368	416	368	192	
2.09 ... 2.14	6.64 ... 6.83	1.23 (1.31)	n_{2N}	r/min	37.5	30	25	20	20	15	12.5	10	6	**1F.2204-5AF..-0..0-Z**
			M_{2N}	Nm	112	151	184	210	220	230	260	230	119	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	126	168	210	230	260	230	260	230	120	
			M_{2max}	Nm	400	416	416	368	416	368	416	368	192	
2.11 ... 2.16	6.64 ... 6.83	1.23 (1.31)	n_{2N}	r/min	37.5	30	25	20	20	15	12.5	10	6	**1F.2204-5AK..-0..0-Z**
			M_{2N}	Nm	116	157	188	215	225	230	260	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	127	169	210	230	260	230	260	230	120	
			M_{2max}	Nm	400	416	416	368	416	368	416	368	192	

➥ Continued on the next page

Planetary gearbox data										
Gearbox type:			**NRB120, 3-stage**							
1. Order code			**A43**							
	i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
	$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	120
	$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	192
	$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413
	$\varphi_{2,G}$	'	11							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 3-stage (continued)													
2.85 ... 2.92	8.94 ... 9.19	1.61 (1.69)	n_{2N} r/min	37.5	30	25	20	20	15	12.5	10	–	**1F.2204-6AF..-0..0-Z**
			M_{2N} Nm	148	200	235	230	260	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	172	225	260	230	260	230	260	230	–	
			M_{2max} Nm	416	416	416	368	416	368	416	368	–	
3.08 ... 3.2	10.2 ... 10.5	3.15 (4.05)	n_{2N} r/min	37.5	25	20	20	12.5	10	10	7.5	–	**1FT2205-2AC..-0..0-Z**
			M_{2N} Nm	121	190	235	210	260	230	255	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	185	245	260	230	260	230	260	230	–	
			M_{2max} Nm	416	416	416	368	416	368	416	368	–	
3.11 ... 3.23	10.2 ... 10.5	3.15 (4.05)	n_{2N} r/min	37.5	30	25	20	20	15	12.5	10	–	**1F.2205-2AF..-0..0-Z**
			M_{2N} Nm	143	192	230	230	250	230	260	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	187	245	260	230	260	230	260	225	–	
			M_{2max} Nm	416	416	416	368	416	368	416	368	–	
3.05 ... 3.16	10.2 ... 10.5	3.15 (4.05)	n_{2N} r/min	37.5	30	25	20	20	15	12.5	10	–	**1FT2205-2AH..-0..0-Z**
			M_{2N} Nm	128	172	200	225	199	225	255	225	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	183	240	260	225	260	230	255	225	–	
			M_{2max} Nm	416	416	416	368	416	368	416	368	–	
5.25 ... 5.46	17.1 ... 17.6	5.1 (6)	n_{2N} r/min	30	30	25	20	20	15	12.5	–	–	**1F.2205-4AF..-0..0-Z**
			M_{2N} Nm	240	230	260	230	220	230	260	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	260	230	260	–	–	
			M_{2max} Nm	416	416	416	368	416	368	416	–	–	
5.31 ... 5.45	17.1 ... 17.6	7.8 (9.4)	n_{2N} r/min	25	25	20	20	12.5	10	10	–	–	**1FT2206-2AC..-0..0-Z**
			M_{2N} Nm	255	250	260	187	260	230	260	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	260	230	260	–	–	
			M_{2max} Nm	416	416	416	368	416	368	416	–	–	
5.41 ... 5.62	17.1 ... 17.6	7.8 (9.4)	n_{2N} r/min	30	30	25	20	20	15	12.5	–	–	**1F.2206-2AF..-0..0-Z**
			M_{2N} Nm	250	250	260	230	220	230	260	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	255	225	255	–	–	
			M_{2max} Nm	416	416	416	368	416	368	416	–	–	
5.25 ... 5.45	17.1 ... 17.6	7.8 (9.4)	n_{2N} r/min	30	25	25	20	15	15	12.5	–	–	**1FT2206-2AH..-0..0-Z**
			M_{2N} Nm	230	255	230	225	255	225	215	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	225	255	225	255	–	–	
			M_{2max} Nm	416	416	416	368	416	368	416	–	–	
7.94 ... 8.26	25.7 ... 26.4	11.5 (13.1)	n_{2N} r/min	25	20	15	12.5	10	–	–	–	–	**1FT2206-3AB..-0..0-Z**
			M_{2N} Nm	260	260	260	230	260	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	260	–	–	–	–	
			M_{2max} Nm	416	416	416	368	416	–	–	–	–	
7.81 ... 8.12	25.7 ... 26.4	11.5 (13.1)	n_{2N} r/min	30	30	25	20	15	–	–	–	–	**1FT2206-3AF..-0..0-Z**
			M_{2N} Nm	260	235	255	230	260	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	260	–	–	–	–	
			M_{2max} Nm	416	416	416	368	416	–	–	–	–	

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Planetary gearbox data										
Gearbox type:			**NRB120, 3-stage**							
1. Order code			**A43**							
	i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
	$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	120
	$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	192
	$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413
	$\varphi_{2,G}$	'	11								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 3-stage (continued)													
10.8 ... 11.1	36.2 ... 37.3	15.1 (16.8)	n_{2N} r/min	25	20	20	15	–	–	–	–	–	**1FT2206-4AC..-0..0-Z**
			M_{2N} Nm	260	260	220	230	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	–	–	–	–	–	
			M_{2max} Nm	416	416	416	368	–	–	–	–	–	
10.6 ... 11	34.3 ... 35.3	15.1 (16.8)	n_{2N} r/min	37.5	30	25	20	–	–	–	–	–	**1F.2206-4AF..-0..0-Z**
			M_{2N} Nm	250	260	260	230	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	–	–	–	–	–	
			M_{2max} Nm	416	416	416	368	–	–	–	–	–	
10.1 ... 10.5	34.3 ... 35.3	15.1 (16.8)	n_{2N} r/min	30	25	25	20	–	–	–	–	–	**1FT2206-4AH..-0..0-Z**
			M_{2N} Nm	260	260	210	225	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	–	–	–	–	–	
			M_{2max} Nm	416	416	416	368	–	–	–	–	–	
10.3 ... 10.6	36.2 ... 37.3	24.86 (28.16)	n_{2N} r/min	30	25	20	15	–	–	–	–	–	**1FT2208-2AF..-0..0-Z**
			M_{2N} Nm	250	250	260	230	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	255	260	255	225	–	–	–	–	–	
			M_{2max} Nm	416	416	416	368	–	–	–	–	–	
16.2 ... 16.6	48.6 ... 50.1	31.96 (34.96)	n_{2N} r/min	25	20	15	–	–	–	–	–	–	**1FT2208-3AB..-0..0-Z**
			M_{2N} Nm	260	260	260	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	–	–	–	–	–	–	
			M_{2max} Nm	416	416	416	–	–	–	–	–	–	
15.2 ... 15.8	48.6 ... 50.1	31.96 (35.36)	n_{2N} r/min	30	25	20	–	–	–	–	–	–	**1F.2208-3AC..-0..0-Z**
			M_{2N} Nm	260	260	260	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	–	–	–	–	–	–	
			M_{2max} Nm	416	416	416	–	–	–	–	–	–	
15.1 ... 15.7	48.6 ... 50.1	31.96 (35.36)	n_{2N} r/min	30	25	20	–	–	–	–	–	–	**1FT2208-3AF..-0..0-Z**
			M_{2N} Nm	255	250	260	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	–	–	–	–	–	–	
			M_{2max} Nm	416	416	416	–	–	–	–	–	–	
19.7 ... 20.2	63.1 ... 64.9	41.16 (46.76)	n_{2N} r/min	25	20	–	–	–	–	–	–	–	**1FT2208-4AB..-0..0-Z**
			M_{2N} Nm	210	235	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	–	–	–	–	–	–	–	
			M_{2max} Nm	416	416	–	–	–	–	–	–	–	
18.9 ... 19.7	63.1 ... 64.9	41.16 (46.76)	n_{2N} r/min	30	25	–	–	–	–	–	–	–	**1F.2208-4AC..-0..0-Z**
			M_{2N} Nm	250	230	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	–	–	–	–	–	–	–	
			M_{2max} Nm	416	416	–	–	–	–	–	–	–	

➥ Continued on the next page

Planetary gearbox data										
Gearbox type:			**NRB120, 3-stage**							
1. Order code			**A43**							
	i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
	$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	120
	$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	192
	$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413
	$\varphi_{2,G}$	'	11								

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRB120

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)											
Nm	Nm	kg cm²											
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 3-stage (continued)													
18.2 ... 18.8	63.1 ... 64.9	41.16 (46.76)	n_{2N}	r/min	30	25	–	–	–	–	–	–	**1FT2208-4AF..-0..0-Z**
			M_{2N}	Nm	255	245	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	255	–	–	–	–	–	–	
			M_{2max}	Nm	416	416	–	–	–	–	–	–	
22.9 ... 23.7	76.6 ... 78.7	50.46 (55.96)	n_{2N}	r/min	25	–	–	–	–	–	–	–	**1FT2208-5AB..-0..0-Z**
			M_{2N}	Nm	260	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	–	–	–	–	–	–	–	
			M_{2max}	Nm	416	–	–	–	–	–	–	–	
22.7 ... 23.5	76.6 ... 78.7	50.46 (55.96)	n_{2N}	r/min	25	–	–	–	–	–	–	–	**1F.2208-5AC..-0..0-Z**
			M_{2N}	Nm	260	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	–	–	–	–	–	–	–	
			M_{2max}	Nm	416	–	–	–	–	–	–	–	

Planetary gearbox data										
Gearbox type:			**NRB120, 3-stage**							
1. Order code			**A43**							
	i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
	$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	120
	$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	192
	$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413
	$\varphi_{2,G}$	'	11								

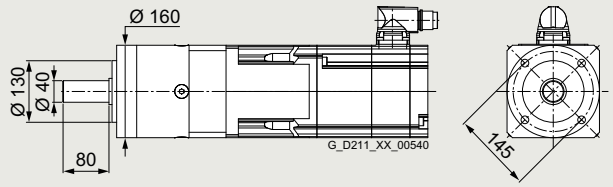
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRB160



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5000 N
Average axial force for 20000 h	$F_{A,eq}$	7000 N
Average radial force for 30000 h	$F_{R,eq}$	4200 N
Average axial force for 30000 h	$F_{A,eq}$	6000 N
Maximum radial force	$F_{R,max}$	5000 N
Maximum axial force	$F_{A,max}$	11000 N

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)															
Nm	Nm	kg cm²															
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB160 1- and 2-stage																	
4.16	14.1	1.71	n_{2N}	r/min	300	250	200	150	100	75	75	60	50	50	37.5	20	**1F.2105-4AF..-0..0-Z**
...	...	(2.55)	M_{2N}	Nm	11.2	14.8	19.5	31	44	57	60	76	95	96	136	245	■■■ + ■■■ + . . .
4.28	14.2		M_{2_0}	Nm	12.4	16.8	21	34	51	63	68	85	106	136	170	270	
			M_{2max}	Nm	42	56	70	113	169	210	225	280	350	450	560	720	
4.19	14.1	1.71	n_{2N}	r/min	300	250	200	150	100	75	75	60	50	37.5	37.5	20	**1FT2105-4AH..-0..0-Z**
...	...	(2.55)	M_{2N}	Nm	10.6	13.8	18.8	28.5	41	55	56	73	90	120	122	235	■■■ + ■■■ + . . .
4.31	14.2		M_{2_0}	Nm	12.5	16.9	21	34	51	64	68	85	107	137	172	275	
			M_{2max}	Nm	42	56	70	113	169	210	225	280	350	450	560	720	
7.13	22.8	2.65	n_{2N}	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	**1F.2105-6AF..-0..0-Z**
...	...	(3.5)	M_{2N}	Nm	16.5	21	29	43	60	83	82	110	132	187	230	350	■■■ + ■■■ + . . .
7.24	23.1		M_{2_0}	Nm	21	28.5	36	57	86	107	114	143	179	230	285	450	
			M_{2max}	Nm	69	92	115	184	270	340	365	455	570	720	910	720	
7.5	24.7	4.6	n_{2N}	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	**1F.2106-3AF..-0..0-Z**
...	...	(6.3)	M_{2N}	Nm	17.5	22.5	30.5	45.5	63	88	86	115	139	195	240	365	■■■ + ■■■ + . . .
7.65	25		M_{2_0}	Nm	22.5	30	38	61	90	112	120	150	187	240	300	450	
			M_{2max}	Nm	75	100	125	200	295	370	395	495	610	790	980	720	
9.84	31.5	6	n_{2N}	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	**1F.2106-4AF..-0..0-Z**
...	...	(7.6)	M_{2N}	Nm	22.5	28.5	39	56	76	108	104	140	167	235	295	435	■■■ + ■■■ + . . .
10	31.9		M_{2_0}	Nm	29.5	39.5	50	80	118	147	157	196	245	310	390	450	
			M_{2max}	Nm	95	127	159	255	375	470	500	630	780	1000	1120	720	
14.1	43.6	8.7	n_{2N}	r/min	300	200	200	125	75	60	60	50	37.5	37.5	25	20	**1F.2106-6AF..-0..0-Z**
...	...	(10.4)	M_{2N}	Nm	30	47	51	88	137	172	173	215	285	290	440	450	■■■ + ■■■ + . . .
14.4	44.3		M_{2_0}	Nm	42.5	57	71	114	168	210	225	280	350	450	560	450	
			M_{2max}	Nm	132	176	220	350	520	650	690	870	1090	1280	1120	720	
20.6	83.8	18.2	n_{2N}	r/min	250	200	150	100	75	50	50	37.5	37.5	30	20	20	**1FT2108-4AC..-0..0-Z**
...	...	(22.3)	M_{2N}	Nm	43	56	77	123	155	235	235	315	315	405	600	450	■■■ + ■■■ + . . .
21.1	85.2		M_{2_0}	Nm	63	84	105	168	245	310	330	410	510	660	700	450	
			M_{2max}	Nm	255	340	425	680	1010	1120	1280	1280	1120	1280	1120	720	

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Planetary gearbox data													
Gearbox type:			NRB160, 1-stage				NRB160, 2-stage							
1. Order code			A51				A52							
	i		3	4	5	8	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R08	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	400	450	450	450	800	700	800	800	700	800	700	450
	$M_{2max,G}$	Nm	640	720	720	720	1280	1120	1280	1280	1120	1280	1120	720
	$M_{2Em.Off}$	Nm	800	900	900	900	1600	1400	1600	1600	1400	1600	1400	900
	$J_{1,G}$	kg cm²	11.999	6.912	5.188	3.726	10.087	9.913	6.059	4.695	4.632	3.549	3.524	3.502
	$\varphi_{2,G}$	'	6				9							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB160

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB160 1- and 2-stage (continued)																	
25.4 ... 26	101 ... 103	21.6 (25.6)	n_{2N} r/min	250	200	150	125	75	60	50	37.5	37.5	30	25	20	**1FT2108-5AB..-0..0-Z**
			M_{2N} Nm	53	69	94	122	187	235	280	370	375	485	570	450	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	77	103	129	205	305	380	405	500	630	800	700	450	
			M_{2max} Nm	305	410	510	720	1220	1120	1280	1280	1120	1280	1120	720	
25.1 ... 25.7	101 ... 103	21.6 (25.6)	n_{2N} r/min	250	200	150	100	60	50	50	37.5	30	25	20	20	**1FT2108-5AC..-0.B0-Z**
			M_{2N} Nm	48.5	62	87	138	215	260	255	350	435	530	660	450	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	77	102	128	205	300	375	400	500	620	800	700	450	
			M_{2max} Nm	305	410	510	720	1220	1120	1280	1280	1120	1280	1120	720	
32.1 ... 32.8	135 ... 138	28.2 (32.2)	n_{2N} r/min	250	200	150	100	60	50	50	37.5	30	25	25	20	**1FT2108-7AB..-0..0-Z**
			M_{2N} Nm	62	80	110	174	260	315	315	425	530	650	620	450	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	98	131	164	260	385	480	510	640	700	800	700	450	
			M_{2max} Nm	410	540	680	720	1280	1120	1280	1280	1120	1280	1120	720	
31.5 ... 32.3	135 ... 138	28.2 (32.2)	n_{2N} r/min	250	200	150	100	60	50	50	37.5	30	25	25	20	**1FT2108-7AC..-0.B0-Z**
			M_{2N} Nm	60	77	107	169	255	310	305	410	510	630	600	450	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	96	128	161	255	375	470	500	630	700	800	700	450	
			M_{2max} Nm	410	540	680	720	1280	1120	1280	1280	1120	1280	1120	720	
31.3 ... 32	135 ... 138	28.2 (32.2)	n_{2N} r/min	250	200	150	100	60	50	50	37.5	30	25	20	20	**1FT2108-7AE..-0.B0-Z**
			M_{2N} Nm	55	71	100	158	240	290	285	390	490	590	690	445	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	95	127	160	255	375	470	500	620	700	800	700	450	
			M_{2max} Nm	410	540	680	720	1280	1120	1280	1280	1120	1280	1120	720	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB160 1- and 2-stage																	
2.65 ... 2.78	9.99 ... 10.1	3.15 (4.05)	n_{2N} r/min	300	250	200	150	100	75	75	60	50	37.5	37.5	20	**1FT2205-2AC..-0..0-Z**
			M_{2N} Nm	5.4	7.1	10.2	15.8	22.5	30.5	31	41	51	68	70	135	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	7.9	10.8	13.6	22	32.5	40.5	43.5	54	68	87	110	176	
			M_{2max} Nm	29.5	40	50	80	120	150	160	200	250	320	400	630	
2.68 ... 2.81	9.99 ... 10.1	3.15 (4.05)	n_{2N} r/min	300	250	250	150	100	75	75	75	60	50	37.5	25	**1F.2205-2AF..-0..0-Z**
			M_{2N} Nm	5.9	8.1	8.9	17.6	25	32	33.5	36.5	47	61	85	127	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	8	10.9	13.8	22	33	41	44	55	69	88	111	178	
			M_{2max} Nm	29.5	40	50	80	120	150	160	200	250	320	400	630	
2.62 ... 2.74	9.99 ... 10.1	3.15 (4.05)	n_{2N} r/min	300	250	200	150	100	75	75	60	50	37.5	37.5	20	**1FT2205-2AH..-0..0-Z**
			M_{2N} Nm	5.8	7.7	10.5	16.9	24	31	32.5	42.5	53	70	77	139	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	7.8	10.6	13.4	21.5	32	40.5	43	54	67	87	108	174	
			M_{2max} Nm	29.5	40	50	80	120	150	160	200	250	320	400	630	
4.91 ... 5.02	17 ... 17.2	5.1 (6)	n_{2N} r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	**1F.2205-4AF..-0..0-Z**
			M_{2N} Nm	10.4	13.4	18.8	28	40	56	55	74	89	127	160	240	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	14.7	19.8	24.5	40	59	74	78	98	123	158	197	315	
			M_{2max} Nm	51	68	85	137	200	255	270	335	420	540	670	720	
4.94 ... 5.06	17 ... 17.2	7.8 (9.4)	n_{2N} r/min	250	200	200	125	75	60	60	50	37.5	37.5	30	20	**1FT2206-2AC..-0..0-Z**
			M_{2N} Nm	12.2	16.5	17.5	31.5	52	65	67	85	110	119	150	220	■■■ + ■■■ + . . .
			$M_{2.0}$ Nm	14.8	19.9	25	40	60	75	80	100	126	161	200	320	
			M_{2max} Nm	51	68	85	137	200	255	270	335	420	540	670	720	

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Planetary gearbox data													
Gearbox type:		**NRB160, 1-stage**				**NRB160, 2-stage**							
1. Order code		**A51**				**A52**							
i		**3**	**4**	**5**	**8**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code		**R03**	**R04**	**R05**	**R08**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
$M_{2N,G}$	Nm	400	450	450	450	800	700	800	800	700	800	700	450
$M_{2max,G}$	Nm	640	720	720	720	1280	1120	1280	1280	1120	1280	1120	720
$M_{2Em.Off}$	Nm	800	900	900	900	1600	1400	1600	1600	1400	1600	1400	900
$J_{1,G}$	kg cm²	11.999	6.912	5.188	3.726	10.087	9.913	6.059	4.695	4.632	3.549	3.524	3.502
$\varphi_{2,G}$	'	6				9							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB160 1- and 2-stage (continued)																	
5.07 ... 5.18	17 ... 17.2	7.8 (9.4)	n_{2N}	r/min	300	250	200	150	100	75	75	60	50	37.5	37.5	20	**1F.2206-2AF..-0..0-Z**
			M_{2N}	Nm	12.1	16.1	21	33	47.5	61	64	82	102	134	143	260	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.2	20	25.5	41	61	76	81	102	127	163	200	325	
			M_{2max}	Nm	51	68	85	137	200	255	270	335	420	540	670	720	
4.9 ... 5.02	17 ... 17.2	7.8 (9.4)	n_{2N}	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	**1FT2206-2AH..-0..0-Z**
			M_{2N}	Nm	10.8	13.8	19.4	28	40.5	57	56	76	91	129	161	240	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.7	19.7	24.5	40	59	74	79	98	123	158	197	315	
			M_{2max}	Nm	51	68	85	137	200	255	270	335	420	540	670	720	
7.64 ... 7.79	25.7 ... 26	11.5 (13.1)	n_{2N}	r/min	300	200	200	125	75	75	60	50	50	37.5	30	20	**1FT2206-3AB..-0..0-Z**
			M_{2N}	Nm	15.7	25	27.5	48.5	76	79	99	125	124	177	220	330	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	23	30.5	38.5	62	91	114	122	152	191	240	305	450	
			M_{2max}	Nm	77	103	130	205	305	385	410	510	640	820	1020	720	
7.51 ... 7.66	25.7 ... 26	11.5 (13.1)	n_{2N}	r/min	250	200	200	125	75	75	60	50	37.5	37.5	30	20	**1FT2206-3AF..-0..0-Z**
			M_{2N}	Nm	18.2	24	26	46.5	75	76	96	121	157	170	210	310	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30	38	61	90	112	120	150	187	240	300	450	
			M_{2max}	Nm	77	103	130	205	305	385	410	510	640	820	1020	720	
10.6 ... 10.7	36.3 ... 36.9	15.1 (16.8)	n_{2N}	r/min	250	200	150	100	75	60	50	37.5	37.5	30	25	15	**1FT2206-4AC..-0..0-Z**
			M_{2N}	Nm	19.7	26	37	59	80	101	122	164	168	215	255	430	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31.5	42.5	53	85	127	159	169	210	265	340	420	450	
			M_{2max}	Nm	110	147	184	290	435	540	580	720	910	1160	1120	720	
10.3 ... 10.5	34.4 ... 34.9	15.1 (16.8)	n_{2N}	r/min	300	250	200	150	75	75	60	60	50	37.5	30	20	**1F.2206-4AF..-0..0-Z**
			M_{2N}	Nm	23	29	39.5	57	106	110	137	143	170	240	300	445	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31	41.5	52	84	123	154	164	205	255	325	410	450	
			M_{2max}	Nm	104	139	174	275	410	510	550	680	860	1100	1120	720	
9.83 ... 10	34.4 ... 34.9	15.1 (16.8)	n_{2N}	r/min	250	200	200	125	75	60	60	50	37.5	30	25	20	**1FT2206-4AH..-0..0-Z**
			M_{2N}	Nm	22.5	29.5	31.5	56	91	115	115	143	191	245	295	350	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29.5	39.5	49.5	80	117	147	157	196	245	310	390	450	
			M_{2max}	Nm	104	139	174	275	410	510	550	680	860	1100	1120	720	
10.1 ... 10.3	36.3 ... 36.9	22.5 (25.8)	n_{2N}	r/min	250	200	200	125	75	60	60	50	37.5	30	25	20	**1FT2208-2AF..-0..0-Z**
			M_{2N}	Nm	25	33.5	35	62	98	123	126	158	205	260	320	370	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30.5	40.5	51	82	121	151	161	200	250	320	400	450	
			M_{2max}	Nm	110	147	184	290	435	540	580	720	910	1160	1120	720	
16.1 ... 16.3	48.9 ... 49.7	29.6 (32.6)	n_{2N}	r/min	250	200	150	100	60	50	50	37.5	30	25	20	15	**1FT2208-3AB..-0..0-Z**
			M_{2N}	Nm	29.5	38.5	54	87	143	174	174	235	290	360	450	450	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	48.5	64	81	130	193	240	255	320	400	510	640	450	
			M_{2max}	Nm	149	198	245	395	580	730	780	980	1120	1280	1120	720	
15 ... 15.3	48.9 ... 49.7	29.6 (33)	n_{2N}	r/min	250	200	200	125	75	60	60	50	37.5	30	25	20	**1F.2208-3AC..-0..0-Z**
			M_{2N}	Nm	35	46	48.5	85	134	169	167	205	275	355	425	450	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	45.5	61	76	122	180	225	240	300	375	480	590	450	
			M_{2max}	Nm	149	198	245	395	580	730	780	980	1120	1280	1120	720	

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Planetary gearbox data													
Gearbox type:			**NRB160, 1-stage**				**NRB160, 2-stage**						
1. Order code			**A51**				**A52**						
	i		**3**	**4**	**5**	**8**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R08**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
	$M_{2N,G}$	Nm	400	450	450	450	800	700	800	800	700	800	700	450
	$M_{2max,G}$	Nm	640	720	720	720	1280	1120	1280	1280	1120	1280	1120	720
	$M_{2Em.Off}$	Nm	800	900	900	900	1600	1400	1600	1600	1400	1600	1400	900
	$J_{1,G}$	kg cm²	11.999	6.912	5.188	3.726	10.087	9.913	6.059	4.695	4.632	3.549	3.524	3.502
	$\varphi_{2,G}$	'	6				9							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRB160

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB160 1- and 2-stage (continued)																	
14.9 ... 15.2	48.9 ... 49.7	29.6 (33)	n_{2N} r/min	250	200	150	125	75	60	60	50	37.5	30	25	20	**1FT2208-3AF..-0..0-Z**
			M_{2N} Nm	34	44.5	61	80	129	163	161	198	265	340	410	440	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	45	60	76	121	179	220	235	295	370	475	590	450	
			M_{2max} Nm	149	198	245	395	580	730	780	980	1120	1280	1120	720	
19.4 ... 19.8	63.5 ... 64.5	38.8 (44.4)	n_{2N} r/min	200	150	125	75	60	50	37.5	37.5	30	25	20	15	**1FT2208-4AB..-0..0-Z**
			M_{2N} Nm	37	51	64	111	143	171	225	230	290	350	440	450	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	59	79	99	158	230	290	310	385	480	620	700	450	
			M_{2max} Nm	193	255	320	510	760	950	1010	1270	1120	1280	1120	720	
18.7 ... 19.1	63.5 ... 64.5	38.8 (44.4)	n_{2N} r/min	250	200	150	125	75	60	50	50	37.5	30	25	20	**1F.2208-4AC..-0..0-Z**
			M_{2N} Nm	42	54	75	97	154	194	230	230	315	400	480	450	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	57	76	95	153	220	280	295	370	465	590	700	450	
			M_{2max} Nm	193	255	320	510	760	950	1010	1270	1120	1280	1120	720	
18 ... 18.3	63.5 ... 64.5	38.8 (44.4)	n_{2N} r/min	250	200	150	125	75	60	50	50	37.5	30	25	20	**1FT2208-4AF..-0..0-Z**
			M_{2N} Nm	42.5	55	74	97	155	195	230	230	315	405	480	450	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	54	73	91	146	215	270	285	355	445	570	700	450	
			M_{2max} Nm	193	255	320	510	760	950	1010	1270	1120	1280	1120	720	
22.7 ... 23.3	77 ... 78.3	48.1 (53.6)	n_{2N} r/min	250	200	150	100	60	50	50	37.5	30	25	20	20	**1FT2208-5AB..-0..0-Z**
			M_{2N} Nm	47	61	84	134	205	250	250	340	420	520	650	450	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	69	92	116	186	270	340	360	455	560	720	700	450	
			M_{2max} Nm	230	310	390	620	920	1120	1230	1280	1120	1280	1120	720	
22.4 ... 23	77 ... 78.3	48.1 (53.6)	n_{2N} r/min	250	200	150	100	60	50	50	37.5	30	25	20	20	**1F.2208-5AC..-0..0-Z**
			M_{2N} Nm	47.5	61	85	135	210	255	250	340	425	520	650	450	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	68	91	114	183	270	335	355	445	560	710	700	450	
			M_{2max} Nm	230	310	390	620	920	1120	1230	1280	1120	1280	1120	720	

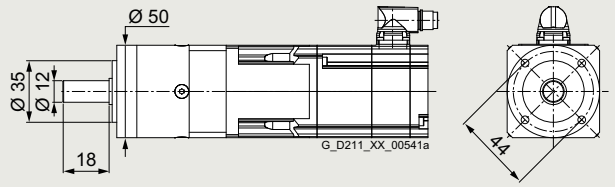
Planetary gearbox data													
Gearbox type:			**NRB160, 1-stage**				**NRB160, 2-stage**						
1. Order code			**A51**				**A52**						
i			**3**	**4**	**5**	**8**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R08**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
$M_{2N,G}$		Nm	400	450	450	450	800	700	800	800	700	800	700	450
$M_{2max,G}$		Nm	640	720	720	720	1280	1120	1280	1280	1120	1280	1120	720
$M_{2Em.Off}$		Nm	800	900	900	900	1600	1400	1600	1600	1400	1600	1400	900
$J_{1,G}$		kg cm²	11.999	6.912	5.188	3.726	10.087	9.913	6.059	4.695	4.632	3.549	3.524	3.502
$\varphi_{2,G}$		'	6				9							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRK050



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	800 N
Average axial force for 20000 h	$F_{A,eq}$	1000 N
Average radial force for 30000 h	$F_{R,eq}$	700 N
Average axial force for 30000 h	$F_{A,eq}$	800 N
Maximum radial force	$F_{R,max}$	1300 N
Maximum axial force	$F_{A,max}$	1000 N

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK050 1- and 2-stage																			
0.5	1.86	0.1396	n_{2N}	r/min	750	600	600	375	375	300	300	250	200	200	150	125	100	100	60	1F.2103-2AH..-2..0-Z
...	...	(0.1586)	M_{2N}	Nm	1.11	1.47	1.55	2.55	2.65	3.35	3.3	4.15	5.2	5.2	7.1	8.6	10.9	9.8	7.5	■■■ + ■■■ + . . .
0.509	1.89		$M_{2.0}$	Nm	1.5	2	2.5	3.5	4.05	5	4.5	6	7.5	8	10	12.5	15	13	7.5	
			M_{2max}	Nm	5.6	7.5	9.4	13.1	9.5	8	16.8	22	21	24	24	21	24	21	12	
0.964	3.9	0.1856	n_{2N}	r/min	750	600	600	375	375	375	300	250	200	200	150	150	125	100	–	1F.2103-4AH..-2..0-Z
...	...	(0.2046)	M_{2N}	Nm	1.99	2.6	2.7	4.5	4.55	4.15	5.7	6.9	8.8	8.7	11.9	10.8	12.4	13	–	■■■ + ■■■ + . . .
0.978	3.96		$M_{2.0}$	Nm	2.9	3.85	4.85	6.8	6	5	8.6	11.5	13	15	15	13	15	13	–	
			M_{2max}	Nm	11.8	15.8	19.7	13.5	9.5	8	19	24	21	24	24	21	24	21	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK050 1- and 2-stage																			
0.531	1.76	0.2466	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	150	150	100	75	75	60	1F.2203-2AK..-2..0-Z
...	...	(0.2666)	M_{2N}	Nm	1	1.32	1.63	2.25	2.2	2.85	2.75	3.3	4.15	5.5	5.6	8.5	11.2	11.5	7.5	■■■ + ■■■ + . . .
0.539	1.79		$M_{2.0}$	Nm	1.59	2.1	2.65	3.75	4.3	5	4.8	6.4	8	8.5	10.6	13	15	13	7.5	
			M_{2max}	Nm	5.3	7.1	8.9	12.4	9.5	8	15.9	21	21	24	24	21	24	21	12	
1.1	3.61	0.3966	n_{2N}	r/min	750	500	500	300	300	300	250	200	150	150	125	125	100	75	–	1F.2203-4AK..-2..0-Z
...	...	(0.4166)	M_{2N}	Nm	1.96	3	3.05	5.3	5.3	4.7	6.6	8.3	11.1	11.1	13.4	11.4	14.2	13	–	■■■ + ■■■ + . . .
1.12	3.66		$M_{2.0}$	Nm	3.3	4.4	5.5	7.7	6	5	9.9	13.2	13	15	15	13	15	13	–	
			M_{2max}	Nm	10.9	14.6	18.2	13.5	9.5	8	19	24	21	24	24	21	24	21	–	

Planetary gearbox data																
Gearbox type:			NRK050, 1-stage						NRK050, 2-stage							
1. Order code			B11						B12							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	11	15	13	8.5	6	5	12	15	13	15	15	13	15	13	7.5
	$M_{2max,G}$	Nm	17.5	24	21	13.5	9.5	8	19	24	21	24	24	21	24	21	12
	$M_{2Em.Off}$	Nm	22.5	30	36	26	27	27	33	40	36	40	40	36	40	36	27
	$J_{1,G}$	kg cm²	0.03	0.022	0.02	0.016	0.015	0.015	0.026	0.026	0.025	0.02	0.018	0.018	0.015	0.015	0.015
	$\varphi_{2,G}$	'	15						19								

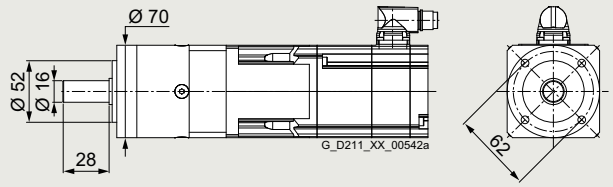
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRK070

Selection and ordering data

NRK070



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1050 N
Average axial force for 20000 h	$F_{A,eq}$	1350 N
Average radial force for 30000 h	$F_{R,eq}$	900 N
Average axial force for 30000 h	$F_{A,eq}$	1000 N
Maximum radial force	$F_{R,max}$	1650 N
Maximum axial force	$F_{A,max}$	2100 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK070 1- and 2-stage																					
0.5	1.84	0.093	n_{2N}	r/min	600	600	500	375	375	300	375	250	250	200	200	150	125	100	60	37.5	**1F.2103-2AH..-2..0-Z**
...	...	(0.112)	M_{2N}	Nm	1.09	1.36	1.84	2.75	2.95	3.9	2.85	4.55	5.2	6.1	6.6	9.2	11.5	14.5	18	15	■■■ + ■■■ + . . .
0.543	1.87		$M_{2.0}$	Nm	1.5	2.05	2.6	3.7	4.25	5.3	4.75	6.4	8	8.5	10.7	13.5	17.3	21.5	18	15	
			M_{2max}	Nm	5.5	7.4	9.2	13	14.9	18.7	16.6	22	27.5	29.5	37	46	53	48	29	24	
0.997	3.89	0.139	n_{2N}	r/min	600	600	500	375	375	300	300	250	200	200	150	150	100	100	60	–	**1F.2103-4AH..-2..0-Z**
...	...	(0.158)	M_{2N}	Nm	2.1	2.5	3.3	4.95	5.2	6.8	6.4	8.1	10.8	10.8	14.7	15.1	23	23	18	–	■■■ + ■■■ + . . .
1.03	3.94		$M_{2.0}$	Nm	2.95	4	5	7.1	8.2	10.3	9.1	12.2	15.3	16.4	20.5	25.5	32.5	30	18	–	
			M_{2max}	Nm	11.7	15.6	19.6	27.5	29	24	35	46.5	53	53	53	48	53	48	29	–	
1.15	3.6	0.371	n_{2N}	r/min	750	600	600	500	375	300	375	250	200	200	150	125	100	75	50	–	**1F.2104-4AF..-2..0-Z**
...	...	(0.451)	M_{2N}	Nm	2.7	3.9	4.4	5.8	7.8	10	7.8	11.6	14.9	15.5	19.9	24.5	31.5	30	18	–	■■■ + ■■■ + . . .
1.19	3.64		$M_{2.0}$	Nm	3.45	4.65	5.8	8.2	9.4	11.8	10.5	14.1	17.7	18.9	23.5	29.5	33	30	18	–	
			M_{2max}	Nm	10.8	14.5	18.1	25	29	24	32	43	53	53	53	48	53	48	29	–	
1.15	3.7	0.371	n_{2N}	r/min	750	600	600	500	375	375	375	300	250	200	200	150	125	100	60	–	**1F.2104-4AK..-2..0-Z**
...	...	(0.451)	M_{2N}	Nm	2.85	4.1	4.6	6.1	8.3	8.9	8.1	10.5	13.7	16.7	17.4	23.5	29	30	18	–	■■■ + ■■■ + . . .
1.18	3.74		$M_{2.0}$	Nm	3.4	4.6	5.8	8.2	9.4	11.8	10.5	14	17.6	18.7	23.5	29	33	30	18	–	
			M_{2max}	Nm	11.1	14.9	18.6	26	29	24	33	44	53	53	53	48	53	48	29	–	
2.26	7.24	0.581	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	–	–	**1F.2104-5AF..-2..0-Z**
...	...	(0.671)	M_{2N}	Nm	4.5	6.4	8.2	11.8	12.2	15	14.6	17.9	23.5	23	31.5	30	33	30	–	–	■■■ + ■■■ + . . .
2.29	7.33		$M_{2.0}$	Nm	6.7	9	11.3	15.9	18	15	20	27	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	21.5	29	36.5	40	29	24	53	53	53	53	53	48	53	48	–	–	
2.24	7.34	0.581	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	150	125	100	–	–	**1F.2104-5AK..-2..0-Z**
...	...	(0.671)	M_{2N}	Nm	4.45	6.3	8.1	11.6	12	15	14.4	17.7	23	23	31	30	33	30	–	–	■■■ + ■■■ + . . .
2.27	7.43		$M_{2.0}$	Nm	6.7	9	11.3	15.8	18	15	20	27	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	22	29.5	37	40	29	24	53	53	53	53	53	48	53	48	–	–	
3.01	9.66	0.781	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	–	–	125	100	75	–	–	**1F.2104-6AF..-2..0-Z**
...	...	(0.861)	M_{2N}	Nm	5.4	7.7	9.8	14.1	14.5	15	17	20.5	27	–	–	30	33	30	–	–	■■■ + ■■■ + . . .
3.04	9.79		$M_{2.0}$	Nm	9	12	15.1	21	18	15	27	33	33	–	–	30	33	30	–	–	
			M_{2max}	Nm	29	39	48	40	29	24	53	53	53	–	–	48	53	48	–	–	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:		NRK070, 1-stage						NRK070, 2-stage									
1. Order code		B21						B22									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$ Nm	28	33	30	25	18	15	33	33	33	33	33	30	33	30	18	15
	$M_{2max,G}$ Nm	45	53	48	40	29	24	53	53	53	53	53	48	53	48	29	24
	$M_{2Em.Off}$ Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
	$J_{1.G}$ kg cm²	0.174	0.117	0.095	0.078	0.074	0.069	0.126	0.121	0.078	0.087	0.076	0.075	0.067	0.066	0.066	0.064
	$\varphi_{2,G}$ '	10						12									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK070 1- and 2-stage (continued)																					
4.68 ... 4.73	14.5 ... 14.7	1.98 (2.82)	n_{2N}	r/min	600	500	375	300	300	300	–	–	150	150	150	125	100	75	–	–	**1F.2105-4AF..-0..0-Z**
			M_{2N}	Nm	9.1	11.4	16.3	21	18	13.4	–	–	33	33	28	29	32.5	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.1	18.8	23.5	25	18	15	–	–	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	44	53	48	40	29	24	–	–	53	53	53	48	53	48	–	–	
4.71 ... 4.77	14.5 ... 14.7	1.98 (2.82)	n_{2N}	r/min	500	375	300	250	250	250	200	150	150	150	125	100	75	75	–	–	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	9.6	13.5	17.4	21.5	18	15	26	33	32	30	33	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.2	19	23.5	25	18	15	33	33	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	44	53	48	40	29	24	53	53	53	53	53	48	53	48	–	–	
7.21 ... 7.3	23.2 ... 23.6	2.92 (3.77)	n_{2N}	r/min	500	375	–	300	300	250	200	200	150	150	125	100	–	–	–	–	**1F.2105-6AF..-0..0-Z**
			M_{2N}	Nm	14	19.5	–	24	18	15	33	28	33	33	33	30	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21.5	29	–	25	18	15	33	33	33	33	33	30	–	–	–	–	
			M_{2max}	Nm	45	53	–	40	29	24	53	53	53	53	53	48	–	–	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK070 1- and 2-stage																					
0.489 ... 0.533	1.74 ... 1.77	0.2 (0.22)	n_{2N}	r/min	600	600	500	375	375	300	300	250	200	200	150	125	100	75	60	37.5	**1F.2203-2AK..-2..0-Z**
			M_{2N}	Nm	1.01	1.21	1.62	2.4	2.5	3.3	3	3.8	5.1	5	6.9	8.5	10.8	14.5	17	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.46	2	2.55	3.6	4.15	5.2	4.65	6.2	7.8	8.4	10.5	13.2	16.9	21	18	15	
			M_{2max}	Nm	5.2	7	8.8	12.3	14.1	17.7	15.8	21	26	28	35	44	53	48	29	24	
1.11 ... 1.14	3.6 ... 3.64	0.35 (0.37)	n_{2N}	r/min	600	500	375	375	300	250	250	200	200	150	150	100	100	75	60	–	**1F.2203-4AK..-2..0-Z**
			M_{2N}	Nm	2.25	3.1	4.35	4.85	6.3	7.9	7.6	9.9	10.3	13.8	14.2	21.5	21.5	29.5	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.3	4.45	5.6	7.9	9.1	11.4	10.1	13.6	17	18.1	22.5	28	33	30	18	–	
			M_{2max}	Nm	10.8	14.5	18.1	25	29	24	32	43	53	53	53	48	53	48	29	–	
2.22 ... 2.25	6.85 ... 6.94	1.251 (1.331)	n_{2N}	r/min	600	600	500	375	300	300	300	200	200	150	150	125	100	75	–	–	**1F.2204-5AF..-2..0-Z**
			M_{2N}	Nm	5.1	5.7	7.3	10.5	13.4	13.5	12.9	20	20.5	27	27.5	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.6	8.9	11.1	15.6	17.9	15	20	26.5	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	20.5	27.5	34.5	40	29	24	53	53	53	53	53	48	53	48	–	–	
2.23 ... 2.26	6.85 ... 6.94	1.251 (1.331)	n_{2N}	r/min	600	600	500	375	300	300	300	200	200	150	150	125	100	100	–	–	**1F.2204-5AK..-2..0-Z**
			M_{2N}	Nm	5.2	5.8	7.5	10.7	13.6	13.8	13.2	20	21	27.5	28	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.6	8.9	11.2	15.7	18	15	20	26.5	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	20.5	27.5	34.5	40	29	24	53	53	53	53	53	48	53	48	–	–	
2.99 ... 3.02	9.18 ... 9.3	1.631 (1.711)	n_{2N}	r/min	600	500	500	375	300	300	250	200	200	–	150	125	100	75	–	–	**1F.2204-6AF..-2..0-Z**
			M_{2N}	Nm	6.8	9	9.6	13.6	17.4	15	19.9	25.5	25.5	–	33	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.9	12	15	21	18	15	26.5	33	33	–	33	30	33	30	–	–	
			M_{2max}	Nm	27.5	37	46	40	29	24	53	53	53	–	53	48	53	48	–	–	
2.84 ... 2.87	10.4 ... 10.5	3.42 (4.32)	n_{2N}	r/min	500	375	300	250	200	200	200	150	125	100	100	100	75	50	–	–	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	5.4	7.9	10.3	12.9	16.4	15	16.4	22	27	33	32.5	26.5	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.5	11.4	14.2	20	18	15	25.5	33	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	31.5	42	48	40	29	24	53	53	53	53	53	48	53	48	–	–	
2.89 ... 2.93	10.4 ... 10.5	3.42 (4.32)	n_{2N}	r/min	500	500	375	300	250	250	200	150	150	125	125	100	75	75	–	–	**1F.2205-2AF..-0..0-Z**
			M_{2N}	Nm	7	7.5	10.8	14	17.1	15	20.5	28	28.5	33	32	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.6	11.6	14.5	20	18	15	26	33	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	31.5	42	48	40	29	24	53	53	53	53	53	48	53	48	–	–	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:		NRK070, 1-stage						NRK070, 2-stage									
1. Order code		B21						B22									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	28	33	30	25	18	15	33	33	33	33	33	30	33	30	18	15
$M_{2max,G}$	Nm	45	53	48	40	29	24	53	53	53	53	53	48	53	48	29	24
$M_{2Em.Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm²	0.174	0.117	0.095	0.078	0.074	0.069	0.126	0.121	0.078	0.087	0.076	0.075	0.067	0.066	0.066	0.064
$\varphi_{2,G}$	'	10						12									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRK070

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK070 1- and 2-stage (continued)																			
2.87 ... 2.9	10.4 ... 10.5	3.42 (4.32)	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	100	75	75	–	–	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	6.1	8.7	9	14.4	14.4	15	18.2	24.5	30	29.5	33	30	33	24.5	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.6	11.5	14.4	20	18	15	25.5	33	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	31.5	42	48	40	29	24	53	53	53	53	53	48	53	48	–	–	
4.93 ... 4.99	17.4 ... 17.7	5.37 (6.27)	n_{2N}	r/min	500	375	300	250	250	250	200	150	150	125	125	100	75	–	–	–	**1F.2205-4AF..-0..0-Z**
			M_{2N}	Nm	9.3	13.1	16.9	21	18	14.2	25.5	33	30.5	33	31	30	33	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.9	19.9	24.5	25	18	15	33	33	33	33	33	30	33	–	–	–	
			M_{2max}	Nm	45	53	48	40	29	24	53	53	53	53	53	48	53	–	–	–	

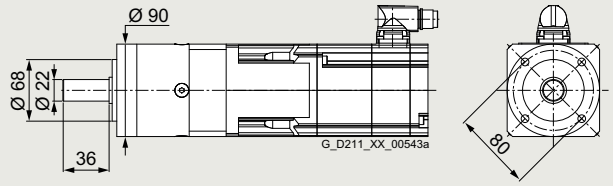
Planetary gearbox data																	
Gearbox type:			NRK070, 1-stage						NRK070, 2-stage								
1. Order code			B21						B22								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	28	33	30	25	18	15	33	33	33	33	33	30	33	30	18	15
	$M_{2max,G}$	Nm	45	53	48	40	29	24	53	53	53	53	53	48	53	48	29	24
	$M_{2Em.Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
	$J_{1,G}$	kg cm²	0.174	0.117	0.095	0.078	0.074	0.069	0.126	0.121	0.078	0.087	0.076	0.075	0.067	0.066	0.066	0.064
	$\varphi_{2,G}$	'	10						12									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRK090



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1900 N
Average axial force for 20000 h	$F_{A,eq}$	2000 N
Average radial force for 30000 h	$F_{R,eq}$	1700 N
Average axial force for 30000 h	$F_{A,eq}$	1500 N
Maximum radial force	$F_{R,max}$	3100 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK090 1- and 2-stage																					
0.445	1.78	0.093	n_{2N}	r/min	600	500	500	375	375	300	300	250	200	200	150	150	125	100	60	37.5	1F.2103-2AH..-0..0-Z
...	...	(0.112)	M_{2N}	Nm	0.86	1.28	1.54	2.4	2.6	3.5	2.95	3.85	4.95	5.2	7.2	7.7	10	12.8	21.5	34.5	■■■ + ■■■ + . . .
0.515	1.83		$M_{2.0}$	Nm	1.33	1.86	2.35	3.4	3.95	5	4.45	6	7.5	8	10.1	12.7	16.3	20.5	32.5	38	
			M_{2max}	Nm	5.3	7.2	9	12.7	14.6	18.3	16.3	21.5	27	29	36	45.5	58	73	80	61	
0.998	3.86	0.139	n_{2N}	r/min	600	500	500	375	300	300	300	200	200	200	150	125	100	75	50	37.5	1F.2103-4AH..-0..0-Z
...	...	(0.158)	M_{2N}	Nm	1.96	2.75	3.05	4.85	6.2	6.7	6.1	9.4	9.8	10	14.7	17.9	23.5	31	48.5	38	■■■ + ■■■ + . . .
1.05	3.9		$M_{2.0}$	Nm	2.95	4.05	5.1	7.2	8.3	10.5	9.3	12.4	15.6	16.6	20.5	26	33.5	41.5	50	38	
			M_{2max}	Nm	11.5	15.4	19.3	27	31	38.5	34.5	46	57	61	77	96	123	131	80	61	
1.1	3.56	0.35	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	30	1F.2104-4AF..-2..0-Z
...	...	(0.43)	M_{2N}	Nm	2.3	3.5	4.65	6.8	7.5	9.6	8.4	10.9	13.8	14.5	19.2	23.5	30.5	39.5	50	38	■■■ + ■■■ + . . .
1.15	3.6		$M_{2.0}$	Nm	3.25	4.45	5.6	7.9	9.1	11.4	10.2	13.7	17.1	18.3	22.5	28.5	36.5	46	50	38	
			M_{2max}	Nm	10.6	14.3	17.9	25	28.5	36	32	42.5	53	57	71	89	114	131	80	61	
1.09	3.66	0.35	n_{2N}	r/min	600	600	500	375	375	300	300	250	200	200	150	150	125	100	60	37.5	1F.2104-4AK..-2..0-Z
...	...	(0.43)	M_{2N}	Nm	3.05	3.7	5	7.4	8.1	10.4	9.2	11.9	15.1	15.8	20.5	21.5	27.5	35	50	38	■■■ + ■■■ + . . .
1.15	3.7		$M_{2.0}$	Nm	3.25	4.4	5.6	7.9	9.1	11.4	10.1	13.6	17	18.2	22.5	28.5	36.5	45.5	50	38	
			M_{2max}	Nm	10.9	14.6	18.4	25.5	29.5	37	33	44	55	58	73	91	117	131	80	61	
2.2	7.19	0.56	n_{2N}	r/min	600	500	500	375	300	300	300	200	150	150	150	125	100	75	50	30	1F.2104-5AF..-2..0-Z
...	...	(0.65)	M_{2N}	Nm	5.4	7.3	8	12	15.3	16.1	14.7	22.5	30	31	32.5	39	51	69	50	38	■■■ + ■■■ + . . .
2.25	7.29		$M_{2.0}$	Nm	6.6	8.8	11.1	15.6	17.9	22	20	26.5	33	35.5	44.5	55	71	82	50	38	
			M_{2max}	Nm	21.5	29	36	50	58	61	65	86	108	115	144	131	144	131	80	61	
2.19	7.29	0.56	n_{2N}	r/min	600	500	500	375	300	300	300	200	150	150	150	125	100	75	60	37.5	1F.2104-5AK..-2..0-Z
...	...	(0.65)	M_{2N}	Nm	5.3	7.2	7.8	11.8	15	15.8	14.4	22	29.5	30.5	32	38.5	50	68	50	38	■■■ + ■■■ + . . .
2.23	7.39		$M_{2.0}$	Nm	6.5	8.8	11	15.5	17.8	22	19.9	26.5	33	35	44	55	71	82	50	38	
			M_{2max}	Nm	22	29	36.5	51	59	61	65	87	109	117	144	131	144	131	80	61	
2.95	9.62	0.76	n_{2N}	r/min	600	500	500	375	300	250	250	200	150	150	125	100	100	75	50	–	1F.2104-6AF..-2..0-Z
...	...	(0.84)	M_{2N}	Nm	6.6	8.9	9.6	14.3	18.3	22.5	20.5	27	35.5	36.5	45.5	57	59	80	50	–	■■■ + ■■■ + . . .
3	9.75		$M_{2.0}$	Nm	8.8	11.8	14.8	20.5	23.5	29.5	26.5	35.5	44.5	47.5	59	74	90	82	50	–	
			M_{2max}	Nm	29	38.5	48.5	68	77	61	86	115	131	144	144	131	144	131	80	–	

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Planetary gearbox data																	
Gearbox type:		NRK090, 1-stage						NRK090, 2-stage									
1. Order code		B31						B32									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	85	90	82	65	50	38	97	90	82	90	90	82	90	82	50	38
	$M_{2max,G}$	Nm	136	144	131	104	80	61	155	144	131	144	144	131	144	131	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
	$J_{1,G}$	kg cm²	0.789	0.557	0.476	0.409	0.394	0.374	0.625	0.601	0.592	0.453	0.41	0.406	0.368	0.366	0.367	0.356
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRK090

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK090 1- and 2-stage (continued)																				
4.67 ... 4.72	14.5 ... 14.7	1.71 (2.55)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	125	125	100	100	75	50	–	**1F.2105-4AF..-0..0-Z**
			M_{2N}	Nm	10.7	13.9	19.6	26.5	27	33	30.5	38	51	62	63	78	69	82	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14	18.7	23.5	33	37.5	38	42	56	70	74	90	82	90	82	50	–	
			M_{2max}	Nm	44	58	73	102	80	61	130	144	131	144	144	131	144	131	80	–	
4.7 ... 4.76	14.5 ... 14.7	1.71 (2.55)	n_{2N}	r/min	500	500	375	300	250	200	200	150	125	125	100	100	75	75	60	–	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	11.4	11.9	17.5	23	28.5	36.5	34	45.5	55	56	71	68	90	79	41.5	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.1	18.9	23.5	33	38	38	42	56	70	75	90	82	90	82	50	–	
			M_{2max}	Nm	44	58	73	102	80	61	130	144	131	144	144	131	144	131	80	–	
7.4 ... 7.52	23.2 ... 23.6	2.65 (3.5)	n_{2N}	r/min	500	375	375	300	250	250	200	150	125	125	100	100	75	75	–	–	**1F.2105-6AF..-0..0-Z**
			M_{2N}	Nm	16.5	23	24.5	32.5	39.5	37	46	62	74	74	90	82	90	82	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22	29.5	37.5	52	50	38	66	89	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	70	94	117	104	80	61	155	144	131	144	144	131	144	131	–	–	
7.47 ... 7.58	25.1 ... 25.5	5.476 (7.176)	n_{2N}	r/min	375	375	300	200	200	200	150	125	100	100	100	75	60	60	–	–	**1F.2106-3AF..-0..0-Z**
			M_{2N}	Nm	18.6	19.9	25.5	40	40.5	36.5	51	62	78	77	68	82	90	80	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30	37.5	53	50	38	67	90	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	76	101	127	104	80	61	155	144	131	144	143	131	144	131	–	–	
9.67 ... 9.82	31.8 ... 32.4	6.876 (8.476)	n_{2N}	r/min	375	300	250	200	200	200	–	125	100	100	100	75	60	50	–	–	**1F.2106-4AF..-0..0-Z**
			M_{2N}	Nm	23	30	36.5	48	47	37	–	71	82	86	67	82	90	82	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29	39	49	65	50	38	–	90	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	97	129	131	104	80	61	–	144	131	144	144	131	144	131	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK090 1- and 2-stage																				
0.432 ... 0.502	1.68 ... 1.74	0.2 (0.22)	n_{2N}	r/min	500	500	375	375	300	250	250	200	150	150	150	100	100	75	50	30	**1F.2203-2AK..-0..0-Z**
			M_{2N}	Nm	0.92	1.14	1.73	2	2.7	3.45	3	3.95	5.4	5.6	6	9.1	9.6	13.2	19.8	34	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.29	1.8	2.3	3.3	3.85	4.85	4.3	5.8	7.3	7.8	9.8	12.4	15.9	19.9	32	38	
			M_{2max}	Nm	5	6.8	8.5	12	13.8	17.3	15.4	20.5	25.5	27.5	34.5	43	55	69	80	61	
1.05 ... 1.11	3.56 ... 3.6	0.35 (0.37)	n_{2N}	r/min	500	500	375	300	300	250	250	200	150	150	150	125	100	75	50	37.5	**1F.2203-4AK..-0..0-Z**
			M_{2N}	Nm	2.55	3	4.4	6.2	6.6	8.4	7.6	10	13.1	13.6	14.5	17.3	23	31	47	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.15	4.25	5.4	7.6	8.7	11	9.8	13.1	16.5	17.6	22	27.5	35	44	50	38	
			M_{2max}	Nm	10.6	14.3	17.9	25	28.5	36	32	42.5	53	57	71	89	114	131	80	61	
2.16 ... 2.21	6.8 ... 6.9	1.23 (1.31)	n_{2N}	r/min	600	500	375	375	300	250	250	200	150	150	125	100	75	75	50	30	**1F.2204-5AF..-2..0-Z**
			M_{2N}	Nm	5.1	6.8	9.7	10.7	14.1	17.6	16.4	21	28	29	36	45	61	61	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.4	8.7	10.9	15.4	17.6	22	19.6	26	32.5	35	43.5	54	70	82	50	38	
			M_{2max}	Nm	20.5	27.5	34	48	55	61	61	82	102	109	136	131	144	131	80	61	
2.17 ... 2.22	6.8 ... 6.9	1.23 (1.31)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	75	60	37.5	**1F.2204-5AK..-2..0-Z**
			M_{2N}	Nm	5.2	7	9.9	13.7	14.4	18	16.8	21.5	28.5	29.5	36.5	46	62	62	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.5	8.7	10.9	15.4	17.7	22	19.7	26	33	35	44	55	70	82	50	38	
			M_{2max}	Nm	20.5	27.5	34	48	55	61	61	82	102	109	136	131	144	131	80	61	
2.94 ... 2.98	9.13 ... 9.26	1.61 (1.69)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	75	50	–	**1F.2204-6AF..-2..0-Z**
			M_{2N}	Nm	6.9	9.2	13	17.9	18.6	23	21	27	36.5	37	46	57	78	76	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.8	11.8	14.8	20.5	23.5	29.5	26.5	35	44	47	59	73	90	82	50	–	
			M_{2max}	Nm	27.5	36.5	46	64	74	61	82	110	131	144	144	131	144	131	80	–	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:			NRK090, 1-stage						NRK090, 2-stage								
1. Order code			B31						B32								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	85	90	82	65	50	38	97	90	82	90	90	82	90	82	50	38
	$M_{2max,G}$	Nm	136	144	131	104	80	61	155	144	131	144	144	131	144	131	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
	$J_{1,G}$	kg cm²	0.789	0.557	0.476	0.409	0.394	0.374	0.625	0.601	0.592	0.453	0.41	0.406	0.368	0.366	0.367	0.356
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK090 1- and 2-stage (continued)																				
2.94 ... 2.98	10.4 ... 10.5	3.15 (4.05)	n_{2N}	r/min	500	375	375	300	250	200	200	150	150	125	100	100	75	50	37.5	–	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	6.7	9.6	10.5	14.1	17.5	22.5	21	28	29	36	46	45	63	82	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.8	11.8	14.8	20.5	23.5	29.5	26	35	44	47	58	73	90	82	49.5	–	
			M_{2max}	Nm	31.5	42	52	73	80	61	94	125	131	144	144	131	144	131	80	–	
2.98 ... 3.02	10.4 ... 10.5	3.15 (4.05)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	75	50	–	**1F.2205-2AF..-0..0-Z**
			M_{2N}	Nm	6.9	9.1	12.6	17.5	18.2	22.5	21	26.5	36	36.5	45	56	77	73	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.9	11.9	15	21	24	30	26.5	35.5	44.5	47.5	59	74	90	82	50	–	
			M_{2max}	Nm	31.5	42	52	73	80	61	94	125	131	144	144	131	144	131	80	–	
2.94 ... 2.99	10.4 ... 10.5	3.15 (4.05)	n_{2N}	r/min	500	500	375	300	250	200	250	200	150	125	100	100	75	60	50	–	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	7.2	7.7	11.4	15.4	18.9	24	18.4	22.5	31.5	38	48	48.5	68	82	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.8	11.8	14.8	20.5	23.5	29.5	26.5	35	44	47	59	73	90	82	50	–	
			M_{2max}	Nm	31.5	42	52	73	80	61	94	125	131	144	144	131	144	131	80	–	
5.06 ... 5.13	17.4 ... 17.6	5.1 (6)	n_{2N}	r/min	500	375	375	300	250	200	200	150	125	125	100	100	75	75	–	–	**1F.2205-4AF..-0..0-Z**
			M_{2N}	Nm	11.1	15.7	16.9	22	27.5	35	33	44.5	54	54	68	63	89	69	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.2	20	25.5	35.5	41	38	45.5	60	76	81	90	82	90	82	–	–	
			M_{2max}	Nm	52	70	88	104	80	61	155	144	131	144	144	131	144	131	–	–	
5.27 ... 5.3	17.3 ... 17.6	8.676 (10.276)	n_{2N}	r/min	375	300	250	200	150	125	150	100	75	75	60	60	50	50	30	–	**1FT2206-2AC..-0..0-Z**
			M_{2N}	Nm	10.8	14.3	17.7	22.5	31	37	31.5	47	62	63	79	78	89	61	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.8	21	26	37	42	38	47.5	63	79	84	90	82	90	82	50	–	
			M_{2max}	Nm	52	70	87	104	80	61	155	144	131	144	144	131	144	131	80	–	
5.19 ... 5.27	17.3 ... 17.6	8.676 (10.276)	n_{2N}	r/min	500	375	300	200	200	200	200	125	100	100	75	75	60	50	–	–	**1F.2206-2AF..-0..0-Z**
			M_{2N}	Nm	10.6	15.3	20	30.5	31.5	28.5	29	49.5	62	62	84	79	90	82	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.6	20.5	26	36.5	42	38	46.5	62	78	83	90	82	90	82	–	–	
			M_{2max}	Nm	52	70	87	104	80	61	155	144	131	144	144	131	144	131	–	–	
5.05 ... 5.12	17.3 ... 17.6	8.676 (10.276)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	60	50	–	–	**1FT2206-2AH..-0..0-Z**
			M_{2N}	Nm	12	15.8	19.7	25.5	25	35	34.5	41.5	52	51	71	82	77	81	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.2	20	25	35.5	40.5	38	45.5	60	75	80	90	82	90	82	–	–	
			M_{2max}	Nm	52	70	87	104	80	61	155	144	131	144	144	131	144	131	–	–	
7.54 ... 7.66	26 ... 26.5	12.38 (13.976)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	–	–	**1FT2206-3AB..-0..0-Z**
			M_{2N}	Nm	16.7	22	27	35.5	35	38	46.5	55	69	68	89	82	90	82	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30.5	38	53	50	38	68	90	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	79	105	131	104	80	61	155	144	131	144	144	131	144	131	–	–	
7.41 ... 7.52	26 ... 26.5	12.38 (13.976)	n_{2N}	r/min	375	300	250	200	150	150	150	100	100	75	75	75	60	50	–	–	**1FT2206-3AF..-0..0-Z**
			M_{2N}	Nm	15.9	20.5	25.5	33	44	38	44	65	64	87	87	70	87	82	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22	30	37.5	52	50	38	66	89	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	79	105	131	104	80	61	155	144	131	144	144	131	144	131	–	–	
10.3 ... 10.5	36.7 ... 37.3	15.98 (17.676)	n_{2N}	r/min	300	250	200	150	125	125	100	75	75	75	60	50	37.5	37.5	–	–	**1FT2206-4AC..-0..0-Z**
			M_{2N}	Nm	18.9	23	29	40	48.5	38	61	81	79	76	90	82	90	82	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31	41.5	52	65	50	38	94	90	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	111	144	131	104	80	61	155	144	131	144	144	131	144	131	–	–	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:			**NRK090, 1-stage**						**NRK090, 2-stage**								
1. Order code			**B31**						**B32**								
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**	**100**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**	**R00**
	$M_{2N,G}$	Nm	85	90	82	65	50	38	97	90	82	90	90	82	90	82	50	38
	$M_{2max,G}$	Nm	136	144	131	104	80	61	155	144	131	144	144	131	144	131	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
	$J_{1,G}$	kg cm²	0.789	0.557	0.476	0.409	0.394	0.374	0.625	0.601	0.592	0.453	0.41	0.406	0.368	0.366	0.367	0.356
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRK090

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK090 1- and 2-stage (continued)																			
10.1	34.7	15.976	n_{2N}	r/min	375	300	250	200	200	200	–	125	100	100	100	75	60	50	–	–	**1F.2206-4AF..-0..0-Z**
...	...	(17.676)	M_{2N}	Nm	23.5	30.5	37.5	49	48.5	38	–	73	82	88	70	82	90	82	–	–	■■■ + ■■■ + . . .
10.3	35.3		$M_{2,0}$	Nm	30.5	41	51	65	50	38	–	90	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	106	141	131	104	79	61	–	144	131	144	144	131	144	131	–	–	
9.7	34.7	15.976	n_{2N}	r/min	375	300	250	150	150	150	125	100	100	75	75	60	60	50	–	–	**1FT2206-4AH..-0..0-Z**
...	...	(17.676)	M_{2N}	Nm	18.3	23.5	28.5	49	49.5	38	59	73	68	90	90	82	77	80	–	–	■■■ + ■■■ + . . .
9.86	35.3		$M_{2,0}$	Nm	29.5	39	49	65	50	38	87	90	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	106	141	131	104	79	61	155	144	131	144	144	131	144	131	–	–	

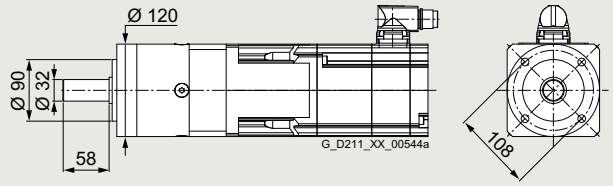
Planetary gearbox data																	
Gearbox type:			**NRK090, 1-stage**						**NRK090, 2-stage**								
1. Order code			**B31**						**B32**								
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**	**100**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**	**R00**
	$M_{2N,G}$	Nm	85	90	82	65	50	38	97	90	82	90	90	82	90	82	50	38
	$M_{2max,G}$	Nm	136	144	131	104	80	61	155	144	131	144	144	131	144	131	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
	$J_{1,G}$	kg cm²	0.789	0.557	0.476	0.409	0.394	0.374	0.625	0.601	0.592	0.453	0.41	0.406	0.368	0.366	0.367	0.356
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRK120



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	2500 N
Average axial force for 20000 h	$F_{A,eq}$	4000 N
Average radial force for 30000 h	$F_{R,eq}$	2150 N
Average axial force for 30000 h	$F_{A,eq}$	3000 N
Maximum radial force	$F_{R,max}$	4000 N
Maximum axial force	$F_{A,max}$	5900 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK120 1- and 2-stage																				
0.318	1.66	0.093	n_{2N}	r/min	375	300	300	300	250	250	200	150	125	125	125	100	75	75	37.5	30	**1F.2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	0.55	0.98	1.29	1.73	2.2	2.45	2.35	3.4	4.35	4.55	5.3	6.8	10.1	10.6	21	28.5	■■■ + ■■■ + . . .
0.449	1.76		$M_{2.0}$	Nm	0.95	1.41	1.87	2.75	3.25	4.15	3.65	5	6.4	6.8	8.6	10.9	14.1	17.7	28.5	44.5	
			M_{2max}	Nm	4.95	6.7	8.5	12.1	13.9	17.5	15.5	20.5	26	27.5	34.5	43.5	56	70	112	152	
0.941	3.73	0.139	n_{2N}	r/min	375	375	300	250	250	200	200	150	125	125	125	100	75	60	37.5	25	**1F.2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	2	2.55	3.7	5.3	5.7	7.7	6.5	8.9	11.2	11.8	12.7	16.5	24	30	49	76	■■■ + ■■■ + . . .
1.06	3.82		$M_{2.0}$	Nm	2.8	3.9	4.95	7.1	8.2	10.3	9.2	12.4	15.5	16.6	20.5	26	33.5	42	67	95	
			M_{2max}	Nm	11.1	15	18.8	26.5	30	38	33.5	45	56	60	75	94	121	151	192	152	
0.969	3.43	0.35	n_{2N}	r/min	500	375	375	300	300	250	250	200	150	150	125	100	100	75	50	30	**1F.2104-4AF..-0..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.25	3.45	4.25	6.2	6.8	8.8	7.3	9.7	13	13.6	17.6	22	24	34	51	88	■■■ + ■■■ + . . .
1.09	3.52		$M_{2.0}$	Nm	2.9	4	5.1	7.3	8.4	10.6	9.4	12.7	16	17.1	21	26.5	34.5	43	69	95	
			M_{2max}	Nm	10.2	13.8	17.4	24.5	28	35	31	41.5	52	55	69	87	112	139	192	152	
0.963	3.53	0.35	n_{2N}	r/min	500	500	375	300	300	250	250	200	150	150	125	100	100	75	50	30	**1F.2104-4AK..-0..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.45	2.65	4.55	6.7	7.4	9.7	8.1	10.5	14.2	15	19.4	24.5	25	37	53	95	■■■ + ■■■ + . . .
1.08	3.62		$M_{2.0}$	Nm	2.85	3.95	5	7.2	8.3	10.6	9.4	12.6	15.9	17	21	26.5	34	43	69	95	
			M_{2max}	Nm	10.5	14.2	17.8	25	28.5	36	32	43	53	57	71	89	115	143	192	152	
2.07	7.13	0.56	n_{2N}	r/min	500	375	375	300	250	200	200	150	125	125	100	100	75	60	37.5	30	**1F.2104-5AF..-0..0-Z**
...	...	(0.65)	M_{2N}	Nm	4.9	7.6	8.5	12.2	15.3	20	18.1	24.5	30.5	31.5	41	41	60	75	120	95	■■■ + ■■■ + . . .
2.17	7.21		$M_{2.0}$	Nm	6.2	8.4	10.6	15	17.2	21.5	19.2	25.5	32	34.5	43	54	69	86	120	95	
			M_{2max}	Nm	21	28.5	35.5	50	57	72	64	85	107	114	142	178	225	275	192	152	
2.06	7.23	0.56	n_{2N}	r/min	500	375	375	300	250	200	200	150	125	125	100	100	75	60	37.5	30	**1F.2104-5AK..-0..0-Z**
...	...	(0.65)	M_{2N}	Nm	4.8	7.5	8.3	12	15.1	19.8	17.7	24	30	30.5	40.5	40.5	59	74	119	95	■■■ + ■■■ + . . .
2.15	7.31		$M_{2.0}$	Nm	6.1	8.3	10.5	14.9	17.1	21	19.1	25.5	32	34	42.5	53	68	85	120	95	
			M_{2max}	Nm	21.5	29	36	51	58	73	65	86	108	115	144	180	230	275	192	152	
2.82	9.55	0.76	n_{2N}	r/min	500	375	375	300	250	200	200	150	125	125	100	75	75	60	37.5	30	**1F.2104-6AF..-0..0-Z**
...	...	(0.84)	M_{2N}	Nm	6.2	9.5	10.5	14.9	18.7	24.5	22	30	37	37.5	49.5	65	71	89	120	95	■■■ + ■■■ + . . .
2.92	9.67		$M_{2.0}$	Nm	8.4	11.4	14.3	20	23	29	25.5	34.5	43	46	57	72	92	116	120	95	
			M_{2max}	Nm	28.5	38	48	67	77	96	86	114	143	153	191	235	305	275	192	152	

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Planetary gearbox data																	
Gearbox type:			NRK120, 1-stage						NRK120, 2-stage								
1. Order code			B41						B42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1.G}$	kg cm²	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRK120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK120 1- and 2-stage (continued)																				
4.56 ... 4.64	14.4 ... 14.6	1.71 (2.55)	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	50	30	1F.2105-4AF..-0..0-Z
			M_{2N}	Nm	10.5	15.8	16.8	28	29	38	34.5	47	57	57	75	100	128	157	92	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.6	18.3	23	32	37	46	41	55	69	73	92	115	147	172	120	95	
			M_{2max}	Nm	43.5	58	72	102	116	145	130	173	215	230	285	275	312	275	192	152	
4.59 ... 4.67	14.4 ... 14.6	1.71 (2.55)	n_{2N}	r/min	500	375	300	250	200	200	200	150	125	100	100	75	60	50	37.5	30	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	9.3	14.4	19.6	25.5	32	34	31	42.5	51	63	67	91	119	143	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.7	18.4	23	32.5	37	46.5	41.5	55	69	74	92	115	148	172	120	95	
			M_{2max}	Nm	43.5	58	72	102	116	145	130	173	215	230	285	275	312	275	192	152	
7.52 ... 7.6	23.1 ... 23.4	2.65 (3.5)	n_{2N}	r/min	375	375	300	250	200	200	200	125	100	100	75	75	60	50	37.5	–	1F.2105-6AF..-0..0-Z
			M_{2N}	Nm	18.8	21	28	36.5	46.5	47.5	43	71	89	90	121	124	161	172	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30	37.5	53	60	76	67	90	112	120	150	172	195	172	120	–	
			M_{2max}	Nm	70	93	117	163	187	152	205	275	275	312	312	275	312	275	192	–	
7.76 ... 7.88	25 ... 25.4	4.6 (6.3)	n_{2N}	r/min	500	375	300	250	200	200	200	125	100	100	75	75	60	60	37.5	–	1F.2106-3AF..-0..0-Z
			M_{2N}	Nm	14.8	22	29.5	38	48.5	50	45	73	93	94	126	128	166	146	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	23	31	39	55	62	78	70	93	116	124	155	172	195	172	120	–	
			M_{2max}	Nm	76	101	126	177	192	152	225	300	275	312	312	275	312	270	192	–	
10.1 ... 10.2	31.8 ... 32.3	6 (7.6)	n_{2N}	r/min	375	375	300	200	200	150	150	125	100	100	75	75	60	50	37.5	–	1F.2106-4AF..-0..0-Z
			M_{2N}	Nm	24.5	26	35.5	56	58	79	71	87	109	109	148	142	184	172	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30.5	40.5	50	71	81	95	90	121	151	161	195	172	195	172	120	–	
			M_{2max}	Nm	96	129	161	216	192	152	251	312	275	312	312	275	312	275	192	–	
14.3 ... 14.5	43.9 ... 44.7	8.7 (10.4)	n_{2N}	r/min	375	300	300	200	200	150	150	125	100	100	75	75	60	60	–	–	1F.2106-6AF..-0..0-Z
			M_{2N}	Nm	32	43	45	72	73	95	89	106	134	132	181	168	195	165	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	43	57	72	101	116	95	128	171	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	133	178	220	216	192	152	251	312	275	312	312	275	312	275	–	–	
20.7 ... 21	84.1 ... 85.6	20.6 (24.7)	n_{2N}	r/min	300	250	200	150	125	125	100	75	75	75	60	60	50	37.5	–	–	1FT2108-4AC..-0..0-Z
			M_{2N}	Nm	41.5	51	66	92	110	95	129	171	168	165	195	166	191	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	62	83	104	135	120	95	157	195	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	–	–	
25.4 ... 25.8	102 ... 103	24.0 (28.0)	n_{2N}	r/min	300	250	200	150	150	150	125	100	75	75	75	60	50	–	–	–	1FT2108-5AB..-0..0-Z
			M_{2N}	Nm	51	64	82	113	114	95	124	152	172	194	173	172	195	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	77	103	129	135	120	95	157	195	172	195	195	172	195	–	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	–	–	–	
25.2 ... 25.6	102 ... 103	24.0 (28.0)	n_{2N}	r/min	300	250	200	150	125	125	100	75	75	75	60	60	50	–	–	–	1FT2108-5AC..-0.B0-Z
			M_{2N}	Nm	46.5	57	73	100	119	95	142	187	172	175	195	167	192	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	76	102	127	135	120	95	157	195	172	195	195	172	195	–	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	–	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK120 1- and 2-stage																				
0.304 ... 0.436	1.56 ... 1.66	0.2 (0.22)	n_{2N}	r/min	375	300	300	250	200	200	150	125	100	100	100	75	75	50	37.5	25	1F.2203-2AK..-0..0-Z
			M_{2N}	Nm	0.54	0.98	1.22	1.89	2.5	2.8	2.9	3.85	5	5.2	5.9	8.1	8.9	13.7	18.8	29	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	0.91	1.36	1.8	2.7	3.1	4	3.55	4.85	6.2	6.6	8.4	10.6	13.6	17.2	27.5	43.5	
			M_{2max}	Nm	4.65	6.3	8	11.4	13.1	16.5	14.6	19.7	24.5	26	33	41	53	66	106	152	

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Planetary gearbox data																	
Gearbox type:			NRK120, 1-stage						NRK120, 2-stage								
1. Order code			B41						B42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$	kg cm²	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK120 1- and 2-stage (continued)																					
0.924 ... 1.04	3.43 ... 3.52	0.35 (0.37)	n_{2N}	r/min	375	375	300	250	250	200	200	150	125	125	100	100	75	60	37.5	25	1F.2203-4AK..-0..0-Z
			M_{2N}	Nm	2.35	3	4.2	6	6.4	8.5	7.3	10	12.5	13.1	17.2	17.3	26	33	53	82	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.75	3.8	4.85	7	8	10.2	9	12.2	15.3	16.3	20.5	25.5	33	41.5	66	95	
			M_{2max}	Nm	10.2	13.8	17.4	24.5	28	35	31	41.5	52	55	69	87	112	139	192	152	
2.03 ... 2.13	6.74 ... 6.82	1.23 (1.31)	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	100	75	60	37.5	30	1F.2204-5AF..-0..0-Z
			M_{2N}	Nm	4.65	7.3	7.9	13.7	14.4	19	17.1	23	28.5	29.5	38.5	37.5	55	70	113	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6	8.2	10.4	14.7	16.9	21	18.9	25	31.5	33.5	42	53	67	84	120	95	
			M_{2max}	Nm	20	27	33.5	47.5	54	68	60	81	101	107	134	168	215	265	192	152	
2.05 ... 2.14	6.74 ... 6.82	1.23 (1.31)	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	100	75	60	37.5	30	1F.2204-5AK..-0..0-Z
			M_{2N}	Nm	4.8	7.5	8.1	14	14.8	19.4	17.6	24	29.5	30	40	38	57	71	116	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.1	8.3	10.4	14.8	17	21	19	25	31.5	34	42.5	53	68	85	120	95	
			M_{2max}	Nm	20	27	33.5	47.5	54	68	60	81	101	107	134	168	215	265	192	152	
2.81 ... 2.9	9.06 ... 9.18	1.61 (1.69)	n_{2N}	r/min	500	375	300	250	250	200	200	150	125	125	100	75	75	50	37.5	30	1F.2204-6AF..-0..0-Z
			M_{2N}	Nm	6.5	10.1	13.7	18.8	19.5	25.5	23	31.5	39	39.5	52	69	72	110	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.4	11.3	14.3	20	23	29	25.5	34.5	43	46	57	72	92	115	120	95	
			M_{2max}	Nm	27	36.5	45.5	64	73	91	81	109	136	145	181	225	290	275	192	152	
2.98 ... 3.07	10.3 ... 10.5	3.15 (4.05)	n_{2N}	r/min	375	375	300	250	200	200	200	150	125	100	100	75	60	50	37.5	20	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	7.1	8.2	11.5	15.3	19.5	20	19	26	32	38.5	42.5	58	75	91	113	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.9	12	15.1	21	24.5	30.5	27	36	45.5	48.5	60	76	97	121	120	95	
			M_{2max}	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	312	275	192	152	
3.02 ... 3.11	10.3 ... 10.5	3.15 (4.05)	n_{2N}	r/min	500	375	375	300	250	200	200	150	125	125	100	75	75	60	37.5	30	1F.2205-2AF..-0..0-Z
			M_{2N}	Nm	6.5	9.8	10.7	14.9	19.1	25	22	29.5	36.5	38.5	49	63	70	89	120	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	9	12.1	15.3	21.5	24.5	31	27.5	36.5	46	49	61	76	98	123	120	95	
			M_{2max}	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	312	275	192	152	
2.96 ... 3.05	10.3 ... 10.5	3.15 (4.05)	n_{2N}	r/min	500	375	300	250	250	200	200	150	125	125	100	75	60	50	37.5	30	1FT2205-2AH..-0..0-Z
			M_{2N}	Nm	5.6	8.9	12.2	16.4	16.5	22	20	28	34	34	45.5	60	77	95	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.8	11.9	15	21	24	30.5	27	36	45	48	60	75	96	120	120	95	
			M_{2max}	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	312	275	192	152	
5.21 ... 5.29	17.3 ... 17.5	5.1 (6)	n_{2N}	r/min	375	375	300	250	200	200	200	125	100	100	100	75	60	50	37.5	30	1F.2205-4AF..-0..0-Z
			M_{2N}	Nm	12.5	14	19.1	25	31.5	32.5	30	49.5	62	64	65	89	116	138	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.6	20.5	26	36.5	42	52	46.5	62	78	83	104	130	167	172	120	95	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	312	275	312	275	192	152	
5.34 ... 5.42	17.3 ... 17.5	7.8 (9.4)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	30	20	1FT2206-2AC..-0..0-Z
			M_{2N}	Nm	11.6	15.7	20	27	27	38	36.5	44.5	56	56	78	98	121	161	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	16	21	26.5	37.5	43	54	48	64	80	86	107	134	172	172	120	95	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	312	275	312	275	192	152	
5.38 ... 5.46	17.3 ... 17.5	7.8 (9.4)	n_{2N}	r/min	500	375	300	250	250	200	200	150	125	100	100	75	60	50	37.5	30	1F.2206-2AF..-0..0-Z
			M_{2N}	Nm	11.2	16.8	22	29.5	29	38.5	35.5	48	58	69	75	102	133	158	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	16.1	21.5	27	38	43.5	54	48.5	64	80	86	107	134	172	172	120	95	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	312	275	312	275	192	152	

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Planetary gearbox data																	
Gearbox type:			NRK120, 1-stage						NRK120, 2-stage								
1. Order code			B41						B42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$	kg cm²	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRK120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK120 1- and 2-stage (continued)																					
5.22 ... 5.3	17.3 ... 17.5	7.8 (9.4)	n_{2N}	r/min	375	300	300	200	200	150	150	125	100	100	75	60	50	50	37.5	25	1FT2206-2AH..-0..0-Z
			M_{2N}	Nm	12.7	17.3	18.7	30	31	42.5	39	49.5	62	63	86	107	134	130	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.6	20.5	26	36.5	42	53	47	62	78	83	104	130	167	172	120	94	
			M_{2max}	Nm	52	70	87	122	140	152	156	205	260	275	312	275	312	275	192	152	
7.89 ... 8.01	26 ... 26.4	11.5 (13.1)	n_{2N}	r/min	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	25	–	1FT2206-3AB..-0..0-Z
			M_{2N}	Nm	17.8	24	26	33.5	43	59	54	66	84	84	115	143	179	172	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	23.5	31.5	39.5	55	64	80	71	94	118	126	157	172	195	172	120	–	
			M_{2max}	Nm	79	105	131	184	192	152	235	312	275	312	312	275	312	275	192	–	
7.76 ... 7.88	26 ... 26.4	11.5 (13.1)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	50	37.5	–	1FT2206-3AF..-0..0-Z
			M_{2N}	Nm	17.1	23	29	39.5	40	55	51	63	79	79	109	136	169	156	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	23	31	39	55	62	78	69	93	116	124	155	172	195	172	120	–	
			M_{2max}	Nm	79	105	131	184	192	152	235	312	275	312	312	275	312	275	192	–	
11 ... 11.1	36.6 ... 37.2	15.1 (16.8)	n_{2N}	r/min	300	250	200	150	125	100	125	100	75	75	60	50	37.5	37.5	30	–	1FT2206-4AC..-0..0-Z
			M_{2N}	Nm	20.5	26	34	47.5	57	73	58	72	98	97	123	146	195	172	108	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	33	44	55	77	88	95	98	131	164	175	195	172	195	172	120	–	
			M_{2max}	Nm	111	148	186	216	192	152	251	312	275	312	312	275	312	275	192	–	
10.5 ... 10.7	34.7 ... 35.3	15.1 (16.8)	n_{2N}	r/min	375	375	300	200	200	150	150	125	100	100	75	75	60	60	37.5	–	1F.2206-4AF..-0..0-Z
			M_{2N}	Nm	25	27	36	57	59	80	73	88	111	111	151	145	186	144	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31.5	42.5	53	74	85	95	95	126	158	168	195	172	195	172	120	–	
			M_{2max}	Nm	105	141	176	216	192	152	251	312	275	312	312	275	310	275	192	–	
10.1 ... 10.2	34.7 ... 35.3	15.1 (16.8)	n_{2N}	r/min	375	300	250	200	150	150	150	100	100	75	75	60	50	50	37.5	–	1FT2206-4AH..-0..0-Z
			M_{2N}	Nm	20	26.5	33.5	44.5	59	62	58	87	87	117	120	150	183	152	117	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30	40.5	50	71	81	95	90	121	151	161	195	172	195	172	120	–	
			M_{2max}	Nm	105	141	176	216	192	152	251	312	275	312	312	275	310	275	192	–	
10.3 ... 10.4	36.6 ... 37.2	24.86 (28.16)	n_{2N}	r/min	300	250	200	150	150	125	125	100	75	75	60	50	50	37.5	30	–	1FT2208-2AF..-0..0-Z
			M_{2N}	Nm	25.5	33	42.5	59	61	75	71	89	119	120	152	172	164	172	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31	41.5	51	72	83	95	92	123	154	164	195	171	195	172	120	–	
			M_{2max}	Nm	111	148	185	216	192	152	251	312	275	312	312	275	312	275	192	–	
16.3 ... 16.6	49.2 ... 50	31.96 (34.96)	n_{2N}	r/min	300	200	200	150	125	100	100	75	60	60	50	50	37.5	37.5	–	–	1FT2208-3AB..-0..0-Z
			M_{2N}	Nm	28.5	44.5	46	64	78	95	95	127	158	159	190	170	195	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	49.5	66	82	115	120	95	146	195	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	150	199	245	216	192	152	251	312	275	312	312	275	312	275	–	–	
15.1 ... 15.4	49.2 ... 50	31.96 (35.36)	n_{2N}	r/min	375	250	250	150	150	125	125	100	75	75	60	60	50	37.5	–	–	1F.2208-3AC..-0..0-Z
			M_{2N}	Nm	28	44	45.5	79	81	95	92	115	154	153	192	171	194	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	45.5	61	76	107	120	95	136	181	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	150	199	245	216	192	152	251	312	275	312	312	275	312	275	–	–	
15.1 ... 15.3	49.2 ... 50	31.96 (35.36)	n_{2N}	r/min	300	250	200	150	150	125	125	100	75	75	60	60	50	37.5	–	–	1FT2208-3AF..-0..0-Z
			M_{2N}	Nm	33	42	54	75	76	92	87	108	146	144	183	159	185	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	45.5	61	76	107	120	95	136	181	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	150	199	245	216	192	152	251	312	275	312	312	275	312	275	–	–	

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Planetary gearbox data																	
Gearbox type:			NRK120, 1-stage						NRK120, 2-stage								
1. Order code			B41						B42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$	kg cm²	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376
	$\varphi_{2,G}$	'	7						9									

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK120 1- and 2-stage (continued)																				
19.3 ... 19.7	63.8 ... 64.9	41.16 (46.76)	n_{2N}	r/min	250	200	150	100	100	100	75	60	60	50	50	37.5	37.5	30	–	–	**1FT2208-4AB..-0..0-Z**
			M_{2N}	Nm	32.5	41.5	57	87	89	84	117	148	145	177	166	172	184	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	59	78	98	135	120	95	157	195	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	–	–	
18.8 ... 19.1	63.8 ... 64.9	41.16 (46.76)	n_{2N}	r/min	300	250	200	150	125	125	125	75	75	75	60	60	50	37.5	–	–	**1F.2208-4AC..-0..0-Z**
			M_{2N}	Nm	40.5	51	65	90	108	95	102	167	168	165	195	168	192	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	57	76	95	134	120	95	157	195	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	312	270	310	312	275	312	275	–	–	
18.1 ... 18.4	63.8 ... 64.9	41.16 (46.76)	n_{2N}	r/min	300	250	200	150	125	125	125	75	75	75	60	60	50	37.5	–	–	**1FT2208-4AF..-0..0-Z**
			M_{2N}	Nm	41	51	65	90	108	95	102	169	168	166	195	168	192	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	55	73	92	128	120	95	157	195	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	312	270	312	312	275	312	275	–	–	
22.8 ... 23.2	77.3 ... 78.7	50.46 (55.96)	n_{2N}	r/min	300	250	200	150	125	150	100	75	75	75	60	60	50	37.5	–	–	**1FT2208-5AB..-0..0-Z**
			M_{2N}	Nm	45	55	71	98	118	79	139	182	171	173	195	168	191	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	69	92	115	135	120	95	157	195	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	–	–	
22.5 ... 22.9	77.3 ... 78.7	50.46 (55.96)	n_{2N}	r/min	300	250	200	150	125	125	100	75	75	75	60	60	50	37.5	–	–	**1F.2208-5AC..-0..0-Z**
			M_{2N}	Nm	45	55	71	98	118	95	138	183	170	170	195	159	173	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	68	91	114	135	120	95	157	195	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	184	248	275	216	192	152	251	310	275	312	312	275	312	275	–	–	

Planetary gearbox data																	
Gearbox type:			NRK120, 1-stage						NRK120, 2-stage								
1. Order code			B41						B42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$	kg cm²	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376
	$\varphi_{2,G}$	'	7						9									

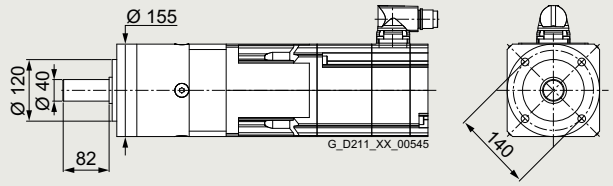
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRK155

Selection and ordering data

NRK155



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5200 N
Average axial force for 20000 h	$F_{A,eq}$	7000 N
Average radial force for 30000 h	$F_{R,eq}$	4600 N
Average axial force for 30000 h	$F_{A,eq}$	6000 N
Maximum radial force	$F_{R,max}$	8400 N
Maximum axial force	$F_{A,max}$	11000 N

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)											
Nm	Nm	kg cm²											
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK155 1- and 2-stage													
4.5	14.3	1.71	n_{2N}	r/min	375	300	200	100	100	75	50	37.5	30	**1F.2105-4AF..-0..0-Z**
...	...	(2.55)	M_{2N}	Nm	15.1	20.5	39.5	65	71	98	161	205	186	■■■ + ■■■ + . . .
4.58	14.5		M_{2_0}	Nm	18	22.5	45.5	72	91	113	182	225	210	
			M_{2max}	Nm	57	72	145	225	285	355	570	712	336	
4.53	14.3	1.71	n_{2N}	r/min	375	300	200	100	100	75	50	37.5	25	**1FT2105-4AH..-0..0-Z**
...	...	(2.55)	M_{2N}	Nm	13.6	19.6	35	61	63	90	150	195	210	■■■ + ■■■ + . . .
4.62	14.5		M_{2_0}	Nm	18.1	22.5	46	73	91	114	183	225	210	
			M_{2max}	Nm	57	72	145	225	285	355	570	712	336	
7.47	23	2.65	n_{2N}	r/min	300	300	200	100	75	60	50	37.5	25	**1F.2105-6AF..-0..0-Z**
...	...	(3.5)	M_{2N}	Nm	25.5	28.5	50	87	124	156	200	270	210	■■■ + ■■■ + . . .
7.54	23.4		M_{2_0}	Nm	29.5	37	75	119	149	187	295	370	210	
			M_{2max}	Nm	93	116	230	365	460	570	736	712	336	
7.89	25	4.6	n_{2N}	r/min	375	300	200	100	75	60	50	37.5	25	**1F.2106-3AF..-0..0-Z**
...	...	(6.3)	M_{2N}	Nm	21	29.5	52	91	128	161	205	280	210	■■■ + ■■■ + . . .
8.04	25.3		M_{2_0}	Nm	31.5	39.5	80	126	158	197	315	395	210	
			M_{2max}	Nm	101	126	250	400	500	620	736	712	336	
10.3	31.7	6	n_{2N}	r/min	300	300	150	100	75	60	37.5	30	25	**1F.2106-4AF..-0..0-Z**
...	...	(7.6)	M_{2N}	Nm	33	36	82	106	153	192	320	400	210	■■■ + ■■■ + . . .
10.5	32.2		M_{2_0}	Nm	41.5	52	104	164	205	255	410	445	210	
			M_{2max}	Nm	128	161	320	500	630	712	736	712	336	
14.5	43.9	8.7	n_{2N}	r/min	300	250	150	75	75	60	37.5	37.5	–	**1F.2106-6AF..-0..0-Z**
...	...	(10.4)	M_{2N}	Nm	43.5	56	107	179	189	235	400	380	–	■■■ + ■■■ + . . .
14.8	44.5		M_{2_0}	Nm	59	73	148	230	290	360	460	445	–	
			M_{2max}	Nm	178	220	336	700	736	712	736	712	–	
21.2	84.1	18.2	n_{2N}	r/min	250	200	125	60	60	50	30	30	–	**1FT2108-4AC..-0..0-Z**
...	...	(22.3)	M_{2N}	Nm	57	74	130	235	240	285	460	440	–	■■■ + ■■■ + . . .
21.6	85.4		M_{2_0}	Nm	86	107	210	335	420	445	460	445	–	
			M_{2max}	Nm	340	425	336	736	736	712	736	712	–	

➥ Continued on the next page

Planetary gearbox data										
Gearbox type:			NRK155, 1-stage			NRK155, 2-stage					
1. Order code			B51			B52					
	i		4	5	10	16	20	25	40	50	100
2. Order code			R04	R05	R10	R16	R20	R25	R40	R50	R00
	$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210
	$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336
	$M_{2Em.Off}$	Nm	920	890	420	920	920	890	920	890	420
	$J_{1,G}$	kg cm²	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
	$\varphi_{2,G}$	'	6			9					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK155 1- and 2-stage (continued)														
26 ... 26.5	102 ... 103	21.6 (25.6)	n_{2N}	r/min	250	250	125	75	60	50	37.5	30	–	1FT2108-5AB..-0..0-Z
			M_{2N}	Nm	70	73	161	220	290	340	445	445	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	105	132	210	415	460	445	460	445	–	
			M_{2max}	Nm	410	510	336	736	736	712	736	712	–	
25.8 ... 26.3	102 ... 103	21.6 (25.6)	n_{2N}	r/min	250	200	125	60	50	37.5	37.5	30	–	1FT2108-5AC..-0.B0-Z
			M_{2N}	Nm	63	82	141	255	315	415	380	445	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	104	131	210	410	460	445	460	445	–	
			M_{2max}	Nm	410	510	336	736	736	712	736	712	–	
32.8 ... 33.4	135 ... 138	28.2 (32.2)	n_{2N}	r/min	250	200	125	60	50	50	37.5	30	–	1FT2108-7AB..-0..0-Z
			M_{2N}	Nm	80	104	178	310	380	370	450	445	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	133	167	210	460	460	445	460	445	–	
			M_{2max}	Nm	550	680	336	736	736	712	736	712	–	
32.2 ... 32.8	135 ... 138	28.2 (32.2)	n_{2N}	r/min	250	200	125	60	50	50	37.5	30	–	1FT2108-7AC..-0.B0-Z
			M_{2N}	Nm	76	100	167	300	365	345	415	445	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	131	164	210	460	460	445	460	445	–	
			M_{2max}	Nm	550	680	336	736	736	712	736	712	–	
32 ... 32.6	135 ... 138	28.2 (32.2)	n_{2N}	r/min	200	200	100	60	50	37.5	30	30	–	1FT2108-7AE..-0.B0-Z
			M_{2N}	Nm	87	91	193	275	340	440	460	425	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	130	162	210	460	460	445	460	445	–	
			M_{2max}	Nm	550	680	336	736	736	712	736	712	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1- and 2-stage														
3.04 ... 3.12	10.3 ... 10.4	3.15 (4.05)	n_{2N}	r/min	300	300	200	100	100	75	50	37.5	20	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	9.4	11.4	21	37	39	55	94	121	210	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	12.1	15.3	31	49	61	77	123	154	210	
			M_{2max}	Nm	41	51	103	164	205	255	410	510	336	
3.07 ... 3.15	10.3 ... 10.4	3.15 (4.05)	n_{2N}	r/min	375	375	200	125	100	75	60	50	25	1F.2205-2AF..-0..0-Z
			M_{2N}	Nm	9.2	9.8	24.5	32.5	47.5	61	90	106	210	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	12.2	15.4	31.5	49.5	62	77	124	156	210	
			M_{2max}	Nm	41	51	103	164	205	255	410	510	336	
3 ... 3.08	10.3 ... 10.4	3.15 (4.05)	n_{2N}	r/min	375	300	200	100	100	75	50	37.5	25	1FT2205-2AH..-0..0-Z
			M_{2N}	Nm	8.2	11.8	22.5	37.5	42	58	96	122	183	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	11.9	15.1	30.5	48.5	60	76	122	152	205	
			M_{2max}	Nm	41	51	103	164	205	255	410	510	336	
5.3 ... 5.39	17.2 ... 17.5	5.1 (6)	n_{2N}	r/min	300	300	200	100	75	60	50	37.5	25	1F.2205-4AF..-0..0-Z
			M_{2N}	Nm	17.1	19.2	34	61	87	109	146	196	210	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	21	26.5	53	84	106	132	210	265	210	
			M_{2max}	Nm	69	87	174	275	345	430	690	712	336	
5.29 ... 5.37	17.2 ... 17.5	7.8 (9.4)	n_{2N}	r/min	300	250	150	75	75	60	37.5	30	20	1FT2206-2AC..-0..0-Z
			M_{2N}	Nm	15.8	20.5	40.5	73	79	100	171	215	205	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	21	26.5	53	85	106	133	210	265	210	
			M_{2max}	Nm	69	87	174	275	345	430	690	712	336	

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Planetary gearbox data										
Gearbox type:			NRK155, 1-stage			NRK155, 2-stage					
1. Order code			B51			B52					
	i		4	5	10	16	20	25	40	50	100
2. Order code			R04	R05	R10	R16	R20	R25	R40	R50	R00
	$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210
	$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336
	$M_{2Em.Off}$	Nm	920	890	420	920	920	890	920	890	420
	$J_{1,G}$	kg cm²	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
	$\varphi_{2,G}$	'	6			9					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRK155

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1- and 2-stage (continued)													
5.46 ... 5.54	17.2 ... 17.5	7.8 (9.4)	n_{2N} r/min	375	300	200	100	100	75	50	37.5	25	**1F.2206-2AF..-0..0-Z**
			M_{2N} Nm	16	21.5	39.5	68	71	100	165	210	210	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	21.5	27	55	87	109	136	215	270	205	
			M_{2max} Nm	69	87	174	275	345	430	690	712	336	
5.29 ... 5.37	17.2 ... 17.5	7.8 (9.4)	n_{2N} r/min	300	300	150	100	75	60	50	37.5	25	**1FT2206-2AH..-0..0-Z**
			M_{2N} Nm	17.2	18.8	44.5	60	86	108	138	189	200	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	21	26.5	53	84	105	132	210	265	210	
			M_{2max} Nm	69	87	174	275	345	430	690	712	336	
8.04 ... 8.19	25.9 ... 26.3	11.5 (13.1)	n_{2N} r/min	300	300	150	100	75	60	37.5	30	15	**1FT2206-3AB..-0..0-Z**
			M_{2N} Nm	24	26.5	62	81	117	148	250	310	210	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	32	40.5	81	128	161	200	320	400	210	
			M_{2max} Nm	105	131	260	415	520	650	736	712	336	
7.91 ... 8.06	25.9 ... 26.3	11.5 (13.1)	n_{2N} r/min	300	250	150	75	75	60	37.5	30	25	**1FT2206-3AF..-0..0-Z**
			M_{2N} Nm	23	30	59	103	111	140	235	295	210	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	31.5	40	80	126	158	198	315	395	210	
			M_{2max} Nm	105	131	260	415	520	650	736	712	336	
10.9 ... 11	36.6 ... 37.1	15.1 (16.8)	n_{2N} r/min	250	200	125	60	60	50	30	25	20	**1FT2206-4AC..-0..0-Z**
			M_{2N} Nm	27.5	36.5	64	125	131	156	275	330	162	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	43.5	54	110	174	215	270	435	445	210	
			M_{2max} Nm	148	185	336	580	730	712	736	712	336	
10.7 ... 10.9	34.6 ... 35.2	15.1 (16.8)	n_{2N} r/min	300	300	150	100	75	60	37.5	30	25	**1F.2206-4AF..-0..0-Z**
			M_{2N} Nm	34	37	84	108	155	195	325	405	210	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	43	54	109	171	210	265	425	445	210	
			M_{2max} Nm	140	175	336	550	690	712	736	712	336	
10.2 ... 10.4	34.6 ... 35.2	15.1 (16.8)	n_{2N} r/min	300	250	150	75	75	50	37.5	30	20	**1FT2206-4AH..-0..0-Z**
			M_{2N} Nm	27	35	67	119	124	188	265	330	210	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	41	51	104	164	205	255	410	445	210	
			M_{2max} Nm	140	175	336	550	690	712	736	712	336	
10.5 ... 10.7	36.6 ... 37.1	22.5 (25.8)	n_{2N} r/min	300	250	125	75	60	50	37.5	30	20	**1FT2208-2AF..-0..0-Z**
			M_{2N} Nm	29.5	38	85	129	166	200	280	350	210	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	42	53	106	167	205	260	415	445	210	
			M_{2max} Nm	148	185	336	580	730	712	736	712	336	
16.4 ... 16.6	49.2 ... 49.9	29.6 (32.6)	n_{2N} r/min	250	200	100	60	50	37.5	30	25	–	**1FT2208-3AB..-0..0-Z**
			M_{2N} Nm	39.5	52	113	174	215	280	370	435	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	66	82	165	260	325	405	460	445	–	
			M_{2max} Nm	199	245	336	736	736	712	736	712	–	
15.5 ... 15.8	49.2 ... 49.9	29.6 (33)	n_{2N} r/min	300	250	125	75	60	50	30	30	–	**1F.2208-3AC..-0..0-Z**
			M_{2N} Nm	40.5	52	115	169	215	260	450	440	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	63	78	158	245	310	385	460	445	–	
			M_{2max} Nm	199	245	336	736	736	712	736	712	–	

➥ Continued on the next page

Planetary gearbox data										
Gearbox type:			NRK155, 1-stage			NRK155, 2-stage				
1. Order code			B51			B52				
i			4	5	10	16	20	25	40	50	100
2. Order code			R04	R05	R10	R16	R20	R25	R40	R50	R00
$M_{2N,G}$		Nm	460	445	210	460	460	445	460	445	210
$M_{2max,G}$		Nm	736	712	336	736	736	712	736	712	336
$M_{2Em.Off}$		Nm	920	890	420	920	920	890	920	890	420
$J_{1,G}$		kg cm²	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
$\varphi_{2,G}$		'	6			9					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	M_{maxM}	J_M ($J_{M,Br}$)											
Nm	Nm	kg cm²											
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1- and 2-stage (continued)													
15.4 ... 15.7	49.2 ... 49.9	29.6 (33)	n_{2N} r/min	250	250	125	75	60	50	30	30	–	**1FT2208-3AF..-0..0-Z**
			M_{2N} Nm	45.5	48	108	160	205	245	425	410	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	62	78	156	245	305	385	460	445	–	
			M_{2max} Nm	199	245	336	736	736	712	736	712	–	
19.9 ... 20.1	63.8 ... 64.7	38.8 (44.4)	n_{2N} r/min	200	150	100	50	37.5	37.5	25	20	–	**1FT2208-4AB..-0..0-Z**
			M_{2N} Nm	46.5	64	102	197	260	265	405	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	80	100	200	315	395	445	460	445	–	
			M_{2max} Nm	255	320	336	736	736	712	736	712	–	
19.2 ... 19.6	63.8 ... 64.7	38.8 (44.4)	n_{2N} r/min	250	200	125	75	60	50	37.5	30	–	**1F.2208-4AC..-0..0-Z**
			M_{2N} Nm	56	73	129	186	240	285	365	440	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	78	98	196	305	385	445	460	445	–	
			M_{2max} Nm	255	320	336	736	736	712	730	712	–	
18.4 ... 18.8	63.8 ... 64.7	38.8 (44.4)	n_{2N} r/min	250	200	125	75	60	50	37.5	30	–	**1FT2208-4AF..-0..0-Z**
			M_{2N} Nm	56	73	128	186	240	285	370	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	74	93	187	295	365	445	460	445	–	
			M_{2max} Nm	255	320	336	736	736	712	730	712	–	
23.3 ... 23.8	77.3 ... 78.5	48.1 (53.6)	n_{2N} r/min	250	200	125	60	50	37.5	37.5	30	–	**1FT2208-5AB..-0..0-Z**
			M_{2N} Nm	61	80	138	250	305	405	375	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	95	118	210	370	460	445	460	445	–	
			M_{2max} Nm	310	390	336	736	736	712	736	712	–	
23.1 ... 23.5	77.3 ... 78.5	48.1 (53.6)	n_{2N} r/min	250	200	125	60	50	37.5	30	30	–	**1F.2208-5AC..-0..0-Z**
			M_{2N} Nm	61	80	137	250	310	405	460	435	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	94	117	210	365	455	445	460	445	–	
			M_{2max} Nm	310	390	336	736	736	712	736	712	–	
18.2 ... 18.6	57.9 ... 58.7	66.7 (72.7)	n_{2N} r/min	250	200	100	60	50	37.5	30	30	–	**1FT2210-2AC..-0..0-Z**
			M_{2N} Nm	57	74	153	235	290	370	460	400	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	74	92	185	290	365	445	460	445	–	
			M_{2max} Nm	230	290	336	736	736	712	736	712	–	
18 ... 18.3	57.9 ... 58.7	66.7 (72.7)	n_{2N} r/min	250	200	100	60	50	37.5	30	25	–	**1FT2210-2AF..-0..0-Z**
			M_{2N} Nm	53	69	148	220	270	360	440	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	73	91	183	285	360	445	460	445	–	
			M_{2max} Nm	230	290	336	736	736	712	736	712	–	
28.3 ... 28.7	86.9 ... 88.3	93.8 (99.8)	n_{2N} r/min	250	200	100	60	50	37.5	30	30	–	**1F.2210-3AB..-0..0-Z**
			M_{2N} Nm	73	96	200	290	355	445	460	435	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	114	143	210	450	460	445	460	445	–	
			M_{2max} Nm	350	440	336	736	736	712	736	712	–	
28.3 ... 28.7	86.9 ... 88.3	93.8 (99.8)	n_{2N} r/min	250	200	100	60	50	37.5	30	30	–	**1F.2210-3AC..-0..0-Z**
			M_{2N} Nm	73	95	200	285	350	445	460	435	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	114	143	210	450	460	445	460	445	–	
			M_{2max} Nm	350	440	336	736	736	710	736	712	–	

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Planetary gearbox data										
Gearbox type:			NRK155, 1-stage			NRK155, 2-stage				
1. Order code			B51			B52				
	i		4	5	10	16	20	25	40	50	100
2. Order code			R04	R05	R10	R16	R20	R25	R40	R50	R00
	$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210
	$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336
	$M_{2Em.Off}$	Nm	920	890	420	920	920	890	920	890	420
	$J_{1,G}$	kg cm²	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
	$\varphi_{2,G}$	'	6			9					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRK155

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1- and 2-stage (continued)													
27.8 ... 28.2	86.9 ... 88.3	93.8 (99.8)	n_{2N}	r/min	200	200	100	50	37.5	37.5	30	25	–	**1FT2210-3AF..-0..0-Z**
			M_{2N}	Nm	85	86	184	325	435	435	455	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	112	140	210	445	460	445	455	440	–	
			M_{2max}	Nm	350	440	336	736	736	712	736	712	–	
37.6 ... 38.5	116 ... 118	122 (138)	n_{2N}	r/min	200	200	100	50	50	37.5	30	30	–	**1F.2210-4AB..-0..0-Z**
			M_{2N}	Nm	105	107	210	385	380	445	460	395	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	153	192	210	460	460	445	460	445	–	
			M_{2max}	Nm	470	580	335	736	736	712	736	712	–	
37 ... 37.8	116 ... 118	122 (138)	n_{2N}	r/min	200	200	100	50	50	37.5	30	30	–	**1F.2210-4AC..-0..0-Z**
			M_{2N}	Nm	104	106	210	380	375	445	460	390	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	151	188	210	460	460	445	460	445	–	
			M_{2max}	Nm	470	580	335	736	736	712	736	712	–	
35.5 ... 36.2	116 ... 118	122 (138)	n_{2N}	r/min	200	150	100	50	50	37.5	30	25	–	**1FT2210-4AF..-0.B0-Z**
			M_{2N}	Nm	102	138	205	375	360	445	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	144	180	210	460	460	445	460	440	–	
			M_{2max}	Nm	470	580	335	736	736	712	736	712	–	
42.9 ... 43.7	145 ... 147	19.5 (21.1)	n_{2N}	r/min	200	200	125	50	50	50	30	30	–	**1FT2210-5AB..-0..0-Z**
			M_{2N}	Nm	125	126	187	440	430	350	460	435	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	174	215	210	460	460	445	460	445	–	
			M_{2max}	Nm	580	712	336	736	736	712	736	712	–	
43.9 ... 44.9	145 ... 147	150 (166)	n_{2N}	r/min	200	150	100	50	50	37.5	30	25	–	**1F.2210-5AC..-0.B0-Z**
			M_{2N}	Nm	114	154	210	410	390	445	460	445	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	179	220	210	460	460	445	460	445	–	
			M_{2max}	Nm	580	712	336	736	736	712	736	712	–	

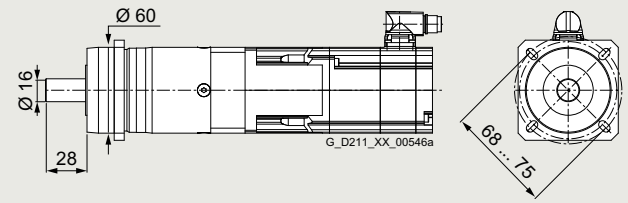
Planetary gearbox data										
Gearbox type:			**NRK155, 1-stage**			**NRK155, 2-stage**					
1. Order code			**B51**			**B52**					
	i		**4**	**5**	**10**	**16**	**20**	**25**	**40**	**50**	**100**
2. Order code			**R04**	**R05**	**R10**	**R16**	**R20**	**R25**	**R40**	**R50**	**R00**
	$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210
	$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336
	$M_{2Em.Off}$	Nm	920	890	420	920	920	890	920	890	420
	$J_{1,G}$	kg cm²	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
	$\varphi_{2,G}$	'	6			9					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NLC060



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	3200 N
Average axial force for 20000 h	$F_{A,eq}$	4400 N
Average radial force for 30000 h	$F_{R,eq}$	3200 N
Average axial force for 30000 h	$F_{A,eq}$	3900 N
Maximum radial force	$F_{R,max}$	3200 N
Maximum axial force	$F_{A,max}$	4400 N

Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC060 1- and 2-stage																					
0.326	1.7	0.093	n_{2N}	r/min	375	375	375	300	300	300	300	250	250	200	200	150	150	125	100	60	37.5	**1F.2103-2AH..-2..0-Z**
...	...	(0.112)	M_{2N}	Nm	0.6	0.96	1.28	2.1	2.35	2.8	2.4	3.35	3.95	4.8	5.3	7.4	9.6	12.3	18	15	■■■ + ■■■ + . . .
0.5	1.85		$M_{2.0}$	Nm	0.97	1.49	2	3.05	3.55	4.6	4	5.5	7	7.5	9.5	12.1	15.6	19.6	18	15	
			M_{2max}	Nm	5	6.9	8.8	12.6	14.5	18.3	16.2	21.5	27	29	36.5	46	59	64	28.5	24	
0.801	3.77	0.139	n_{2N}	r/min	375	375	375	300	300	250	250	250	200	200	150	150	125	100	60	–	**1F.2103-4AH..-2..0-Z**
...	...	(0.158)	M_{2N}	Nm	1.79	2.35	2.8	4.65	5	6.8	6.1	6.8	9.9	10.1	13.7	15.2	19.4	24.5	18	–	■■■ + ■■■ + . . .
0.958	3.9		$M_{2.0}$	Nm	2.4	3.35	4.35	6.3	7.3	9.3	8.1	11	13.9	14.9	18.8	23.5	30	38	18	–	
			M_{2max}	Nm	11.3	15.2	19.2	27	29	24	34.5	46	58	61	70	64	70	64	29	–	
1.01	3.48	0.371	n_{2N}	r/min	500	375	375	375	300	300	300	250	200	200	150	125	100	75	50	–	**1F.2104-4AF..-2..0-Z**
...	...	(0.451)	M_{2N}	Nm	2	3.45	4.35	5.5	7.2	8.6	7.6	10.2	13.3	13.8	18.2	22.5	29	37.5	18	–	■■■ + ■■■ + . . .
1.18	3.6		$M_{2.0}$	Nm	3	4.2	5.4	7.8	9	11.4	10.1	13.7	17.3	18.4	23	29	37	40	18	–	
			M_{2max}	Nm	10.4	14	17.7	25	28.5	24	32	42.5	53	57	70	64	70	64	29	–	
1.01	3.58	0.371	n_{2N}	r/min	500	375	375	375	300	300	300	250	250	200	200	150	125	100	60	–	**1F.2104-4AK..-2..0-Z**
...	...	(0.451)	M_{2N}	Nm	2.15	3.75	4.75	5.8	7.8	9.1	8.2	11	11.7	15	15.9	22.5	28.5	36.5	18	–	■■■ + ■■■ + . . .
1.17	3.7		$M_{2.0}$	Nm	3	4.2	5.4	7.8	9	11.3	10.1	13.6	17.1	18.3	23	28.5	37	40	18	–	
			M_{2max}	Nm	10.7	14.4	18.2	25.5	29	24	32.5	44	55	58	70	64	70	64	29	–	
2.12	7.18	0.581	n_{2N}	r/min	375	375	375	300	300	300	250	200	200	150	150	125	100	75	–	–	**1F.2104-5AF..-2..0-Z**
...	...	(0.671)	M_{2N}	Nm	5.4	6.8	7.9	12	12.7	13.1	15.5	21	22.5	29.5	32	40	44	40	–	–	■■■ + ■■■ + . . .
2.26	7.29		$M_{2.0}$	Nm	6.3	8.6	10.9	15.5	17.8	15	19.9	26.5	33.5	35.5	44	40	44	40	–	–	
			M_{2max}	Nm	21.5	28.5	36	40	29	24	64	70	70	70	70	64	70	64	–	–	
2.1	7.28	0.581	n_{2N}	r/min	375	375	375	300	300	300	250	200	200	150	150	125	125	100	–	–	**1F.2104-5AK..-2..0-Z**
...	...	(0.671)	M_{2N}	Nm	5.3	6.7	7.8	11.8	12.6	12.9	15.2	20.5	22.5	30	32	39.5	37.5	40	–	–	■■■ + ■■■ + . . .
2.24	7.39		$M_{2.0}$	Nm	6.3	8.5	10.8	15.4	17.7	15	19.8	26.5	33	35.5	44	40	44	40	–	–	
			M_{2max}	Nm	21.5	29	36.5	40	29	24	65	70	70	70	70	64	70	64	–	–	
2.87	9.65	0.781	n_{2N}	r/min	375	375	375	300	300	300	250	200	150	150	150	125	100	75	–	–	**1F.2104-6AF..-2..0-Z**
...	...	(0.861)	M_{2N}	Nm	6.7	8.4	9.6	14.5	15.2	15	18.2	24.5	35	35.5	37	40	44	40	–	–	■■■ + ■■■ + . . .
3	9.75		$M_{2.0}$	Nm	8.6	11.6	14.7	20.5	18	15	26.5	35.5	44	44	44	40	44	40	–	–	
			M_{2max}	Nm	28.5	38.5	48.5	40	29	24	70	70	70	70	70	64	70	64	–	–	

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Planetary gearbox data																	
Gearbox type:			NLC060, 1-stage						NLC060, 2-stage								
1. Order code			C21						C22								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18	15
	$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29	24
	$M_{2Em.Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
	$J_{1.G}$	kg cm²	0.178	0.12	0.097	0.078	0.074	0.069	0.135	0.129	0.081	0.091	0.079	0.078	0.068	0.067	0.067	0.064
	$\varphi_{2,G}$	'	10						12									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NLC060

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC060 1- and 2-stage (continued)																					
4.51 ... 4.63	14.5 ... 14.6	1.98 (2.82)	n_{2N}	r/min	375	300	300	250	250	250	200	150	150	125	125	100	100	75	–	–	1F.2105-4AF..-0..0-Z
			M_{2N}	Nm	10.6	15.4	17.1	22.5	18	15	28.5	40.5	39	44	43.5	40	38	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.5	18.2	22.5	25	18	15	41	44	44	44	44	40	44	40	–	–	
			M_{2max}	Nm	43.5	58	64	40	29	24	70	70	70	70	70	64	70	64	–	–	
4.49 ... 4.61	14.5 ... 14.6	1.98 (2.82)	n_{2N}	r/min	375	300	250	200	250	200	200	150	125	125	125	100	75	75	–	–	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	9.6	14.3	18.7	25	17.7	15	25	36.5	44	43.5	36.5	40	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.4	18.1	22.5	25	18	15	40.5	44	44	44	44	40	44	40	–	–	
			M_{2max}	Nm	43.5	58	64	40	29	24	70	70	70	70	70	64	70	64	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC060 1- and 2-stage																					
0.348 ... 0.529	1.6 ... 1.76	0.2 (0.22)	n_{2N}	r/min	375	375	300	300	250	250	250	200	150	150	125	100	100	75	50	37.5	1F.2203-2AK..-2..0-Z
			M_{2N}	Nm	0.55	0.83	1.32	1.74	2.25	2.55	2.25	3.2	4.75	4.8	6.2	8	8.3	11.7	17.9	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.04	1.58	2.1	3.2	3.75	4.8	4.25	5.8	7.4	8	10.1	12.8	16.5	20.5	18	15	
			M_{2max}	Nm	4.8	6.5	8.3	11.9	13.7	17.3	15.3	20.5	25.5	27.5	34.5	43.5	55	64	29	24	
0.942 ... 1.09	3.48 ... 3.6	0.35 (0.37)	n_{2N}	r/min	375	375	300	300	250	250	250	200	200	200	150	125	100	75	60	–	1F.2203-4AK..-2..0-Z
			M_{2N}	Nm	2.05	2.6	3.8	4.85	6.1	6.9	6.3	8.5	9.2	9	12.7	15.6	20	27	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.8	3.95	5	7.3	8.4	10.7	9.4	12.7	16	17.1	21.5	27	34.5	40	18	–	
			M_{2max}	Nm	10.4	14	17.7	25	28.5	24	32	42.5	53	57	70	64	70	64	29	–	
2.08 ... 2.22	6.78 ... 6.89	1.251 (1.331)	n_{2N}	r/min	375	375	375	300	250	250	250	200	200	150	150	125	100	75	–	–	1F.2204-5AF..-2..0-Z
			M_{2N}	Nm	5.2	6.5	7.3	11.2	14.2	14.9	14.3	19.5	19.9	27.5	28.5	35.5	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.2	8.4	10.7	15.2	17.5	15	19.6	26	33	35	44	40	44	40	–	–	
			M_{2max}	Nm	20	27	34	40	29	24	61	70	70	70	70	64	70	64	–	–	
2.09 ... 2.23	6.78 ... 6.89	1.251 (1.331)	n_{2N}	r/min	375	375	300	300	250	250	250	200	150	150	125	125	100	100	–	–	1F.2204-5AK..-2..0-Z
			M_{2N}	Nm	5.3	6.6	9.4	11.4	14.5	15	14.6	19.9	27.5	28.5	35.5	36	44	38.5	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.2	8.5	10.8	15.3	17.6	15	19.7	26	33	35	44	40	44	40	–	–	
			M_{2max}	Nm	20	27	34	40	29	24	61	70	70	70	70	64	70	64	–	–	
2.85 ... 2.98	9.15 ... 9.26	1.631 (1.711)	n_{2N}	r/min	375	375	300	250	250	300	200	200	150	150	125	125	100	75	–	–	1F.2204-6AF..-2..0-Z
			M_{2N}	Nm	7.1	8.7	12.4	17.5	18	13.3	22.5	24	35.5	35.5	43.5	40	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.5	11.5	14.6	20.5	18	15	26.5	35.5	44	44	44	40	44	40	–	–	
			M_{2max}	Nm	27	36.5	46	40	29	24	70	70	70	70	70	64	70	64	–	–	
2.6 ... 2.73	10.4 ... 10.5	3.42 (4.32)	n_{2N}	r/min	375	300	250	200	200	200	200	150	125	125	100	100	75	50	–	–	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	5.4	8.3	10.9	15.3	16.7	15	16.5	24	30.5	30	39.5	33.5	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.7	10.5	13.3	18.9	18	15	24	32	40	43	44	40	44	40	–	–	
			M_{2max}	Nm	31	41.5	52	40	29	24	70	70	70	70	70	64	70	64	–	–	
2.66 ... 2.79	10.4 ... 10.5	3.42 (4.32)	n_{2N}	r/min	375	375	300	250	250	250	200	150	150	125	100	100	75	75	–	–	1F.2205-2AF..-0..0-Z
			M_{2N}	Nm	6.7	7.6	11.3	15.5	15.4	12.4	20.5	27.5	29	36	44	40	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.9	10.8	13.6	19.3	18	15	24.5	33	41.5	43.5	44	40	44	40	–	–	
			M_{2max}	Nm	31	41.5	52	40	29	24	70	70	70	70	70	64	70	64	–	–	
2.65 ... 2.77	10.4 ... 10.5	3.42 (4.32)	n_{2N}	r/min	375	300	300	250	200	200	200	150	125	125	100	100	75	75	–	–	1FT2205-2AH..-0..0-Z
			M_{2N}	Nm	6	9	9.9	13.4	17.9	15	18.2	26	33	32.5	42.5	37.5	44	38	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.9	10.7	13.6	19.2	18	15	24.5	32.5	41	43.5	44	40	44	40	–	–	
			M_{2max}	Nm	31	41.5	52	40	29	24	70	70	70	70	70	64	70	64	–	–	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:		NLC060, 1-stage						NLC060, 2-stage									
1. Order code		C21						C22									
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18	15
$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29	24
$M_{2Em.Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm²	0.178	0.12	0.097	0.078	0.074	0.069	0.135	0.129	0.081	0.091	0.079	0.078	0.068	0.067	0.067	0.064
$\varphi_{2,G}$	'	10						12									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC060 1- and 2-stage (continued)																			
4.69 ... 4.81	17.4 ... 17.6	5.37 (6.27)	n_{2N}	r/min	300	300	250	200	250	200	150	125	125	125	100	100	75	75	–	–	1F.2205-4AF..-0..0-Z
			M_{2N}	Nm	11.9	13.9	18.4	24.5	17.2	15	35	43.5	44	42.5	44	40	44	39	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14	18.9	23.5	25	18	15	42.5	44	44	44	44	40	44	40	–	–	
			M_{2max}	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	–	–	

Planetary gearbox data																	
Gearbox type:			NLC060, 1-stage						NLC060, 2-stage								
1. Order code			C21						C22								
i			3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$		Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18	15
$M_{2max,G}$		Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29	24
$M_{2Em.Off}$		Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$		kg cm²	0.178	0.12	0.097	0.078	0.074	0.069	0.135	0.129	0.081	0.091	0.079	0.078	0.068	0.067	0.067	0.064
$\varphi_{2,G}$		'	10						12								

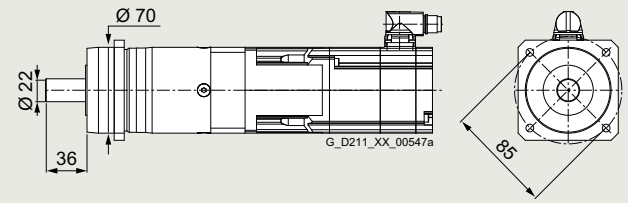
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NLC080

Selection and ordering data

NLC080



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5500 N
Average axial force for 20000 h	$F_{A,eq}$	6400 N
Average radial force for 30000 h	$F_{R,eq}$	4800 N
Average axial force for 30000 h	$F_{A,eq}$	5700 N
Maximum radial force	$F_{R,max}$	5500 N
Maximum axial force	$F_{A,max}$	6400 N

Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC080 1- and 2-stage																					
0.224	1.56	0.093	n_{2N}	r/min	250	300	300	300	300	250	250	250	200	200	150	150	125	100	60	37.5	**1F.2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	0.35	0.63	0.98	1.59	1.83	2.6	2.1	2.5	3.6	3.65	5.6	6	8.3	10.8	19	31.5	■■■ + ■■■ + . . .
0.501	1.82		$M_{2,0}$	Nm	0.67	1.19	1.72	2.75	3.3	4.35	3.7	5.2	6.7	7.3	9.3	11.8	15.4	19.5	31.5	38	
			M_{2max}	Nm	4.65	6.5	8.3	12.1	13.9	17.6	15.6	21	26.5	28	35.5	44.5	57	72	80	61	
0.727	3.64	0.139	n_{2N}	r/min	375	375	300	300	300	250	250	200	200	200	150	125	125	100	60	37.5	**1F.2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	1.5	2	3.1	4.35	4.65	6.6	5.7	7.8	8.9	8.5	12.9	16.2	18.6	23.5	40	38	■■■ + ■■■ + . . .
0.984	3.85		$M_{2,0}$	Nm	2.15	3.2	4.2	6.2	7.3	9.3	8.1	11	14	15	19	23.5	30.5	38.5	50	38	
			M_{2max}	Nm	10.9	14.8	18.7	26.5	30	38	34	45.5	57	61	76	95	122	153	80	61	
0.875	3.34	0.35	n_{2N}	r/min	375	375	375	300	300	300	300	250	200	200	150	125	100	75	50	30	**1F.2104-4AF..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.1	3	3.85	5.9	6.7	7.8	7	9.4	12.2	12.7	17.3	21.5	28.5	37	50	38	■■■ + ■■■ + . . .
1.15	3.56		$M_{2,0}$	Nm	2.6	3.75	4.95	7.3	8.4	10.8	9.5	13	16.5	17.6	22	28	36	45	50	38	
			M_{2max}	Nm	10	13.6	17.2	24.5	28	35	31	42	52	56	70	88	113	142	80	61	
0.869	3.44	0.35	n_{2N}	r/min	375	375	375	300	300	300	300	250	200	200	150	150	125	100	60	37.5	**1F.2104-4AK..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.35	3.3	4.25	6.5	7.3	8.2	7.6	10.1	13.4	13.9	18.9	21	28	35.5	50	38	■■■ + ■■■ + . . .
1.14	3.66		$M_{2,0}$	Nm	2.6	3.75	4.9	7.2	8.4	10.7	9.5	12.9	16.4	17.5	22	27.5	35.5	45	50	38	
			M_{2max}	Nm	10.3	14	17.7	25	28.5	36	32	43	54	58	72	91	116	145	80	61	
1.98	7.04	0.56	n_{2N}	r/min	375	375	375	300	300	250	250	200	200	150	150	125	100	75	50	30	**1F.2104-5AF..-2..0-Z**
...	...	(0.65)	M_{2N}	Nm	5.3	6.6	7.5	12.2	12.7	17.4	16.1	21.5	21	29.5	33.5	41	56	73	50	38	■■■ + ■■■ + . . .
2.23	7.22		$M_{2,0}$	Nm	5.9	8.2	10.4	15	17.2	21.5	19.3	26	32.5	35	44	55	70	88	50	38	
			M_{2max}	Nm	21	28	35.5	50	57	61	64	86	107	114	143	176	192	176	80	61	
1.96	7.14	0.56	n_{2N}	r/min	375	375	300	300	250	250	250	200	150	150	150	100	100	75	60	37.5	**1F.2104-5AK..-2..0-Z**
...	...	(0.65)	M_{2N}	Nm	5.3	6.5	9.7	12	15.5	17.1	16	22	29.5	31	33	49.5	56	77	50	38	■■■ + ■■■ + . . .
2.21	7.32		$M_{2,0}$	Nm	5.8	8.1	10.4	14.9	17.1	21.5	19.2	25.5	32.5	34.5	43.5	54	70	88	50	38	
			M_{2max}	Nm	21	28.5	36	51	58	61	65	87	109	116	145	176	192	176	80	61	
2.73	9.51	0.76	n_{2N}	r/min	375	375	300	300	250	250	250	200	150	150	125	100	100	75	50	–	**1F.2104-6AF..-2..0-Z**
...	...	(0.84)	M_{2N}	Nm	6.8	8.3	12.2	14.9	19.3	20.5	19.4	26.5	37.5	37.5	48.5	62	66	91	50	–	■■■ + ■■■ + . . .
2.96	9.68		$M_{2,0}$	Nm	8.1	11.2	14.2	20	23	29	26	35	43.5	46.5	58	73	94	110	50	–	
			M_{2max}	Nm	28.5	38	48	67	77	61	86	115	144	153	192	176	192	176	80	–	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:			NLC080, 1-stage						NLC080, 2-stage								
1. Order code			C31						C32								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50	38
	$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
	$J_{1,G}$	kg cm²	0.775	0.54	0.466	0.401	0.387	0.37	0.641	0.615	0.607	0.46	0.415	0.412	0.37	0.368	0.369	0.357
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC080 1- and 2-stage (continued)																				
4.47 ... 4.66	14.4 ... 14.6	1.71 (2.55)	n_{2N}	r/min	375	375	300	300	250	250	250	200	150	150	125	100	75	75	50	–	**1F.2105-4AF..-0..0-Z**
			M_{2N}	Nm	11.5	14	19.3	23	29.5	30	28	37	53	53	68	87	115	110	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.4	18.1	22.5	32	37	38	41	55	69	74	92	110	120	110	50	–	
			M_{2max}	Nm	43	57	72	101	80	61	130	173	176	192	192	176	192	176	80	–	
4.5 ... 4.69	14.4 ... 14.6	1.71 (2.55)	n_{2N}	r/min	375	375	300	250	250	200	200	200	150	150	125	100	75	75	60	–	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	11	12.5	18.3	25	27	35.5	32	32.5	49.5	48	61	79	107	104	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.4	18.2	23	32.5	37	38	41.5	55	70	74	93	110	120	110	50	–	
			M_{2max}	Nm	43	57	72	101	80	61	130	173	176	192	192	176	192	176	80	–	
7.08 ... 7.26	23.2 ... 23.4	2.65 (3.5)	n_{2N}	r/min	375	300	300	250	200	250	200	150	125	100	100	100	75	75	–	–	**1F.2105-6AF..-0..0-Z**
			M_{2N}	Nm	16.7	24	26.5	37	48	33	47	65	81	95	104	96	120	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21	28.5	35.5	50	50	38	64	85	107	114	120	110	120	110	–	–	
			M_{2max}	Nm	70	93	116	104	80	61	208	192	176	192	192	176	192	176	–	–	
7.18 ... 7.36	25 ... 25.3	5.476 (7.176)	n_{2N}	r/min	300	300	250	200	200	200	150	125	100	100	75	75	60	60	–	–	**1F.2106-3AF..-0..0-Z**
			M_{2N}	Nm	18.7	21	28.5	39.5	39.5	32.5	54	67	86	85	118	108	120	104	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21.5	28.5	36	51	50	38	65	87	109	116	120	110	120	110	–	–	
			M_{2max}	Nm	75	101	126	104	80	61	208	192	176	192	192	175	192	176	–	–	
9.37 ... 9.55	31.8 ... 32.2	6.876 (8.476)	n_{2N}	r/min	300	250	250	200	200	200	150	125	100	100	75	75	60	60	–	–	**1F.2106-4AF..-0..0-Z**
			M_{2N}	Nm	23.5	31.5	34	47	45	32	64	76	98	94	120	109	120	95	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	28	37.5	47	65	50	38	84	112	110	120	120	110	120	110	–	–	
			M_{2max}	Nm	96	128	160	104	80	61	208	192	176	192	192	176	192	176	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC080 1- and 2-stage																				
0.286 ... 0.496	1.54 ... 1.72	0.2 (0.22)	n_{2N}	r/min	–	250	250	250	200	200	200	150	150	125	125	100	75	75	37.5	30	**1F.2203-2AK..-0..0-Z**
			M_{2N}	Nm	–	0.73	1.07	1.61	2.2	2.65	2.25	3.5	3.9	4.75	5.3	7.1	10.4	10.8	22	30	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	–	1.14	1.65	2.65	3.15	4.2	3.65	5.1	6.7	7.2	9.2	11.7	15.3	19.3	31	38	
			M_{2max}	Nm	–	6.1	7.9	11.4	13.1	16.6	14.8	20	25	26.5	33.5	42.5	54	68	80	61	
0.83 ... 1.1	3.34 ... 3.56	0.35 (0.37)	n_{2N}	r/min	375	375	300	300	250	250	250	200	200	150	150	125	100	75	50	37.5	**1F.2203-4AK..-0..0-Z**
			M_{2N}	Nm	1.74	2.3	3.45	4.7	5.8	6.7	5.9	8.1	8.4	11.4	12.3	15.1	20	27.5	42	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.45	3.6	4.7	7	8.1	10.3	9.1	12.5	15.8	16.9	21	26.5	34.5	43.5	50	38	
			M_{2max}	Nm	10	13.6	17.2	24.5	28	35	31	42	52	56	70	88	113	142	80	61	
1.94 ... 2.19	6.65 ... 6.83	1.23 (1.31)	n_{2N}	r/min	375	375	300	300	250	250	250	200	150	150	150	125	100	75	50	30	**1F.2204-5AF..-2..0-Z**
			M_{2N}	Nm	5	6.3	8.9	11.3	14.3	15.9	15	20	26	27.5	30	37	50	66	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.8	8	10.2	14.7	16.9	21	19	25.5	32	34	43	54	69	87	50	38	
			M_{2max}	Nm	19.9	26.5	33.5	47.5	54	61	60	81	101	108	135	169	192	176	80	61	
1.95 ... 2.2	6.65 ... 6.83	1.23 (1.31)	n_{2N}	r/min	375	375	300	300	250	250	250	200	150	150	150	125	100	75	60	37.5	**1F.2204-5AK..-2..0-Z**
			M_{2N}	Nm	5.2	6.4	9.2	11.6	14.8	16.2	15.4	20.5	27	28.5	30.5	37.5	52	68	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.8	8	10.3	14.8	17	21.5	19.1	25.5	32	34.5	43	54	70	87	50	38	
			M_{2max}	Nm	19.9	26.5	33.5	47.5	54	61	60	81	101	108	135	169	192	176	80	61	
2.72 ... 2.95	9.02 ... 9.19	1.61 (1.69)	n_{2N}	r/min	375	375	300	250	250	200	250	200	150	150	125	100	100	75	50	–	**1F.2204-6AF..-2..0-Z**
			M_{2N}	Nm	7.3	8.7	12.9	18.6	20	26.5	19.6	26.5	38	38.5	49	63	63	89	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.1	11.1	14.1	20	23	29	25.5	34.5	43.5	46.5	58	73	94	110	50	–	
			M_{2max}	Nm	27	36	45.5	64	73	61	81	109	136	145	182	176	192	176	80	–	

➥ Continued on the next page

Planetary gearbox data																
Gearbox type:		NLC080, 1-stage						NLC080, 2-stage								
1. Order code		C31						C32								
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$ Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50	38
	$M_{2max,G}$ Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80	61
	$M_{2Em.Off}$ Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
	$J_{1,G}$ kg cm²	0.775	0.54	0.466	0.401	0.387	0.37	0.641	0.615	0.607	0.46	0.415	0.412	0.37	0.368	0.369	0.357
	$\varphi_{2,G}$ '	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NLC080

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC080 1- and 2-stage (continued)																				
2.62 ... 2.82	10.3 ... 10.5	3.15 (4.05)	n_{2N}	r/min	375	375	300	250	250	200	250	200	150	125	100	100	75	50	37.5	–	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	6.2	6.9	10.6	15	16.4	21	15.8	21.5	29.5	34	43	46.5	63	88	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.8	10.7	13.6	19.5	22	28	24.5	33	41.5	44.5	56	70	90	110	50	–	
			M_{2max}	Nm	30.5	41	51	73	80	61	93	124	155	166	192	176	192	176	80	–	
2.67 ... 2.87	10.3 ... 10.5	3.15 (4.05)	n_{2N}	r/min	375	375	375	300	250	250	250	200	150	150	125	100	100	75	50	–	1F.2205-2AF..-0..0-Z
			M_{2N}	Nm	6.7	8.8	9.6	15.3	18.6	20.5	19.7	26	34	35.5	45	56	62	86	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8	10.9	13.9	19.8	22.5	28.5	25	33.5	42.5	45	57	71	91	110	50	–	
			M_{2max}	Nm	30.5	41	51	73	80	61	93	124	155	166	192	176	192	176	80	–	
2.64 ... 2.85	10.3 ... 10.5	3.15 (4.05)	n_{2N}	r/min	375	375	300	250	250	200	250	200	150	150	125	100	100	75	60	–	1FT2205-2AH..-0..0-Z
			M_{2N}	Nm	6.5	7.8	11.2	15.8	17.6	22.5	17.4	23.5	32	33.5	41.5	52	53	78	49.5	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.9	10.8	13.7	19.6	22.5	28	25	33.5	42	45	56	70	90	110	50	–	
			M_{2max}	Nm	30.5	41	51	73	80	61	93	124	155	166	192	176	192	176	80	–	
4.75 ... 4.94	17.4 ... 17.5	5.1 (6)	n_{2N}	r/min	375	300	300	250	200	200	200	150	125	125	100	100	75	75	–	–	1F.2205-4AF..-0..0-Z
			M_{2N}	Nm	11	16.2	18.3	25.5	32.5	36	34	47	58	60	77	75	110	95	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.2	19.2	24	34	39	38	43.5	58	73	77	97	110	120	110	–	–	
			M_{2max}	Nm	52	69	87	104	80	61	156	192	176	192	192	176	192	176	–	–	
4.98 ... 5.17	17.3 ... 17.5	8.676 (10.276)	n_{2N}	r/min	300	250	200	200	150	150	150	125	100	100	75	60	50	50	37.5	–	1FT2206-2AC..-0..0-Z
			M_{2N}	Nm	11.7	16.2	21	23	33.5	34.5	35.5	43.5	56	54	78	99	119	101	49.5	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.9	20	25	35.5	41	38	45.5	61	76	81	102	110	120	110	50	–	
			M_{2max}	Nm	52	69	87	104	80	61	155	192	176	192	192	176	192	176	80	–	
4.9 ... 5.09	17.3 ... 17.5	8.676 (10.276)	n_{2N}	r/min	375	300	250	200	200	150	150	150	125	100	100	75	60	50	–	–	1F.2206-2AF..-0..0-Z
			M_{2N}	Nm	10.9	16.2	20.5	29	31	38	37.5	41	50	64	62	91	119	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.7	19.8	25	35	40.5	38	45	60	75	80	100	110	120	110	–	–	
			M_{2max}	Nm	52	69	87	104	80	61	155	192	176	192	192	176	192	176	–	–	
4.76 ... 4.95	17.3 ... 17.5	8.676 (10.276)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	60	50	–	–	1FT2206-2AH..-0..0-Z
			M_{2N}	Nm	12.2	16.5	18.6	26	25	38	36	47.5	59	60	80	100	101	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.2	19.2	24	34	39	38	43.5	58	73	78	97	110	120	110	–	–	
			M_{2max}	Nm	52	69	87	104	80	61	155	192	176	192	192	176	192	176	–	–	
7.23 ... 7.41	26 ... 26.3	12.38 (13.976)	n_{2N}	r/min	300	250	250	200	150	150	150	100	100	100	75	60	50	37.5	–	–	1FT2206-3AB..-0..0-Z
			M_{2N}	Nm	17.7	24	25.5	35.5	49	38	50	73	79	77	109	110	120	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21.5	29	36.5	51	50	38	65	87	109	117	120	110	120	110	–	–	
			M_{2max}	Nm	78	105	131	104	80	61	208	192	176	192	192	176	192	176	–	–	
7.09 ... 7.28	26 ... 26.3	12.38 (13.976)	n_{2N}	r/min	300	250	200	200	150	150	150	125	100	100	75	75	60	50	–	–	1FT2206-3AF..-0..0-Z
			M_{2N}	Nm	17	23	30	33.5	47.5	38	48	58	75	72	104	89	117	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21	28.5	35.5	50	50	38	64	85	107	114	120	110	120	110	–	–	
			M_{2max}	Nm	78	105	131	104	80	61	208	192	176	192	192	176	192	176	–	–	
9.93 ... 10.1	36.7 ... 37.1	15.98 (17.676)	n_{2N}	r/min	250	200	200	125	150	150	100	100	75	75	60	60	50	37.5	–	–	1FT2206-4AC..-0..0-Z
			M_{2N}	Nm	22	30.5	31.5	56	45.5	34.5	73	74	103	101	120	110	119	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29.5	39.5	50	65	50	38	89	119	110	120	120	110	120	110	–	–	
			M_{2max}	Nm	111	148	176	104	80	61	208	192	176	192	192	176	192	176	–	–	

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Planetary gearbox data																	
Gearbox type:			NLC080, 1-stage						NLC080, 2-stage								
1. Order code			C31						C32								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50	38
	$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
	$J_{1,G}$	kg cm²	0.775	0.54	0.466	0.401	0.387	0.37	0.641	0.615	0.607	0.46	0.415	0.412	0.37	0.368	0.369	0.357
	$\varphi_{2,G}$	'	7						9									

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NLC080

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC080 1- and 2-stage (continued)																				
9.84	34.7	15.976	n_{2N}	r/min	300	250	250	200	200	200	150	100	100	100	75	75	60	60	–	–	**1F.2206-4AF..-0..0-Z**
...	...	(17.676)	M_{2N}	Nm	24.5	33	35	48	46	34	65	100	100	96	120	110	120	97	–	–	■■■ + ■■■ + . . .
10	35.2		$M_{2,0}$	Nm	29.5	39.5	49.5	65	50	38	88	118	110	120	120	110	120	110	–	–	
			M_{2max}	Nm	105	140	175	104	79	61	208	192	176	192	191	176	192	176	–	–	
9.42	34.7	15.976	n_{2N}	r/min	300	250	200	150	150	150	125	100	75	75	75	60	60	50	–	–	**1FT2206-4AH..-0..0-Z**
...	...	(17.676)	M_{2N}	Nm	20	27	37	54	50	38	67	86	110	116	112	110	115	110	–	–	■■■ + ■■■ + . . .
9.6	35.2		$M_{2,0}$	Nm	28	37.5	47.5	65	50	38	84	113	110	120	120	110	120	110	–	–	
			M_{2max}	Nm	105	140	175	104	79	61	208	192	176	192	191	176	192	176	–	–	

Planetary gearbox data																	
Gearbox type:			**NLC080, 1-stage**						**NLC080, 2-stage**								
1. Order code			**C31**						**C32**								
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**	**100**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**	**R00**
	$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50	38
	$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
	$J_{1,G}$	kg cm²	0.775	0.54	0.466	0.401	0.387	0.37	0.641	0.615	0.607	0.46	0.415	0.412	0.37	0.368	0.369	0.357
	$\varphi_{2,G}$	'	7						9									

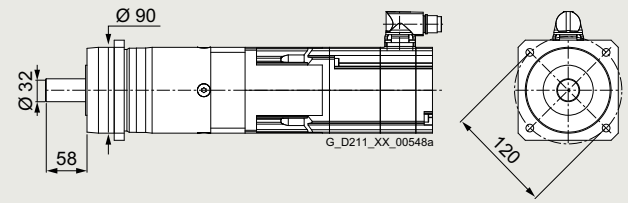
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NLC120

Selection and ordering data

NLC120



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	6000 N
Average axial force for 20000 h	$F_{A,eq}$	8000 N
Average radial force for 30000 h	$F_{R,eq}$	5400 N
Average axial force for 30000 h	$F_{A,eq}$	7000 N
Maximum radial force	$F_{R,max}$	6000 N
Maximum axial force	$F_{A,max}$	8000 N

Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC120 1- and 2-stage																					
0.211	1.55	0.093	n_{2N}	r/min	–	–	200	200	200	200	150	125	100	100	100	100	75	75	50	30	**1F.2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	–	–	0.7	1.38	1.65	2.1	1.92	2.85	4.05	4.3	5.4	5.8	9.6	10.2	16.5	29.5	■■■ + ■■■ + . . .
0.441	1.75		$M_{2.0}$	Nm	–	–	1.05	1.97	2.4	3.35	2.85	4.2	5.5	6	7.8	10.1	13.3	16.9	27.5	44	
			M_{2max}	Nm	–	–	7.7	11.3	13	16.6	14.7	20	25	27	34	42.5	55	69	111	152	
0.666	3.45	0.139	n_{2N}	r/min	300	250	250	200	200	200	200	150	125	125	100	100	75	60	37.5	30	**1F.2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	1.18	2.15	2.85	4.8	5.4	6	4.9	7.8	10.1	10.6	14.6	15	23.5	30	49.5	67	■■■ + ■■■ + . . .
1.05	3.78		$M_{2.0}$	Nm	1.99	3.05	4.15	6.3	7.3	9.5	8.3	11.5	14.7	15.8	20	25	32.5	41	66	95	
			M_{2max}	Nm	10.3	14.2	18	25.5	29.5	37	33	44.5	55	59	74	93	120	150	192	152	
0.695	3.16	0.35	n_{2N}	r/min	375	300	300	250	250	200	200	150	150	150	125	100	100	75	50	30	**1F.2104-4AF..-0..0-Z**
...	...	(0.43)	M_{2N}	Nm	1.51	2.6	3.5	5.5	6.3	8.6	7	10.1	11.6	11.9	16.4	21	23.5	34	54	90	■■■ + ■■■ + . . .
1.08	3.49		$M_{2.0}$	Nm	2.05	3.15	4.3	6.5	7.6	9.8	8.6	11.9	15.2	16.3	20.5	26	33.5	42	68	95	
			M_{2max}	Nm	9.4	13	16.5	23.5	27	34	30.5	41	51	55	69	86	111	139	192	152	
0.688	3.26	0.35	n_{2N}	r/min	375	300	300	250	250	200	200	150	150	150	125	100	100	75	50	30	**1F.2104-4AK..-0..0-Z**
...	...	(0.43)	M_{2N}	Nm	1.69	2.75	3.8	5.9	7	9.1	7.5	10.5	12.7	12.7	18.2	23.5	24.5	37.5	57	95	■■■ + ■■■ + . . .
1.07	3.59		$M_{2.0}$	Nm	2.05	3.15	4.25	6.4	7.5	9.7	8.5	11.8	15.1	16.1	20.5	25.5	33.5	42	68	95	
			M_{2max}	Nm	9.7	13.4	17	24	28	35	31	42	53	56	71	89	114	143	192	152	
1.8	6.86	0.56	n_{2N}	r/min	300	300	250	250	200	200	200	150	125	125	100	100	75	60	37.5	30	**1F.2104-5AF..-0..0-Z**
...	...	(0.65)	M_{2N}	Nm	5.1	6.6	9.3	11.8	15.7	17.6	15.2	22	28	29	40	39	61	77	120	95	■■■ + ■■■ + . . .
2.16	7.13		$M_{2.0}$	Nm	5.3	7.6	9.8	14.2	16.4	20.5	18.4	25	31.5	33.5	42	53	68	85	120	95	
			M_{2max}	Nm	20.5	27.5	35	49.5	56	71	63	84	106	113	141	177	225	280	192	152	
1.78	6.96	0.56	n_{2N}	r/min	300	300	250	250	200	200	200	150	125	125	100	100	75	60	37.5	30	**1F.2104-5AK..-0..0-Z**
...	...	(0.65)	M_{2N}	Nm	5	6.5	9.2	11.5	15.5	17.2	14.9	21.5	27.5	28	39	38.5	60	76	120	95	■■■ + ■■■ + . . .
2.15	7.23		$M_{2.0}$	Nm	5.3	7.5	9.7	14.1	16.3	20.5	18.3	24.5	31	33	42	52	68	85	120	95	
			M_{2max}	Nm	20.5	28	35.5	50	57	72	64	86	107	114	143	179	230	285	192	152	
2.55	9.33	0.76	n_{2N}	r/min	300	300	250	250	200	200	200	150	125	125	100	75	75	60	50	30	**1F.2104-6AF..-0..0-Z**
...	...	(0.84)	M_{2N}	Nm	6.8	8.4	11.8	14.6	19.5	21.5	18.6	27	34.5	35	48	65	72	92	97	95	■■■ + ■■■ + . . .
2.9	9.59		$M_{2.0}$	Nm	7.6	10.6	13.5	19.4	22	28	25	33.5	42.5	45.5	57	71	92	115	120	95	
			M_{2max}	Nm	27.5	37.5	47	66	76	95	85	114	142	152	190	235	305	368	192	152	

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Planetary gearbox data																	
Gearbox type:			NLC120, 1-stage						NLC120, 2-stage								
1. Order code			C41						C42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$	kg cm²	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC120 1- and 2-stage (continued)																					
4.29 ... 4.6	14.3 ... 14.5	1.71 (2.55)	n_{2N}	r/min	375	300	250	250	200	200	200	150	125	100	100	75	75	50	50	30	1F.2105-4AF..-0..0-Z
			M_{2N}	Nm	9.8	15	20	23.5	32	33.5	29.5	42.5	53	65	73	99	104	160	106	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	12.8	17.5	22	31.5	36	45.5	40.5	54	68	72	91	114	146	183	120	95	
			M_{2max}	Nm	42.5	57	71	101	115	145	129	172	215	230	285	355	416	368	192	152	
4.32 ... 4.63	14.3 ... 14.5	1.71 (2.55)	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	100	75	60	50	37.5	30	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	11.5	13.7	18.9	27.5	29	40.5	35.5	47	59	62	65	91	123	149	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	12.9	17.6	22	31.5	36.5	45.5	40.5	54	68	73	91	115	147	184	120	95	
			M_{2max}	Nm	42.5	57	71	101	115	145	129	172	215	230	285	355	416	368	192	152	
7.26 ... 7.52	23.1 ... 23.4	2.65 (3.5)	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	75	75	60	50	37.5	–	1F.2105-6AF..-0..0-Z
			M_{2N}	Nm	17.6	20.5	27.5	40	42	59	53	67	87	88	122	124	165	199	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21.5	29	37	52	59	75	66	89	112	119	149	187	240	230	120	–	
			M_{2max}	Nm	69	92	116	163	186	152	205	275	345	365	416	368	416	368	192	–	
7.64 ... 7.9	25 ... 25.3	4.6 (6.3)	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	75	75	60	50	37.5	–	1F.2106-3AF..-0..0-Z
			M_{2N}	Nm	18.6	21.5	29	42	43.5	62	56	70	90	91	126	129	171	205	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30.5	38.5	54	62	78	70	93	117	125	156	195	250	230	120	–	
			M_{2max}	Nm	75	100	126	176	192	152	225	300	368	400	416	368	416	368	192	–	
10 ... 10.3	31.8 ... 32.2	6 (7.6)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	50	37.5	–	1F.2106-4AF..-0..0-Z
			M_{2N}	Nm	23.5	32.5	36	51	52	75	67	83	107	106	149	189	235	225	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30	40	50	71	81	95	91	121	152	162	200	230	260	230	120	–	
			M_{2max}	Nm	96	128	160	216	192	152	285	380	368	416	416	368	416	368	192	–	
14.3 ... 14.6	43.9 ... 44.5	8.7 (10.4)	n_{2N}	r/min	300	250	250	200	150	150	150	100	100	75	75	60	60	50	–	–	1F.2106-6AF..-0..0-Z
			M_{2N}	Nm	31.5	42.5	46.5	65	88	95	84	128	131	174	183	230	225	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	43	57	72	101	116	95	129	172	215	230	260	230	260	230	–	–	
			M_{2max}	Nm	133	177	220	216	192	152	336	416	368	416	416	365	416	368	–	–	
20.8 ... 21.1	84.1 ... 85.3	20.6 (24.7)	n_{2N}	r/min	250	200	200	150	125	125	100	75	60	60	50	50	50	37.5	–	–	1FT2108-4AC..-0..0-Z
			M_{2N}	Nm	41.5	56	59	86	107	95	127	172	215	215	255	230	210	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	62	84	105	135	120	95	187	250	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	–	
25.6 ... 26	102 ... 103	24.0 (28.0)	n_{2N}	r/min	250	200	200	150	150	150	100	75	75	60	60	60	50	37.5	–	–	1FT2108-5AB..-0..0-Z
			M_{2N}	Nm	52	70	74	107	107	92	152	205	205	255	255	220	255	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	77	103	129	135	120	95	210	260	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	–	
25.4 ... 25.8	102 ... 103	24.0 (28.0)	n_{2N}	r/min	250	200	150	125	125	125	100	75	60	60	60	50	50	37.5	–	–	1FT2108-5AC..-0.B0-Z
			M_{2N}	Nm	47	63	87	114	117	95	140	188	230	235	225	230	210	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	76	102	128	135	120	95	210	260	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	–	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC120 1- and 2-stage																					
0.198 ... 0.428	1.45 ... 1.66	0.2 (0.22)	n_{2N}	r/min	–	–	200	200	200	150	150	125	100	100	100	75	60	50	37.5	25	1F.2203-2AK..-0..0-Z
			M_{2N}	Nm	–	–	0.68	1.29	1.48	2.6	1.88	2.75	3.95	4.15	4.85	7.2	10.6	13.4	19.2	30.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	–	–	0.98	1.88	2.3	3.2	2.7	4.05	5.3	5.8	7.5	9.7	12.8	16.3	26.5	42.5	
			M_{2max}	Nm	–	–	7.2	10.6	12.3	15.7	13.8	18.8	23.5	25.5	32	40.5	52	65	105	152	

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Planetary gearbox data																	
Gearbox type:			NLC120, 1-stage						NLC120, 2-stage								
1. Order code			C41						C42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$	kg cm²	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NLC120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC120 1- and 2-stage (continued)																				
0.649 ... 1.03	3.16 ... 3.49	0.35 (0.37)	n_{2N}	r/min	300	250	250	200	200	200	200	150	125	125	100	75	75	60	37.5	25	1F.2203-4AK..-0..0-Z
			M_{2N}	Nm	1.58	2.6	3.45	5.5	6.2	6.7	5.7	8.8	11.4	12	16.3	21.5	26	33	54	84	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.94	3	4.05	6.1	7.2	9.3	8.2	11.3	14.5	15.5	19.7	24.5	32	40.5	65	95	
			M_{2max}	Nm	9.4	13	16.5	23.5	27	34	30.5	41	51	55	69	86	111	139	192	152	
1.76 ... 2.12	6.47 ... 6.74	1.23 (1.31)	n_{2N}	r/min	300	300	250	250	200	200	200	150	125	125	100	75	75	60	37.5	30	1F.2204-5AF..-0..0-Z
			M_{2N}	Nm	4.95	6.3	9	11	15.1	16.3	14.3	21	26.5	27	37.5	49	56	72	119	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.2	7.4	9.5	13.9	16	20	18	24.5	30.5	33	41.5	52	67	84	120	95	
			M_{2max}	Nm	19.3	26	33	46.5	53	67	59	80	100	107	134	167	215	265	192	152	
1.77 ... 2.14	6.47 ... 6.74	1.23 (1.31)	n_{2N}	r/min	300	300	250	250	200	200	200	150	125	125	100	75	75	60	37.5	30	1F.2204-5AK..-0..0-Z
			M_{2N}	Nm	5	6.5	9.1	11.3	15.4	16.7	14.6	21.5	27.5	27.5	38.5	50	58	74	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.3	7.4	9.6	14	16.2	20.5	18.2	24.5	31	33	41.5	52	67	84	120	95	
			M_{2max}	Nm	19.3	26	33	46.5	53	67	59	80	100	107	134	167	215	265	192	152	
2.54 ... 2.88	8.84 ... 9.09	1.61 (1.69)	n_{2N}	r/min	300	300	250	250	200	200	200	150	125	100	100	75	75	60	37.5	30	1F.2204-6AF..-0..0-Z
			M_{2N}	Nm	7.2	9.1	12.8	15.3	20.5	22	19.4	28.5	36	43.5	50	68	74	95	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.6	10.5	13.4	19.3	22	28	25	33.5	42	45	56	71	91	114	120	95	
			M_{2max}	Nm	26.5	35.5	44.5	63	72	90	81	108	135	144	180	225	285	360	192	152	
2.76 ... 3.09	10.1 ... 10.4	3.15 (4.05)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	100	75	60	50	37.5	20	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	6.3	9	10.7	16.2	16.9	24	21	28	35.5	37.5	40.5	57	76	94	120	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.2	11.4	14.6	20.5	24	30	26.5	36	45	48.5	60	76	98	122	120	95	
			M_{2max}	Nm	30	40.5	51	72	82	103	92	123	154	164	205	255	325	368	192	152	
2.79 ... 3.12	10.1 ... 10.4	3.15 (4.05)	n_{2N}	r/min	375	300	300	250	200	200	200	150	125	125	100	75	75	60	37.5	30	1F.2205-2AF..-0..0-Z
			M_{2N}	Nm	5.7	9	10.3	15.1	19.7	21.5	19.3	28	35	35.5	48.5	62	72	92	120	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.3	11.5	14.7	21	24	30.5	27	36.5	45.5	49	61	77	99	124	120	94	
			M_{2max}	Nm	30	40.5	51	72	82	103	92	123	154	164	205	255	325	368	192	152	
2.73 ... 3.06	10.1 ... 10.4	3.15 (4.05)	n_{2N}	r/min	300	300	250	200	200	150	200	150	125	100	100	75	60	50	37.5	30	1FT2205-2AH..-0..0-Z
			M_{2N}	Nm	6.5	8.1	11.4	16.8	18.2	24.5	16.6	25	31	38.5	43.5	59	77	96	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.1	11.3	14.4	20.5	23.5	30	26.5	35.5	45	48	60	75	97	121	119	95	
			M_{2max}	Nm	30	40.5	51	72	82	103	92	123	154	164	205	255	325	368	192	152	
5.01 ... 5.28	17.2 ... 17.5	5.1 (6)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	75	60	50	37.5	30	1F.2205-4AF..-0..0-Z
			M_{2N}	Nm	11.4	16	18.4	27	28	40.5	37	47	61	62	86	89	119	144	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15	20	25.5	36.5	42	52	46.5	62	78	83	104	131	168	210	120	95	
			M_{2max}	Nm	51	69	86	121	139	152	155	205	255	275	345	368	416	368	192	152	
5.07 ... 5.37	17.2 ... 17.5	7.8 (9.4)	n_{2N}	r/min	300	250	200	200	150	125	150	100	100	75	75	60	50	37.5	37.5	20	1FT2206-2AC..-0..0-Z
			M_{2N}	Nm	10.7	15	20.5	23.5	33	42	33.5	52	54	72	77	99	125	167	110	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.2	20.5	26	37	42	53	47.5	63	79	85	106	133	171	210	120	95	
			M_{2max}	Nm	51	69	86	121	139	152	155	205	255	275	345	368	416	368	192	152	
5.18 ... 5.45	17.2 ... 17.5	7.8 (9.4)	n_{2N}	r/min	375	300	250	200	200	150	200	150	125	100	100	75	60	50	37.5	30	1F.2206-2AF..-0..0-Z
			M_{2N}	Nm	10.9	16.3	21.5	30.5	33.5	44.5	30	43.5	54	68	73	102	134	164	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.5	21	26.5	37.5	43	54	48	64	81	86	108	135	173	215	120	95	
			M_{2max}	Nm	51	69	86	121	139	152	155	205	255	275	345	368	416	368	192	152	

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Planetary gearbox data																
Gearbox type:		NLC120, 1-stage						NLC120, 2-stage								
1. Order code		C41						C42								
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152
$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
$J_{1,G}$	kg cm²	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378
$\varphi_{2,G}$	'	7						9									

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC120 1- and 2-stage (continued)																					
5.01	17.2	7.8	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	50	37.5	30	**1FT2206-2AH..-0..0-Z**
...	...	(9.4)	M_{2N}	Nm	11.8	16.4	18.4	26.5	27	39.5	37	46.5	60	61	85	108	137	136	119	85	■■■ + ■■■ + . . .
5.28	17.5		$M_{2,0}$	Nm	15	20	25.5	36.5	42	52	46.5	62	78	83	105	131	168	210	119	95	
			M_{2max}	Nm	51	69	86	121	139	152	155	205	255	275	345	368	416	368	192	152	
7.78	26	11.5	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	25	–	**1FT2206-3AB..-0..0-Z**
...	...	(13.1)	M_{2N}	Nm	16.8	23	26	37.5	38.5	55	50	63	81	82	115	145	184	230	120	–	■■■ + ■■■ + . . .
8.04	26.3		$M_{2,0}$	Nm	23	31	39.5	55	64	80	71	95	119	127	159	198	255	230	120	–	
			M_{2max}	Nm	78	104	131	183	192	152	230	310	368	416	416	368	416	368	192	–	
7.64	26	11.5	n_{2N}	r/min	300	250	250	200	150	150	150	125	100	100	75	60	50	37.5	37.5	–	**1FT2206-3AF..-0..0-Z**
...	...	(13.1)	M_{2N}	Nm	16.1	22	24	35	48	52	48	59	77	76	109	138	174	230	120	–	■■■ + ■■■ + . . .
7.91	26.3		$M_{2,0}$	Nm	22.5	30.5	38.5	54	63	79	70	93	117	125	156	195	250	230	120	–	
			M_{2max}	Nm	78	104	131	183	192	152	230	310	368	416	416	368	416	368	192	–	
10.8	36.6	15.1	n_{2N}	r/min	250	200	200	150	125	100	100	75	75	60	60	50	37.5	37.5	30	–	**1FT2206-4AC..-0..0-Z**
...	...	(16.8)	M_{2N}	Nm	19.9	27.5	29.5	44	55	71	68	93	97	121	125	151	210	193	120	–	■■■ + ■■■ + . . .
11	37.1		$M_{2,0}$	Nm	32	43	54	76	87	95	98	130	163	174	215	230	260	230	120	–	
			M_{2max}	Nm	110	148	185	216	192	152	330	416	368	416	416	368	416	368	192	–	
10.5	34.7	15.1	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	75	60	50	50	37.5	–	**1F.2206-4AF..-0..0-Z**
...	...	(16.8)	M_{2N}	Nm	24	27.5	36.5	52	53	76	68	84	109	108	152	191	240	230	120	–	■■■ + ■■■ + . . .
10.7	35.2		$M_{2,0}$	Nm	31	42	53	74	85	95	95	127	159	169	210	230	260	230	120	–	
			M_{2max}	Nm	104	140	175	216	192	152	310	416	368	416	416	368	416	368	192	–	
10	34.7	15.1	n_{2N}	r/min	300	250	200	150	150	125	125	100	75	75	75	60	50	37.5	37.5	–	**1FT2206-4AH..-0..0-Z**
...	...	(16.8)	M_{2N}	Nm	19.4	26.5	36	52	56	70	66	85	114	117	121	153	191	230	120	–	■■■ + ■■■ + . . .
10.3	35.2		$M_{2,0}$	Nm	30	40	50	71	81	95	90	121	152	162	200	230	260	230	120	–	
			M_{2max}	Nm	104	140	175	216	192	152	310	416	368	416	416	368	416	368	192	–	
10.2	36.6	24.86	n_{2N}	r/min	250	250	200	150	150	125	125	100	75	75	60	50	37.5	37.5	30	–	**1FT2208-2AF..-0..0-Z**
...	...	(28.16)	M_{2N}	Nm	25	27.5	38	56	57	72	68	87	119	120	154	186	255	225	119	–	■■■ + ■■■ + . . .
10.4	37.1		$M_{2,0}$	Nm	30.5	41	51	72	83	95	92	123	154	165	205	230	255	225	119	–	
			M_{2max}	Nm	110	147	184	216	192	152	330	416	368	416	416	368	416	368	192	–	
16.3	49.2	31.96	n_{2N}	r/min	250	200	150	125	125	100	100	75	60	60	50	50	37.5	37.5	–	–	**1FT2208-3AB..-0..0-Z**
...	...	(34.96)	M_{2N}	Nm	28.5	39.5	55	73	74	94	93	127	160	161	197	185	255	215	–	–	■■■ + ■■■ + . . .
16.5	49.9		$M_{2,0}$	Nm	48.5	65	81	115	120	95	147	196	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	149	199	245	216	192	152	336	416	368	416	416	368	416	368	–	–	
15.3	49.2	31.96	n_{2N}	r/min	300	250	200	150	150	125	125	100	75	75	60	50	50	37.5	–	–	**1F.2208-3AC..-0..0-Z**
...	...	(35.36)	M_{2N}	Nm	28.5	38	51	75	77	94	89	113	154	154	198	230	220	230	–	–	■■■ + ■■■ + . . .
15.5	49.9		$M_{2,0}$	Nm	45.5	61	76	108	120	95	137	183	225	240	260	230	260	230	–	–	
			M_{2max}	Nm	149	199	245	216	192	152	336	416	368	416	416	368	416	368	–	–	
15.2	49.2	31.96	n_{2N}	r/min	250	200	200	150	125	125	125	100	75	75	60	50	50	37.5	–	–	**1FT2208-3AF..-0..0-Z**
...	...	(35.36)	M_{2N}	Nm	33	45	48.5	70	86	89	84	106	146	145	186	220	197	230	–	–	■■■ + ■■■ + . . .
15.4	49.9		$M_{2,0}$	Nm	45.5	61	76	107	120	95	136	182	225	240	260	230	260	230	–	–	
			M_{2max}	Nm	149	199	245	216	192	152	336	416	368	416	416	368	416	368	–	–	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:			NLC120, 1-stage						NLC120, 2-stage								
1. Order code			C41						C42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$	kg cm²	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378
	$\varphi_{2,G}$	'	7						9									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NLC120

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC120 1- and 2-stage (continued)																			
19.6	63.7	41.16	n_{2N}	r/min	200	150	125	100	100	100	75	60	50	50	37.5	37.5	30	30	–	–	**1FT2208-4AB..-0..0-Z**
...	...	(46.76)	M_{2N}	Nm	35	50	63	85	86	80	117	149	181	181	240	225	260	230	–	–	■■■ + ■■■ + . . .
20.1	64.6		$M_{2,0}$	Nm	59	79	99	135	120	95	176	235	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	–	
19	63.7	41.16	n_{2N}	r/min	250	200	200	150	125	125	100	75	75	60	60	50	50	37.5	–	–	**1F.2208-4AC..-0..0-Z**
...	...	(46.76)	M_{2N}	Nm	40.5	55	59	85	105	95	124	168	170	210	210	230	205	230	–	–	■■■ + ■■■ + . . .
19.3	64.6		$M_{2,0}$	Nm	57	76	95	134	120	95	170	225	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	–	
18.3	63.7	41.16	n_{2N}	r/min	250	200	200	150	125	125	100	75	75	60	50	50	50	37.5	–	–	**1FT2208-4AF..-0..0-Z**
...	...	(46.76)	M_{2N}	Nm	41	55	59	85	105	95	125	169	170	215	255	230	205	230	–	–	■■■ + ■■■ + . . .
18.5	64.6		$M_{2,0}$	Nm	54	73	92	129	120	95	164	215	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	415	368	416	368	–	–	
23	77.3	50.46	n_{2N}	r/min	250	200	200	125	125	125	100	75	60	60	60	50	50	37.5	–	–	**1FT2208-5AB..-0..0-Z**
...	...	(55.96)	M_{2N}	Nm	45.5	61	63	111	114	95	137	184	225	230	220	230	210	230	–	–	■■■ + ■■■ + . . .
23.3	78.4		$M_{2,0}$	Nm	69	92	116	135	120	95	205	260	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	–	–	
22.7	77.3	50.46	n_{2N}	r/min	250	200	200	125	125	125	100	75	60	60	60	50	37.5	37.5	–	–	**1F.2208-5AC..-0..0-Z**
...	...	(55.96)	M_{2N}	Nm	46	62	63	111	114	95	136	183	225	230	220	230	260	230	–	–	■■■ + ■■■ + . . .
23.1	78.4		$M_{2,0}$	Nm	68	91	115	135	120	95	205	260	230	260	260	230	260	230	–	–	
			M_{2max}	Nm	184	248	312	216	192	152	336	416	368	415	416	368	416	368	–	–	

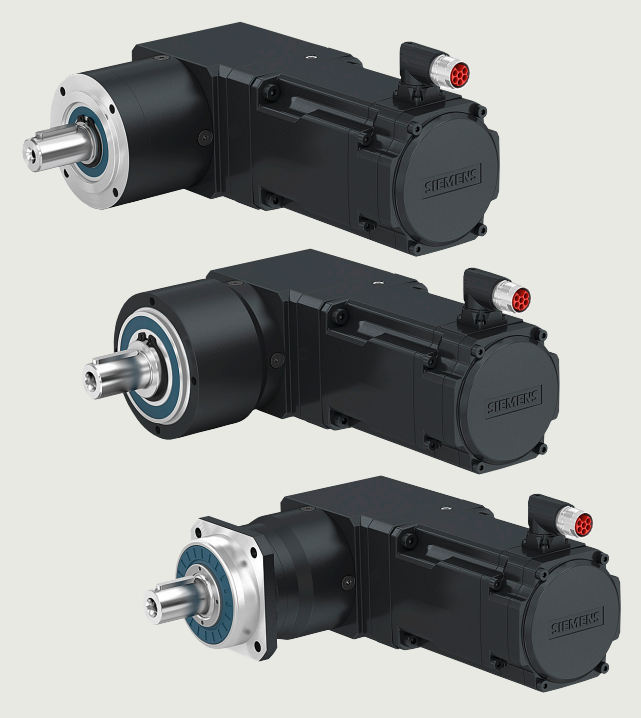
Planetary gearbox data																	
Gearbox type:			NLC120, 1-stage						NLC120, 2-stage								
1. Order code			C41						C42								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95
	$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152
	$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
	$J_{1,G}$	kg cm²	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378
	$\varphi_{2,G}$	'	7						9									

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Selection and ordering data



SIMOTICS S-1FT2 servo planetary geared motors with economy angular gearbox

The following pages show the permissible combinations of **servo motors for 230 V 1 AC / 240 V 3 AC** converters

and the economy angled planetary gearboxes **NRBW, NRKW and NLCW** geared motors.

They show the most important component data of the motor and gearbox as well as the rating of the system geared motor.

The rated operating points of the geared motors are adapted to the converter supply voltage.

More information on selection is provided in the section "Information on Selection".

Right-angle gearboxes

As a result of the preliminary bevel gear stage, NRB, NRK and NLC planetary gearboxes are also available as NRBW, NRKW or NLCW angled gearboxes.

The angled versions are ideal when space is restricted.

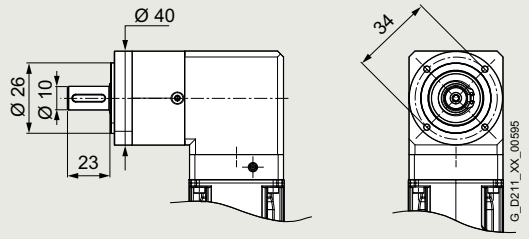
Due to the additional angle stage, the losses in the angled gearboxes are somewhat higher and the rated specifications are reduced in comparison to the corresponding coaxial version.

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Gearbox type NRBW040

Selection and ordering data

NRBW040



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	200 N
Average axial force for 20000 h	$F_{A,eq}$	200 N
Average radial force for 30000 h	$F_{R,eq}$	160 N
Average axial force for 30000 h	$F_{A,eq}$	160 N
Maximum radial force	$F_{R,max}$	200 N
Maximum axial force	$F_{A,max}$	240 N

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW040 1- and 2-stage																			
0.106	0.498	0.0245	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	**1FT2102-0AG..-0.A0-Z**
...	...	(0.0285)	M_{2N}	Nm	0.175	0.25	0.33	0.44	0.57	0.73	0.57	0.85	1.07	1.1	1.48	1.82	2.35	3.05	4.75	■■■ + ■■■ + . . .
0.113	0.511		$M_{2,0}$	Nm	0.315	0.43	0.54	0.77	0.88	1.11	1	1.34	1.68	1.8	2.25	2.8	3.6	4.5	7.2	
			M_{2max}	Nm	1.51	2	2.5	3.55	4.05	5.1	4.55	6	7.5	8	10.1	12.6	16.1	20	12	
0.25	1.01	0.036	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	**1FT2102-1AG..-0.A0-Z**
...	...	(0.04)	M_{2N}	Nm	0.54	0.73	0.94	1.26	1.55	1.96	1.64	2.3	2.9	3	3.9	4.8	6.1	7.9	7.5	■■■ + ■■■ + . . .
0.256	1.04		$M_{2,0}$	Nm	0.74	1	1.26	1.77	2	2.55	2.25	3.05	3.8	4.05	5.1	6.3	8.1	10.2	7.5	
			M_{2max}	Nm	3.1	4.15	5.1	7.2	8.3	8	9.2	12.3	15.4	16.4	20.5	25.5	32	29	12	

Planetary gearbox data																
Gearbox type:			**NRBW040, 1-stage**						**NRBW040, 2-stage**							
1. Order code			**A16**						**A17**							
i			**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
$M_{2N,G}$		Nm	4.5	6	7.5	8.5	6	5	16.5	20	18	20	20	18	20	18	7.5
$M_{2max,G}$		Nm	7	10	12	13.5	10	8	26	32	29	32	32	29	32	29	12
$M_{2Em.Off}$		Nm	22.5	28	35	26	27	25	33	40	36	40	40	36	40	36	27
$J_{1,G}$		kg cm²	0.049	0.041	0.035	0.033	0.032	0.032	0.048	0.048	0.048	0.038	0.034	0.033	0.032	0.032	0.032
$\varphi_{2,G}$		'	21						25								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)											
Nm	Nm	kg cm²											
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW040 3-stage													
0.106 ... 0.113	0.498 ... 0.511	0.0245 (0.0285)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	6	**1FT2102-0AG..-0.A0-Z**
			M_{2N}	Nm	4.4	6	7.5	8.9	12	15.5	19.1	18	7.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.7	9	11.3	13.5	18	18	20	18	7.4	
			M_{2max}	Nm	30	32	32	29	32	29	32	29	12	
0.25 ... 0.256	1.01 ... 1.04	0.036 (0.04)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	6	**1FT2102-1AG..-0.A0-Z**
			M_{2N}	Nm	11.6	15.6	19.6	18	20	18	20	18	7.4	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.2	20	20	18	20	18	20	18	7.5	
			M_{2max}	Nm	32	32	32	29	32	29	32	29	12	

Planetary gearbox data										
Gearbox type:		**NRBW040, 3-stage**								
1. Order code		**A18**								
i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code		**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
$M_{2N,G}$	Nm	20	20	20	18	20	18	20	18	7.5
$M_{2max,G}$	Nm	32	32	32	29	32	29	32	29	12
$M_{2Em.Off}$	Nm	40	40	40	36	40	36	40	36	27
$J_{1,G}$	kg cm²	0.047	0.033	0.033	0.047	0.032	0.032	0.032	0.032	0.032
$\varphi_{2,G}$	'	28								

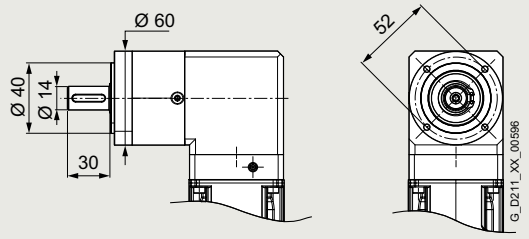
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRBW060

Selection and ordering data

NRBW060



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	400 N
Average axial force for 20000 h	$F_{A,eq}$	500 N
Average radial force for 30000 h	$F_{R,eq}$	340 N
Average axial force for 30000 h	$F_{A,eq}$	450 N
Maximum radial force	$F_{R,max}$	700 N
Maximum axial force	$F_{A,max}$	800 N

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW060 1- and 2-stage																			
0.0764	0.468	0.0245	n_{2N}	r/min	500	375	375	300	250	200	200	150	150	125	100	75	75	60	37.5	1FT2102-0AG..-0.A0-Z
...	...	(0.0285)	M_{2N}	Nm	0.107	0.182	0.205	0.29	0.365	0.48	0.41	0.57	0.66	0.78	1.03	1.37	1.47	1.86	3	■■■ + ■■■ + . . .
0.0919	0.479		M_{2_0}	Nm	0.225	0.32	0.415	0.6	0.69	0.88	0.78	1.06	1.34	1.43	1.8	2.25	2.9	3.65	5.8	
			M_{2max}	Nm	1.4	1.88	2.35	3.3	3.8	4.75	4.25	5.7	7.1	7.6	9.5	11.9	15.2	19	29	
0.226	0.986	0.036	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1FT2102-1AG..-0.A0-Z
...	...	(0.04)	M_{2N}	Nm	0.36	0.55	0.73	0.95	1.26	1.6	1.17	1.8	2.4	2.4	3.25	4	5.1	6.7	10.4	■■■ + ■■■ + . . .
0.238	1.01		M_{2_0}	Nm	0.67	0.91	1.16	1.64	1.88	2.35	2.1	2.8	3.55	3.75	4.7	5.9	7.6	9.5	15.2	
			M_{2max}	Nm	3	4	5	7	8	10	9	12	15	16	20	25	31.5	39.5	29	
0.512	1.77	0.093	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1FT2103-2AG..-2.A0-Z
...	...	(0.112)	M_{2N}	Nm	0.86	1.25	1.61	2.05	2.7	3.4	2.6	3.9	5.1	5.1	6.9	8.4	10.7	14	18	■■■ + ■■■ + . . .
0.525	1.82		M_{2_0}	Nm	1.53	2.05	2.55	3.6	4.15	5.2	4.7	6.2	7.8	8.3	10.4	13.1	16.7	20.5	18	
			M_{2max}	Nm	5.4	7.2	9	12.7	14.5	18.1	16.2	21.5	27	28.5	36	45	57	64	29	
0.498	1.77	0.093	n_{2N}	r/min	750	600	500	375	375	250	300	250	200	200	125	100	100	75	50	1FT2103-2AH..-2..0-Z
...	...	(0.112)	M_{2N}	Nm	1.02	1.38	1.73	2.4	2.55	3.6	3	3.75	4.95	4.95	7.3	9.1	10.3	13.5	18	■■■ + ■■■ + . . .
0.51	1.82		M_{2_0}	Nm	1.49	2	2.5	3.5	4.05	5	4.55	6	7.6	8.1	10.1	12.7	16.3	20	18	
			M_{2max}	Nm	5.4	7.2	9	12.7	14.5	18.1	16.2	21.5	27	28.5	36	45	57	64	29	
1.11	3.74	0.139	n_{2N}	r/min	750	600	500	375	300	250	300	200	200	150	125	100	75	75	50	1FT2103-4AG..-2.A0-Z
...	...	(0.158)	M_{2N}	Nm	2.25	3	3.7	5.1	6.4	7.8	6.2	9.5	9.7	13	15.9	19.9	26.5	26.5	18	■■■ + ■■■ + . . .
1.13	3.85		M_{2_0}	Nm	3.35	4.45	5.6	7.8	9	11.2	10.1	13.4	16.8	17.9	22	28	35.5	40	18	
			M_{2max}	Nm	11.5	15.3	19.2	26.5	29	24	34	45.5	57	60	70	64	70	64	29	
0.983	3.74	0.139	n_{2N}	r/min	750	600	500	375	300	250	300	200	200	150	125	100	75	75	50	1FT2103-4AH..-2..0-Z
...	...	(0.158)	M_{2N}	Nm	2.05	2.7	3.35	4.65	5.8	7.1	5.7	8.6	8.9	11.8	14.5	18.1	24	24.5	18	■■■ + ■■■ + . . .
0.993	3.85		M_{2_0}	Nm	2.95	3.9	4.9	6.9	7.9	9.9	8.9	11.9	14.8	15.8	19.8	24.5	31.5	39.5	18	
			M_{2max}	Nm	11.5	15.3	19.2	26.5	29	24	34	45.5	57	60	70	64	70	64	29	
1.12	3.46	0.368	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1FT2104-4AF..-2..0-Z
...	...	(0.448)	M_{2N}	Nm	3.1	4.2	5.2	7.2	8.4	10.6	9.1	12.6	15.9	16.7	21	26.5	33.5	40	18	■■■ + ■■■ + . . .
1.15	3.56		M_{2_0}	Nm	3.4	4.55	5.7	8	9.1	11.4	10.2	13.6	17	18.2	22.5	28	36	40	18	
			M_{2max}	Nm	10.6	14.2	17.7	24.5	28	24	31.5	42	52	56	70	64	70	64	29	

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Planetary gearbox data																
Gearbox type:			NRBW060, 1-stage						NRBW060, 2-stage							
1. Order code			A26						A27							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18
	$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29
	$M_{2Em.Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80
	$J_{1.G}$	kg cm²	0.357	0.248	0.236	0.225	0.223	0.221	0.35	0.346	0.232	0.241	0.231	0.231	0.222	0.222	0.222
	$\varphi_{2,G}$	'	16						18								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW060 1- and 2-stage (continued)																			
1.11	3.55	0.368	n_{2N}	r/min	750	750	600	375	375	300	300	250	200	200	150	125	100	75	50	1FT2104-4AK..-2..0-Z
...	...	(0.448)	M_{2N}	Nm	3.05	3.3	4.3	7	7.2	9.1	8.7	10.3	13.7	13.2	18.3	21.5	27.5	37	18	■■■ + ■■■ + . . .
1.14	3.65		$M_{2,0}$	Nm	3.35	4.5	5.6	7.9	9.1	11.4	10.1	13.5	16.9	18	22.5	28	36	40	18	
			M_{2max}	Nm	10.9	14.6	18.2	25.5	29	24	32.5	43	54	57	70	64	70	64	29	
2.18	7	0.578	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	1FT2104-5AF..-2..0-Z
...	...	(0.668)	M_{2N}	Nm	6.2	8.3	10.4	14.1	16.5	15	17.6	24.5	31	32.5	41	40	44	40	–	■■■ + ■■■ + . . .
2.23	7.18		$M_{2,0}$	Nm	6.6	8.8	11.1	15.5	17.8	15	19.8	26	33	35	44	40	44	40	–	
			M_{2max}	Nm	21.5	28.5	35.5	40	29	24	63	70	70	70	70	64	70	64	–	
2.16	7.09	0.578	n_{2N}	r/min	750	600	500	375	300	250	250	200	150	150	125	100	100	75	–	1FT2104-5AK..-2..0-Z
...	...	(0.668)	M_{2N}	Nm	4.75	6.1	7.5	10.2	12.9	15	14.8	18.6	25	25	30	38	35	40	–	■■■ + ■■■ + . . .
2.21	7.28		$M_{2,0}$	Nm	6.6	8.8	11	15.4	17.6	15	19.7	26	32.5	35	43.5	40	44	40	–	
			M_{2max}	Nm	21.5	29	36	40	29	24	64	70	70	70	70	64	70	64	–	
2.89	9.35	0.778	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	1FT2104-6AF..-2..0-Z
...	...	(0.858)	M_{2N}	Nm	7.5	10.1	12.7	16.7	18	15	20.5	30	38	39	44	40	44	40	–	■■■ + ■■■ + . . .
2.96	9.6		$M_{2,0}$	Nm	8.8	11.8	14.7	20.5	18	15	26	35	43.5	44	44	40	44	40	–	
			M_{2max}	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW060 1- and 2-stage																			
0.523	1.68	0.2	n_{2N}	r/min	750	600	600	375	375	300	300	250	200	200	150	125	100	75	50	1FT2203-2AG..-2.A0-Z
...	...	(0.22)	M_{2N}	Nm	1.12	1.5	1.57	2.6	2.65	3.35	3.15	3.85	5.1	5	6.8	8.2	10.5	14	18	■■■ + ■■■ + . . .
0.534	1.72		$M_{2,0}$	Nm	1.56	2.1	2.6	3.7	4.25	5.3	4.75	6.3	7.9	8.4	10.6	13.2	16.9	21	18	
			M_{2max}	Nm	5.1	6.8	8.6	12	13.7	17.2	15.3	20	25.5	27	34	42.5	54	64	29	
0.489	1.68	0.2	n_{2N}	r/min	750	600	500	375	300	250	250	200	150	150	125	100	75	60	50	1FT2203-2AK..-2..0-Z
...	...	(0.22)	M_{2N}	Nm	0.89	1.19	1.47	2	2.55	3.1	2.95	3.8	5.2	5.2	6.4	8	10.7	13.5	15.1	■■■ + ■■■ + . . .
0.5	1.72		$M_{2,0}$	Nm	1.46	1.97	2.45	3.45	3.95	4.95	4.45	5.9	7.4	7.9	9.9	12.4	15.9	19.8	18	
			M_{2max}	Nm	5.1	6.8	8.6	12	13.7	17.2	15.3	20	25.5	27	34	42.5	54	64	29	
1.12	3.46	0.35	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	100	100	75	50	1FT2203-4AG..-2.A0-Z
...	...	(0.37)	M_{2N}	Nm	2.85	3.8	4.7	6.5	6.4	8.2	8	9.2	12.4	11.7	16.5	24	24.5	33.5	18	■■■ + ■■■ + . . .
1.14	3.56		$M_{2,0}$	Nm	3.4	4.5	5.6	7.9	9.1	11.4	10.1	13.5	16.9	18.1	22.5	28	36	40	18	
			M_{2max}	Nm	10.6	14.2	17.7	24.5	28	24	31.5	42	52	56	70	64	70	64	29	
1.08	3.46	0.35	n_{2N}	r/min	750	500	500	300	300	250	250	200	150	150	125	100	75	60	50	1FT2203-4AK..-2..0-Z
...	...	(0.37)	M_{2N}	Nm	2.1	3.35	3.35	5.8	6	7.2	7.1	8.9	12.2	12.3	14.9	18.6	25	31.5	18	■■■ + ■■■ + . . .
1.1	3.56		$M_{2,0}$	Nm	3.25	4.35	5.5	7.7	8.8	11	9.8	13.1	16.4	17.5	21.5	27	34.5	40	18	
			M_{2max}	Nm	10.6	14.2	17.7	24.5	28	24	31.5	42	52	56	70	64	70	64	29	
2.14	6.62	1.248	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	1FT2204-5AF..-2..0-Z
...	...	(1.328)	M_{2N}	Nm	5.9	7.9	9.9	13.5	15.7	15	16.8	23.5	29.5	31	39.5	40	44	40	–	■■■ + ■■■ + . . .
2.19	6.8		$M_{2,0}$	Nm	6.5	8.7	10.9	15.3	17.4	15	19.5	25.5	32	34.5	43	40	44	40	–	
			M_{2max}	Nm	20	27	33.5	40	29	24	60	70	70	70	70	64	70	64	–	
2.15	6.62	1.248	n_{2N}	r/min	750	500	500	300	300	250	250	200	150	150	125	100	75	75	–	1FT2204-5AK..-2..0-Z
...	...	(1.328)	M_{2N}	Nm	4.5	7	7	12.1	12.2	14.6	14.2	17.6	24	24	28.5	35.5	44	40	–	■■■ + ■■■ + . . .
2.2	6.8		$M_{2,0}$	Nm	6.5	8.7	10.9	15.3	17.5	15	19.6	26	32.5	34.5	43.5	40	44	40	–	
			M_{2max}	Nm	20	27	33.5	40	29	24	60	70	70	70	70	64	70	64	–	

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Planetary gearbox data																
Gearbox type:			NRBW060, 1-stage						NRBW060, 2-stage							
1. Order code			A26						A27							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18
	$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29
	$M_{2Em.Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80
	$J_{1,G}$	kg cm²	0.357	0.248	0.236	0.225	0.223	0.221	0.35	0.346	0.232	0.241	0.231	0.231	0.222	0.222	0.222
	$\varphi_{2,G}$	'	16						18								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRBW060

Servomotor data

$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)
Nm	Nm	kg cm²
2.88 ... 2.95	8.88 ... 9.12	1.628 (1.708)

Selection data servomotors with planetary gearbox

Servomotors with planetary gearbox

SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW060 1- and 2-stage (continued)

n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	**1FT2204-6AF..-2..0-Z**
M_{2N}	Nm	7.9	10.7	13.4	17.3	18	15	21	31.5	40	40.5	44	40	44	40	–	■■■ + ■■■ + . . .
$M_{2,0}$	Nm	8.8	11.7	14.7	20.5	18	15	26	35	43.5	44	44	40	44	40	–	
M_{2max}	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	–	

Planetary gearbox data

Gearbox type:		**NRBW060, 1-stage**						**NRBW060, 2-stage**								
1. Order code		**A26**						**A27**								
i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code		**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18
$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29
$M_{2Em.Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80
$J_{1,G}$	kg cm²	0.357	0.248	0.236	0.225	0.223	0.221	0.35	0.346	0.232	0.241	0.231	0.231	0.222	0.222	0.222
$\varphi_{2,G}$	'	16						18								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox									Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW060 3-stage												
0.0764 ... 0.0919	0.468 ... 0.479	0.0245 (0.0285)	n_{2N}	r/min	37.5	30	25	20	15	12.5	10	7.5	**1FT2102-0AG..-0.A0-Z**
			M_{2N}	Nm	2.9	3.65	4.4	5.8	7.8	9.3	11.6	15.6	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.4	7.3	9.1	10.9	14.6	18.2	23	29	
			M_{2max}	Nm	28	37.5	47	56	70	64	70	64	
0.226 ... 0.238	0.986 ... 1.01	0.036 (0.04)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	**1FT2102-1AG..-0.A0-Z**
			M_{2N}	Nm	10	13.4	16.7	20.5	26	34	42	40	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.1	18.9	23.5	28	37.5	40	44	40	
			M_{2max}	Nm	59	70	70	70	70	64	70	64	
0.512 ... 0.525	1.77 ... 1.82	0.093 (0.112)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	**1FT2103-2AG..-2.A0-Z**
			M_{2N}	Nm	20.5	27.5	34.5	42	44	40	44	40	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31	41.5	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
0.498 ... 0.51	1.77 ... 1.82	0.093 (0.112)	n_{2N}	r/min	50	37.5	25	25	20	12.5	10	10	**1FT2103-2AH..-2..0-Z**
			M_{2N}	Nm	20	26.5	36.5	40.5	44	40	44	39.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30	40	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
1.11 ... 1.13	3.74 ... 3.85	0.139 (0.158)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	**1FT2103-4AG..-2.A0-Z**
			M_{2N}	Nm	39	44	44	44	44	40	44	40	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
0.983 ... 0.993	3.74 ... 3.85	0.139 (0.158)	n_{2N}	r/min	50	37.5	25	25	20	12.5	10	10	**1FT2103-4AH..-2..0-Z**
			M_{2N}	Nm	36	44	44	44	44	40	44	40	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
1.12 ... 1.15	3.46 ... 3.56	0.368 (0.448)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	**1FT2104-4AF..-2..0-Z**
			M_{2N}	Nm	44	44	44	44	44	40	44	40	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
1.11 ... 1.14	3.55 ... 3.65	0.368 (0.448)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	**1FT2104-4AK..-2..0-Z**
			M_{2N}	Nm	44	44	44	44	44	40	44	40	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
2.18 ... 2.23	7 ... 7.18	0.578 (0.668)	n_{2N}	r/min	25	20	15	12.5	–	–	–	–	**1FT2104-5AF..-2..0-Z**
			M_{2N}	Nm	44	44	44	44	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	–	–	–	–	
			M_{2max}	Nm	70	70	70	70	–	–	–	–	
2.16 ... 2.21	7.09 ... 7.28	0.578 (0.668)	n_{2N}	r/min	50	37.5	30	25	–	–	–	–	**1FT2104-5AK..-2..0-Z**
			M_{2N}	Nm	44	44	44	44	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	–	–	–	–	
			M_{2max}	Nm	70	70	70	70	–	–	–	–	

➥ Continued on the next page

Planetary gearbox data									
Gearbox type:		**NRBW060, 3-stage**							
1. Order code		**A28**							
i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**
2. Order code		**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**
$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40
$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64
$M_{2Em.Off}$	Nm	88	88	88	88	88	80	88	80
$J_{1,G}$	kg cm²	0.232	0.231	0.231	0.222	0.222	0.222	0.222	0.222
$\varphi_{2,G}$	'	21							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRBW060

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW060 3-stage (continued)													
2.89 ... 2.96	9.35 ... 9.6	0.778 (0.858)	n_{2N} r/min	25	20	15	–	–	–	–	–		1FT2104-6AF..-2..0-Z
			M_{2N} Nm	44	44	44	–	–	–	–	–		■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	44	44	–	–	–	–	–		
			M_{2max} Nm	70	70	70	–	–	–	–	–		
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW060 3-stage													
0.523 ... 0.534	1.68 ... 1.72	0.2 (0.22)	n_{2N} r/min	50	37.5	30	25	20	15	12.5	10		1FT2203-2AG..-2.A0-Z
			M_{2N} Nm	20.5	27.5	34.5	42	44	40	44	40		■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	31.5	42	44	44	44	40	44	40		
			M_{2max} Nm	70	70	70	70	70	64	70	64		
0.489 ... 0.5	1.68 ... 1.72	0.2 (0.22)	n_{2N} r/min	50	30	25	20	20	15	12.5	10		1FT2203-2AK..-2..0-Z
			M_{2N} Nm	15.8	26.5	32	40.5	38.5	40	44	40		■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	29.5	39	44	44	44	40	44	40		
			M_{2max} Nm	70	70	70	70	70	64	70	64		
1.12 ... 1.14	3.46 ... 3.56	0.35 (0.37)	n_{2N} r/min	50	37.5	30	25	20	15	12.5	10		1FT2203-4AG..-2.A0-Z
			M_{2N} Nm	44	44	44	44	44	40	44	40		■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	44	44	44	44	40	44	40		
			M_{2max} Nm	70	70	70	70	70	64	70	64		
1.08 ... 1.1	3.46 ... 3.56	0.35 (0.37)	n_{2N} r/min	50	37.5	30	25	20	15	12.5	10		1FT2203-4AK..-2..0-Z
			M_{2N} Nm	33.5	43.5	44	44	44	40	44	40		■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	44	44	44	44	40	44	40		
			M_{2max} Nm	70	70	70	70	70	64	70	64		
2.14 ... 2.19	6.62 ... 6.8	1.248 (1.328)	n_{2N} r/min	25	20	15	12.5	–	–	–	–		1FT2204-5AF..-2..0-Z
			M_{2N} Nm	44	44	44	44	–	–	–	–		■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	44	44	44	–	–	–	–		
			M_{2max} Nm	70	70	70	70	–	–	–	–		
2.15 ... 2.2	6.62 ... 6.8	1.248 (1.328)	n_{2N} r/min	50	37.5	30	25	–	–	–	–		1FT2204-5AK..-2..0-Z
			M_{2N} Nm	44	44	44	44	–	–	–	–		■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	44	44	44	–	–	–	–		
			M_{2max} Nm	70	70	70	70	–	–	–	–		
2.88 ... 2.95	8.88 ... 9.12	1.628 (1.708)	n_{2N} r/min	25	20	15	–	–	–	–	–		1FT2204-6AF..-2..0-Z
			M_{2N} Nm	44	44	44	–	–	–	–	–		■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	44	44	–	–	–	–	–		
			M_{2max} Nm	70	70	70	–	–	–	–	–		

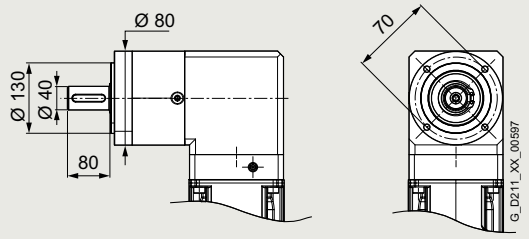
Planetary gearbox data								
Gearbox type:		NRBW060, 3-stage						
1. Order code		A28						
i		60	80	100	120	160	200	256	320
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23
$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40
$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64
$M_{2Em.Off}$	Nm	88	88	88	88	88	80	88	80
$J_{1,G}$	kg cm²	0.232	0.231	0.231	0.222	0.222	0.222	0.222	0.222
$\varphi_{2,G}$	'	21							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Selection and ordering data

NRBW080



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	750 N
Average axial force for 20000 h	$F_{A,eq}$	1000 N
Average radial force for 30000 h	$F_{R,eq}$	650 N
Average axial force for 30000 h	$F_{A,eq}$	900 N
Maximum radial force	$F_{R,max}$	1250 N
Maximum axial force	$F_{A,max}$	1600 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW080 1- and 2-stage																				
0.45	1.71	0.093	n_{2N}	r/min	600	500	500	375	300	250	250	200	150	150	125	100	75	60	37.5	**1FT2103-2AG..-0.A0-Z**
...	...	(0.112)	M_{2N}	Nm	0.84	1.09	1.17	1.73	2.2	2.7	2.5	3.2	4.35	4.35	5.5	6.9	9.6	12.1	19.5	■■■ + ■■■ + . . .
0.477	1.75		M_{2_0}	Nm	1.34	1.83	2.3	3.25	3.75	4.7	4.2	5.6	7	7.5	9.4	11.8	15.2	19	30.5	
			M_{2max}	Nm	5.2	6.9	8.7	12.2	14	17.5	15.6	20.5	26	27.5	34.5	43	55	69	80	
0.422	1.71	0.093	n_{2N}	r/min	750	500	500	375	300	250	250	200	150	150	125	100	75	60	37.5	**1FT2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	0.66	1.07	1.15	1.7	2.15	2.7	2.45	3.15	4.25	4.25	5.4	6.8	9.4	11.8	19.1	■■■ + ■■■ + . . .
0.45	1.75		M_{2_0}	Nm	1.26	1.72	2.15	3.05	3.55	4.45	3.95	5.3	6.6	7.1	8.9	11.2	14.3	17.9	28.5	
			M_{2max}	Nm	5.2	6.9	8.7	12.2	14	17.5	15.6	20.5	26	27.5	34.5	43	55	69	80	
1.05	3.68	0.139	n_{2N}	r/min	600	500	375	300	250	200	250	200	150	125	100	100	75	60	37.5	**1FT2103-4AG..-0.A0-Z**
...	...	(0.158)	M_{2N}	Nm	2.5	3.1	4.35	5.7	6.9	8.8	6.8	8.4	11.7	13.9	17.6	17.5	24.5	31	49.5	■■■ + ■■■ + . . .
1.07	3.78		M_{2_0}	Nm	3.1	4.2	5.2	7.4	8.5	10.6	9.5	12.7	15.9	16.9	21	26.5	34	42.5	50	
			M_{2max}	Nm	11.3	15	18.8	26	30	37.5	33.5	44.5	56	59	74	93	119	149	80	
0.983	3.68	0.139	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	**1FT2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	2.1	2.7	3.65	5	5	6	6.1	7.5	10.4	10.1	12.5	15.7	22	27.5	44.5	■■■ + ■■■ + . . .
1.01	3.78		M_{2_0}	Nm	2.9	3.95	4.95	7	8	10	9	12	15	16	20	25	32	40	50	
			M_{2max}	Nm	11.3	15	18.8	26	30	37.5	33.5	44.5	56	59	74	93	119	149	80	
1.06	3.4	0.35	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2104-4AF..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.85	3.9	4.95	6.8	8	10.2	8.6	12	15.1	15.8	20	25	32	40.5	50	■■■ + ■■■ + . . .
1.08	3.49		M_{2_0}	Nm	3.15	4.25	5.3	7.5	8.6	10.8	9.6	12.8	16.1	17.2	21.5	26.5	34	43	50	
			M_{2max}	Nm	10.4	13.9	17.4	24	27.5	34.5	31	41	51	55	69	86	110	137	80	
1.05	3.49	0.35	n_{2N}	r/min	750	600	500	375	300	250	300	200	150	150	125	100	75	60	50	**1FT2104-4AK..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.65	3.4	4.3	6.1	7.6	9.5	7.2	11.2	14.5	15	18.8	23.5	31	39	41.5	■■■ + ■■■ + . . .
1.08	3.59		M_{2_0}	Nm	3.15	4.2	5.3	7.5	8.5	10.7	9.5	12.8	16	17	21	26.5	34	42.5	50	
			M_{2max}	Nm	10.7	14.3	17.8	25	28.5	35.5	31.5	42.5	53	56	70	88	113	141	80	
2.11	6.91	0.56	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2104-5AF..-2..0-Z**
...	...	(0.65)	M_{2N}	Nm	6.1	8.2	10.3	14.2	16.5	21	17.9	24.5	31	32.5	41.5	51	66	83	50	■■■ + ■■■ + . . .
2.16	7.11		M_{2_0}	Nm	6.4	8.5	10.7	15.1	17.2	21.5	19.2	25.5	32	34	42.5	53	68	85	50	
			M_{2max}	Nm	21	28	35.5	49.5	56	61	63	84	105	112	140	175	192	176	80	

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Planetary gearbox data																
Gearbox type:			NRBW080, 1-stage						NRBW080, 2-stage							
1. Order code			A36						A37							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50
	$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80
	$M_{2Em.Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190
	$J_{1.G}$	kg cm²	1.273	1.004	0.973	0.929	0.92	0.91	1.232	1.209	1.205	0.996	0.955	0.954	0.917	0.916	0.917
	$\varphi_{2,G}$	'	13						15								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRBW080

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW080 1- and 2-stage (continued)																			
2.09 ... 2.15	7 ... 7.2	0.56 (0.65)	n_{2N} r/min	600	500	375	300	250	200	250	150	150	125	100	75	75	50	50	**1FT2104-5AK..-2..0-Z**
			M_{2N} Nm	5.6	6.8	9.5	12.4	14.9	18.9	14.5	24	24	29	37	49	50	75	49.5	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	6.3	8.5	10.6	14.9	17.1	21	19.1	25.5	31.5	34	42.5	53	68	84	50	
			M_{2max} Nm	21.5	28.5	35.5	50	57	61	64	85	106	113	142	176	192	176	80	
2.82 ... 2.89	9.25 ... 9.53	0.76 (0.84)	n_{2N} r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2104-6AF..-2..0-Z**
			M_{2N} Nm	7.8	10.5	13.4	17.5	21	27.5	21.5	32.5	40.5	41.5	54	68	84	109	50	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	8.6	11.5	14.4	20	23	28.5	25.5	34	43	45.5	57	71	91	110	50	
			M_{2max} Nm	28.5	38	47.5	66	76	61	84	113	141	150	188	176	192	176	80	
4.47 ... 4.59	14 ... 14.4	1.71 (2.55)	n_{2N} r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2105-4AF..-0..0-Z**
			M_{2N} Nm	12	16	20	26.5	31.5	38	32	47.5	59	62	79	99	120	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	13.7	18.3	22.5	32	36.5	38	40.5	54	68	72	90	110	120	110	50	
			M_{2max} Nm	43	57	71	100	80	61	127	170	176	192	192	176	192	176	80	
4.5 ... 4.62	14 ... 14.4	1.71 (2.55)	n_{2N} r/min	500	375	375	250	200	200	200	150	100	100	75	75	50	50	37.5	**1FT2105-4AH..-0..0-Z**
			M_{2N} Nm	11.3	15.2	15.4	24	30	29.5	29	38.5	57	58	76	76	117	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	13.8	18.4	23	32	36.5	38	41	54	68	73	91	110	120	110	50	
			M_{2max} Nm	43	57	71	100	80	61	127	170	176	192	192	176	192	176	80	
7.27 ... 7.4	22.4 ... 23.1	2.65 (3.5)	n_{2N} r/min	500	375	300	250	200	150	150	125	100	100	75	60	50	37.5	–	**1FT2105-6AF..-0..0-Z**
			M_{2N} Nm	15.6	20.5	26.5	32	40.5	38	51	61	76	76	101	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	22	29.5	36.5	51	50	38	66	88	110	117	120	110	120	110	–	
			M_{2max} Nm	64	85	107	104	80	61	205	192	176	192	192	176	192	176	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW080 1- and 2-stage																			
0.444 ... 0.471	1.62 ... 1.66	0.2 (0.22)	n_{2N} r/min	600	500	375	300	250	200	250	200	150	125	100	100	75	60	37.5	**1FT2203-2AG..-0.A0-Z**
			M_{2N} Nm	0.93	1.19	1.7	2.3	2.8	3.55	2.7	3.35	4.65	5.5	7.1	7.2	10.2	12.8	20.5	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	1.33	1.8	2.25	3.2	3.7	4.65	4.15	5.5	7	7.4	9.3	11.7	15	18.8	30	
			M_{2max} Nm	4.9	6.5	8.2	11.5	13.2	16.5	14.7	19.7	24.5	26	32.5	41	52	65	80	
0.409 ... 0.437	1.62 ... 1.66	0.2 (0.22)	n_{2N} r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	30	**1FT2203-2AK..-0..0-Z**
			M_{2N} Nm	0.9	1.26	1.37	2.2	2.25	2.9	2.75	3.7	4.5	4.5	5.8	7.8	10.2	12.3	20.5	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	1.22	1.67	2.1	3	3.45	4.3	3.85	5.1	6.4	6.9	8.6	10.8	13.9	17.4	27.5	
			M_{2max} Nm	4.9	6.5	8.2	11.5	13.2	16.5	14.7	19.7	24.5	26	32.5	41	52	65	80	
1.06 ... 1.08	3.4 ... 3.49	0.35 (0.37)	n_{2N} r/min	750	500	500	375	300	250	250	200	150	150	125	100	75	60	37.5	**1FT2203-4AG..-0.A0-Z**
			M_{2N} Nm	2.45	3.7	3.85	5.5	7.2	8.9	8.2	10.6	13.8	14.2	17.6	22	29.5	36.5	50	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	3.15	4.25	5.3	7.5	8.6	10.7	9.6	12.8	16	17.1	21	26.5	34	42.5	50	
			M_{2max} Nm	10.4	13.9	17.4	24	27.5	34.5	31	41	51	55	69	86	110	137	80	
1.02 ... 1.04	3.4 ... 3.49	0.35 (0.37)	n_{2N} r/min	600	500	375	300	250	200	250	200	150	125	100	100	75	60	37.5	**1FT2203-4AK..-0..0-Z**
			M_{2N} Nm	2.35	2.95	4	5.4	6.4	8.1	6.5	7.8	11.1	12.8	16.2	16.2	23.5	29.5	47.5	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	3	4.05	5.1	7.2	8.2	10.3	9.2	12.3	15.4	16.4	20.5	25.5	33	41	50	
			M_{2max} Nm	10.4	13.9	17.4	24	27.5	34.5	31	41	51	55	69	86	110	137	80	
2.07 ... 2.12	6.53 ... 6.72	1.23 (1.31)	n_{2N} r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2204-5AF..-2..0-Z**
			M_{2N} Nm	5.8	7.8	9.8	13.4	15.7	20	16.9	23.5	29.5	31	39.5	49.5	62	79	50	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	6.3	8.4	10.5	14.8	16.9	21	18.9	25	31.5	33.5	42	52	67	83	50	
			M_{2max} Nm	20	26.5	33.5	47	53	61	59	79	99	106	132	165	192	176	80	

➥ Continued on the next page

Planetary gearbox data																
Gearbox type:		NRBW080, 1-stage						NRBW080, 2-stage								
1. Order code		A36						A37								
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50
$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80
$M_{2Em.Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190
$J_{1,G}$	kg cm²	1.273	1.004	0.973	0.929	0.92	0.91	1.232	1.209	1.205	0.996	0.955	0.954	0.917	0.916	0.917
$\varphi_{2,G}$	'	13						15								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW080 1- and 2-stage (continued)																			
2.08 ... 2.13	6.53 ... 6.72	1.23 (1.31)	n_{2N}	r/min	600	500	375	300	250	200	200	150	125	125	100	75	60	50	50	**1FT2204-5AK..-2..0-Z**
			M_{2N}	Nm	5.5	6.7	9.3	12.1	14.7	18.5	17.6	23	28.5	28.5	36.5	48	61	74	39.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.3	8.4	10.6	14.9	17	21	19	25	31.5	33.5	42	52	67	84	50	
			M_{2max}	Nm	20	26.5	33.5	47	53	61	59	79	99	106	132	165	192	176	80	
2.81 ... 2.88	8.78 ... 9.04	1.61 (1.69)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2204-6AF..-2..0-Z**
			M_{2N}	Nm	8.2	11.1	14	18.4	22	28	22.5	33	41.5	43.5	55	69	88	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34	42.5	45.5	57	71	91	110	50	
			M_{2max}	Nm	27	36	45	63	72	61	80	107	134	142	178	176	192	176	80	
2.87 ... 2.92	10 ... 10.3	3.15 (4.05)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	7.3	10	12.6	17.7	20	25.5	23	29	37	39	50	59	78	101	49.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.7	11.6	14.5	20	23	29	26	34.5	43.5	46	58	72	92	110	49.5	
			M_{2max}	Nm	30.5	41	51	72	80	61	91	122	152	162	192	176	192	176	80	
2.91 ... 2.96	10 ... 10.3	3.15 (4.05)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2205-2AF..-0..0-Z**
			M_{2N}	Nm	7.4	9.9	12.5	17.1	20	25	21.5	30	37.5	39	50	62	79	100	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.8	11.7	14.7	20.5	23.5	29.5	26.5	35	44	47	58	73	94	110	50	
			M_{2max}	Nm	30.5	41	51	72	80	61	91	122	152	162	192	176	192	176	80	
2.87 ... 2.92	10 ... 10.3	3.15 (4.05)	n_{2N}	r/min	600	500	375	250	250	200	200	150	125	100	100	75	60	50	37.5	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	6.3	7.4	10.6	16.3	16.4	20.5	20.5	27	32.5	37.5	40.5	55	70	83	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.7	11.6	14.5	20	23	29	26	34.5	43.5	46	57	72	92	110	49.5	
			M_{2max}	Nm	30.5	41	51	72	80	61	91	122	152	162	192	176	192	176	80	
4.95 ... 5.04	16.8 ... 17.3	5.1 (6)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2205-4AF..-0..0-Z**
			M_{2N}	Nm	11.2	15.1	19.2	23.5	29.5	38	28.5	45.5	57	57	76	94	116	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.1	20	25	35	40	38	45	60	75	80	100	110	120	110	50	
			M_{2max}	Nm	51	69	86	104	80	61	153	192	176	192	192	176	192	176	80	

Planetary gearbox data																
Gearbox type:			**NRBW080, 1-stage**						**NRBW080, 2-stage**							
1. Order code			**A36**						**A37**							
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
	$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50
	$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80
	$M_{2Em.Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190
	$J_{1,G}$	kg cm²	1.273	1.004	0.973	0.929	0.92	0.91	1.232	1.209	1.205	0.996	0.955	0.954	0.917	0.916	0.917
	$\varphi_{2,G}$	'	13						15								

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRBW080

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW080 3-stage													
0.45 ... 0.477	1.71 ... 1.75	0.093 (0.112)	n_{2N}	r/min	37.5	30	25	20	15	15	10	7.5	6	**1FT2103-2AG..-0.A0-Z**
			M_{2N}	Nm	18.1	23.5	28.5	34.5	49	49.5	75	98	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	28	37.5	47	56	75	94	120	110	50	
			M_{2max}	Nm	103	137	171	176	192	176	192	176	80	
0.422 ... 0.45	1.71 ... 1.75	0.093 (0.112)	n_{2N}	r/min	37.5	30	25	20	15	12.5	10	7.5	5	**1FT2103-2AH..-0..0-Z**
			M_{2N}	Nm	17.7	23	28	33.5	48	58	73	96	49.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	26.5	35.5	44.5	53	71	89	114	110	49.5	
			M_{2max}	Nm	103	137	171	176	192	176	192	176	80	
1.05 ... 1.07	3.68 ... 3.78	0.139 (0.158)	n_{2N}	r/min	37.5	30	25	20	15	15	12.5	10	6	**1FT2103-4AG..-0.A0-Z**
			M_{2N}	Nm	48.5	61	72	90	120	107	115	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	63	84	105	110	120	110	120	110	50	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	80	
0.983 ... 1.01	3.68 ... 3.78	0.139 (0.158)	n_{2N}	r/min	37.5	30	25	20	15	12.5	10	10	5	**1FT2103-4AH..-0..0-Z**
			M_{2N}	Nm	42	55	65	80	112	110	120	110	49.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	60	80	100	110	120	110	120	110	50	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	80	
1.06 ... 1.08	3.4 ... 3.49	0.35 (0.43)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	3	**1FT2104-4AF..-2..0-Z**
			M_{2N}	Nm	60	79	101	110	120	110	120	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	64	85	106	110	120	110	120	110	49.5	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	80	
1.05 ... 1.08	3.49 ... 3.59	0.35 (0.43)	n_{2N}	r/min	37.5	30	25	20	20	15	12.5	10	6	**1FT2104-4AK..-2..0-Z**
			M_{2N}	Nm	58	76	93	110	108	110	120	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	63	84	105	110	120	110	120	110	49.5	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	80	
2.11 ... 2.16	6.91 ... 7.11	0.56 (0.65)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	–	**1FT2104-5AF..-2..0-Z**
			M_{2N}	Nm	110	120	120	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.09 ... 2.15	7 ... 7.2	0.56 (0.65)	n_{2N}	r/min	37.5	30	25	25	20	15	12.5	10	–	**1FT2104-5AK..-2..0-Z**
			M_{2N}	Nm	97	119	120	107	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.82 ... 2.89	9.25 ... 9.53	0.76 (0.84)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	–	**1FT2104-6AF..-2..0-Z**
			M_{2N}	Nm	110	120	120	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
4.47 ... 4.59	14 ... 14.4	1.71 (2.55)	n_{2N}	r/min	25	20	15	12.5	10	–	–	–	–	**1FT2105-4AF..-0..0-Z**
			M_{2N}	Nm	110	120	120	110	120	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	–	–	–	–	
			M_{2max}	Nm	176	192	192	176	192	–	–	–	–	

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Planetary gearbox data										
Gearbox type:			**NRBW080, 3-stage**							
1. Order code			**A38**							
i			**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
$M_{2N,G}$	Nm		110	120	120	110	120	110	120	110	50
$M_{2max,G}$	Nm		176	192	192	176	192	176	192	176	80
$M_{2Em.Off}$	Nm		220	240	240	220	240	220	240	220	190
$J_{1,G}$	kg cm²		1.203	0.955	0.954	1.209	0.916	0.916	0.917	0.917	0.917
$\varphi_{2,G}$	'		17							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)											
Nm	Nm	kg cm²											
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW080 3-stage (continued)													
4.5 ... 4.62	14 ... 14.4	1.71 (2.55)	n_{2N}	r/min	37.5	30	25	20	15	–	–	–	–	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	110	120	120	110	120	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	–	–	–	–	
			M_{2max}	Nm	176	192	192	176	192	–	–	–	–	
7.27 ... 7.4	22.4 ... 23.1	2.65 (3.5)	n_{2N}	r/min	25	20	15	–	–	–	–	–	–	1FT2105-6AF..-0..0-Z
			M_{2N}	Nm	110	120	120	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	–	–	–	–	–	–	
			M_{2max}	Nm	176	192	192	–	–	–	–	–	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW080 3-stage													
0.444 ... 0.471	1.62 ... 1.66	0.2 (0.22)	n_{2N}	r/min	37.5	30	25	20	15	12.5	10	7.5	6	1FT2203-2AG..-0.A0-Z
			M_{2N}	Nm	19.4	25	30	36.5	52	62	78	105	49.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	27.5	37	46.5	55	74	93	119	110	50	
			M_{2max}	Nm	97	130	162	176	192	176	192	176	80	
0.409 ... 0.437	1.62 ... 1.66	0.2 (0.22)	n_{2N}	r/min	30	25	20	15	12.5	10	7.5	7.5	6	1FT2203-2AK..-0..0-Z
			M_{2N}	Nm	19.5	24	30.5	39	50	63	83	83	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	25.5	34.5	43	51	69	86	110	110	49.5	
			M_{2max}	Nm	97	130	162	176	192	176	192	176	80	
1.06 ... 1.08	3.4 ... 3.49	0.35 (0.37)	n_{2N}	r/min	37.5	30	25	20	20	15	12.5	10	6	1FT2203-4AG..-0.A0-Z
			M_{2N}	Nm	55	72	88	107	94	110	120	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	63	84	105	110	120	110	120	110	50	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	80	
1.02 ... 1.04	3.4 ... 3.49	0.35 (0.37)	n_{2N}	r/min	37.5	30	25	20	15	12.5	10	10	6	1FT2203-4AK..-0..0-Z
			M_{2N}	Nm	45	58	68	85	119	110	120	100	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	61	81	102	110	120	110	120	110	50	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	80	
2.07 ... 2.12	6.53 ... 6.72	1.23 (1.31)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	–	1FT2204-5AF..-2..0-Z
			M_{2N}	Nm	110	120	120	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.08 ... 2.13	6.53 ... 6.72	1.23 (1.31)	n_{2N}	r/min	37.5	30	25	25	20	15	12.5	10	–	1FT2204-5AK..-2..0-Z
			M_{2N}	Nm	94	116	120	88	107	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.81 ... 2.88	8.78 ... 9.04	1.61 (1.69)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	–	1FT2204-6AF..-2..0-Z
			M_{2N}	Nm	110	120	120	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.87 ... 2.92	10 ... 10.3	3.15 (4.05)	n_{2N}	r/min	20	12.5	10	10	7.5	5	5	–	–	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	110	120	120	110	120	109	119	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	–	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	–	–	

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Planetary gearbox data										
Gearbox type:			NRBW080, 3-stage								
1. Order code			A38								
	i		60	80	100	120	160	200	256	320	512
2. Order code			R60	R80	R01	R21	R61	R02	R52	R23	R51
	$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50
	$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80
	$M_{2Em.Off}$	Nm	220	240	240	220	240	220	240	220	190
	$J_{1,G}$	kg cm²	1.203	0.955	0.954	1.209	0.916	0.916	0.917	0.917	0.917
	$\varphi_{2,G}$	'	17								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRBW080

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)											
Nm	Nm	kg cm²											
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW080 3-stage (continued)													
2.91 ... 2.96	10 ... 10.3	3.15 (4.05)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	–	–	**1FT2205-2AF..-0..0-Z**
			M_{2N}	Nm	110	120	120	110	120	110	120	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	119	–	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	–	–	
2.87 ... 2.92	10 ... 10.3	3.15 (4.05)	n_{2N}	r/min	37.5	30	25	20	15	12.5	10	–	–	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	98	116	120	110	120	110	120	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	119	110	120	109	119	–	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	–	–	
4.95 ... 5.04	16.8 ... 17.3	5.1 (6)	n_{2N}	r/min	25	20	15	12.5	10	–	–	–	–	**1FT2205-4AF..-0..0-Z**
			M_{2N}	Nm	110	120	120	110	120	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	–	–	–	–	
			M_{2max}	Nm	176	192	192	176	192	–	–	–	–	

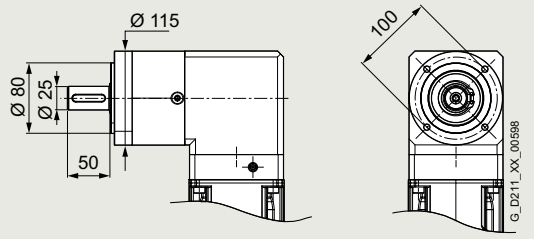
Planetary gearbox data										
Gearbox type:		**NRBW080, 3-stage**								
1. Order code		**A38**								
i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code		**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50
$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80
$M_{2Em.Off}$	Nm	220	240	240	220	240	220	240	220	190
$J_{1,G}$	kg cm²	1.203	0.955	0.954	1.209	0.916	0.916	0.917	0.917	0.917
$\varphi_{2,G}$	'	17								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRBW120



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1750 N
Average axial force for 20000 h	$F_{A,eq}$	2500 N
Average radial force for 30000 h	$F_{R,eq}$	1500 N
Average axial force for 30000 h	$F_{A,eq}$	2100 N
Maximum radial force	$F_{R,max}$	2000 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 1- and 2-stage																				
0.338	1.62	0.093	n_{2N}	r/min	375	300	300	250	200	200	150	125	100	100	75	75	60	50	30	**1FT2103-2AG..-0.A0-Z**
...	...	(0.112)	M_{2N}	Nm	0.61	0.91	1.09	1.57	2	2.1	2.25	2.85	3.65	3.75	5.5	5.7	8.1	9.8	16.6	■■■ + ■■■ + . . .
0.407	1.67		M_{2_0}	Nm	1.01	1.42	1.84	2.65	3.05	3.9	3.45	4.7	5.9	6.3	7.9	10	12.9	16.2	26	
			M_{2max}	Nm	4.85	6.5	8.2	11.6	13.3	16.7	14.8	19.9	24.5	26.5	33	41.5	53	66	106	
0.31	1.62	0.093	n_{2N}	r/min	375	375	300	250	200	200	150	125	100	100	100	75	60	50	30	**1FT2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	0.56	0.69	1.07	1.55	2	2.1	2.1	2.75	3.55	3.7	4.1	5.7	8	9.7	16.4	■■■ + ■■■ + . . .
0.379	1.67		M_{2_0}	Nm	0.92	1.31	1.7	2.45	2.85	3.65	3.2	4.35	5.5	5.9	7.4	9.3	12	15.1	24	
			M_{2max}	Nm	4.85	6.5	8.2	11.6	13.3	16.7	14.8	19.9	24.5	26.5	33	41.5	53	66	106	
0.934	3.61	0.139	n_{2N}	r/min	600	500	375	300	250	200	200	150	125	125	100	75	75	60	37.5	**1FT2103-4AG..-0.A0-Z**
...	...	(0.158)	M_{2N}	Nm	1.98	2.45	3.95	5.5	6.6	8.4	7.2	9.8	12.2	12.7	16.7	21	25	31.5	50	■■■ + ■■■ + . . .
0.992	3.7		M_{2_0}	Nm	2.8	3.8	4.8	6.8	7.8	9.8	8.7	11.7	14.7	15.7	19.7	24.5	31.5	39.5	63	
			M_{2max}	Nm	10.9	14.6	18.3	25.5	29.5	36.5	32.5	43.5	54	58	73	91	117	146	192	
0.92	3.61	0.139	n_{2N}	r/min	600	500	375	300	300	200	250	150	150	125	125	100	75	60	37.5	**1FT2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	1.61	2.1	3.1	4.4	4.4	6.7	4.65	7.8	8.3	10	10.8	13.8	20	25	40.5	■■■ + ■■■ + . . .
0.978	3.7		M_{2_0}	Nm	2.75	3.75	4.75	6.7	7.7	9.7	8.6	11.6	14.5	15.5	19.4	24	31	39	62	
			M_{2max}	Nm	10.9	14.6	18.3	25.5	29.5	36.5	32.5	43.5	54	58	73	91	117	146	192	
0.948	3.33	0.35	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2104-4AF..-0..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.35	3.3	4.25	6.1	7.1	9	7.4	10.2	12.9	13.7	17.7	22	28.5	36	57	■■■ + ■■■ + . . .
1.01	3.41		M_{2_0}	Nm	2.8	3.85	4.85	6.9	7.9	10	8.9	11.9	14.9	15.9	20	25	32	40	64	
			M_{2max}	Nm	10	13.5	16.9	23.5	27	34	30	40.5	50	54	67	84	108	135	192	
0.941	3.42	0.35	n_{2N}	r/min	600	500	500	375	300	250	250	200	150	150	125	100	75	60	37.5	**1FT2104-4AK..-0..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.25	3.1	3.1	5	6.7	8.4	7.1	9.2	12	12.7	16.5	20.5	27.5	34.5	55	■■■ + ■■■ + . . .
0.999	3.5		M_{2_0}	Nm	2.8	3.8	4.85	6.8	7.9	9.9	8.8	11.8	14.8	15.8	19.8	24.5	31.5	39.5	63	
			M_{2max}	Nm	10.3	13.9	17.4	24	27.5	35	31	41.5	52	55	69	86	111	138	192	
2.03	6.84	0.56	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2104-5AF..-0..0-Z**
...	...	(0.65)	M_{2N}	Nm	5.6	7.6	9.6	13.6	15.7	19.7	17	23	28.5	30.5	38.5	48.5	62	78	120	■■■ + ■■■ + . . .
2.08	7.02		M_{2_0}	Nm	6	8.1	10.2	14.4	16.5	20.5	18.5	24.5	30.5	33	41	51	66	82	120	
			M_{2max}	Nm	20.5	28	35	49	56	70	62	83	104	111	138	173	220	275	192	

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Planetary gearbox data																
Gearbox type:			NRBW120, 1-stage						NRBW120, 2-stage							
1. Order code			A46						A47							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855
	$\varphi_{2,G}$	'	11						13								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRBW120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 1- and 2-stage (continued)																			
2.02 ... 2.07	6.93 ... 7.12	0.56 (0.65)	n_{2N} r/min	600	500	375	300	250	200	200	150	125	125	100	100	75	60	37.5	**1FT2104-5AK..-0..0-Z**
			M_{2N} Nm	5.1	6.4	9.4	12.9	15.4	19.4	16.8	22.5	28	30	38	36	55	68	110	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	6	8.1	10.2	14.3	16.4	20.5	18.3	24.5	30.5	32.5	41	51	65	82	120	
			M_{2max} Nm	21	28	35.5	49.5	56	71	63	84	105	112	140	175	225	280	192	
2.75 ... 2.81	9.18 ... 9.44	0.76 (0.84)	n_{2N} r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2104-6AF..-0..0-Z**
			M_{2N} Nm	7.8	10.5	13.3	18.7	21.5	27	23	31.5	39.5	42	53	66	85	107	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	8.3	11.1	13.9	19.6	22	28	25	33	41.5	44.5	55	69	89	111	120	
			M_{2max} Nm	28	37.5	47	65	75	94	84	112	140	149	186	230	295	368	192	
4.4 ... 4.51	13.9 ... 14.3	1.71 (2.55)	n_{2N} r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2105-4AF..-0..0-Z**
			M_{2N} Nm	11.9	16.1	20.5	27.5	32.5	41.5	34	48.5	61	64	82	103	130	166	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	13.4	17.9	22	31.5	36	45	40	53	67	71	89	111	142	178	120	
			M_{2max} Nm	42.5	57	71	99	114	142	127	169	210	225	280	350	416	368	192	
4.43 ... 4.54	13.9 ... 14.3	1.71 (2.55)	n_{2N} r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	**1FT2105-4AH..-0..0-Z**
			M_{2N} Nm	11.3	15.4	16.8	26	26.5	34.5	32	43	51	50	66	90	117	139	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	13.5	18	22.5	31.5	36	45	40	53	67	71	89	112	143	179	120	
			M_{2max} Nm	42.5	57	71	99	114	142	127	169	210	225	280	350	416	368	192	
7.22 ... 7.41	22.3 ... 23	2.65 (3.5)	n_{2N} r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2105-6AF..-0..0-Z**
			M_{2N} Nm	17	23	30	37.5	48	63	43	72	90	90	122	152	188	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	22	29.5	36.5	51	59	74	66	88	110	117	146	183	230	230	120	
			M_{2max} Nm	68	91	114	160	183	152	200	270	340	360	416	368	416	368	192	
7.66 ... 7.8	24.2 ... 24.9	4.6 (6.3)	n_{2N} r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2106-3AF..-0..0-Z**
			M_{2N} Nm	17.6	24	31	39	49.5	63	44.5	74	93	93	125	156	194	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	23	31	38.5	54	62	78	69	93	116	124	154	193	245	230	120	
			M_{2max} Nm	74	99	124	174	192	152	220	295	368	390	416	368	416	368	192	
9.97 ... 10.1	30.8 ... 31.7	6 (7.6)	n_{2N} r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	25	**1FT2106-4AF..-0..0-Z**
			M_{2N} Nm	20.5	28.5	37	55	57	78	70	86	107	106	146	182	220	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	30	40.5	50	70	81	95	90	121	151	161	200	230	260	230	120	
			M_{2max} Nm	95	126	158	216	192	152	280	375	368	416	416	368	416	368	192	
14.1 ... 14.4	42.5 ... 43.8	8.7 (10.4)	n_{2N} r/min	375	300	250	200	200	150	150	100	75	75	60	60	50	37.5	–	**1FT2106-6AF..-0..0-Z**
			M_{2N} Nm	34.5	44	54	70	69	94	87	129	170	171	215	210	255	230	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	43	57	71	100	115	95	128	171	210	225	260	230	260	230	–	
			M_{2max} Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 1- and 2-stage																			
0.33 ... 0.401	1.52 ... 1.58	0.2 (0.22)	n_{2N} r/min	500	375	300	250	250	200	200	150	125	125	100	75	60	50	30	**1FT2203-2AG..-0.A0-Z**
			M_{2N} Nm	0.52	0.83	1.2	1.82	1.84	2.45	1.91	2.65	3.25	3.2	4.8	6.5	9	11.2	18.3	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	0.99	1.4	1.81	2.6	3	3.85	3.4	4.6	5.8	6.2	7.8	9.8	12.7	15.9	25.5	
			M_{2max} Nm	4.55	6.1	7.7	10.9	12.5	15.7	14	18.7	23	25	31	39	50	62	100	
0.297 ... 0.367	1.52 ... 1.58	0.2 (0.22)	n_{2N} r/min	375	375	300	250	200	150	150	125	100	100	75	75	60	50	30	**1FT2203-2AK..-0..0-Z**
			M_{2N} Nm	0.52	0.66	1.06	1.45	1.95	2.6	2	2.6	3.35	3.55	5	5.2	7.5	9	15.5	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	0.88	1.26	1.64	2.35	2.75	3.5	3.1	4.2	5.3	5.7	7.1	9	11.6	14.5	23	
			M_{2max} Nm	4.55	6.1	7.7	10.9	12.5	15.7	14	18.7	23	25	31	39	50	62	100	

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Planetary gearbox data																
Gearbox type:		NRBW120, 1-stage						NRBW120, 2-stage								
1. Order code		A46						A47								
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192
$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380
$J_{1,G}$	kg cm²	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855
$\varphi_{2,G}$	'	11						13								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 1- and 2-stage (continued)																			
0.943	3.33	0.35	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	**1FT2203-4AG..-0.A0-Z**
...	...	(0.37)	M_{2N}	Nm	2.25	3.05	4.1	5.9	6.4	8	6.8	8.6	11.7	12.1	15.6	19.6	27	34	55	■■■ + ■■■ + . . .
1	3.41		$M_{2,0}$	Nm	2.8	3.8	4.85	6.9	7.9	9.9	8.8	11.8	14.8	15.8	19.8	24.5	31.5	39.5	64	
			M_{2max}	Nm	10	13.5	16.9	23.5	27	34	30	40.5	50	54	67	84	108	135	192	
0.903	3.33	0.35	n_{2N}	r/min	600	500	375	300	250	200	200	150	150	125	100	100	75	60	37.5	**1FT2203-4AK..-0..0-Z**
...	...	(0.37)	M_{2N}	Nm	1.85	2.4	3.5	4.95	5.9	7.6	6.6	8.9	9.3	11.4	15	14.9	22	27.5	44.5	■■■ + ■■■ + . . .
0.961	3.41		$M_{2,0}$	Nm	2.7	3.65	4.65	6.6	7.6	9.5	8.5	11.4	14.3	15.2	19.1	23.5	30.5	38	61	
			M_{2max}	Nm	10	13.5	16.9	23.5	27	34	30	40.5	50	54	67	84	108	135	192	
1.99	6.47	1.23	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2204-5AF..-0..0-Z**
...	...	(1.31)	M_{2N}	Nm	5.4	7.4	9.4	13.2	15.3	19.2	16.4	22	28	29.5	37.5	47.5	61	76	120	■■■ + ■■■ + . . .
2.04	6.64		$M_{2,0}$	Nm	5.9	8	10	14.2	16.2	20	18.1	24	30	32	40	50	64	81	120	
			M_{2max}	Nm	19.8	26	33	46	53	66	59	78	98	105	131	164	210	260	192	
2	6.47	1.23	n_{2N}	r/min	600	500	375	300	250	200	200	150	125	125	100	75	75	60	37.5	**1FT2204-5AK..-0..0-Z**
...	...	(1.31)	M_{2N}	Nm	5.1	6.2	9.3	12.6	15.2	19.1	16.6	22	27.5	29.5	37.5	47	53	66	107	■■■ + ■■■ + . . .
2.05	6.64		$M_{2,0}$	Nm	6	8	10.1	14.3	16.3	20.5	18.2	24	30.5	32.5	40.5	50	65	81	120	
			M_{2max}	Nm	19.8	26	33	46	53	66	59	78	98	105	131	164	210	260	192	
2.74	8.71	1.61	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2204-6AF..-0..0-Z**
...	...	(1.69)	M_{2N}	Nm	7.7	10.4	13.1	18.5	21	26.5	23	31	39	41.5	52	66	85	106	120	■■■ + ■■■ + . . .
2.8	8.95		$M_{2,0}$	Nm	8.2	11	13.8	19.5	22	27.5	24.5	33	41.5	44	55	69	88	111	120	
			M_{2max}	Nm	26.5	35.5	44.5	62	71	89	79	106	132	141	177	220	280	350	192	
2.99	9.93	3.15	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	**1FT2205-2AC..-0..0-Z**
...	...	(4.05)	M_{2N}	Nm	7.3	10.1	12.8	18.1	20.5	26	23.5	29.5	37.5	39.5	52	60	80	105	120	■■■ + ■■■ + . . .
3.03	10.2		$M_{2,0}$	Nm	8.9	12	15	21	24	30	27	36	45	48	60	75	96	120	120	
			M_{2max}	Nm	30.5	40.5	50	71	81	102	91	121	151	161	200	250	320	368	192	
3.02	9.93	3.15	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2205-2AF..-0..0-Z**
...	...	(4.05)	M_{2N}	Nm	7.1	9.7	12.4	17	20	25.5	21	29.5	37	39	50	63	80	102	120	■■■ + ■■■ + . . .
3.06	10.2		$M_{2,0}$	Nm	9	12.1	15.2	21	24	30.5	27	36.5	45.5	48.5	61	76	97	122	120	
			M_{2max}	Nm	30.5	40.5	50	71	81	102	91	121	151	161	200	250	320	368	192	
2.96	9.93	3.15	n_{2N}	r/min	600	375	375	300	250	200	200	150	125	125	100	75	60	50	37.5	**1FT2205-2AH..-0..0-Z**
...	...	(4.05)	M_{2N}	Nm	5.9	9.3	11	14.2	17.9	22.5	20	26.5	33	34.5	44	56	73	90	114	■■■ + ■■■ + . . .
3	10.2		$M_{2,0}$	Nm	8.8	11.8	14.9	20.5	23.5	30	26.5	35.5	44.5	47.5	59	74	95	119	120	
			M_{2max}	Nm	30.5	40.5	50	71	81	102	91	121	151	161	200	250	320	368	192	
5.14	16.7	5.1	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2205-4AF..-0..0-Z**
...	...	(6)	M_{2N}	Nm	11.9	16.5	21	27	33.5	43	31.5	50	63	65	85	106	134	171	120	■■■ + ■■■ + . . .
5.23	17.2		$M_{2,0}$	Nm	15.5	20.5	26	36.5	41.5	52	46.5	62	78	83	103	129	166	205	120	
			M_{2max}	Nm	51	68	85	120	137	152	153	200	250	270	335	368	416	368	192	
5.15	16.7	7.8	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	**1FT2206-2AC..-0..0-Z**
...	...	(9.4)	M_{2N}	Nm	13.5	18.8	23.5	33	38	48	43	52	68	69	94	103	140	190	120	■■■ + ■■■ + . . .
5.27	17.2		$M_{2,0}$	Nm	15.7	20.5	26	36.5	42	52	47	62	78	83	104	130	167	205	119	
			M_{2max}	Nm	51	68	85	120	137	152	153	200	250	270	335	368	416	368	192	

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Planetary gearbox data																
Gearbox type:			**NRBW120, 1-stage**						**NRBW120, 2-stage**							
1. Order code			**A46**						**A47**							
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
	$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855
	$\varphi_{2,G}$	'	11						13								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRBW120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 1- and 2-stage (continued)																			
5.29 ... 5.39	16.7 ... 17.2	7.8 (9.4)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	**1FT2206-2AF..-0..0-Z**
			M_{2N}	Nm	12.5	16.9	21.5	29	34	43.5	35.5	51	64	67	86	107	136	173	119	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	16	21	26.5	37.5	43	53	48	64	80	85	107	133	171	210	120	
			M_{2max}	Nm	51	68	85	120	137	152	153	200	250	270	335	368	416	368	192	
5.13 ... 5.23	16.7 ... 17.2	7.8 (9.4)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	75	50	50	37.5	**1FT2206-2AH..-0..0-Z**
			M_{2N}	Nm	11.8	16.5	20.5	26.5	33.5	42.5	30.5	50	62	65	84	85	133	129	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.5	20.5	26	36.5	41.5	52	46.5	62	77	83	103	129	166	205	120	
			M_{2max}	Nm	51	68	85	120	137	152	153	200	250	270	335	368	416	368	192	
7.8 ... 7.95	25.1 ... 25.9	11.5 (13.1)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	12.5	**1FT2206-3AB..-0..0-Z**
			M_{2N}	Nm	21	27.5	35.5	50	56	71	56	75	105	111	141	176	220	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	23.5	31.5	39.5	55	63	79	71	94	118	126	157	197	250	230	120	
			M_{2max}	Nm	77	103	129	180	192	152	230	305	368	405	416	368	416	368	192	
7.68 ... 7.82	25.1 ... 25.9	11.5 (13.1)	n_{2N}	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	25	**1FT2206-3AF..-0..0-Z**
			M_{2N}	Nm	15.1	21	27.5	42.5	43	58	54	65	82	81	112	139	171	225	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	23	31	38.5	54	62	78	70	93	116	124	155	193	245	230	120	
			M_{2max}	Nm	77	103	129	180	192	152	230	305	368	405	416	368	416	368	192	
10.6 ... 10.8	35.5 ... 36.5	15.1 (16.8)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	**1FT2206-4AC..-0..0-Z**
			M_{2N}	Nm	20.5	31.5	40	54	65	82	77	80	107	107	160	160	215	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	32	43	54	75	86	95	96	128	160	171	210	230	260	230	120	
			M_{2max}	Nm	109	145	182	216	192	152	325	416	368	416	416	368	416	368	192	
10.4 ... 10.6	33.6 ... 34.6	15.1 (16.8)	n_{2N}	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	25	**1FT2206-4AF..-0..0-Z**
			M_{2N}	Nm	21	29	37.5	58	58	79	73	87	109	107	148	184	225	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31.5	42	52	74	84	95	94	126	158	168	210	230	260	230	120	
			M_{2max}	Nm	103	138	172	216	192	152	305	405	368	416	416	368	416	368	192	
9.93 ... 10.1	33.6 ... 34.6	15.1 (16.8)	n_{2N}	r/min	375	300	250	200	150	150	150	100	75	75	60	50	37.5	37.5	37.5	**1FT2206-4AH..-0..0-Z**
			M_{2N}	Nm	23.5	30	37.5	48	63	65	61	92	120	122	154	185	245	230	113	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30	40	50	70	80	95	90	120	150	160	200	230	260	230	119	
			M_{2max}	Nm	103	138	172	216	192	152	305	405	368	416	416	368	416	368	192	

Planetary gearbox data																
Gearbox type:		**NRBW120, 1-stage**						**NRBW120, 2-stage**								
1. Order code		**A46**						**A47**								
i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code		**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192
$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380
$J_{1,G}$	kg cm²	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855
$\varphi_{2,G}$	'	11						13								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox									Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 3-stage												
0.338 ... 0.407	1.62 ... 1.67	0.093 (0.112)	n_{2N}	r/min	25	25	20	12.5	12.5	10	7.5	6	**1FT2103-2AG..-0.A0-Z**
			M_{2N}	Nm	15.9	17.9	22.5	32	41	51	68	85	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	24	32	40	48	64	80	103	129	
			M_{2max}	Nm	99	131	164	197	260	325	416	368	
0.31 ... 0.379	1.62 ... 1.67	0.093 (0.112)	n_{2N}	r/min	30	25	20	15	12.5	10	7.5	6	**1FT2103-2AH..-0..0-Z**
			M_{2N}	Nm	12.9	17.9	22.5	26.5	40.5	50	67	84	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30	37.5	45	60	75	96	120	
			M_{2max}	Nm	99	131	164	197	260	325	416	368	
0.934 ... 0.992	3.61 ... 3.7	0.139 (0.158)	n_{2N}	r/min	37.5	30	25	20	15	12.5	10	7.5	**1FT2103-4AG..-0.A0-Z**
			M_{2N}	Nm	43.5	59	69	77	128	156	192	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	58	78	98	117	157	196	250	230	
			M_{2max}	Nm	215	285	360	368	416	368	416	368	
0.92 ... 0.978	3.61 ... 3.7	0.139 (0.158)	n_{2N}	r/min	37.5	30	25	20	15	12.5	10	7.5	**1FT2103-4AH..-0..0-Z**
			M_{2N}	Nm	34.5	48	58	66	102	124	157	205	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	58	77	96	116	155	193	245	230	
			M_{2max}	Nm	215	285	360	368	416	368	416	368	
0.948 ... 1.01	3.33 ... 3.41	0.35 (0.43)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	**1FT2104-4AF..-0..0-Z**
			M_{2N}	Nm	51	70	88	103	143	180	230	225	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	59	79	99	119	159	198	250	230	
			M_{2max}	Nm	200	265	330	368	416	368	416	368	
0.941 ... 0.999	3.42 ... 3.5	0.35 (0.43)	n_{2N}	r/min	37.5	30	25	20	15	15	10	10	**1FT2104-4AK..-0..0-Z**
			M_{2N}	Nm	48	66	82	96	137	149	215	188	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	59	79	98	118	158	197	250	230	
			M_{2max}	Nm	205	270	340	368	416	368	416	368	
2.03 ... 2.08	6.84 ... 7.02	0.56 (0.65)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	**1FT2104-5AF..-0..0-Z**
			M_{2N}	Nm	114	154	193	225	260	230	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	122	163	200	230	260	230	260	230	
			M_{2max}	Nm	410	416	416	368	416	368	416	368	
2.02 ... 2.07	6.93 ... 7.12	0.56 (0.65)	n_{2N}	r/min	37.5	30	20	20	15	15	10	10	**1FT2104-5AK..-0..0-Z**
			M_{2N}	Nm	98	129	188	174	260	210	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	122	162	200	230	260	230	260	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
2.75 ... 2.81	9.18 ... 9.44	0.76 (0.84)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	**1FT2104-6AF..-0..0-Z**
			M_{2N}	Nm	157	210	260	230	260	230	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	165	220	260	230	260	230	260	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
4.4 ... 4.51	13.9 ... 14.3	1.71 (2.55)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	**1FT2105-4AF..-0..0-Z**
			M_{2N}	Nm	240	260	260	230	260	230	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	260	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	

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Planetary gearbox data									
Gearbox type:		**NRBW120, 3-stage**							
1. Order code		**A48**							
i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**
2. Order code		**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368
$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	500
$J_{1,G}$	kg cm²	2.681	2.011	2.005	2.663	1.857	1.857	1.855	1.855
$\varphi_{2,G}$	'	15							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRBW120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox									Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 3-stage (continued)												
4.43 ... 4.54	13.9 ... 14.3	1.71 (2.55)	n_{2N}	r/min	30	25	20	20	15	12.5	10	7.5	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	215	255	260	220	260	230	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	260	225	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
7.22 ... 7.41	22.3 ... 23	2.65 (3.5)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	–	**1FT2105-6AF..-0..0-Z**
			M_{2N}	Nm	260	260	260	230	260	230	260	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	260	–	
			M_{2max}	Nm	416	416	416	368	416	368	416	–	
7.66 ... 7.8	24.2 ... 24.9	4.6 (6.3)	n_{2N}	r/min	25	20	15	12.5	10	7.5	–	–	**1FT2106-3AF..-0..0-Z**
			M_{2N}	Nm	260	260	260	230	260	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	–	–	
			M_{2max}	Nm	416	416	416	368	416	368	–	–	
9.97 ... 10.1	30.8 ... 31.7	6 (7.6)	n_{2N}	r/min	25	20	15	12.5	10	–	–	–	**1FT2106-4AF..-0..0-Z**
			M_{2N}	Nm	260	260	260	230	260	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	–	–	–	
			M_{2max}	Nm	416	416	416	368	416	–	–	–	
14.1 ... 14.4	42.5 ... 43.8	8.7 (10.4)	n_{2N}	r/min	25	20	15	–	–	–	–	–	**1FT2106-6AF..-0..0-Z**
			M_{2N}	Nm	260	260	260	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	–	–	–	–	–	
			M_{2max}	Nm	416	416	416	–	–	–	–	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 3-stage												
0.33 ... 0.401	1.52 ... 1.58	0.2 (0.22)	n_{2N}	r/min	30	25	20	15	12.5	10	7.5	7.5	**1FT2203-2AG..-0.A0-Z**
			M_{2N}	Nm	14.5	20.5	26	29.5	45	56	73	74	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	23.5	31.5	39.5	47.5	63	79	101	127	
			M_{2max}	Nm	93	124	155	186	245	310	395	368	
0.297 ... 0.367	1.52 ... 1.58	0.2 (0.22)	n_{2N}	r/min	30	25	20	15	12.5	10	7.5	6	**1FT2203-2AK..-0..0-Z**
			M_{2N}	Nm	12.1	16.3	20.5	25	38	47.5	64	80	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21.5	29	36	43.5	58	72	93	116	
			M_{2max}	Nm	93	124	155	186	245	310	395	368	
0.943 ... 1	3.33 ... 3.41	0.35 (0.37)	n_{2N}	r/min	37.5	30	25	20	15	12.5	10	7.5	**1FT2203-4AG..-0.A0-Z**
			M_{2N}	Nm	48	65	80	92	137	169	210	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	59	79	99	118	158	197	250	230	
			M_{2max}	Nm	200	265	330	368	416	368	416	368	
0.903 ... 0.961	3.33 ... 3.41	0.35 (0.37)	n_{2N}	r/min	37.5	30	25	20	15	12.5	10	7.5	**1FT2203-4AK..-0..0-Z**
			M_{2N}	Nm	39	53	63	73	113	136	170	225	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	57	76	95	114	152	190	240	230	
			M_{2max}	Nm	200	265	330	368	416	368	416	368	
1.99 ... 2.04	6.47 ... 6.64	1.23 (1.31)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	**1FT2204-5AF..-0..0-Z**
			M_{2N}	Nm	111	150	188	220	260	230	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	120	160	200	230	260	230	260	230	
			M_{2max}	Nm	385	416	416	368	416	368	416	368	

➥ Continued on the next page

Planetary gearbox data									
Gearbox type:			**NRBW120, 3-stage**						
1. Order code			**A48**						
	i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**
	$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230
	$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368
	$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	500
	$J_{1,G}$	kg cm²	2.681	2.011	2.005	2.663	1.857	1.857	1.855	1.855
	$\varphi_{2,G}$	'	15							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	M_{maxM} Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox									Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 3-stage (continued)												
2 ... 2.05	6.47 ... 6.64	1.23 (1.31)	n_{2N}	r/min	37.5	30	20	15	15	12.5	10	10	**1FT2204-5AK..-0..0-Z**
			M_{2N}	Nm	95	125	186	220	260	230	260	197	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	121	161	200	230	260	230	260	230	
			M_{2max}	Nm	385	416	416	368	416	368	416	368	
2.74 ... 2.8	8.71 ... 8.95	1.61 (1.69)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	**1FT2204-6AF..-0..0-Z**
			M_{2N}	Nm	156	205	260	230	260	230	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	165	215	260	230	260	230	260	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
2.99 ... 3.03	9.93 ... 10.2	3.15 (4.05)	n_{2N}	r/min	20	12.5	10	10	7.5	5	5	3.75	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	148	205	255	225	260	230	255	225	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	180	240	260	230	260	230	260	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
3.02 ... 3.06	9.93 ... 10.2	3.15 (4.05)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	**1FT2205-2AF..-0..0-Z**
			M_{2N}	Nm	149	198	250	225	260	230	260	225	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	182	240	260	230	255	230	255	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
2.96 ... 3	9.93 ... 10.2	3.15 (4.05)	n_{2N}	r/min	30	25	20	15	15	12.5	10	7.5	**1FT2205-2AH..-0..0-Z**
			M_{2N}	Nm	135	176	220	230	260	225	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	178	235	260	230	260	225	260	225	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
5.14 ... 5.23	16.7 ... 17.2	5.1 (6)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	**1FT2205-4AF..-0..0-Z**
			M_{2N}	Nm	250	260	260	230	260	230	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	260	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
5.15 ... 5.27	16.7 ... 17.2	7.8 (9.4)	n_{2N}	r/min	20	12.5	10	10	7.5	5	5	3.75	**1FT2206-2AC..-0..0-Z**
			M_{2N}	Nm	255	260	260	230	260	230	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	225	255	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
5.29 ... 5.39	16.7 ... 17.2	7.8 (9.4)	n_{2N}	r/min	25	20	15	12.5	10	7.5	6	5	**1FT2206-2AF..-0..0-Z**
			M_{2N}	Nm	250	260	260	225	260	230	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	255	230	255	225	260	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
5.13 ... 5.23	16.7 ... 17.2	7.8 (9.4)	n_{2N}	r/min	30	25	20	20	15	12.5	10	7.5	**1FT2206-2AH..-0..0-Z**
			M_{2N}	Nm	205	240	255	175	260	230	255	225	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	255	255	230	260	230	260	225	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
7.8 ... 7.95	25.1 ... 25.9	11.5 (13.1)	n_{2N}	r/min	12.5	10	7.5	7.5	5	3.75	–	–	**1FT2206-3AB..-0..0-Z**
			M_{2N}	Nm	260	260	260	230	260	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	255	230	–	–	
			M_{2max}	Nm	416	416	416	368	416	368	–	–	

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Planetary gearbox data									
Gearbox type:			**NRBW120, 3-stage**						
1. Order code			**A48**						
	i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**
	$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230
	$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368
	$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	500
	$J_{1,G}$	kg cm²	2.681	2.011	2.005	2.663	1.857	1.857	1.855	1.855
	$\varphi_{2,G}$	'	15							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRBW120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox									Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 3-stage (continued)												
7.68 ... 7.82	25.1 ... 25.9	11.5 (13.1)	n_{2N} r/min	25	20	15	12.5	10	7.5	–	–	**1FT2206-3AF..-0..0-Z**
			M_{2N} Nm	260	260	260	230	260	230	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	260	230	–	–	
			M_{2max} Nm	416	416	416	368	416	368	–	–	
10.6 ... 10.8	35.5 ... 36.5	15.1 (16.8)	n_{2N} r/min	20	12.5	10	10	7.5	–	–	–	**1FT2206-4AC..-0..0-Z**
			M_{2N} Nm	260	260	260	230	260	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	260	–	–	–	
			M_{2max} Nm	416	416	416	368	416	–	–	–	
10.4 ... 10.6	33.6 ... 34.6	15.1 (16.8)	n_{2N} r/min	25	20	15	12.5	10	–	–	–	**1FT2206-4AF..-0..0-Z**
			M_{2N} Nm	260	260	260	230	260	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	260	–	–	–	
			M_{2max} Nm	416	416	416	368	416	–	–	–	
9.93 ... 10.1	33.6 ... 34.6	15.1 (16.8)	n_{2N} r/min	30	25	20	15	15	–	–	–	**1FT2206-4AH..-0..0-Z**
			M_{2N} Nm	250	260	260	230	260	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	260	260	260	230	255	–	–	–	
			M_{2max} Nm	416	416	416	368	416	–	–	–	

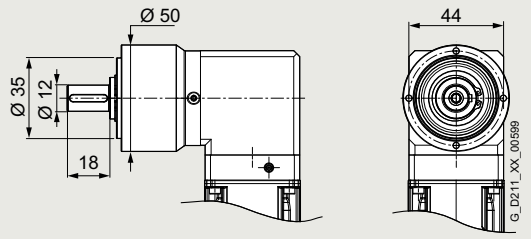
Planetary gearbox data								
Gearbox type:		**NRBW120, 3-stage**						
1. Order code		**A48**						
i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**
2. Order code		**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368
$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	500
$J_{1,G}$	kg cm²	2.681	2.011	2.005	2.663	1.857	1.857	1.855	1.855
$\varphi_{2,G}$	'	15							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRKW050



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	800 N
Average axial force for 20000 h	$F_{A,eq}$	1000 N
Average radial force for 30000 h	$F_{R,eq}$	700 N
Average axial force for 30000 h	$F_{A,eq}$	800 N
Maximum radial force	$F_{R,max}$	1300 N
Maximum axial force	$F_{A,max}$	1000 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW050 1- and 2-stage																					
0.103 ... 0.116	0.501 ... 0.509	0.0245 (0.0285)	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	30	**1FT2102-0AG..-0.A0-Z**
			M_{2N}	Nm	0.152	0.235	0.32	0.435	0.57	0.74	0.57	0.86	1.1	1.15	1.53	1.89	2.45	3.15	4.95	5	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	0.305	0.425	0.54	0.77	0.89	1.12	1	1.35	1.7	1.82	2.25	2.85	3.65	4.6	7.3	5	
			M_{2max}	Nm	1.5	2	2.5	3.55	4.05	5	4.5	6	7.5	8	10.1	12.6	16.1	20	12	8	
0.249 ... 0.261	1.03 ... 1.04	0.036 (0.04)	n_{2N}	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	30	**1FT2102-1AG..-0.A0-Z**
			M_{2N}	Nm	0.52	0.73	0.95	1.28	1.58	2	1.67	2.35	2.95	3.1	4	4.95	6.3	8.1	7.5	5	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	0.74	1.01	1.27	1.79	2.05	2.55	2.3	3.1	3.85	4.1	5.1	6.4	8.3	10.4	7.5	5	
			M_{2max}	Nm	3.05	4.1	5.1	7.2	8.3	8	9.2	12.3	15.4	16.4	20.5	21	24	21	12	8	

Planetary gearbox data																		
Gearbox type:			NRKW050, 1-stage						NRKW050, 2-stage									
1. Order code			B16						B17									
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	4.5	6	7.5	8.5	6	5	12	15	13	15	15	13	15	13	7.5	5
	$M_{2max,G}$	Nm	7	10	12	13.5	10	8	19	24	21	24	24	21	24	21	12	8
	$M_{2Em.Off}$	Nm	22.5	28	35	26	27	25	33	40	36	40	40	36	40	36	27	27
	$J_{1.G}$	kg cm²	0.052	0.04	0.035	0.033	0.033	0.032	0.049	0.048	0.048	0.038	0.034	0.033	0.032	0.032	0.032	0.031
	$\varphi_{2,G}$	'	21						25									

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

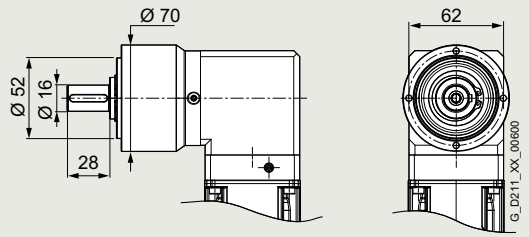
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Gearbox type NRKW070

Selection and ordering data

NRKW070



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1050 N
Average axial force for 20000 h	$F_{A,eq}$	1350 N
Average radial force for 30000 h	$F_{R,eq}$	900 N
Average axial force for 30000 h	$F_{A,eq}$	1000 N
Maximum radial force	$F_{R,max}$	1650 N
Maximum axial force	$F_{A,max}$	2100 N

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW070 1- and 2-stage																					
0.053 ... 0.0911	0.444 ... 0.475	0.0245 (0.0285)	n_{2N}	r/min	–	200	200	200	200	150	150	125	125	125	100	75	60	50	37.5	25	1FT2102-0AG..-0.A0-Z
			M_{2N}	Nm	–	0.112	0.168	0.25	0.28	0.44	0.38	0.53	0.64	0.63	0.88	1.23	1.64	2	2.8	4.35	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	–	0.21	0.305	0.49	0.58	0.77	0.67	0.95	1.23	1.32	1.69	2.15	2.8	3.55	5.7	9.1	
			M_{2max}	Nm	–	1.77	2.25	3.2	3.7	4.65	4.15	5.5	7	7.5	9.4	11.8	15.1	18.9	29	24	
0.189 ... 0.237	0.963 ... 0.998	0.036 (0.04)	n_{2N}	r/min	600	600	500	375	375	300	300	250	200	200	150	125	100	75	50	30	1FT2102-1AG..-0.A0-Z
			M_{2N}	Nm	0.33	0.44	0.62	0.98	1.04	1.4	1.26	1.64	2.25	2.25	3.1	3.8	4.95	6.5	10.2	15	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	0.56	0.8	1.05	1.53	1.77	2.25	2	2.7	3.4	3.65	4.6	5.8	7.5	9.4	15.1	15	
			M_{2max}	Nm	2.85	3.9	4.9	6.9	7.9	9.9	8.8	11.8	14.9	15.8	19.8	24.5	31.5	39.5	29	24	
0.475 ... 0.523	1.78 ... 1.81	0.093 (0.112)	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	30	1FT2103-2AG..-2.A0-Z
			M_{2N}	Nm	0.79	1.17	1.54	2.25	2.4	3.1	2.9	3.7	4.9	4.9	6.6	8.1	10.4	13.7	18	15	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	1.42	1.95	2.45	3.5	4.05	5.1	4.55	6.1	7.7	8.2	10.3	12.9	16.6	20.5	18	15	
			M_{2max}	Nm	5.3	7.1	8.9	12.6	14.4	18	16.1	21.5	26.5	28.5	35.5	44.5	53	48	29	24	
0.461 ... 0.508	1.78 ... 1.81	0.093 (0.112)	n_{2N}	r/min	600	500	500	375	300	250	300	250	200	200	125	100	100	75	50	25	1FT2103-2AH..-2..0-Z
			M_{2N}	Nm	0.91	1.28	1.43	2.15	2.7	3.4	2.8	3.35	4.65	4.35	7	8.9	9.9	13.2	18	14.9	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	1.38	1.89	2.4	3.4	3.95	4.95	4.45	5.9	7.5	8	10	12.6	16.1	20	18	15	
			M_{2max}	Nm	5.3	7.1	8.9	12.6	14.4	18	16.1	21.5	26.5	28.5	35.5	44.5	53	48	29	24	
1.08 ... 1.12	3.79 ... 3.83	0.139 (0.158)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	75	50	30	1FT2103-4AG..-2.A0-Z
			M_{2N}	Nm	2.15	2.9	4.1	5.6	5.7	7.2	6.9	8.9	12.3	12.4	15.1	19.2	25.5	25	18	15	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	3.25	4.35	5.5	7.7	8.9	11.1	10	13.3	16.7	17.8	22	27.5	33	30	18	15	
			M_{2max}	Nm	11.4	15.2	19.1	26.5	29	24	34	45.5	53	53	53	48	53	48	29	24	
0.948 ... 0.989	3.79 ... 3.83	0.139 (0.158)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	50	25	1FT2103-4AH..-2..0-Z
			M_{2N}	Nm	1.92	2.6	3.65	5	5.2	6.4	6.2	8.1	11.1	11.2	13.8	17.4	23	29	18	15	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.8	3.8	4.8	6.8	7.8	9.8	8.8	11.7	14.7	15.7	19.7	24.5	31.5	30	18	15	
			M_{2max}	Nm	11.4	15.2	19.1	26.5	29	24	34	45.5	53	53	53	48	53	48	29	24	
1.1 ... 1.14	3.5 ... 3.54	0.368 (0.448)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2104-4AF..-2..0-Z
			M_{2N}	Nm	2.85	3.95	5	7	8.2	10.4	8.9	12.4	15.7	16.5	21	26	33	30	18	15	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	3.3	4.45	5.6	7.9	9	11.3	10.1	13.5	16.9	18	22.5	28	33	30	18	15	
			M_{2max}	Nm	10.5	14.1	17.6	24.5	28	24	31.5	42	52	53	53	48	53	48	29	24	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:		NRKW070, 1-stage						NRKW070, 2-stage									
1. Order code		B26						B27									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$ Nm	14	19	24	25	18	15	33	33	33	33	33	30	33	30	18	15
	$M_{2max,G}$ Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	29	24
	$M_{2Em.Off}$ Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80
	$J_{1.G}$ kg cm²	0.329	0.23	0.224	0.22	0.219	0.218	0.326	0.326	0.224	0.228	0.223	0.223	0.219	0.219	0.219	0.218
	$\varphi_{2,G}$ '	16						18									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW070 1- and 2-stage (continued)																					
1.1 ... 1.13	3.6 ... 3.64	0.368 (0.448)	n_{2N}	r/min	600	600	500	375	300	250	300	200	200	150	150	100	100	75	50	30	1FT2104-4AK..-2..0-Z
			M_{2N}	Nm	2.95	3.4	4.4	6.3	8	10	7.9	12	12.7	16.2	17.3	25	26	30	18	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.25	4.4	5.5	7.8	9	11.3	10	13.4	16.8	17.9	22.5	28	33	30	18	15	
			M_{2max}	Nm	10.8	14.4	18.1	25	29	24	32	43	53	53	53	48	53	48	29	24	
2.19 ... 2.22	7.07 ... 7.16	0.578 (0.668)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	1FT2104-5AF..-2..0-Z
			M_{2N}	Nm	5.6	7.8	10	13.3	16.1	15	16.8	24.5	30.5	32	33	30	33	30	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.5	8.7	11	15.4	17.6	15	19.7	26	32.5	33	33	30	33	30	18	–	
			M_{2max}	Nm	21	28.5	35.5	40	29	24	53	53	53	53	53	48	53	48	29	–	
2.17 ... 2.2	7.16 ... 7.26	0.578 (0.668)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	125	100	75	50	–	1FT2104-5AK..-2..0-Z
			M_{2N}	Nm	4.75	6.2	8.6	11.5	11.7	14.5	13.8	17.5	24	24	29	26.5	32.5	30	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.5	8.7	10.9	15.3	17.5	15	19.6	26	32.5	33	33	30	33	30	18	–	
			M_{2max}	Nm	21.5	28.5	36	40	29	24	53	53	53	53	53	48	53	48	29	–	
2.92 ... 2.95	9.45 ... 9.57	0.778 (0.858)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	1FT2104-6AF..-2..0-Z
			M_{2N}	Nm	6.7	9.4	12	15.9	18	15	19.7	29	33	33	33	30	33	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.7	11.7	14.6	20.5	18	15	26	33	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	–	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW070 1- and 2-stage																					
0.486 ... 0.529	1.68 ... 1.71	0.2 (0.22)	n_{2N}	r/min	600	600	500	375	300	250	300	200	200	200	150	125	100	75	50	30	1FT2203-2AG..-2.A0-Z
			M_{2N}	Nm	1.01	1.19	1.56	2.25	2.9	3.6	2.9	4.45	4.8	4.65	6.5	7.9	10	13.6	18	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.45	1.99	2.5	3.6	4.1	5.2	4.6	6.2	7.8	8.3	10.4	13.1	16.8	21	18	15	
			M_{2max}	Nm	5	6.7	8.4	11.9	13.6	17.1	15.2	20	25	27	33.5	42.5	53	48	29	24	
0.452 ... 0.495	1.68 ... 1.71	0.2 (0.22)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	50	30	1FT2203-2AK..-2..0-Z
			M_{2N}	Nm	0.8	1.12	1.6	2.2	2.25	2.8	2.7	3.55	4.95	4.95	6.1	7.7	10.4	13.1	14.6	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.35	1.85	2.35	3.35	3.85	4.85	4.3	5.8	7.3	7.8	9.8	12.3	15.7	19.7	18	15	
			M_{2max}	Nm	5	6.7	8.4	11.9	13.6	17.1	15.2	20	25	27	33.5	42.5	53	48	29	24	
1.1 ... 1.13	3.5 ... 3.54	0.35 (0.37)	n_{2N}	r/min	600	500	500	375	300	250	300	200	200	150	125	100	100	75	50	30	1FT2203-4AG..-2.A0-Z
			M_{2N}	Nm	2.8	3.75	3.9	5.7	7.4	9.2	7.1	11.2	11.4	15.2	18.9	23.5	23	30	18	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.25	4.4	5.5	7.8	9	11.3	10	13.4	16.8	18	22.5	28	33	30	18	15	
			M_{2max}	Nm	10.5	14.1	17.6	24.5	28	24	31.5	42	52	53	53	48	53	48	29	24	
1.06 ... 1.09	3.5 ... 3.54	0.35 (0.37)	n_{2N}	r/min	600	500	375	300	250	200	250	200	150	150	125	100	75	60	50	30	1FT2203-4AK..-2..0-Z
			M_{2N}	Nm	2.05	2.75	3.95	5.3	6.5	8.3	6.5	8.2	11.7	11.5	13.9	17.7	24	29.5	18	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.15	4.25	5.3	7.6	8.7	10.9	9.7	13	16.3	17.3	21.5	27	33	30	18	15	
			M_{2max}	Nm	10.5	14.1	17.6	24.5	28	24	31.5	42	52	53	53	48	53	48	29	24	
2.15 ... 2.18	6.69 ... 6.77	1.248 (1.328)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	1FT2204-5AF..-2..0-Z
			M_{2N}	Nm	5.3	7.5	9.6	12.7	15.4	15	16	23	29	30.5	33	30	33	30	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.4	8.6	10.8	15.1	17.3	15	19.3	25.5	32	33	33	30	33	30	18	–	
			M_{2max}	Nm	20	27	33.5	40	29	24	53	53	53	53	53	48	53	48	29	–	
2.16 ... 2.19	6.69 ... 6.77	1.248 (1.328)	n_{2N}	r/min	600	500	375	300	250	250	250	150	150	125	100	100	100	75	50	–	1FT2204-5AK..-2..0-Z
			M_{2N}	Nm	4.65	6	8.4	11.1	13.5	13.4	13.1	21.5	23	27	33	30	26.5	30	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.4	8.6	10.8	15.2	17.4	15	19.5	26	32.5	33	33	30	33	30	18	–	
			M_{2max}	Nm	20	27	33.5	40	29	24	53	53	53	53	53	48	53	48	29	–	

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Planetary gearbox data																	
Gearbox type:		NRKW070, 1-stage						NRKW070, 2-stage									
1. Order code		B26						B27									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	14	19	24	25	18	15	33	33	33	33	33	30	33	30	18	15
$M_{2max,G}$	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	29	24
$M_{2Em.Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm²	0.329	0.23	0.224	0.22	0.219	0.218	0.326	0.326	0.224	0.228	0.223	0.223	0.219	0.219	0.219	0.218
$\varphi_{2,G}$	'	16						18									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRKW070

Servomotor data

$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)
Nm	Nm	kg cm²
2.91 ... 2.93	8.98 ... 9.09	1.628 (1.708)

Selection data servomotors with planetary gearbox

Servomotors with planetary gearbox

SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW070 1- and 2-stage (continued)

n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	–	–	**1FT2204-6AF..-2..0-Z**
M_{2N}	Nm	7	9.8	12.6	16.4	18	15	20	30.5	33	33	33	30	33	30	–	–	■■■ + ■■■ + . . .
$M_{2,0}$	Nm	8.7	11.6	14.6	20.5	18	15	26	33	33	33	33	30	33	30	–	–	
M_{2max}	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	–	–	

Planetary gearbox data

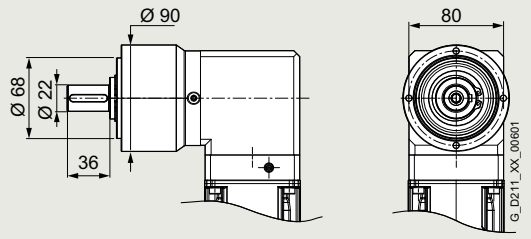
Gearbox type:		NRKW070, 1-stage						NRKW070, 2-stage									
1. Order code		B26						B27									
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	14	19	24	25	18	15	33	33	33	33	33	30	33	30	18	15
$M_{2max,G}$	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	29	24
$M_{2Em.Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm²	0.329	0.23	0.224	0.22	0.219	0.218	0.326	0.326	0.224	0.228	0.223	0.223	0.219	0.219	0.219	0.218
$\varphi_{2,G}$	'	16						18									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRKW090



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1900 N
Average axial force for 20000 h	$F_{A,eq}$	2000 N
Average radial force for 30000 h	$F_{R,eq}$	1700 N
Average axial force for 30000 h	$F_{A,eq}$	1500 N
Maximum radial force	$F_{R,max}$	3100 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW090 1- and 2-stage																					
0.407 ... 0.476	1.69 ... 1.74	0.093 (0.112)	n_{2N}	r/min	500	375	375	300	300	250	250	200	150	150	125	100	75	60	37.5	25	1FT2103-2AG..-0.A0-Z
			M_{2N}	Nm	0.67	1.07	1.26	1.82	1.89	2.4	2.2	2.85	4	4.1	5.2	6.6	9.2	11.6	18.8	28.5	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	1.22	1.7	2.15	3.15	3.6	4.6	4.05	5.5	6.9	7.4	9.3	11.7	15	18.9	30	38	
			M_{2max}	Nm	5	6.8	8.5	12.1	13.8	17.4	15.5	20.5	25.5	27.5	34.5	43	55	69	80	61	
0.379 ... 0.449	1.69 ... 1.74	0.093 (0.112)	n_{2N}	r/min	500	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	25	1FT2103-2AH..-0..0-Z
			M_{2N}	Nm	0.66	0.79	1.24	1.8	1.85	2.3	2.15	2.85	3.95	4.05	5.1	6.5	9	11.4	18.5	28	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	1.13	1.59	2.05	2.95	3.4	4.3	3.85	5.2	6.5	7	8.8	11	14.2	17.8	28.5	38	
			M_{2max}	Nm	5	6.8	8.5	12.1	13.8	17.4	15.5	20.5	25.5	27.5	34.5	43	55	69	80	61	
1 ... 1.06	3.72 ... 3.77	0.139 (0.158)	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	75	75	50	37.5	30	1FT2103-4AG..-0.A0-Z
			M_{2N}	Nm	2.25	3.35	3.65	6	6.2	8	7.7	10.5	13	13.2	17	22	23	35	47	38	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	3	4.05	5.1	7.3	8.4	10.5	9.4	12.6	15.7	16.8	21	26	33.5	42	50	38	
			M_{2max}	Nm	11.1	14.9	18.7	26	30	37.5	33.5	44.5	55	59	74	93	119	131	80	61	
0.938 ... 1	3.72 ... 3.77	0.139 (0.158)	n_{2N}	r/min	500	375	375	300	250	200	200	150	150	125	100	100	75	60	37.5	25	1FT2103-4AH..-0..0-Z
			M_{2N}	Nm	1.97	2.8	3.2	4.35	5.5	7.1	6.5	8.8	9.4	11.4	14.6	14.5	20.5	26	42	38	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.8	3.8	4.8	6.8	7.8	9.9	8.8	11.8	14.9	15.9	19.9	24.5	31.5	39.5	50	38	
			M_{2max}	Nm	11.1	14.9	18.7	26	30	37.5	33.5	44.5	55	59	74	93	119	131	80	61	
1.02 ... 1.07	3.43 ... 3.48	0.35 (0.43)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2104-4AF..-2..0-Z
			M_{2N}	Nm	2.55	3.6	4.65	6.5	7.7	9.9	8.2	11.7	14.8	15.6	20	25	31.5	40.5	50	38	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	3.05	4.1	5.2	7.4	8.5	10.7	9.5	12.7	16	17	21	26.5	34	42.5	50	38	
			M_{2max}	Nm	10.3	13.7	17.2	24	27.5	34.5	31	41	51	55	68	86	110	131	80	61	
1.01 ... 1.07	3.53 ... 3.57	0.35 (0.43)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	30	1FT2104-4AK..-2..0-Z
			M_{2N}	Nm	2.6	3.45	4.75	6.6	6.9	8.5	8.2	10.6	14.1	14.7	18.2	23	30.5	38	50	38	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	3	4.1	5.2	7.3	8.4	10.6	9.4	12.6	15.8	16.9	21	26.5	34	42.5	50	38	
			M_{2max}	Nm	10.5	14.1	17.7	24.5	28.5	35.5	31.5	42.5	53	56	70	88	113	131	80	61	
2.1 ... 2.15	7 ... 7.09	0.56 (0.65)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2104-5AF..-2..0-Z
			M_{2N}	Nm	5.5	7.8	10	13.4	16.2	20.5	17	24.5	30.5	32	41	51	65	82	50	38	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	6.3	8.4	10.6	14.9	17.1	21	19.1	25.5	32	34	42.5	53	68	82	50	38	
			M_{2max}	Nm	21	28	35	49.5	56	61	63	84	105	112	140	131	144	131	80	61	

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Planetary gearbox data																	
Gearbox type:			NRKW090, 1-stage						NRKW090, 2-stage								
1. Order code			B36						B37								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	40	53	67	65	50	38	97	90	82	90	90	82	90	82	50	38
	$M_{2max,G}$	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	170
	$J_{1.G}$	kg cm²	1.408	1.107	1.026	0.96	0.944	0.925	1.245	1.22	1.211	1.002	0.96	0.956	0.918	0.917	0.917	0.907
	$\varphi_{2,G}$	'	13						15									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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SIMOTICS S servomotors

Economy angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRKW090

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW090 1- and 2-stage (continued)																				
2.08 ... 2.13	7.09 ... 7.19	0.56 (0.65)	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	30	1FT2104-5AK..-2..0-Z
			M_{2N}	Nm	5.4	7.7	8.3	13.2	13.6	17.5	16.7	22.5	27.5	27.5	35.5	47	60	72	46	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.2	8.4	10.5	14.8	17	21	19	25	31.5	33.5	42	52	67	82	50	38	
			M_{2max}	Nm	21	28.5	35.5	50	57	61	64	85	106	113	142	131	144	131	80	61	
2.84 ... 2.88	9.37 ... 9.5	0.76 (0.84)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2104-6AF..-2..0-Z
			M_{2N}	Nm	6.7	9.5	12.3	16.1	20	26	20	31	39	40	52	65	82	82	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34	42.5	45.5	57	71	90	82	50	38	
			M_{2max}	Nm	28	37.5	47	66	76	61	84	112	131	144	144	131	144	131	80	61	
4.52 ... 4.57	14.1 ... 14.3	1.71 (2.55)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25		1FT2105-4AF..-0..0-Z
			M_{2N}	Nm	10.6	15	19.4	24	30.5	38	29.5	47	59	60	79	82	90	82	50		■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.6	18.1	22.5	31.5	36.5	38	40.5	54	67	72	90	82	90	82	50	–	
			M_{2max}	Nm	42.5	57	71	100	80	61	127	144	131	144	144	131	144	131	80	–	
4.56 ... 4.61	14.1 ... 14.3	1.71 (2.55)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	75	60	60	37.5	–	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	9.6	13.7	17.9	22	28	37.5	26.5	44	55	55	74	72	89	72	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.7	18.3	22.5	32	36.5	38	41	54	68	73	90	82	90	82	50	–	
			M_{2max}	Nm	42.5	57	71	100	80	61	127	144	131	144	144	131	144	131	80	–	
7.31 ... 7.38	22.7 ... 23	2.65 (3.5)	n_{2N}	r/min	375	375	300	200	200	150	150	125	100	100	75	60	50	37.5	–	–	1FT2105-6AF..-0..0-Z
			M_{2N}	Nm	17.7	18.7	24	37.5	37.5	38	48	58	72	72	90	82	90	82	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22	29	36.5	51	50	38	66	87	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	–	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW090 1- and 2-stage																				
0.401 ... 0.47	1.59 ... 1.64	0.2 (0.22)	n_{2N}	r/min	500	375	375	300	250	200	200	150	125	125	100	75	75	60	37.5	25	1FT2203-2AG..-0.A0-Z
			M_{2N}	Nm	0.77	1.22	1.38	1.95	2.45	3.2	2.95	4.1	5.1	5.2	6.8	9.1	9.7	12.2	19.8	30	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.2	1.68	2.15	3.1	3.55	4.55	4	5.4	6.8	7.3	9.2	11.5	14.9	18.6	30	38	
			M_{2max}	Nm	4.75	6.4	8.1	11.4	13.1	16.4	14.6	19.5	24.5	26	32.5	40.5	52	65	80	61	
0.366 ... 0.436	1.59 ... 1.64	0.2 (0.22)	n_{2N}	r/min	375	375	300	250	200	200	200	150	125	125	100	75	60	50	30	20	1FT2203-2AK..-0..0-Z
			M_{2N}	Nm	0.82	0.99	1.39	1.9	2.4	2.55	2.4	3.35	4.15	4.2	5.5	7.5	9.7	11.8	19.9	30	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.09	1.54	1.98	2.85	3.3	4.2	3.7	5	6.3	6.8	8.5	10.7	13.8	17.3	27.5	38	
			M_{2max}	Nm	4.75	6.4	8.1	11.4	13.1	16.4	14.6	19.5	24.5	26	32.5	40.5	52	65	80	61	
1.01 ... 1.07	3.43 ... 3.48	0.35 (0.37)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	30	1FT2203-4AG..-0.A0-Z
			M_{2N}	Nm	2.4	3.15	4.55	6.3	6.2	7.6	7.7	9.7	13.3	13.6	16.7	21	28.5	36	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3	4.1	5.2	7.3	8.4	10.6	9.4	12.7	15.9	16.9	21	26.5	34	42.5	50	38	
			M_{2max}	Nm	10.3	13.7	17.2	24	27.5	34.5	31	41	51	55	68	86	110	131	80	61	
0.974 ... 1.03	3.43 ... 3.48	0.35 (0.37)	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	75	75	60	37.5	30	1FT2203-4AK..-0..0-Z
			M_{2N}	Nm	2.2	3.15	3.55	5.6	6	7.7	7.1	9.7	12	12.5	15.9	20.5	21.5	27	44.5	33.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.9	3.95	5	7.1	8.1	10.2	9.1	12.2	15.3	16.3	20	25.5	32.5	41	50	38	
			M_{2max}	Nm	10.3	13.7	17.2	24	27.5	34.5	31	41	51	55	68	86	110	131	80	61	
2.06 ... 2.11	6.62 ... 6.71	1.23 (1.31)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2204-5AF..-2..0-Z
			M_{2N}	Nm	5.2	7.4	9.5	12.8	15.3	19.6	16.2	23	29	30.5	39	49	62	78	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.1	8.3	10.4	14.6	16.8	21	18.7	25	31	33	41.5	52	67	82	50	38	
			M_{2max}	Nm	20	26.5	33	46.5	53	61	59	79	99	106	132	131	144	131	80	61	

➥ Continued on the next page

Planetary gearbox data																
Gearbox type:		NRKW090, 1-stage						NRKW090, 2-stage								
1. Order code		B36						B37								
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	40	53	67	65	50	38	97	90	82	90	90	82	90	82	50	38
$M_{2max,G}$	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	80	61
$M_{2Em.Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	170
$J_{1,G}$	kg cm²	1.408	1.107	1.026	0.96	0.944	0.925	1.245	1.22	1.211	1.002	0.96	0.956	0.918	0.917	0.917	0.907
$\varphi_{2,G}$	'	13						15									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW090 1- and 2-stage (continued)																				
2.07 ... 2.12	6.62 ... 6.71	1.23 (1.31)	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	30	1FT2204-5AK..-2..0-Z
			M_{2N}	Nm	5.4	7.7	8.1	13.1	13.2	17.1	16.5	22	27	27	34.5	46.5	59	71	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.2	8.3	10.4	14.7	16.9	21	18.9	25	31.5	33.5	42	52	67	82	50	38	
			M_{2max}	Nm	20	26.5	33	46.5	53	61	59	79	99	106	132	131	144	131	80	61	
2.82 ... 2.87	8.9 ... 9.02	1.61 (1.69)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2204-6AF..-2..0-Z
			M_{2N}	Nm	7	10	13	16.8	21	27.5	21	32.5	41	42	55	68	86	82	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.4	11.3	14.2	20	22.5	28.5	25.5	34	42.5	45	56	71	90	82	50	38	
			M_{2max}	Nm	27	36	45	63	72	61	80	107	131	142	144	131	144	131	80	61	
2.85 ... 2.9	10.1 ... 10.3	3.15 (4.05)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	–	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	7	9.8	12.3	17.3	20	25	22.5	28.5	36.5	38.5	50	58	77	82	49.5	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34.5	43	46	57	72	90	82	49.5	–	
			M_{2max}	Nm	30.5	41	51	71	80	61	91	122	131	144	144	131	144	131	80	–	
2.89 ... 2.94	10.1 ... 10.3	3.15 (4.05)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	–	1FT2205-2AF..-0..0-Z
			M_{2N}	Nm	7	9.6	12.1	16.6	19.6	24.5	21	29.5	37	39	49.5	62	78	82	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.6	11.6	14.5	20.5	23	29	26	35	43.5	46.5	58	73	90	82	50	–	
			M_{2max}	Nm	30.5	41	51	71	80	61	91	122	131	144	144	131	144	131	80	–	
2.85 ... 2.9	10.1 ... 10.3	3.15 (4.05)	n_{2N}	r/min	500	375	300	250	200	200	200	150	125	100	100	75	60	50	37.5	–	1FT2205-2AH..-0..0-Z
			M_{2N}	Nm	6.4	9.1	11.7	15.1	18.8	18.8	18.8	25.5	30.5	37.5	38	52	66	78	49.5	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34.5	43	46	57	72	90	82	49.5	–	
			M_{2max}	Nm	30.5	41	51	71	80	61	91	122	131	144	144	131	144	131	80	–	
4.98 ... 5.02	17 ... 17.2	5.1 (6)	n_{2N}	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	25	–	1FT2205-4AF..-0..0-Z
			M_{2N}	Nm	9.3	13.4	17.4	27	27.5	37	35	43	54	54	72	82	90	82	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.9	19.9	25	35	40	38	44.5	59	74	79	90	82	90	82	50	–	
			M_{2max}	Nm	51	68	86	104	80	61	153	144	131	144	144	131	144	131	80	–	

Planetary gearbox data																	
Gearbox type:			NRKW090, 1-stage						NRKW090, 2-stage								
1. Order code			B36						B37								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	40	53	67	65	50	38	97	90	82	90	90	82	90	82	50	38
	$M_{2max,G}$	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	170
	$J_{1,G}$	kg cm²	1.408	1.107	1.026	0.96	0.944	0.925	1.245	1.22	1.211	1.002	0.96	0.956	0.918	0.917	0.917	0.907
	$\varphi_{2,G}$	'	13						15									

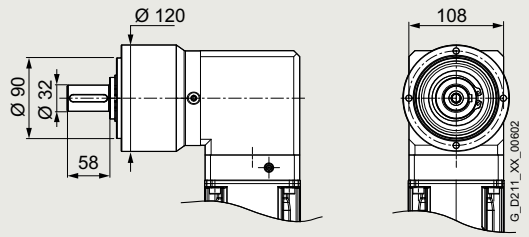
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRKW120

Selection and ordering data

NRKW120



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	2500 N
Average axial force for 20000 h	$F_{A,eq}$	4000 N
Average radial force for 30000 h	$F_{R,eq}$	2150 N
Average axial force for 30000 h	$F_{A,eq}$	3000 N
Maximum radial force	$F_{R,max}$	4000 N
Maximum axial force	$F_{A,max}$	5900 N

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW120 1- and 2-stage																					
0.277 ... 0.406	1.56 ... 1.67	0.093 (0.112)	n_{2N}	r/min	250	250	200	200	200	150	150	125	100	100	75	60	60	50	30	20	**1FT2103-2AG..-0.A0-Z**
			M_{2N}	Nm	0.495	0.7	1.11	1.45	1.53	2.3	1.9	2.45	3.25	3.3	5	6.4	7	8.5	14.7	22.5	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	0.83	1.24	1.66	2.45	2.9	3.7	3.3	4.5	5.7	6.1	7.8	9.8	12.7	16	25.5	40.5	
			M_{2max}	Nm	4.65	6.3	8	11.4	13.1	16.5	14.7	19.7	24.5	26	33	41	53	66	106	152	
0.249 ... 0.379	1.56 ... 1.67	0.093 (0.112)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	60	50	30	20	**1FT2103-2AH..-0..0-Z**
			M_{2N}	Nm	0.38	0.68	0.88	1.44	1.54	2.25	1.88	2.4	3.2	3.3	4.9	6.3	7	8.5	14.7	22.5	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	0.74	1.13	1.52	2.3	2.65	3.45	3.05	4.2	5.3	5.7	7.2	9.1	11.8	14.9	24	37.5	
			M_{2max}	Nm	4.65	6.3	8	11.4	13.1	16.5	14.7	19.7	24.5	26	33	41	53	66	106	152	
0.874 ... 0.992	3.59 ... 3.68	0.139 (0.158)	n_{2N}	r/min	375	375	300	250	200	200	200	150	125	125	100	75	60	50	30	20	**1FT2103-4AG..-0.A0-Z**
			M_{2N}	Nm	2.15	2.65	3.8	5.2	6.6	6.8	6.4	9	11	10.8	14.8	20	26.5	32.5	54	83	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.6	3.6	4.6	6.6	7.6	9.6	8.6	11.5	14.5	15.5	19.5	24.5	31.5	39	63	95	
			M_{2max}	Nm	10.7	14.4	18.2	25.5	29	36.5	32.5	43.5	54	58	73	91	117	146	192	152	
0.86 ... 0.978	3.59 ... 3.68	0.139 (0.158)	n_{2N}	r/min	375	375	300	250	250	200	200	150	125	125	100	75	60	50	30	20	**1FT2103-4AH..-0..0-Z**
			M_{2N}	Nm	1.7	2.15	3	4.25	4.25	5.9	5.2	7.3	9.1	9.4	12.4	16.3	21.5	26	43.5	67	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.55	3.55	4.55	6.5	7.5	9.5	8.4	11.4	14.3	15.3	19.2	24	31	38.5	62	95	
			M_{2max}	Nm	10.7	14.4	18.2	25.5	29	36.5	32.5	43.5	54	58	73	91	117	146	192	152	
0.888 ... 1.01	3.3 ... 3.39	0.35 (0.43)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	**1FT2104-4AF..-0..0-Z**
			M_{2N}	Nm	1.89	2.85	3.9	5.5	6.7	8.8	6.8	10.1	12.8	13.6	17.6	22	28.5	36	57	91	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.65	3.65	4.7	6.7	7.7	9.8	8.7	11.7	14.7	15.7	19.8	24.5	31.5	39.5	64	95	
			M_{2max}	Nm	9.9	13.3	16.7	23.5	27	33.5	30	40	50	53	67	84	107	134	192	152	
0.881 ... 0.998	3.4 ... 3.49	0.35 (0.43)	n_{2N}	r/min	500	375	375	300	250	200	200	150	150	125	100	100	75	60	37.5	25	**1FT2104-4AK..-0..0-Z**
			M_{2N}	Nm	2.05	3	3.85	5.4	6.6	8.5	7.2	9.8	11	13.2	17	17.1	26.5	33.5	54	84	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.6	3.65	4.65	6.7	7.7	9.7	8.6	11.6	14.6	15.6	19.6	24.5	31.5	39.5	63	95	
			M_{2max}	Nm	10.2	13.7	17.2	24	27.5	34.5	31	41	51	55	69	86	110	138	192	152	
1.97 ... 2.07	6.93 ... 7.01	0.56 (0.65)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	**1FT2104-5AF..-0..0-Z**
			M_{2N}	Nm	4.6	7.1	9.4	12.8	15.4	19.5	15.7	22.5	28.5	30.5	38.5	48.5	62	78	120	95	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	5.9	8	10.1	14.3	16.4	20.5	18.3	24.5	30.5	32.5	41	51	65	82	120	95	
			M_{2max}	Nm	20.5	27.5	34.5	48.5	55	70	62	83	104	111	138	173	220	275	192	152	

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Planetary gearbox data																	
Gearbox type:			NRKW120, 1-stage						NRKW120, 2-stage								
1. Order code			B46						B47								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
	$J_{1.G}$	kg cm²	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818
	$\varphi_{2,G}$	'	11						13									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW120 1- and 2-stage (continued)																				
1.96 ... 2.05	7.03 ... 7.1	0.56 (0.65)	n_{2N}	r/min	500	375	300	250	250	200	200	150	125	100	100	75	60	50	30	25	1FT2104-5AK..-0..0-Z
			M_{2N}	Nm	4.5	7	9.3	12.6	12.4	16.4	15.4	21	25.5	30	34	46.5	60	72	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.8	7.9	10	14.2	16.2	20	18.2	24	30.5	32.5	40.5	51	65	81	120	95	
			M_{2max}	Nm	21	28	35	49.5	56	71	63	84	105	112	140	175	225	275	192	152	
2.71 ... 2.8	9.3 ... 9.42	0.76 (0.84)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2104-6AF..-0..0-Z
			M_{2N}	Nm	5.7	8.8	12	15.6	20	26.5	19	31.5	39.5	40.5	53	66	85	107	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.1	10.9	13.7	19.4	22	27.5	24.5	33	41.5	44	55	69	89	111	120	95	
			M_{2max}	Nm	28	37	46.5	65	75	94	83	111	139	149	186	230	295	275	192	152	
4.41 ... 4.49	14.1 ... 14.2	1.71 (2.55)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2105-4AF..-0..0-Z
			M_{2N}	Nm	9.5	14.4	19.4	24	31	40	28.5	47	59	61	79	100	126	161	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.2	17.7	22	31	35.5	44.5	40	53	66	71	89	111	142	172	120	95	
			M_{2max}	Nm	42.5	56	71	99	113	142	127	169	210	225	280	275	312	275	192	152	
4.44 ... 4.52	14.1 ... 14.2	1.71 (2.55)	n_{2N}	r/min	375	375	300	250	200	150	150	125	100	100	75	60	50	37.5	37.5	25	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	11.6	13.1	17.9	21.5	29	38.5	34.5	45	56	58	76	95	120	154	110	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.3	17.8	22	31.5	36	45	40	53	67	71	89	112	143	172	120	95	
			M_{2max}	Nm	42.5	56	71	99	113	142	127	169	210	225	280	275	312	275	192	152	
7.32 ... 7.39	22.6 ... 22.9	2.65 (3.5)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2105-6AF..-0..0-Z
			M_{2N}	Nm	18	24	30	40	40	55	51	62	78	77	107	133	163	172	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21.5	29	36.5	51	59	73	65	87	109	117	146	172	195	172	120	95	
			M_{2max}	Nm	68	91	114	160	183	152	200	270	275	312	312	275	312	275	192	152	
7.64 ... 7.72	24.5 ... 24.8	4.6 (6.3)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	–	1FT2106-3AF..-0..0-Z
			M_{2N}	Nm	18.7	24.5	31	41.5	41.5	57	53	64	81	80	111	139	169	172	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30.5	38	53	61	77	69	92	115	122	153	172	195	172	120	–	
			M_{2max}	Nm	74	99	124	173	192	152	220	295	275	312	312	275	312	275	192	–	
9.94 ... 10	31.1 ... 31.6	6 (7.6)	n_{2N}	r/min	375	300	250	200	150	150	150	100	100	75	60	60	50	37.5	25	–	1FT2106-4AF..-0..0-Z
			M_{2N}	Nm	23	30	37.5	49	64	67	62	94	92	125	158	157	189	172	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29.5	39.5	50	70	80	95	89	119	149	159	195	172	195	172	120	–	
			M_{2max}	Nm	94	126	157	216	192	152	251	312	275	312	312	275	312	275	192	–	
14.1 ... 14.2	43 ... 43.7	8.7 (10.4)	n_{2N}	r/min	375	300	250	200	150	150	125	100	75	75	60	60	50	37.5	–	–	1FT2106-6AF..-0..0-Z
			M_{2N}	Nm	28.5	37	46	58	80	80	90	114	151	152	190	172	195	172	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	42.5	56	71	99	113	95	127	169	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	–	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW120 1- and 2-stage																				
0.271 ... 0.4	1.46 ... 1.57	0.2 (0.22)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	75	60	50	30	20	1FT2203-2AG..-0.A0-Z
			M_{2N}	Nm	0.365	0.69	1.05	1.7	1.84	2.65	2.1	2.85	3.75	3.95	5.4	5.8	8	9.6	16.8	25.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	0.81	1.22	1.63	2.45	2.85	3.65	3.2	4.45	5.6	6	7.6	9.6	12.5	15.7	25	39.5	
			M_{2max}	Nm	4.35	5.9	7.5	10.7	12.3	15.5	13.8	18.5	23	24.5	31	39	50	62	100	152	
0.236 ... 0.366	1.46 ... 1.57	0.2 (0.22)	n_{2N}	r/min	300	250	250	200	150	150	150	125	100	100	75	60	50	37.5	25	15	1FT2203-2AK..-0..0-Z
			M_{2N}	Nm	0.34	0.63	0.87	1.39	1.89	2.15	1.87	2.3	3.1	3.1	4.8	6.2	8	10.8	16.8	27.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	0.7	1.08	1.46	2.2	2.55	3.3	2.9	4.05	5.1	5.5	7	8.8	11.4	14.4	23	36.5	
			M_{2max}	Nm	4.35	5.9	7.5	10.7	12.3	15.5	13.8	18.5	23	24.5	31	39	50	62	100	152	

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Planetary gearbox data																	
Gearbox type:			NRKW120, 1-stage						NRKW120, 2-stage								
1. Order code			B46						B47								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
	$J_{1,G}$	kg cm²	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818
	$\varphi_{2,G}$	'	11						13									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRKW120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW120 1- and 2-stageg (continued)																				
0.883 ... 1	3.3 ... 3.39	0.35 (0.37)	n_{2N}	r/min	500	375	375	300	250	200	200	150	125	125	100	75	75	60	37.5	25	1FT2203-4AG..-0.A0-Z
			M_{2N}	Nm	2.05	3	3.65	5	6.4	8.3	7.2	9.8	12.4	13.1	16.9	21.5	25	31.5	51	78	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.6	3.65	4.65	6.7	7.7	9.7	8.6	11.6	14.7	15.7	19.7	24.5	31.5	39.5	63	95	
			M_{2max}	Nm	9.9	13.3	16.7	23.5	27	33.5	30	40	50	53	67	84	107	134	192	152	
0.843 ... 0.961	3.3 ... 3.39	0.35 (0.37)	n_{2N}	r/min	375	375	300	250	200	200	200	150	125	125	100	75	60	50	30	20	1FT2203-4AK..-0..0-Z
			M_{2N}	Nm	2	2.5	3.5	4.85	6	6.7	6	8.3	10.3	10.6	13.9	18.4	24	29.5	49	75	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.5	3.5	4.45	6.4	7.4	9.3	8.3	11.2	14.1	15	18.9	23.5	30.5	38	61	95	
			M_{2max}	Nm	9.9	13.3	16.7	23.5	27	33.5	30	40	50	53	67	84	107	134	192	152	
1.93 ... 2.03	6.55 ... 6.62	1.23 (1.31)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2204-5AF..-0..0-Z
			M_{2N}	Nm	4.35	6.8	9	12.2	14.9	19	14.9	22	28	29.5	37.5	47	61	76	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.7	7.8	9.9	14	16	20	17.9	24	30	32	40	50	64	80	120	95	
			M_{2max}	Nm	19.6	26	32.5	46	52	66	59	78	98	104	131	163	205	260	192	152	
1.94 ... 2.04	6.55 ... 6.62	1.23 (1.31)	n_{2N}	r/min	500	375	300	250	200	200	200	150	125	100	100	75	60	50	30	25	1FT2204-5AK..-0..0-Z
			M_{2N}	Nm	4.5	7	9.2	12.5	15.1	16	15.3	21	25.5	30	33	46	59	71	119	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.8	7.9	9.9	14.1	16.1	20	18.1	24	30	32	40.5	50	65	81	120	95	
			M_{2max}	Nm	19.6	26	32.5	46	52	66	59	78	98	104	131	163	205	260	192	152	
2.69 ... 2.78	8.83 ... 8.94	1.61 (1.69)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2204-6AF..-0..0-Z
			M_{2N}	Nm	6.1	9.4	12.9	16.5	21	26.5	19.9	31	39	41.5	52	66	84	106	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8	10.8	13.7	19.3	22	27.5	24.5	33	41	44	55	69	88	110	120	95	
			M_{2max}	Nm	26.5	35.5	44.5	62	71	89	79	106	132	141	176	220	280	275	192	152	
2.89 ... 2.98	10.1 ... 10.2	3.15 (4.05)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	10	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	6.7	9.5	12.2	17.3	20	25	22.5	28.5	36.5	38.5	50	58	78	102	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.6	11.6	14.6	20.5	23.5	29.5	26.5	35.5	44.5	47.5	59	74	95	119	120	95	
			M_{2max}	Nm	30	40.5	50	71	81	101	90	121	151	161	200	250	312	275	192	152	
2.92 ... 3.01	10.1 ... 10.2	3.15 (4.05)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2205-2AF..-0..0-Z
			M_{2N}	Nm	6.1	9	11.6	16	19.1	24.5	19.8	28.5	36	38	49	61	78	99	120	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.7	11.8	14.8	20.5	23.5	30	26.5	35.5	45	48	60	75	96	120	120	95	
			M_{2max}	Nm	30	40.5	50	71	81	101	90	121	151	161	200	250	312	275	192	152	
2.86 ... 2.95	10.1 ... 10.2	3.15 (4.05)	n_{2N}	r/min	500	375	300	250	200	150	200	150	125	100	100	75	60	50	30	25	1FT2205-2AH..-0..0-Z
			M_{2N}	Nm	5.3	8.4	11.2	14.5	18.3	23.5	17.5	24	28.5	36.5	36.5	52	67	79	119	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.5	11.5	14.5	20.5	23.5	29.5	26	35	44	47	58	73	94	117	119	94	
			M_{2max}	Nm	30	40.5	50	71	81	101	90	121	151	161	200	250	312	275	192	152	
5.08 ... 5.16	16.9 ... 17.1	5.1 (6)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2205-4AF..-0..0-Z
			M_{2N}	Nm	12.3	16.6	21	28	28.5	39.5	37	45	57	56	78	98	120	160	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.2	20	25.5	36	41	51	46	61	77	82	102	128	164	172	120	95	
			M_{2max}	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152	
5.18 ... 5.26	16.9 ... 17.1	7.8 (9.4)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	10	1FT2206-2AC..-0..0-Z
			M_{2N}	Nm	11.7	18.1	22.5	32	37	46.5	42	50	67	67	92	100	137	172	120	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.5	20.5	26	36.5	41.5	52	46.5	62	78	83	104	130	166	172	120	95	
			M_{2max}	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152	

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Planetary gearbox data																	
Gearbox type:			NRKW120, 1-stage						NRKW120, 2-stage								
1. Order code			B46						B47								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
	$J_{1,G}$	kg cm²	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818
	$\varphi_{2,G}$	'	11						13									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW120 1- and 2-stageg (continued)																					
5.25 ... 5.33	16.9 ... 17.1	7.8 (9.4)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2206-2AF..-0..0-Z
			M_{2N}	Nm	10	15.2	20.5	24.5	32.5	42.5	29	49.5	62	64	84	105	132	170	120	94	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	15.7	21	26	37	42.5	53	47.5	63	79	84	105	132	169	172	120	95	
			M_{2max}	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152	
5.09 ... 5.17	16.9 ... 17.1	7.8 (9.4)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	30	25	1FT2206-2AH..-0..0-Z
			M_{2N}	Nm	12.5	16.7	21	28	28	39	37	44.5	56	55	78	97	119	159	119	91	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	15.2	20	25.5	36	41	51	46	61	77	82	102	128	164	172	119	95	
			M_{2max}	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152	
7.78 ... 7.85	25.4 ... 25.8	11.5 (13.1)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	12.5	–	1FT2206-3AB..-0..0-Z
			M_{2N}	Nm	20	27	34.5	49	55	70	55	74	103	109	138	172	195	172	120	–	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	23	31	39	54	62	78	70	93	117	124	155	172	195	172	120	–	
			M_{2max}	Nm	77	103	128	180	192	152	230	305	275	312	312	275	312	275	192	–	
7.65 ... 7.72	25.4 ... 25.8	11.5 (13.1)	n_{2N}	r/min	375	300	250	200	150	125	150	100	75	75	60	50	37.5	37.5	25	–	1FT2206-3AF..-0..0-Z
			M_{2N}	Nm	16.5	21.5	27.5	35.5	48	59	47	71	93	95	120	145	193	172	120	–	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	22.5	30.5	38	53	61	77	69	92	115	122	153	172	195	172	120	–	
			M_{2max}	Nm	77	103	128	180	192	152	230	305	275	312	312	275	312	275	192	–	
10.7 ... 10.8	35.9 ... 36.5	15.1 (16.8)	n_{2N}	r/min	300	250	200	150	125	100	100	75	75	60	50	50	37.5	25	20	–	1FT2206-4AC..-0..0-Z
			M_{2N}	Nm	21	26	34	46.5	57	72	68	91	92	116	140	134	186	172	120	–	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	32	43	53	75	86	95	96	128	160	171	195	172	195	172	120	–	
			M_{2max}	Nm	109	145	182	216	192	152	251	312	275	312	312	275	312	275	192	–	
10.4 ... 10.5	34 ... 34.5	15.1 (16.8)	n_{2N}	r/min	375	300	250	200	150	150	150	100	75	75	60	60	50	37.5	25	–	1FT2206-4AF..-0..0-Z
			M_{2N}	Nm	23	30.5	38	49.5	66	68	63	95	126	127	161	160	191	172	120	–	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	31	41.5	52	73	83	95	93	125	156	166	195	172	195	172	120	–	
			M_{2max}	Nm	103	138	172	216	192	152	251	312	275	312	312	275	312	275	192	–	
9.93 ... 10	34 ... 34.5	15.1 (16.8)	n_{2N}	r/min	375	250	250	150	150	125	125	100	75	75	60	50	50	37.5	30	–	1FT2206-4AH..-0..0-Z
			M_{2N}	Nm	19.1	30	31	53	55	67	64	80	107	107	136	163	152	172	120	–	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	29.5	39.5	49.5	70	80	95	89	119	149	159	195	172	195	172	120	–	
			M_{2max}	Nm	103	138	172	216	192	152	251	312	275	312	312	275	312	275	192	–	

Planetary gearbox data																		
Gearbox type:			NRKW120, 1-stage						NRKW120, 2-stage									
1. Order code			B46						B47									
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
	$J_{1,G}$	kg cm²	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818
	$\varphi_{2,G}$	'	11						13									

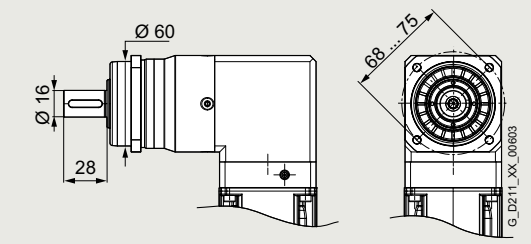
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NLCW060

Selection and ordering data

NLCW060



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	3200 N
Average axial force for 20000 h	$F_{A,eq}$	4400 N
Average radial force for 30000 h	$F_{R,eq}$	3200 N
Average axial force for 30000 h	$F_{A,eq}$	3900 N
Maximum radial force	$F_{R,max}$	3200 N
Maximum axial force	$F_{A,max}$	4400 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW060 1- and 2-stage																				
0.0258 ... 0.0878	0.416 ... 0.477	0.0245 (0.0285)	n_{2N}	r/min	–	–	–	–	–	60	30	50	50	50	50	50	37.5	37.5	25	20	**1FT2102-0AG..-0.A0-Z**
			M_{2N}	Nm	–	–	–	–	–	0.165	0.119	0.23	0.415	0.46	0.64	0.81	1.33	1.54	2.75	3.75	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	–	–	–	–	–	0.325	0.23	0.51	0.79	0.89	1.26	1.73	2.35	3.1	5.3	8.7	
			M_{2max}	Nm	–	–	–	–	–	4.2	3.7	5.1	6.6	7.1	9	11.4	14.8	18.7	29	24	
0.0892 ... 0.236	0.863 ... 1	0.036 (0.04)	n_{2N}	r/min	–	200	250	250	250	200	150	150	125	125	100	100	75	60	37.5	30	**1FT2102-1AG..-0.A0-Z**
			M_{2N}	Nm	–	0.2	0.315	0.6	0.72	1.13	0.99	1.34	1.94	2	2.75	3.05	4.55	5.9	10	13.4	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	–	0.355	0.59	1.08	1.32	1.81	1.57	2.25	3	3.25	4.2	5.4	7.1	9	14.8	15	
			M_{2max}	Nm	–	3.45	4.45	6.4	7.5	9.5	8.5	11.5	14.6	15.6	19.6	24.5	31.5	39.5	29	24	
0.323 ... 0.502	1.63 ... 1.81	0.093 (0.112)	n_{2N}	r/min	375	375	375	300	300	250	200	150	150	150	125	100	75	60	50	30	**1FT2103-2AG..-2.A0-Z**
			M_{2N}	Nm	0.48	0.77	1	1.74	1.89	2.6	2.4	3.6	4.3	4.35	5.7	7.5	10.3	13.2	15.8	15	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	0.96	1.49	2	3.05	3.6	4.65	3.95	5.5	7	7.5	9.5	12.1	15.6	19.7	18	15	
			M_{2max}	Nm	4.85	6.6	8.5	12.1	13.9	17.6	15.8	21	26.5	28.5	35.5	44.5	57	64	29	24	
0.309 ... 0.489	1.63 ... 1.81	0.093 (0.112)	n_{2N}	r/min	375	300	300	250	250	200	150	150	125	125	100	75	75	60	37.5	25	**1FT2103-2AH..-2..0-Z**
			M_{2N}	Nm	0.455	0.91	1.2	1.94	2.05	3	2.75	3.25	4.5	4.45	6.1	8.5	8.9	11.7	18	15	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	0.92	1.43	1.95	2.95	3.45	4.5	3.85	5.3	6.8	7.3	9.3	11.7	15.2	19.2	18	15	
			M_{2max}	Nm	4.85	6.6	8.5	12.1	13.9	17.6	15.8	21	26.5	28.5	35.5	44.5	57	64	29	24	
0.93 ... 1.09	3.66 ... 3.83	0.139 (0.158)	n_{2N}	r/min	300	300	300	250	200	200	150	125	125	125	100	75	60	50	50	30	**1FT2103-4AG..-2.A0-Z**
			M_{2N}	Nm	2.05	2.65	3.1	4.6	6.1	6.7	6.5	8.7	9.6	9.6	12.9	17.9	23	28.5	18	15	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.75	3.9	5	7.3	8.4	10.7	9.2	12.5	15.8	16.9	21	26.5	34	40	18	15	
			M_{2max}	Nm	10.9	14.8	18.6	26	29	24	34	45.5	57	60	70	64	70	64	29	24	
0.795 ... 0.962	3.66 ... 3.83	0.139 (0.158)	n_{2N}	r/min	300	300	250	250	200	200	150	125	125	100	100	75	60	50	50	25	**1FT2103-4AH..-2..0-Z**
			M_{2N}	Nm	1.77	2.3	3.25	4.05	5.4	5.9	5.7	7.7	8.5	10.6	11.4	15.9	20.5	25.5	17.3	15	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.35	3.35	4.35	6.3	7.3	9.3	8.1	11	13.9	14.9	18.7	23.5	30	38	18	15	
			M_{2max}	Nm	10.9	14.8	18.6	26	29	24	34	45.5	57	60	70	64	70	64	29	24	
0.952 ... 1.14	3.37 ... 3.54	0.368 (0.448)	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	**1FT2104-4AF..-2..0-Z**
			M_{2N}	Nm	2.3	2.95	4.25	6.1	7.3	9.6	6.8	11.1	14.4	15.1	19.5	24.5	31.5	40	18	15	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.85	4	5.1	7.4	8.6	10.9	9.7	13.2	16.7	17.8	22	28	36	40	18	15	
			M_{2max}	Nm	10.1	13.6	17.2	24	27.5	24	31	42	52	56	70	64	70	64	29	24	

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Planetary gearbox data																	
Gearbox type:			NLCW060, 1-stage						NLCW060, 2-stage								
1. Order code			C26						C27								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18	15
	$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29	24
	$M_{2Em.Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80
	$J_{1,G}$	kg cm²	0.406	0.275	0.253	0.234	0.23	0.225	0.355	0.35	0.234	0.242	0.233	0.231	0.223	0.222	0.222	0.22
	$\varphi_{2,G}$	'	16						18									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW060 1- and 2-stage (continued)																				
0.945 ... 1.14	3.46 ... 3.64	0.368 (0.448)	n_{2N}	r/min	375	375	300	250	250	200	200	150	125	125	100	75	75	60	50	30	1FT2104-4AK..-2..0-Z
			M_{2N}	Nm	2.5	3.1	4.6	6.6	7	9.6	7.1	10.6	13.9	14	18.5	25	26.5	34.5	18	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.8	3.95	5.1	7.4	8.5	10.8	9.7	13.1	16.6	17.7	22	28	36	40	18	15	
			M_{2max}	Nm	10.3	14	17.6	24.5	28.5	24	32	43	54	57	70	64	70	64	29	24	
2.03 ... 2.22	7 ... 7.15	0.578 (0.668)	n_{2N}	r/min	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	25	–	1FT2104-5AF..-2..0-Z
			M_{2N}	Nm	4.45	6.6	7.5	10.5	13.6	15	14.9	19.4	25.5	26	35	40	44	40	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.1	8.3	10.5	15	17.2	15	19.4	26	32.5	35	43.5	40	44	40	18	–	
			M_{2max}	Nm	20.5	28	35	40	29	24	63	70	70	70	70	64	70	64	29	–	
2.02 ... 2.2	7.09 ... 7.24	0.578 (0.668)	n_{2N}	r/min	375	300	300	250	200	200	150	150	125	125	100	75	75	60	50	–	1FT2104-5AK..-2..0-Z
			M_{2N}	Nm	4.35	6.5	7.4	10.3	13.4	14.5	14.6	16.1	21	20.5	27	37.5	37.5	40	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6	8.2	10.4	14.9	17.1	15	19.3	25.5	32.5	34.5	43.5	40	44	40	18	–	
			M_{2max}	Nm	21	28.5	35.5	40	29	24	64	70	70	70	70	64	70	64	29	–	
2.77 ... 2.94	9.42 ... 9.55	0.778 (0.858)	n_{2N}	r/min	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	–	–	1FT2104-6AF..-2..0-Z
			M_{2N}	Nm	5.5	8.1	9.1	12.5	16.3	15	17.9	23	30.5	31	41.5	40	44	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.3	11.2	14.2	20	18	15	26	34.5	43.5	44	44	40	44	40	–	–	
			M_{2max}	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	–	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW060 1- and 2-stage																				
0.335 ... 0.531	1.53 ... 1.72	0.2 (0.22)	n_{2N}	r/min	375	300	300	250	250	200	200	150	150	125	125	100	75	60	50	30	1FT2203-2AG..-2.A0-Z
			M_{2N}	Nm	0.56	1.06	1.36	2.1	2.3	3.25	2.55	3.8	4.35	5.2	5.5	7.4	10.4	13.4	15.6	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1	1.54	2.05	3.15	3.65	4.75	4.2	5.8	7.4	8	10.1	12.8	16.6	20.5	18	15	
			M_{2max}	Nm	4.55	6.3	8	11.4	13.2	16.6	14.9	20	25	27	33.5	42.5	54	64	29	24	
0.301 ... 0.497	1.53 ... 1.72	0.2 (0.22)	n_{2N}	r/min	300	300	250	250	200	200	150	150	125	125	100	75	60	50	37.5	30	1FT2203-2AK..-2..0-Z
			M_{2N}	Nm	0.55	0.83	1.27	1.67	2.25	2.55	2.6	3	4.05	4.05	5.4	7.6	10	12.3	17.1	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	0.9	1.4	1.91	2.9	3.4	4.4	3.9	5.4	6.9	7.4	9.4	11.9	15.5	19.5	18	15	
			M_{2max}	Nm	4.55	6.3	8	11.4	13.2	16.6	14.9	20	25	27	33.5	42.5	54	64	29	24	
0.947 ... 1.14	3.37 ... 3.54	0.35 (0.37)	n_{2N}	r/min	375	300	300	250	250	200	150	150	125	125	100	75	60	60	50	30	1FT2203-4AG..-2.A0-Z
			M_{2N}	Nm	2.25	3.5	4.15	6	6.3	8.7	8.4	9.4	12.6	12.5	16.7	23	30	30.5	18	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.8	3.95	5.1	7.4	8.5	10.8	9.7	13.1	16.6	17.7	22	28	36	40	18	15	
			M_{2max}	Nm	10.1	13.6	17.2	24	27.5	24	31	42	52	56	70	64	70	64	29	24	
0.907 ... 1.1	3.37 ... 3.54	0.35 (0.37)	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	75	75	60	50	37.5	30	1FT2203-4AK..-2..0-Z
			M_{2N}	Nm	2.1	2.65	3.75	5.5	5.9	8.3	6.4	8.4	11.4	11.5	15.9	16.6	21.5	26.5	18	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.7	3.8	4.9	7.1	8.2	10.4	9.3	12.6	16	17.1	21.5	27	34.5	40	18	15	
			M_{2max}	Nm	10.1	13.6	17.2	24	27.5	24	31	42	52	56	70	64	70	64	29	24	
1.99 ... 2.18	6.61 ... 6.76	1.248 (1.328)	n_{2N}	r/min	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	25	–	1FT2204-5AF..-2..0-Z
			M_{2N}	Nm	4.25	6.4	7.1	9.8	12.9	15	14.3	18.5	24	24.5	33.5	40	44	40	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.9	8.1	10.3	14.7	16.9	15	19.1	25.5	32	34	43	40	44	40	18	–	
			M_{2max}	Nm	19.8	26.5	33	40	29	24	60	70	70	70	70	64	70	64	29	–	
2.01 ... 2.19	6.61 ... 6.76	1.248 (1.328)	n_{2N}	r/min	375	300	300	250	200	200	150	125	125	100	100	75	60	60	50	–	1FT2204-5AK..-2..0-Z
			M_{2N}	Nm	4.35	6.5	7.3	10	13.2	13.9	14.5	18.8	20	25	25.5	36	44	40	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6	8.2	10.4	14.8	17	15	19.2	25.5	32	34.5	43	40	44	40	18	–	
			M_{2max}	Nm	19.8	26.5	33	40	29	24	60	70	70	70	70	64	70	64	29	–	

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Planetary gearbox data																	
Gearbox type:		NLCW060, 1-stage						NLCW060, 2-stage									
1. Order code		C26						C27									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$ Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18	15
	$M_{2max,G}$ Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29	24
	$M_{2Em.Off}$ Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80
	$J_{1,G}$ kg cm²	0.406	0.275	0.253	0.234	0.23	0.225	0.355	0.35	0.234	0.242	0.233	0.231	0.223	0.222	0.222	0.22
	$\varphi_{2,G}$ '	16						18									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NLCW060

Servomotor data

$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)
Nm	Nm	kg cm²
2.76 ... 2.93	8.93 ... 9.07	1.628 (1.708)

Selection data servomotors with planetary gearbox

Servomotors with planetary gearbox

SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW060 1- and 2-stage (continued)

n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	–	–	**1FT2204-6AF..-2..0-Z**	
M_{2N}	Nm	5.7	8.5	11.2	15.8	16.7	15	18.5	23.5	31.5	31.5	43	40	44	40	–	–	■■■ + ■■■	+ . . .
$M_{2,0}$	Nm	8.2	11.2	14.1	20	18	15	25.5	34.5	43.5	44	44	40	44	40	–	–		
M_{2max}	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	–	–		

Planetary gearbox data

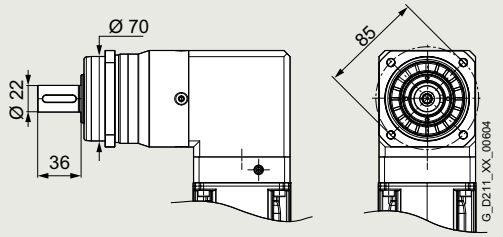
Gearbox type:		**NLCW060, 1-stage**						**NLCW060, 2-stage**									
1. Order code		**C26**						**C27**									
i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**	**100**
2. Order code		**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**	**R00**
$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18	15
$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29	24
$M_{2Em.Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm²	0.406	0.275	0.253	0.234	0.23	0.225	0.355	0.35	0.234	0.242	0.233	0.231	0.223	0.222	0.222	0.22
$\varphi_{2,G}$	'	16						18									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NLCW080



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5500 N
Average axial force for 20000 h	$F_{A,eq}$	6400 N
Average radial force for 30000 h	$F_{R,eq}$	4800 N
Average axial force for 30000 h	$F_{A,eq}$	5700 N
Maximum radial force	$F_{R,max}$	5500 N
Maximum axial force	$F_{A,max}$	6400 N

Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW080 1- and 2-stage																					
0.25	1.53	0.093	n_{2N}	r/min	–	200	200	200	200	150	150	125	100	100	100	75	60	50	37.5	25	1FT2103-2AG..-0.A0-Z
...	...	(0.112)	M_{2N}	Nm	–	0.51	0.81	1.31	1.49	2.35	1.85	2.65	3.7	3.8	4.3	6.2	8.5	10.6	15	23.5	■■■ + ■■■ + . . .
0.475	1.75		$M_{2.0}$	Nm	–	0.99	1.48	2.45	2.9	3.9	3.4	4.85	6.3	6.8	8.7	11.1	14.5	18.4	30	38	
			M_{2max}	Nm	–	6.1	7.8	11.4	13.1	16.7	14.9	20	25	27	34	43	55	69	80	61	
0.223	1.53	0.093	n_{2N}	r/min	–	200	200	200	200	150	150	125	100	100	75	75	60	50	30	20	1FT2103-2AH..-0..0-Z
...	...	(0.112)	M_{2N}	Nm	–	0.495	0.8	1.3	1.49	2.35	1.83	2.65	3.65	3.8	5.4	6.1	8.4	10.5	18.2	28.5	■■■ + ■■■ + . . .
0.447	1.75		$M_{2.0}$	Nm	–	0.89	1.35	2.25	2.7	3.6	3.15	4.55	5.9	6.3	8.2	10.4	13.7	17.3	28	38	
			M_{2max}	Nm	–	6.1	7.8	11.4	13.1	16.7	14.9	20	25	27	34	43	55	69	80	61	
0.769	3.49	0.139	n_{2N}	r/min	250	250	250	200	200	150	150	125	100	100	75	60	50	37.5	30	25	1FT2103-4AG..-0.A0-Z
...	...	(0.158)	M_{2N}	Nm	1.88	2.5	3	4.75	5	7.6	5.9	7.8	10.5	10.6	15.3	19.9	25	34	45	38	■■■ + ■■■ + . . .
1.07	3.76		$M_{2.0}$	Nm	2.3	3.35	4.45	6.6	7.7	9.8	8.7	12	15.2	16.3	20.5	26	33.5	42	50	38	
			M_{2max}	Nm	10.4	14.2	18	25.5	29	36.5	33	44.5	55	59	74	93	120	150	80	61	
0.695	3.49	0.139	n_{2N}	r/min	300	250	250	200	200	150	150	100	100	100	75	60	50	37.5	30	25	1FT2103-4AH..-0..0-Z
...	...	(0.158)	M_{2N}	Nm	1.27	2.1	2.55	4.15	4.3	6.6	5.1	8.4	9.2	9.2	13.5	17.6	22.5	30	40	37	■■■ + ■■■ + . . .
0.975	3.76		$M_{2.0}$	Nm	2.05	3.05	4.05	6.1	7.1	9.1	7.9	10.9	13.8	14.8	18.7	23.5	30.5	38	50	38	
			M_{2max}	Nm	10.4	14.2	18	25.5	29	36.5	33	44.5	55	59	74	93	120	150	80	61	
0.782	3.2	0.35	n_{2N}	r/min	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2104-4AF..-2..0-Z
...	...	(0.43)	M_{2N}	Nm	1.62	2.7	3.25	4.9	6.4	8.6	7.4	10	13	13.6	18	22.5	29.5	37.5	50	38	■■■ + ■■■ + . . .
1.08	3.48		$M_{2.0}$	Nm	2.3	3.4	4.5	6.7	7.8	9.9	8.9	12.1	15.4	16.5	20.5	26	34	42.5	50	38	
			M_{2max}	Nm	9.5	13	16.5	23.5	27	34	30.5	41	51	54	68	86	110	138	80	61	
0.776	3.3	0.35	n_{2N}	r/min	375	300	250	250	200	200	150	125	100	100	100	75	60	50	37.5	30	1FT2104-4AK..-2..0-Z
...	...	(0.43)	M_{2N}	Nm	1.77	3.05	4.15	5.1	7.1	7.5	8.2	11	14.2	14.9	15.6	22.5	30	37	46.5	32.5	■■■ + ■■■ + . . .
1.07	3.57		$M_{2.0}$	Nm	2.3	3.4	4.45	6.6	7.7	9.9	8.8	12	15.3	16.4	20.5	26	33.5	42	50	38	
			M_{2max}	Nm	9.8	13.4	17	24	27.5	35	31	42	52	56	70	88	113	142	80	61	
1.87	6.83	0.56	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2104-5AF..-2..0-Z
...	...	(0.65)	M_{2N}	Nm	4.9	7	8.1	12	12.5	18	14.8	19.1	25	25	35	45	57	76	50	38	■■■ + ■■■ + . . .
2.16	7.08		$M_{2.0}$	Nm	5.5	7.7	9.9	14.2	16.4	20.5	18.6	25	31.5	33.5	42	53	68	85	50	38	
			M_{2max}	Nm	20	27.5	34.5	48.5	56	61	63	84	105	112	141	176	192	176	80	61	

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Planetary gearbox data																	
Gearbox type:		NLCW080, 1-stage						NLCW080, 2-stage									
1. Order code		C36						C37									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$ Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50	38
	$M_{2max,G}$ Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80	61
	$M_{2Em.Off}$ Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	200
	$J_{1.G}$ kg cm²	1.394	1.089	1.016	0.951	0.937	0.921	1.246	1.218	1.21	1.001	0.959	0.956	0.918	0.917	0.917	0.906
	$\varphi_{2,G}$ '	13						15									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NLCW080

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW080 1- and 2-stage (continued)																					
1.85 ... 2.14	6.93 ... 7.17	0.56 (0.65)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	60	50	37.5	30	1FT2104-5AK..-2..0-Z
			M_{2N}	Nm	4.8	6.9	7.9	11.7	12.3	17.7	14.5	18.7	24.5	24.5	34.5	44.5	47	56	50	35.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.5	7.7	9.8	14.1	16.3	20.5	18.4	24.5	31	33.5	42	52	67	85	50	38	
			M_{2max}	Nm	20.5	27.5	35	49.5	56	61	64	85	107	114	143	176	192	176	80	61	
2.6 ... 2.88	9.25 ... 9.48	0.76 (0.84)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2104-6AF..-2..0-Z
			M_{2N}	Nm	6.2	8.8	10	14.6	15.2	21.5	18	23	30	30.5	42.5	54	68	91	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.8	10.7	13.6	19.4	22	28	25	33.5	42.5	45	57	71	91	110	50	38	
			M_{2max}	Nm	27.5	37	46.5	65	75	61	84	113	141	151	189	176	192	176	80	61	
4.3 ... 4.57	14.1 ... 14.3	1.71 (2.55)	n_{2N}	r/min	300	250	250	200	150	150	150	100	100	75	75	60	50	37.5	25	–	1FT2105-4AF..-0..0-Z
			M_{2N}	Nm	10.9	15	16.4	23	31.5	34	28.5	44.5	46	61	65	83	104	110	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	12.9	17.5	22	31	35.5	38	40	54	67	72	90	110	120	110	50	–	
			M_{2max}	Nm	42	56	70	99	80	61	128	171	176	192	192	176	192	176	80	–	
4.33 ... 4.6	14.1 ... 14.3	1.71 (2.55)	n_{2N}	r/min	300	250	200	200	150	125	125	100	75	75	60	50	50	37.5	37.5	–	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	10.2	14	18.9	20.5	29.5	37	31.5	41.5	56	57	73	90	92	110	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	12.9	17.6	22	31	36	38	40.5	54	68	73	91	110	120	110	50	–	
			M_{2max}	Nm	42	56	70	99	80	61	128	171	176	192	192	176	192	176	80	–	
7.09 ... 7.28	22.8 ... 23	2.65 (3.5)	n_{2N}	r/min	300	250	200	150	150	150	125	100	75	75	60	60	50	37.5	–	–	1FT2105-6AF..-0..0-Z
			M_{2N}	Nm	14.7	19.9	26.5	39	41	38	44	57	77	78	101	100	120	110	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21	28.5	35.5	50	50	38	64	86	108	115	120	110	120	110	–	–	
			M_{2max}	Nm	64	85	107	104	80	61	205	192	176	192	192	176	192	176	–	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW080 1- and 2-stage																					
0.244 ... 0.469	1.44 ... 1.65	0.2 (0.22)	n_{2N}	r/min	–	200	200	200	150	150	150	125	100	100	75	75	60	50	30	20	1FT2203-2AG..-0.A0-Z
			M_{2N}	Nm	–	0.71	1.03	1.53	2.25	2.7	2.1	3	4.15	4.2	6.2	6.6	9.1	11.3	19.9	31	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	–	0.97	1.45	2.4	2.85	3.85	3.35	4.8	6.2	6.7	8.6	11	14.3	18.2	29.5	38	
			M_{2max}	Nm	–	5.7	7.4	10.7	12.4	15.7	14	19	24	25.5	32	40.5	52	65	80	61	
0.209 ... 0.434	1.44 ... 1.65	0.2 (0.22)	n_{2N}	r/min	–	200	150	150	150	125	125	100	100	75	75	60	50	37.5	25	20	1FT2203-2AK..-0..0-Z
			M_{2N}	Nm	–	0.52	1.04	1.61	1.83	2.55	2	3	3.25	4.45	5	6.7	8.7	12	19.1	24	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	–	0.83	1.28	2.15	2.6	3.5	3.05	4.35	5.7	6.1	7.9	10.1	13.2	16.8	27	38	
			M_{2max}	Nm	–	5.7	7.4	10.7	12.4	15.7	14	19	24	25.5	32	40.5	52	65	80	61	
0.777 ... 1.08	3.2 ... 3.48	0.35 (0.37)	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	75	75	60	50	37.5	25	1FT2203-4AG..-0.A0-Z
			M_{2N}	Nm	2.05	2.8	4	6	6.7	9.1	7.8	10.4	13.6	14.1	18.9	20.5	27.5	33.5	40.5	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.3	3.4	4.5	6.6	7.7	9.9	8.8	12.1	15.3	16.4	20.5	26	33.5	42.5	50	38	
			M_{2max}	Nm	9.5	13	16.5	23.5	27	34	30.5	41	51	54	68	86	110	138	80	61	
0.738 ... 1.04	3.2 ... 3.48	0.35 (0.37)	n_{2N}	r/min	300	250	250	200	200	150	150	100	100	100	75	60	50	37.5	30	25	1FT2203-4AK..-0..0-Z
			M_{2N}	Nm	1.65	2.55	3.05	4.8	4.85	7.5	5.9	9.5	10.5	10.3	15.4	19.8	25	33	43	30.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.2	3.25	4.3	6.4	7.4	9.5	8.5	11.6	14.7	15.8	20	25	32.5	40.5	50	38	
			M_{2max}	Nm	9.5	13	16.5	23.5	27	34	30.5	41	51	54	68	86	110	138	80	61	
1.83 ... 2.11	6.44 ... 6.69	1.23 (1.31)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2204-5AF..-2..0-Z
			M_{2N}	Nm	4.75	6.8	7.8	11.4	11.8	17.3	14.1	18.1	23.5	23.5	33.5	43	54	73	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.4	7.6	9.7	14	16.1	20	18.2	24.5	30.5	33	41.5	52	67	84	50	38	
			M_{2max}	Nm	19.3	26	32.5	46	52	61	59	79	99	106	133	166	192	176	80	61	

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Planetary gearbox data																
Gearbox type:		NLCW080, 1-stage						NLCW080, 2-stage								
1. Order code		C36						C37								
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50	38
$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80	61
$M_{2Em.Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	200
$J_{1,G}$	kg cm²	1.394	1.089	1.016	0.951	0.937	0.921	1.246	1.218	1.21	1.001	0.959	0.956	0.918	0.917	0.917	0.906
$\varphi_{2,G}$	'	13						15									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW080 1- and 2-stage (continued)																					
1.84 ... 2.13	6.44 ... 6.69	1.23 (1.31)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	37.5	25	1FT2204-5AK..-2..0-Z
			M_{2N}	Nm	4.9	7	8	11.7	12.1	17.6	14.5	18.5	24	24	34.5	44	55	74	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.5	7.6	9.7	14	16.2	20	18.3	24.5	31	33	41.5	52	67	84	50	38	
			M_{2max}	Nm	19.3	26	32.5	46	52	61	59	79	99	106	133	166	192	176	80	61	
2.59 ... 2.87	8.77 ... 9	1.61 (1.69)	n_{2N}	r/min	300	250	250	200	150	150	150	125	100	100	75	60	50	37.5	25	15	1FT2204-6AF..-2..0-Z
			M_{2N}	Nm	6.7	9.4	10.6	15.3	20.5	22.5	18.9	23.5	31	31	44.5	56	71	95	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.7	10.6	13.5	19.3	22	27.5	25	33.5	42	45	56	71	91	110	50	38	
			M_{2max}	Nm	26	35	44	62	71	61	80	107	134	143	179	176	192	176	80	61	
2.6 ... 2.85	10 ... 10.3	3.15 (4.05)	n_{2N}	r/min	300	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	10	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	5.8	8.2	11	16	18.7	23.5	21	25.5	34.5	35.5	47.5	55	75	97	49.5	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.8	10.7	13.6	19.4	22	28	24.5	33	42	44.5	56	70	90	110	50	38	
			M_{2max}	Nm	30	40	50	71	80	61	91	122	153	163	192	176	192	176	80	61	
2.64 ... 2.89	10 ... 10.3	3.15 (4.05)	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2205-2AF..-0..0-Z
			M_{2N}	Nm	6.5	7.9	10.9	15.6	15.9	23	19.3	24	31.5	31.5	45	57	72	95	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.9	10.8	13.8	19.7	22.5	28.5	25	33.5	42.5	45.5	57	71	92	110	50	38	
			M_{2max}	Nm	30	40	50	71	80	61	91	122	153	163	192	176	192	176	80	61	
2.61 ... 2.86	10 ... 10.3	3.15 (4.05)	n_{2N}	r/min	300	250	250	200	150	150	125	100	100	75	75	60	50	37.5	37.5	25	1FT2205-2AH..-0..0-Z
			M_{2N}	Nm	6.2	8.7	9.6	13.9	18.6	20.5	20.5	27	28	37.5	40	51	64	87	44	37.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.8	10.7	13.6	19.4	22	28	24.5	33.5	42	45	56	70	90	110	50	37.5	
			M_{2max}	Nm	30	40	50	71	80	61	91	122	153	163	192	176	192	176	80	61	
4.73 ... 4.94	17 ... 17.2	5.1 (6)	n_{2N}	r/min	300	250	200	150	150	125	125	100	75	75	60	50	50	37.5	25	–	1FT2205-4AF..-0..0-Z
			M_{2N}	Nm	9.9	13.6	18.5	27	29	36.5	30.5	40.5	55	56	72	88	90	110	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.1	19.2	24	34	39	38	43.5	58	73	78	98	110	120	110	50	–	
			M_{2max}	Nm	50	68	85	104	80	61	154	192	176	192	192	176	192	176	80	–	

Planetary gearbox data																	
Gearbox type:			NLCW080, 1-stage						NLCW080, 2-stage								
1. Order code			C36						C37								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50	38
	$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	200
	$J_{1,G}$	kg cm²	1.394	1.089	1.016	0.951	0.937	0.921	1.246	1.218	1.21	1.001	0.959	0.956	0.918	0.917	0.917	0.906
	$\varphi_{2,G}$	'	13						15									

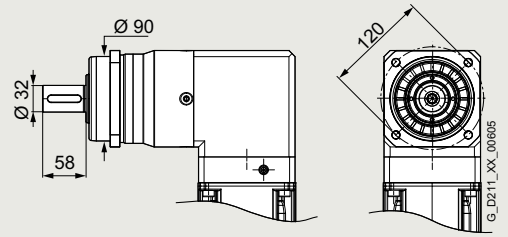
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NLCW120

Selection and ordering data

NLCW120



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	6000 N
Average axial force for 20000 h	$F_{A,eq}$	8000 N
Average radial force for 30000 h	$F_{R,eq}$	5400 N
Average axial force for 30000 h	$F_{A,eq}$	7000 N
Maximum radial force	$F_{R,max}$	6000 N
Maximum axial force	$F_{A,max}$	8000 N

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW120 1- and 2-stage																					
0.159 ... 0.402	1.44 ... 1.68	0.093 (0.112)	n_{2N}	r/min	–	–	150	150	150	125	100	75	75	75	60	50	50	37.5	25	20	1FT2103-2AG..-0.A0-Z
			M_{2N}	Nm	–	–	0.39	1.01	1.23	1.92	1.45	2.45	2.9	3	4.55	5.9	7.1	9.9	16	20.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	–	–	0.79	1.63	2	2.85	2.45	3.7	4.9	5.3	7	9.1	12	15.3	25	40	
			M_{2max}	Nm	–	–	7.1	10.5	12.2	15.6	13.9	19	24	25.5	32.5	40.5	52	66	106	152	
0.132 ... 0.375	1.44 ... 1.68	0.093 (0.112)	n_{2N}	r/min	–	–	150	150	150	150	100	100	75	75	75	60	50	37.5	30	20	1FT2103-2AH..-0..0-Z
			M_{2N}	Nm	–	–	0.255	0.85	1.12	1.54	1.35	1.77	2.85	3	3.6	4.95	7	9.8	13.2	21	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	–	–	0.65	1.43	1.82	2.6	2.2	3.35	4.5	4.9	6.4	8.4	11.1	14.2	23.5	37	
			M_{2max}	Nm	–	–	7.1	10.5	12.2	15.6	13.9	19	24	25.5	32.5	40.5	52	66	106	152	
0.584 ... 0.995	3.3 ... 3.69	0.139 (0.158)	n_{2N}	r/min	375	300	300	250	200	200	150	125	100	100	75	75	60	50	30	20	1FT2103-4AG..-0.A0-Z
			M_{2N}	Nm	1.25	2.2	2.95	4.6	5.9	6.8	6.3	8.3	11.3	11.4	16.3	16.8	24	29	51	79	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.75	2.75	3.75	5.7	6.8	8.8	7.8	10.8	13.8	14.8	18.9	23.5	31	39	63	95	
			M_{2max}	Nm	9.9	13.6	17.3	24.5	28	35.5	32	43	54	58	73	91	117	147	192	152	
0.569 ... 0.981	3.3 ... 3.69	0.139 (0.158)	n_{2N}	r/min	300	300	300	250	250	200	150	125	100	100	75	75	60	50	30	20	1FT2103-4AH..-0..0-Z
			M_{2N}	Nm	0.98	1.56	2.1	3.45	3.75	5.4	4.9	6.6	8.8	9.3	13	14.6	20	25	42	66	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.7	2.7	3.7	5.6	6.6	8.6	7.6	10.6	13.6	14.6	18.6	23.5	30.5	38.5	62	95	
			M_{2max}	Nm	9.9	13.6	17.3	24.5	28	35.5	32	43	54	58	73	91	117	147	192	152	
0.597 ... 1.01	3.01 ... 3.41	0.35 (0.43)	n_{2N}	r/min	375	375	300	250	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2104-4AF..-0..0-Z
			M_{2N}	Nm	1.27	1.87	2.95	4.7	6	7.9	6.5	8.8	11.5	12.1	16.7	21	28	35.5	57	91	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.79	2.8	3.8	5.8	6.9	8.9	7.9	11	14	15	19.1	24	31	39.5	64	95	
			M_{2max}	Nm	9	12.4	15.8	22.5	26	33	29.5	39.5	50	53	67	84	108	135	192	152	
0.59 ... 1	3.11 ... 3.5	0.35 (0.43)	n_{2N}	r/min	375	375	375	300	250	200	200	150	125	125	100	75	75	60	37.5	25	1FT2104-4AK..-0..0-Z
			M_{2N}	Nm	1.31	2.1	2.5	4.6	5.8	7.6	5.2	8.7	11.1	10.9	16	20.5	22	29.5	51	77	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.77	2.75	3.8	5.8	6.8	8.8	7.8	10.9	13.9	14.9	19	24	31	39	63	95	
			M_{2max}	Nm	9.3	12.8	16.3	23	26.5	33.5	30	41	51	55	69	86	111	139	192	152	
1.68 ... 2.08	6.64 ... 7.01	0.56 (0.65)	n_{2N}	r/min	375	375	300	250	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2104-5AF..-0..0-Z
			M_{2N}	Nm	4.55	5.6	8.5	12.4	14.6	18.6	16.4	21.5	28	29	38	48	62	78	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5	7.1	9.2	13.4	15.5	19.7	17.6	23.5	30	32	40.5	51	65	82	120	95	
			M_{2max}	Nm	19.9	26.5	33.5	48	55	69	62	83	104	111	139	174	220	275	192	152	

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Planetary gearbox data																	
Gearbox type:		NLCW120, 1-stage						NLCW120, 2-stage									
1. Order code		C46						C47									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$ Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95
	$M_{2max,G}$ Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152
	$M_{2Em.Off}$ Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
	$J_{1,G}$ kg cm²	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818
	$\varphi_{2,G}$ '	11						13									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW120 1- and 2-stage (continued)																					
1.67 ... 2.07	6.74 ... 7.1	0.56 (0.65)	n_{2N}	r/min	375	375	300	250	250	200	150	125	100	100	75	75	60	50	30	25	1FT2104-5AK..-0..0-Z
			M_{2N}	Nm	4.5	5.4	8.4	12.2	12.3	17.3	16.2	21	27.5	28.5	37.5	41	56	68	118	95	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	4.95	7	9.1	13.3	15.4	19.6	17.5	23.5	29.5	32	40	50	65	82	120	95	
			M_{2max}	Nm	20	27	34	48.5	55	70	63	84	105	112	141	176	225	280	192	152	
2.42 ... 2.81	9.06 ... 9.41	0.76 (0.84)	n_{2N}	r/min	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2104-6AF..-0..0-Z
			M_{2N}	Nm	6.5	9.5	11	15.5	20	26	21	26.5	35	35.5	51	64	83	107	120	95	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	7.2	10	12.9	18.5	21	27	24	32.5	41	44	55	69	89	111	120	95	
			M_{2max}	Nm	27	36.5	46	64	74	93	83	112	140	149	187	230	300	368	192	152	
4.11 ... 4.5	13.9 ... 14.2	1.71 (2.55)	n_{2N}	r/min	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2105-4AF..-0..0-Z
			M_{2N}	Nm	11	15.2	18.4	24.5	31	40	34.5	43	56	56	78	99	126	161	120	95	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	12.3	16.8	21	30	34.5	44	39.5	53	66	71	89	111	143	179	120	95	
			M_{2max}	Nm	41.5	55	70	98	112	141	127	169	210	225	280	350	416	368	192	152	
4.15 ... 4.53	13.9 ... 14.2	1.71 (2.55)	n_{2N}	r/min	375	300	300	250	200	200	150	125	100	100	75	60	50	37.5	37.5	25	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	10.5	14.6	16.9	22	29.5	29	32	39.5	51	51	75	94	120	154	97	95	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	12.4	17	21.5	30.5	35	44	39.5	53	67	71	89	112	144	180	120	95	
			M_{2max}	Nm	41.5	55	70	98	112	141	127	169	210	225	280	350	416	368	192	152	
7.03 ... 7.39	22.6 ... 22.9	2.65 (3.5)	n_{2N}	r/min	375	300	250	200	200	150	125	100	100	75	75	60	50	37.5	25	15	1FT2105-6AF..-0..0-Z
			M_{2N}	Nm	16	22.5	30	42	42.5	61	54	71	71	98	103	131	164	220	120	95	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	21	28.5	35.5	50	58	73	65	87	110	117	147	184	235	230	120	95	
			M_{2max}	Nm	67	90	113	159	182	152	205	270	340	365	416	368	416	368	192	152	
7.48 ... 7.75	24.6 ... 24.8	4.6 (6.3)	n_{2N}	r/min	375	300	250	200	200	150	150	100	100	75	75	60	50	37.5	25	–	1FT2106-3AF..-0..0-Z
			M_{2N}	Nm	16.8	23.5	30.5	43	44	62	47	74	74	101	107	136	171	230	120	–	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	22	30	38	53	61	77	68	91	114	122	153	192	245	230	120	–	
			M_{2max}	Nm	73	98	123	172	192	152	220	295	368	395	416	368	416	368	192	–	
9.85 ... 10.1	31.3 ... 31.5	6 (7.6)	n_{2N}	r/min	375	300	250	200	200	150	125	100	75	75	60	50	50	37.5	25	–	1FT2106-4AF..-0..0-Z
			M_{2N}	Nm	20.5	29	37.5	52	51	74	69	89	120	123	158	193	194	230	120	–	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	29.5	39.5	49.5	70	80	95	89	119	149	159	199	230	260	230	120	–	
			M_{2max}	Nm	93	125	157	216	192	152	280	375	368	416	416	368	416	368	192	–	
14.1 ... 14.4	43.4 ... 43.6	8.7 (10.4)	n_{2N}	r/min	300	250	250	200	150	150	125	100	75	75	60	50	50	37.5	–	–	1FT2106-6AF..-0..0-Z
			M_{2N}	Nm	33.5	44.5	46.5	63	88	90	85	109	148	151	195	225	225	230	–	–	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	42	56	71	100	114	95	127	169	210	225	260	230	260	230	–	–	
			M_{2max}	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	–	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW120 1- and 2-stage																					
0.153 ... 0.396	1.34 ... 1.58	0.2 (0.22)	n_{2N}	r/min	–	–	150	200	200	150	125	100	75	75	75	60	50	37.5	25	20	1FT2203-2AG..-0.A0-Z
			M_{2N}	Nm	–	–	0.35	0.84	1.03	1.79	1.35	2.15	3.15	3.4	4.4	6	8.4	11.1	18.4	23.5	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	–	–	0.76	1.58	1.99	2.8	2.4	3.6	4.85	5.2	6.9	8.9	11.8	15	24.5	39.5	
			M_{2max}	Nm	–	–	6.7	9.9	11.5	14.7	13.1	17.8	22.5	24	30.5	38.5	49.5	62	100	152	
0.192 ... 0.362	1.42 ... 1.58	0.2 (0.22)	n_{2N}	r/min	–	–	–	150	150	150	125	100	75	75	60	50	50	37.5	25	15	1FT2203-2AK..-0..0-Z
			M_{2N}	Nm	–	–	–	0.76	1.02	1.47	1.01	1.73	2.7	2.95	4.3	5.6	6.6	9.5	15.2	27	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	–	–	–	1.34	1.72	2.45	2.05	3.2	4.3	4.7	6.2	8	10.7	13.7	22.5	36	
			M_{2max}	Nm	–	–	–	9.9	11.5	14.7	13.1	17.8	22.5	24	30.5	38.5	49.5	62	100	152	

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Planetary gearbox data																		
Gearbox type:			NLCW120, 1-stage						NLCW120, 2-stage									
1. Order code			C46						C47									
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95
	$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
	$J_{1,G}$	kg cm²	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818
	$\varphi_{2,G}$	'	11						13									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NLCW120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW120 1- and 2-stage (continued)																				
0.592 ... 1	3.01 ... 3.41	0.35 (0.37)	n_{2N}	r/min	375	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	20	1FT2203-4AG..-0.A0-Z
			M_{2N}	Nm	1.31	2.1	3.1	4.15	5.7	7.6	6.6	8	10.2	12.7	15.3	20.5	27	34.5	46	88	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.77	2.75	3.8	5.8	6.8	8.9	7.8	10.9	13.9	15	19	24	31	39	63	95	
			M_{2max}	Nm	9	12.4	15.8	22.5	26	33	29.5	39.5	50	53	67	84	108	135	192	152	
0.552 ... 0.964	3.01 ... 3.41	0.35 (0.37)	n_{2N}	r/min	375	300	300	250	250	200	150	125	100	100	75	75	60	50	30	20	1FT2203-4AK..-0..0-Z
			M_{2N}	Nm	1.07	1.99	2.55	4.1	4.45	6.2	5.7	7.7	10.2	10.7	15	16.5	22.5	28	47.5	74	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.65	2.6	3.6	5.5	6.5	8.5	7.5	10.4	13.3	14.3	18.2	23	30	37.5	61	95	
			M_{2max}	Nm	9	12.4	15.8	22.5	26	33	29.5	39.5	50	53	67	84	108	135	192	152	
1.64 ... 2.04	6.26 ... 6.62	1.23 (1.31)	n_{2N}	r/min	375	375	300	250	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2204-5AF..-0..0-Z
			M_{2N}	Nm	4.4	5.2	8.1	11.7	14.2	18.2	15.7	20.5	26.5	27.5	37	46.5	60	76	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	4.9	6.9	9	13.1	15.2	19.3	17.2	23	29.5	31.5	39.5	50	64	80	120	95	
			M_{2max}	Nm	18.7	25	32	45	52	65	58	78	98	105	131	164	210	260	192	152	
1.65 ... 2.06	6.26 ... 6.62	1.23 (1.31)	n_{2N}	r/min	375	375	300	250	250	200	150	125	100	100	75	75	60	50	30	25	1FT2204-5AK..-0..0-Z
			M_{2N}	Nm	4.45	5.4	8.3	12.1	12	17	16	21	27.5	28.5	37.5	40.5	55	66	116	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	4.95	7	9.1	13.2	15.3	19.4	17.4	23.5	29.5	31.5	40	50	65	81	120	95	
			M_{2max}	Nm	18.7	25	32	45	52	65	58	78	98	105	131	164	210	260	192	152	
2.4 ... 2.8	8.58 ... 8.93	1.61 (1.69)	n_{2N}	r/min	375	375	300	250	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2204-6AF..-0..0-Z
			M_{2N}	Nm	6.7	7.6	11.9	16.4	20	25.5	22.5	28.5	37.5	37.5	52	65	85	106	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.2	10	12.8	18.4	21	26.5	24	32.5	40.5	43.5	55	69	88	111	120	95	
			M_{2max}	Nm	25.5	34.5	43.5	61	70	88	79	106	133	142	177	220	285	355	192	152	
2.66 ... 2.99	9.84 ... 10.2	3.15 (4.05)	n_{2N}	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	10	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	5.6	8.6	11.4	16.7	19.6	25	21.5	27	35	37	49.5	57	78	102	120	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.9	11	14.1	20	23	29.5	25.5	34.5	43.5	46.5	58	73	95	119	120	95	
			M_{2max}	Nm	29.5	39.5	49.5	70	80	101	90	121	151	162	200	250	325	368	192	152	
2.69 ... 3.03	9.84 ... 10.2	3.15 (4.05)	n_{2N}	r/min	375	375	300	250	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2205-2AF..-0..0-Z
			M_{2N}	Nm	6	7.6	10.7	15.3	18.5	24	20	27	34.5	36	47.5	60	77	99	119	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8	11.1	14.2	20.5	23.5	29.5	26	35	44	47	59	74	96	120	120	95	
			M_{2max}	Nm	29.5	39.5	49.5	70	80	101	90	121	151	162	200	250	325	368	192	152	
2.63 ... 2.97	9.84 ... 10.2	3.15 (4.05)	n_{2N}	r/min	375	300	300	250	200	200	150	125	100	100	75	60	60	50	30	25	1FT2205-2AH..-0..0-Z
			M_{2N}	Nm	5.8	8.3	10.3	14.3	17.7	19.4	19.8	25.5	33	33.5	45.5	57	62	74	120	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.8	10.9	13.9	20	23	29	25.5	34.5	43.5	46.5	58	73	94	118	120	94	
			M_{2max}	Nm	29.5	39.5	49.5	70	80	101	90	121	151	162	200	250	325	368	192	152	
4.88 ... 5.17	16.8 ... 17.1	5.1 (6)	n_{2N}	r/min	375	300	250	200	200	150	150	100	100	75	75	60	50	37.5	25	15	1FT2205-4AF..-0..0-Z
			M_{2N}	Nm	10.7	15.6	20	29	30	41.5	31.5	49.5	50	68	73	93	118	159	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.6	19.9	25	35.5	41	51	45.5	61	76	81	102	128	164	205	120	95	
			M_{2max}	Nm	50	67	84	118	136	152	153	200	255	270	340	368	416	368	192	152	
4.89 ... 5.27	16.8 ... 17.1	7.8 (9.4)	n_{2N}	r/min	300	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	10	1FT2206-2AC..-0..0-Z
			M_{2N}	Nm	12.7	17.3	22	31.5	37	46.5	41	45.5	63	63	92	96	137	187	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.6	19.9	25	35.5	41	51	46	62	78	83	104	130	168	210	120	95	
			M_{2max}	Nm	50	67	84	118	136	152	153	200	255	270	340	368	416	368	192	152	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:			NLCW120, 1-stage						NLCW120, 2-stage								
1. Order code			C46						C47								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95
	$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
	$J_{1,G}$	kg cm²	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818
	$\varphi_{2,G}$	'	11						13									

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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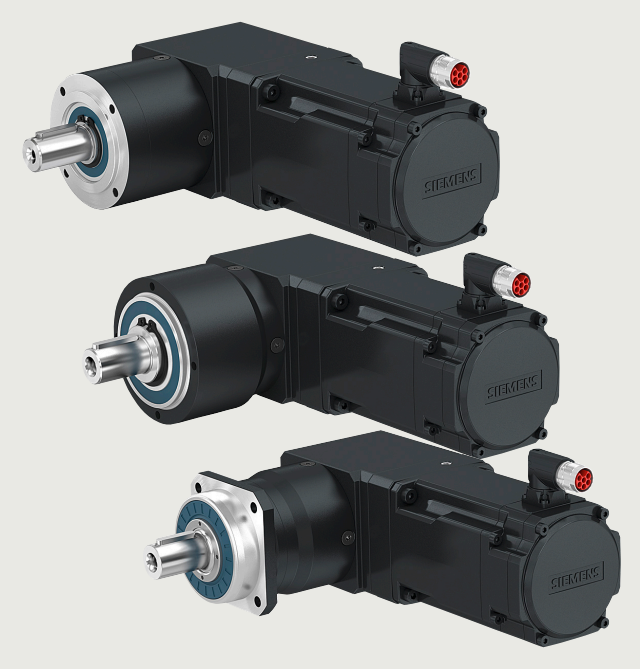
Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW120 1- and 2-stage (continued)																				
5.04 ... 5.33	16.8 ... 17.1	7.8 (9.4)	n_{2N}	r/min	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	25	15	**1FT2206-2AF..-0..0-Z**
			M_{2N}	Nm	11.8	16.3	19.5	25	32.5	42	37	45.5	59	59	83	104	133	170	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.1	20.5	25.5	36.5	42	53	47	63	79	84	105	132	170	210	120	95	
			M_{2max}	Nm	50	67	84	118	136	152	153	200	255	270	340	368	416	368	192	152	
4.87 ... 5.17	16.8 ... 17.1	7.8 (9.4)	n_{2N}	r/min	375	300	250	200	200	150	150	100	100	75	75	60	50	37.5	30	20	**1FT2206-2AH..-0..0-Z**
			M_{2N}	Nm	10.9	15.7	20	28.5	29.5	41	31.5	50	49.5	67	72	93	116	158	119	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.6	19.8	25	35.5	40.5	51	45.5	61	76	81	102	128	165	205	119	95	
			M_{2max}	Nm	50	67	84	118	136	152	153	200	255	270	340	368	416	368	192	152	
7.62 ... 7.89	25.5 ... 25.8	11.5 (13.1)	n_{2N}	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	12.5	–	**1FT2206-3AB..-0..0-Z**
			M_{2N}	Nm	19.5	26	34	49	55	70	54	73	103	108	138	173	220	230	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30.5	38.5	54	62	78	69	93	116	124	156	195	250	230	120	–	
			M_{2max}	Nm	76	102	128	179	192	152	230	305	368	410	416	368	416	368	192	–	
7.49 ... 7.76	25.5 ... 25.8	11.5 (13.1)	n_{2N}	r/min	300	300	250	200	150	150	125	100	75	75	60	50	37.5	37.5	25	–	**1FT2206-3AF..-0..0-Z**
			M_{2N}	Nm	18.4	20.5	27.5	38	50	55	50	65	88	90	117	143	196	198	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22	30	38	53	61	77	68	91	114	122	153	192	245	230	120	–	
			M_{2max}	Nm	76	102	128	179	192	152	230	305	368	410	416	368	416	368	192	–	
10.5 ... 10.8	36.2 ... 36.3	15.1 (16.8)	n_{2N}	r/min	250	200	200	150	125	100	100	75	60	60	50	37.5	30	25	20	–	**1FT2206-4AC..-0..0-Z**
			M_{2N}	Nm	24	33	35.5	51	63	81	63	86	110	112	138	184	235	230	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31	42	53	74	85	95	96	128	161	172	215	230	260	230	120	–	
			M_{2max}	Nm	108	144	181	216	192	152	325	416	368	416	416	368	416	368	192	–	
10.3 ... 10.6	34.2 ... 34.4	15.1 (16.8)	n_{2N}	r/min	375	300	250	200	150	150	125	100	75	75	60	50	50	37.5	25	–	**1FT2206-4AF..-0..0-Z**
			M_{2N}	Nm	21	29.5	38.5	52	70	75	70	91	122	125	161	196	199	230	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30.5	41.5	52	73	84	95	93	124	156	166	205	230	260	230	120	–	
			M_{2max}	Nm	102	137	171	216	192	152	305	410	368	416	416	368	416	368	192	–	
9.81 ... 10.1	34.2 ... 34.4	15.1 (16.8)	n_{2N}	r/min	300	250	200	150	150	125	125	100	75	75	60	50	37.5	37.5	30	–	**1FT2206-4AH..-0..0-Z**
			M_{2N}	Nm	22.5	30	40	57	60	75	58	74	102	103	134	161	220	215	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29	39.5	49.5	70	80	95	89	119	149	159	199	230	260	230	120	–	
			M_{2max}	Nm	102	137	171	216	192	152	305	410	368	416	416	368	416	368	192	–	

Planetary gearbox data																	
Gearbox type:		**NLCW120, 1-stage**						**NLCW120, 2-stage**									
1. Order code		**C46**						**C47**									
i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**	**100**
2. Order code		**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**	**R00**
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152
$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
$J_{1,G}$	kg cm²	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818
$\varphi_{2,G}$	'	11						13									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Selection and ordering data



SIMOTICS S-1FT2 servo planetary geared motors with economy angular gearbox

The following pages show the permissible combinations of **servo motors for 400 V 3AC** converters

and the economy angled planetary gearboxes **NRBW, NRKW and NLCW** geared motors.

They show the most important component data of the motor and gearbox as well as the rating of the system geared motor.

The rated operating points of the geared motors are adapted to the converter supply voltage.

More information on selection is provided in the section "Information on Selection".

Right-angle gearboxes

As a result of the preliminary bevel gear stage, NRB, NRK and NLC planetary gearboxes are also available as NRBW, NRKW or NLCW angled gearboxes.

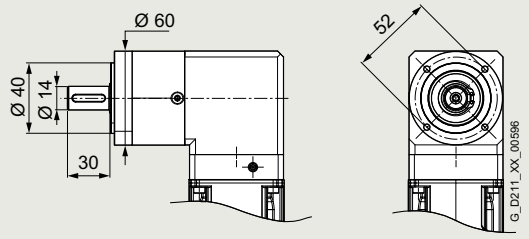
The angled versions are ideal when space is restricted.

Due to the additional angle stage, the losses in the angled gearboxes are somewhat higher and the rated specifications are reduced in comparison to the corresponding coaxial version.

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Selection and ordering data

NRBW060



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	400 N
Average axial force for 20000 h	$F_{A,eq}$	500 N
Average radial force for 30000 h	$F_{R,eq}$	340 N
Average axial force for 30000 h	$F_{A,eq}$	450 N
Maximum radial force	$F_{R,max}$	700 N
Maximum axial force	$F_{A,max}$	800 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW060 1- and 2-stage																				
0.498	1.77	0.093	n_{2N}	r/min	750	600	600	375	375	300	300	250	200	200	150	125	100	75	50	1FT2103-2AH..-2..0-Z
...	...	(0.112)	M_{2N}	Nm	1.02	1.38	1.48	2.4	2.55	3.25	3	3.75	4.95	4.95	6.6	8.1	10.3	13.5	18	■■■ + ■■■ + . . .
0.51	1.82		$M_{2.0}$	Nm	1.49	2	2.5	3.5	4.05	5	4.55	6	7.6	8.1	10.1	12.7	16.3	20	18	
			M_{2max}	Nm	5.4	7.2	9	12.7	14.5	18.1	16.2	21.5	27	28.5	36	45	57	64	29	
0.983	3.74	0.139	n_{2N}	r/min	750	600	500	375	300	250	300	200	200	150	125	100	75	75	60	1FT2103-4AH..-2..0-Z
...	...	(0.158)	M_{2N}	Nm	2.05	2.7	3.35	4.65	5.8	7.1	5.7	8.6	8.9	11.8	14.5	18.1	24	24.5	18	■■■ + ■■■ + . . .
0.993	3.85		$M_{2.0}$	Nm	2.95	3.9	4.9	6.9	7.9	9.9	8.9	11.9	14.8	15.8	19.8	24.5	31.5	39.5	18	
			M_{2max}	Nm	11.5	15.3	19.2	26.5	29	24	34	45.5	57	60	70	64	70	64	29	
1.12	3.46	0.368	n_{2N}	r/min	1000	750	600	375	375	300	300	250	200	200	150	125	100	75	50	1FT2104-4AF..-2..0-Z
...	...	(0.448)	M_{2N}	Nm	2.1	3.15	4.1	6.5	6.9	8.8	8.1	10	13.2	12.7	17.6	21	26.5	35.5	18	■■■ + ■■■ + . . .
1.15	3.56		$M_{2.0}$	Nm	3.4	4.55	5.7	8	9.1	11.4	10.2	13.6	17	18.2	22.5	28	36	40	18	
			M_{2max}	Nm	10.6	14.2	17.7	24.5	28	24	31.5	42	52	56	70	64	70	64	29	
1.11	3.55	0.368	n_{2N}	r/min	750	750	600	375	375	300	300	250	200	200	150	125	100	75	60	1FT2104-4AK..-2..0-Z
...	...	(0.448)	M_{2N}	Nm	3.05	3.3	4.3	7	7.2	9.1	8.7	10.3	13.7	13.2	18.3	21.5	27.5	37	18	■■■ + ■■■ + . . .
1.14	3.65		$M_{2.0}$	Nm	3.35	4.5	5.6	7.9	9.1	11.4	10.1	13.5	16.9	18	22.5	28	36	40	18	
			M_{2max}	Nm	10.9	14.6	18.2	25.5	29	24	32.5	43	54	57	70	64	70	64	29	
2.18	7	0.578	n_{2N}	r/min	750	600	500	375	300	250	250	200	150	150	125	100	100	75	–	1FT2104-5AF..-2..0-Z
...	...	(0.668)	M_{2N}	Nm	4.8	6.2	7.6	10.3	13	15	15	18.8	25.5	25.5	30.5	38.5	35	40	–	■■■ + ■■■ + . . .
2.23	7.18		$M_{2.0}$	Nm	6.6	8.8	11.1	15.5	17.8	15	19.8	26	33	35	44	40	44	40	–	
			M_{2max}	Nm	21.5	28.5	35.5	40	29	24	63	70	70	70	70	64	70	64	–	
2.16	7.09	0.578	n_{2N}	r/min	750	600	500	375	300	250	250	200	150	150	125	100	100	75	–	1FT2104-5AK..-2..0-Z
...	...	(0.668)	M_{2N}	Nm	4.75	6.1	7.5	10.2	12.9	15	14.8	18.6	25	25	30	38	35	40	–	■■■ + ■■■ + . . .
2.21	7.28		$M_{2.0}$	Nm	6.6	8.8	11	15.4	17.6	15	19.7	26	32.5	35	43.5	40	44	40	–	
			M_{2max}	Nm	21.5	29	36	40	29	24	64	70	70	70	70	64	70	64	–	
2.89	9.35	0.778	n_{2N}	r/min	750	600	500	375	300	300	250	200	150	150	125	100	100	75	–	1FT2104-6AF..-2..0-Z
...	...	(0.858)	M_{2N}	Nm	5.6	7.3	8.9	12	15.2	14.2	17.4	21.5	29.5	29	35	40	39	40	–	■■■ + ■■■ + . . .
2.96	9.6		$M_{2.0}$	Nm	8.8	11.8	14.7	20.5	18	15	26	35	43.5	44	44	40	44	40	–	
			M_{2max}	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	–	

Planetary gearbox data																	
Gearbox type:			NRBW060, 1-stage						NRBW060, 2-stage								
1. Order code			A26						A27								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18
	$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29
	$M_{2Em.Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80
	$J_{1.G}$	kg cm²	0.357	0.248	0.236	0.225	0.223	0.221	0.35	0.346	0.232	0.241	0.231	0.231	0.222	0.222	0.222
	$\varphi_{2,G}$	'	16						18								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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SIMOTICS S servomotors

Economy angular geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NRBW060

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW060 1- and 2-stage																			
0.489 ... 0.5	1.68 ... 1.72	0.2 (0.22)	n_{2N}	r/min	750	600	500	375	300	250	250	200	150	150	125	100	75	60	50	1FT2203-2AK..-2..0-Z
			M_{2N}	Nm	0.89	1.19	1.47	2	2.55	3.1	2.95	3.8	5.2	5.2	6.4	8	10.7	13.5	15.1	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.46	1.97	2.45	3.45	3.95	4.95	4.45	5.9	7.4	7.9	9.9	12.4	15.9	19.8	18	
			M_{2max}	Nm	5.1	6.8	8.6	12	13.7	17.2	15.3	20	25.5	27	34	42.5	54	64	29	
1.08 ... 1.1	3.46 ... 3.56	0.35 (0.37)	n_{2N}	r/min	750	500	500	300	300	250	250	200	150	150	125	100	75	60	50	1FT2203-4AK..-2..0-Z
			M_{2N}	Nm	2.1	3.35	3.35	5.8	6	7.2	7.1	8.9	12.2	12.3	14.9	18.6	25	31.5	18	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.25	4.35	5.5	7.7	8.8	11	9.8	13.1	16.4	17.5	21.5	27	34.5	40	18	
			M_{2max}	Nm	10.6	14.2	17.7	24.5	28	24	31.5	42	52	56	70	64	70	64	29	
2.14 ... 2.19	6.62 ... 6.8	1.248 (1.328)	n_{2N}	r/min	750	500	500	300	300	250	250	200	150	150	125	100	75	75	–	1FT2204-5AF..-2..0-Z
			M_{2N}	Nm	4.4	6.9	6.9	11.9	12	14.4	14	17.3	23.5	23.5	28	35	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.5	8.7	10.9	15.3	17.4	15	19.5	25.5	32	34.5	43	40	44	40	–	
			M_{2max}	Nm	20	27	33.5	40	29	24	60	70	70	70	70	64	70	64	–	
2.15 ... 2.2	6.62 ... 6.8	1.248 (1.328)	n_{2N}	r/min	750	500	500	300	300	250	250	200	150	150	125	100	75	75	–	1FT2204-5AK..-2..0-Z
			M_{2N}	Nm	4.5	7	7	12.1	12.2	14.6	14.2	17.6	24	24	28.5	35.5	44	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.5	8.7	10.9	15.3	17.5	15	19.6	26	32.5	34.5	43.5	40	44	40	–	
			M_{2max}	Nm	20	27	33.5	40	29	24	60	70	70	70	70	64	70	64	–	
2.88 ... 2.95	8.88 ... 9.12	1.628 (1.708)	n_{2N}	r/min	600	500	375	300	250	250	250	150	150	125	100	100	100	75	–	1FT2204-6AF..-2..0-Z
			M_{2N}	Nm	7	8.8	11.7	15	17.8	15	17.2	28	29	34.5	43.5	40	33	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.8	11.7	14.7	20.5	18	15	26	35	43.5	44	44	40	44	40	–	
			M_{2max}	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	–	

Planetary gearbox data																
Gearbox type:		NRBW060, 1-stage						NRBW060, 2-stage								
1. Order code		A26						A27								
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18
$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29
$M_{2Em.Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80
$J_{1,G}$	kg cm²	0.357	0.248	0.236	0.225	0.223	0.221	0.35	0.346	0.232	0.241	0.231	0.231	0.222	0.222	0.222
$\varphi_{2,G}$	'	16						18								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox									Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW060 3-stage												
0.498 ... 0.51	1.77 ... 1.82	0.093 (0.112)	n_{2N}	r/min	50	37.5	30	30	20	20	15	12.5	**1FT2103-2AH..-2..0-Z**
			M_{2N}	Nm	20	26.5	33	34	44	40	44	39.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30	40	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
0.983 ... 0.993	3.74 ... 3.85	0.139 (0.158)	n_{2N}	r/min	50	37.5	37.5	30	25	20	15	12.5	**1FT2103-4AH..-2..0-Z**
			M_{2N}	Nm	36	44	39	44	44	40	44	40	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
1.12 ... 1.15	3.46 ... 3.56	0.368 (0.448)	n_{2N}	r/min	50	37.5	30	25	20	15	12.5	10	**1FT2104-4AF..-2..0-Z**
			M_{2N}	Nm	44	44	44	44	44	40	44	40	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
1.11 ... 1.14	3.55 ... 3.65	0.368 (0.448)	n_{2N}	r/min	60	50	37.5	37.5	25	20	15	12.5	**1FT2104-4AK..-2..0-Z**
			M_{2N}	Nm	41	42	44	43	44	40	44	40	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
2.18 ... 2.23	7 ... 7.18	0.578 (0.668)	n_{2N}	r/min	50	37.5	30	25	–	–	–	–	**1FT2104-5AF..-2..0-Z**
			M_{2N}	Nm	44	44	44	44	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	–	–	–	–	
			M_{2max}	Nm	70	70	70	70	–	–	–	–	
2.16 ... 2.21	7.09 ... 7.28	0.578 (0.668)	n_{2N}	r/min	60	50	37.5	30	–	–	–	–	**1FT2104-5AK..-2..0-Z**
			M_{2N}	Nm	44	42	44	44	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	–	–	–	–	
			M_{2max}	Nm	70	70	70	70	–	–	–	–	
2.89 ... 2.96	9.35 ... 9.6	0.778 (0.858)	n_{2N}	r/min	50	37.5	30	–	–	–	–	–	**1FT2104-6AF..-2..0-Z**
			M_{2N}	Nm	44	44	44	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	–	–	–	–	–	
			M_{2max}	Nm	70	70	70	–	–	–	–	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW060 3-stage												
0.489 ... 0.5	1.68 ... 1.72	0.2 (0.22)	n_{2N}	r/min	50	30	25	20	20	15	12.5	12.5	**1FT2203-2AK..-2..0-Z**
			M_{2N}	Nm	15.8	26.5	32	40.5	38.5	40	44	33	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29.5	39	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
1.08 ... 1.1	3.46 ... 3.56	0.35 (0.37)	n_{2N}	r/min	50	37.5	30	30	20	15	15	12.5	**1FT2203-4AK..-2..0-Z**
			M_{2N}	Nm	33.5	43.5	44	39	44	40	44	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	44	40	44	40	
			M_{2max}	Nm	70	70	70	70	70	64	70	64	
2.14 ... 2.19	6.62 ... 6.8	1.248 (1.328)	n_{2N}	r/min	50	37.5	30	25	–	–	–	–	**1FT2204-5AF..-2..0-Z**
			M_{2N}	Nm	44	44	44	44	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	44	44	44	44	–	–	–	–	
			M_{2max}	Nm	70	70	70	70	–	–	–	–	

➥ Continued on the next page

Planetary gearbox data									
Gearbox type:		NRBW060, 3-stage							
1. Order code		A28							
i		60	80	100	120	160	200	256	320
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23
$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40
$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64
$M_{2Em.Off}$	Nm	88	88	88	88	88	80	88	80
$J_{1,G}$	kg cm²	0.232	0.231	0.231	0.222	0.222	0.222	0.222	0.222
$\varphi_{2,G}$	'	21							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRBW060

Servomotor data			Selection data servomotors with planetary gearbox									Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)										
Nm	Nm	kg cm²										
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW060 3-stage (continued)												
2.15 ... 2.2	6.62 ... 6.8	1.248 (1.328)	n_{2N} r/min	50	37.5	37.5	30	–	–	–	–	**1FT2204-5AK..-2..0-Z**
			M_{2N} Nm	44	44	43.5	44	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	44	44	44	–	–	–	–	
			M_{2max} Nm	70	70	70	70	–	–	–	–	
2.88 ... 2.95	8.88 ... 9.12	1.628 (1.708)	n_{2N} r/min	50	37.5	30	–	–	–	–	–	**1FT2204-6AF..-2..0-Z**
			M_{2N} Nm	44	44	44	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	44	44	44	–	–	–	–	–	
			M_{2max} Nm	70	70	70	–	–	–	–	–	

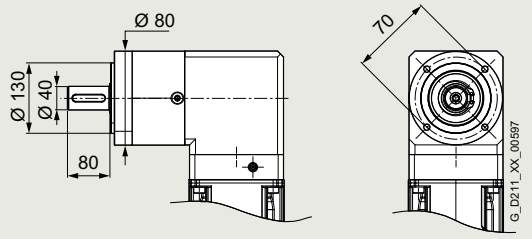
Planetary gearbox data									
Gearbox type:			**NRBW060, 3-stage**						
1. Order code			**A28**						
	i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**
	$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40
	$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64
	$M_{2Em.Off}$	Nm	88	88	88	88	88	80	88	80
	$J_{1,G}$	kg cm²	0.232	0.231	0.231	0.222	0.222	0.222	0.222	0.222
	$\varphi_{2,G}$	'	21							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRBW080



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	750 N
Average axial force for 20000 h	$F_{A,eq}$	1000 N
Average radial force for 30000 h	$F_{R,eq}$	650 N
Average axial force for 30000 h	$F_{A,eq}$	900 N
Maximum radial force	$F_{R,max}$	1250 N
Maximum axial force	$F_{A,max}$	1600 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW080 1- and 2-stage																				
0.422	1.71	0.093	n_{2N}	r/min	750	500	500	375	300	250	250	200	150	150	125	100	75	60	37.5	**1FT2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	0.66	1.07	1.15	1.7	2.15	2.7	2.45	3.15	4.25	4.25	5.4	6.8	9.4	11.8	19.1	■■■ + ■■■ + . . .
0.45	1.75		M_{2_0}	Nm	1.26	1.72	2.15	3.05	3.55	4.45	3.95	5.3	6.6	7.1	8.9	11.2	14.3	17.9	28.5	
			M_{2max}	Nm	5.2	6.9	8.7	12.2	14	17.5	15.6	20.5	26	27.5	34.5	43	55	69	80	
0.983	3.68	0.139	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	**1FT2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	2.1	2.7	3.65	5	5	6	6.1	7.5	10.4	10.1	12.5	15.7	22	27.5	44.5	■■■ + ■■■ + . . .
1.01	3.78		M_{2_0}	Nm	2.9	3.95	4.95	7	8	10	9	12	15	16	20	25	32	40	50	
			M_{2max}	Nm	11.3	15	18.8	26	30	37.5	33.5	44.5	56	59	74	93	119	149	80	
1.06	3.4	0.35	n_{2N}	r/min	750	600	500	375	300	250	300	200	150	150	125	100	75	75	50	**1FT2104-4AF..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.45	3.2	4.05	5.7	7	8.6	6.9	10.3	13.3	13.7	17.1	21.5	28.5	29	39.5	■■■ + ■■■ + . . .
1.08	3.49		M_{2_0}	Nm	3.15	4.25	5.3	7.5	8.6	10.8	9.6	12.8	16.1	17.2	21.5	26.5	34	43	50	
			M_{2max}	Nm	10.4	13.9	17.4	24	27.5	34.5	31	41	51	55	69	86	110	137	80	
1.05	3.49	0.35	n_{2N}	r/min	750	600	500	375	300	250	300	200	150	150	125	100	75	60	50	**1FT2104-4AK..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.65	3.4	4.3	6.1	7.6	9.5	7.2	11.2	14.5	15	18.8	23.5	31	39	41.5	■■■ + ■■■ + . . .
1.08	3.59		M_{2_0}	Nm	3.15	4.2	5.3	7.5	8.5	10.7	9.5	12.8	16	17	21	26.5	34	42.5	50	
			M_{2max}	Nm	10.7	14.3	17.8	25	28.5	35.5	31.5	42.5	53	56	70	88	113	141	80	
2.11	6.91	0.56	n_{2N}	r/min	600	500	375	300	250	200	250	200	150	125	100	75	75	50	50	**1FT2104-5AF..-2..0-Z**
...	...	(0.65)	M_{2N}	Nm	5.7	7	9.6	12.6	15.2	19.2	14.7	17.9	24.5	29.5	37.5	49.5	51	77	49.5	■■■ + ■■■ + . . .
2.16	7.11		M_{2_0}	Nm	6.4	8.5	10.7	15.1	17.2	21.5	19.2	25.5	32	34	42.5	53	68	85	50	
			M_{2max}	Nm	21	28	35.5	49.5	56	61	63	84	105	112	140	175	192	176	80	
2.09	7	0.56	n_{2N}	r/min	600	500	375	300	250	200	250	150	150	125	100	75	75	50	50	**1FT2104-5AK..-2..0-Z**
...	...	(0.65)	M_{2N}	Nm	5.6	6.8	9.5	12.4	14.9	18.9	14.5	24	24	29	37	49	50	75	49.5	■■■ + ■■■ + . . .
2.15	7.2		M_{2_0}	Nm	6.3	8.5	10.6	14.9	17.1	21	19.1	25.5	31.5	34	42.5	53	68	84	50	
			M_{2max}	Nm	21.5	28.5	35.5	50	57	61	64	85	106	113	142	176	192	176	80	
2.82	9.25	0.76	n_{2N}	r/min	600	500	375	300	250	200	200	150	125	125	100	75	60	50	50	**1FT2104-6AF..-2..0-Z**
...	...	(0.84)	M_{2N}	Nm	6.8	8.3	11.5	15	18.1	22.5	21.5	29	35	35	44.5	58	75	90	50	■■■ + ■■■ + . . .
2.89	9.53		M_{2_0}	Nm	8.6	11.5	14.4	20	23	28.5	25.5	34	43	45.5	57	71	91	110	50	
			M_{2max}	Nm	28.5	38	47.5	66	76	61	84	113	141	150	188	176	192	176	80	

➥ Continued on the next page

Planetary gearbox data																
Gearbox type:			NRBW080, 1-stage						NRBW080, 2-stage							
1. Order code			A36						A37							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50
	$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80
	$M_{2Em.Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190
	$J_{1,G}$	kg cm²	1.273	1.004	0.973	0.929	0.92	0.91	1.232	1.209	1.205	0.996	0.955	0.954	0.917	0.916	0.917
	$\varphi_{2,G}$	'	13						15								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRBW080

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW080 1- and 2-stage (continued)																			
4.47 ... 4.59	14 ... 14.4	1.71 (2.55)	n_{2N} r/min	600	500	375	250	250	200	200	150	125	100	100	75	60	60	50	**1FT2105-4AF..-0..0-Z**
			M_{2N} Nm	10.4	12.1	17.2	26.5	26	33	32	42.5	51	62	63	84	107	94	48.5	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	13.7	18.3	22.5	32	36.5	38	40.5	54	68	72	90	110	120	110	50	
			M_{2max} Nm	43	57	71	100	80	61	127	170	176	192	192	176	192	176	80	
4.5 ... 4.62	14 ... 14.4	1.71 (2.55)	n_{2N} r/min	500	375	375	250	200	200	200	150	100	100	75	75	50	50	37.5	**1FT2105-4AH..-0..0-Z**
			M_{2N} Nm	11.3	15.2	15.4	24	30	29.5	29	38.5	57	58	76	76	117	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	13.8	18.4	23	32	36.5	38	41	54	68	73	91	110	120	110	50	
			M_{2max} Nm	43	57	71	100	80	61	127	170	176	192	192	176	192	176	80	
7.27 ... 7.4	22.4 ... 23.1	2.65 (3.5)	n_{2N} r/min	500	375	300	250	200	200	150	125	100	100	75	75	60	60	–	**1FT2105-6AF..-0..0-Z**
			M_{2N} Nm	15.6	20.5	26.5	32	40.5	37.5	51	61	76	76	101	97	119	96	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	22	29.5	36.5	51	50	38	66	88	110	117	120	110	120	110	–	
			M_{2max} Nm	64	85	107	104	80	61	205	192	176	192	192	176	192	176	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW080 1- and 2-stage																			
0.409 ... 0.437	1.62 ... 1.66	0.2 (0.22)	n_{2N} r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	30	**1FT2203-2AK..-0..0-Z**
			M_{2N} Nm	0.9	1.26	1.37	2.2	2.25	2.9	2.75	3.7	4.5	4.5	5.8	7.8	10.2	12.3	20.5	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	1.22	1.67	2.1	3	3.45	4.3	3.85	5.1	6.4	6.9	8.6	10.8	13.9	17.4	27.5	
			M_{2max} Nm	4.9	6.5	8.2	11.5	13.2	16.5	14.7	19.7	24.5	26	32.5	41	52	65	80	
1.02 ... 1.04	3.4 ... 3.49	0.35 (0.37)	n_{2N} r/min	600	500	375	300	250	200	250	200	150	125	100	100	75	60	37.5	**1FT2203-4AK..-0..0-Z**
			M_{2N} Nm	2.35	2.95	4	5.4	6.4	8.1	6.5	7.8	11.1	12.8	16.2	16.2	23.5	29.5	47.5	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	3	4.05	5.1	7.2	8.2	10.3	9.2	12.3	15.4	16.4	20.5	25.5	33	41	50	
			M_{2max} Nm	10.4	13.9	17.4	24	27.5	34.5	31	41	51	55	69	86	110	137	80	
2.07 ... 2.12	6.53 ... 6.72	1.23 (1.31)	n_{2N} r/min	600	500	375	300	250	200	250	150	125	125	100	75	60	50	50	**1FT2204-5AF..-2..0-Z**
			M_{2N} Nm	5.4	6.5	9.1	11.8	14.4	18.2	13.7	22.5	27.5	28	36	46.5	59	73	39	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	6.3	8.4	10.5	14.8	16.9	21	18.9	25	31.5	33.5	42	52	67	83	50	
			M_{2max} Nm	20	26.5	33.5	47	53	61	59	79	99	106	132	165	192	176	80	
2.08 ... 2.13	6.53 ... 6.72	1.23 (1.31)	n_{2N} r/min	600	500	375	300	250	200	200	150	125	125	100	75	60	50	50	**1FT2204-5AK..-2..0-Z**
			M_{2N} Nm	5.5	6.7	9.3	12.1	14.7	18.5	17.6	23	28.5	28.5	36.5	48	61	74	39.5	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	6.3	8.4	10.6	14.9	17	21	19	25	31.5	33.5	42	52	67	84	50	
			M_{2max} Nm	20	26.5	33.5	47	53	61	59	79	99	106	132	165	192	176	80	
2.81 ... 2.88	8.78 ... 9.04	1.61 (1.69)	n_{2N} r/min	600	500	375	250	250	200	200	150	125	125	100	75	60	50	50	**1FT2204-6AF..-2..0-Z**
			M_{2N} Nm	7.1	8.5	11.9	18.4	18.7	23.5	22.5	30	36.5	36	45.5	61	77	93	44.5	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	8.5	11.4	14.3	20	23	28.5	25.5	34	42.5	45.5	57	71	91	110	50	
			M_{2max} Nm	27	36	45	63	72	61	80	107	134	142	178	176	192	176	80	
2.87 ... 2.92	10 ... 10.3	3.15 (4.05)	n_{2N} r/min	600	375	375	250	250	200	200	150	125	100	100	75	60	50	37.5	**1FT2205-2AC..-0..0-Z**
			M_{2N} Nm	5.8	9.2	9.8	15.5	15.1	19.2	19.3	25.5	30.5	36.5	37.5	51	65	77	50	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	8.7	11.6	14.5	20	23	29	26	34.5	43.5	46	58	72	92	110	49.5	
			M_{2max} Nm	30.5	41	51	72	80	61	91	122	152	162	192	176	192	176	80	
2.91 ... 2.96	10 ... 10.3	3.15 (4.05)	n_{2N} r/min	600	500	375	300	250	200	200	150	125	125	100	75	60	50	37.5	**1FT2205-2AF..-0..0-Z**
			M_{2N} Nm	7	8.5	11.8	15.2	18.6	23	21.5	28.5	35.5	36	45.5	59	76	92	50	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	8.8	11.7	14.7	20.5	23.5	29.5	26.5	35	44	47	58	73	94	110	50	
			M_{2max} Nm	30.5	41	51	72	80	61	91	122	152	162	192	176	192	176	80	

➥ Continued on the next page

Planetary gearbox data																
Gearbox type:		NRBW080, 1-stage						NRBW080, 2-stage								
1. Order code		A36						A37								
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50
$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80
$M_{2Em.Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190
$J_{1,G}$	kg cm²	1.273	1.004	0.973	0.929	0.92	0.91	1.232	1.209	1.205	0.996	0.955	0.954	0.917	0.916	0.917
$\varphi_{2,G}$	'	13						15								

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW080 1- and 2-stage (continued)																			
2.87	10	3.15	n_{2N}	r/min	600	500	375	250	250	200	200	150	125	100	100	75	60	50	37.5	**1FT2205-2AH..-0..0-Z**
...	...	(4.05)	M_{2N}	Nm	6.3	7.4	10.6	16.3	16.4	20.5	20.5	27	32.5	37.5	40.5	55	70	83	50	■■■ + ■■■ + . . .
2.92	10.3		$M_{2,0}$	Nm	8.7	11.6	14.5	20	23	29	26	34.5	43.5	46	57	72	92	110	49.5	
			M_{2max}	Nm	30.5	41	51	72	80	61	91	122	152	162	192	176	192	176	80	
4.95	16.8	5.1	n_{2N}	r/min	500	375	300	250	200	200	200	125	100	100	75	60	50	50	37.5	**1FT2205-4AF..-0..0-Z**
...	...	(6)	M_{2N}	Nm	11.2	15.1	19.2	23.5	29.5	28.5	28.5	45.5	57	57	76	94	116	108	50	■■■ + ■■■ + . . .
5.04	17.3		$M_{2,0}$	Nm	15.1	20	25	35	40	38	45	60	75	80	100	110	120	110	50	
			M_{2max}	Nm	51	69	86	104	80	61	153	192	176	192	192	176	192	176	80	

Planetary gearbox data																
Gearbox type:			**NRBW080, 1-stage**						**NRBW080, 2-stage**							
1. Order code			**A36**						**A37**							
i			**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
$M_{2N,G}$		Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50
$M_{2max,G}$		Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80
$M_{2Em.Off}$		Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190
$J_{1,G}$		kg cm²	1.273	1.004	0.973	0.929	0.92	0.91	1.232	1.209	1.205	0.996	0.955	0.954	0.917	0.916	0.917
$\varphi_{2,G}$		'	13						15								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRBW080

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW080 3-stage													
0.422 ... 0.45	1.71 ... 1.75	0.093 (0.112)	n_{2N}	r/min	37.5	30	25	20	15	15	10	7.5	6	**1FT2103-2AH..-0..0-Z**
			M_{2N}	Nm	17.7	23	28	33.5	48	49.5	73	96	49.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	26.5	35.5	44.5	53	71	89	114	110	49.5	
			M_{2max}	Nm	103	137	171	176	192	176	192	176	80	
0.983 ... 1.01	3.68 ... 3.78	0.139 (0.158)	n_{2N}	r/min	37.5	30	25	20	15	15	12.5	10	6	**1FT2103-4AH..-0..0-Z**
			M_{2N}	Nm	42	55	65	80	112	98	104	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	60	80	100	110	120	110	120	110	50	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	80	
1.06 ... 1.08	3.4 ... 3.49	0.35 (0.43)	n_{2N}	r/min	37.5	37.5	25	20	20	15	12.5	10	6	**1FT2104-4AF..-2..0-Z**
			M_{2N}	Nm	53	56	85	103	103	110	120	110	49.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	64	85	106	110	120	110	120	110	49.5	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	80	
1.05 ... 1.08	3.49 ... 3.59	0.35 (0.43)	n_{2N}	r/min	37.5	30	25	20	20	15	12.5	10	7.5	**1FT2104-4AK..-2..0-Z**
			M_{2N}	Nm	58	76	93	110	108	110	120	110	50	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	63	84	105	110	120	110	120	110	49.5	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	80	
2.11 ... 2.16	6.91 ... 7.11	0.56 (0.65)	n_{2N}	r/min	37.5	30	25	25	20	15	12.5	10	–	**1FT2104-5AF..-2..0-Z**
			M_{2N}	Nm	98	119	120	107	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.09 ... 2.15	7 ... 7.2	0.56 (0.65)	n_{2N}	r/min	37.5	30	25	25	20	15	12.5	10	–	**1FT2104-5AK..-2..0-Z**
			M_{2N}	Nm	97	119	120	107	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
2.82 ... 2.89	9.25 ... 9.53	0.76 (0.84)	n_{2N}	r/min	37.5	30	30	25	20	15	12.5	10	–	**1FT2104-6AF..-2..0-Z**
			M_{2N}	Nm	110	120	108	110	120	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	–	
			M_{2max}	Nm	176	192	192	176	192	176	192	176	–	
4.47 ... 4.59	14 ... 14.4	1.71 (2.55)	n_{2N}	r/min	37.5	30	30	25	20	–	–	–	–	**1FT2105-4AF..-0..0-Z**
			M_{2N}	Nm	110	120	106	110	119	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	–	–	–	–	
			M_{2max}	Nm	176	192	192	176	192	–	–	–	–	
4.5 ... 4.62	14 ... 14.4	1.71 (2.55)	n_{2N}	r/min	37.5	30	25	20	15	–	–	–	–	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	110	120	120	110	120	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	110	120	–	–	–	–	
			M_{2max}	Nm	176	192	192	176	192	–	–	–	–	
7.27 ... 7.4	22.4 ... 23.1	2.65 (3.5)	n_{2N}	r/min	37.5	30	25	–	–	–	–	–	–	**1FT2105-6AF..-0..0-Z**
			M_{2N}	Nm	110	120	120	–	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	110	120	120	–	–	–	–	–	–	
			M_{2max}	Nm	176	192	192	–	–	–	–	–	–	

Planetary gearbox data										
Gearbox type:			**NRBW080, 3-stage**							
1. Order code			**A38**							
i			**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
$M_{2N,G}$	Nm		110	120	120	110	120	110	120	110	50
$M_{2max,G}$	Nm		176	192	192	176	192	176	192	176	80
$M_{2Em.Off}$	Nm		220	240	240	220	240	220	240	220	190
$J_{1,G}$	kg cm²		1.203	0.955	0.954	1.209	0.916	0.916	0.917	0.917	0.917
$\varphi_{2,G}$	'		17							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW080 3-stage													
0.409 ... 0.437	1.62 ... 1.66	0.2 (0.22)	n_{2N} r/min	30	25	20	15	12.5	10	7.5	7.5	6	**1FT2203-2AK..-0..0-Z**
			M_{2N} Nm	19.5	24	30.5	39	50	63	83	83	50	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	25.5	34.5	43	51	69	86	110	110	49.5	
			M_{2max} Nm	97	130	162	176	192	176	192	176	80	
1.02 ... 1.04	3.4 ... 3.49	0.35 (0.37)	n_{2N} r/min	37.5	30	25	20	15	12.5	10	10	6	**1FT2203-4AK..-0..0-Z**
			M_{2N} Nm	45	58	68	85	119	110	120	100	50	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	61	81	102	110	120	110	120	110	50	
			M_{2max} Nm	176	192	192	176	192	176	192	176	80	
2.07 ... 2.12	6.53 ... 6.72	1.23 (1.31)	n_{2N} r/min	37.5	30	25	20	20	15	12.5	10	–	**1FT2204-5AF..-2..0-Z**
			M_{2N} Nm	92	114	120	110	106	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	120	110	120	110	–	
			M_{2max} Nm	176	192	192	176	192	176	192	176	–	
2.08 ... 2.13	6.53 ... 6.72	1.23 (1.31)	n_{2N} r/min	37.5	30	25	25	20	15	12.5	10	–	**1FT2204-5AK..-2..0-Z**
			M_{2N} Nm	94	116	120	88	107	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	120	110	120	110	–	
			M_{2max} Nm	176	192	192	176	192	176	192	176	–	
2.81 ... 2.88	8.78 ... 9.04	1.61 (1.69)	n_{2N} r/min	37.5	30	25	25	20	15	12.5	10	–	**1FT2204-6AF..-2..0-Z**
			M_{2N} Nm	110	120	120	100	117	110	120	110	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	120	110	120	110	–	
			M_{2max} Nm	176	192	192	176	192	176	192	176	–	
2.87 ... 2.92	10 ... 10.3	3.15 (4.05)	n_{2N} r/min	37.5	25	20	20	12.5	10	10	–	–	**1FT2205-2AC..-0..0-Z**
			M_{2N} Nm	89	120	120	110	120	110	120	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	120	110	120	–	–	
			M_{2max} Nm	176	192	192	176	192	176	192	–	–	
2.91 ... 2.96	10 ... 10.3	3.15 (4.05)	n_{2N} r/min	37.5	30	25	25	20	15	12.5	–	–	**1FT2205-2AF..-0..0-Z**
			M_{2N} Nm	109	120	120	89	100	110	120	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	120	110	119	–	–	
			M_{2max} Nm	176	192	192	176	192	176	192	–	–	
2.87 ... 2.92	10 ... 10.3	3.15 (4.05)	n_{2N} r/min	37.5	30	25	20	15	15	10	–	–	**1FT2205-2AH..-0..0-Z**
			M_{2N} Nm	98	116	120	110	120	109	120	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	119	110	120	109	119	–	–	
			M_{2max} Nm	176	192	192	176	192	176	192	–	–	
4.95 ... 5.04	16.8 ... 17.3	5.1 (6)	n_{2N} r/min	37.5	30	25	20	15	–	–	–	–	**1FT2205-4AF..-0..0-Z**
			M_{2N} Nm	110	120	120	110	120	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	110	120	120	110	120	–	–	–	–	
			M_{2max} Nm	176	192	192	176	192	–	–	–	–	

Planetary gearbox data										
Gearbox type:		**NRBW080, 3-stage**								
1. Order code		**A38**								
i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**	**512**
2. Order code		**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**	**R51**
$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50
$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80
$M_{2Em.Off}$	Nm	220	240	240	220	240	220	240	220	190
$J_{1,G}$	kg cm²	1.203	0.955	0.954	1.209	0.916	0.916	0.917	0.917	0.917
$\varphi_{2,G}$	'	17								

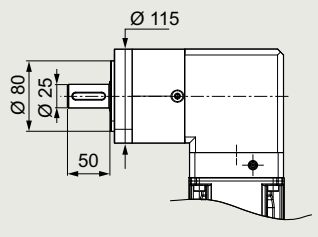
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRBW120

Selection and ordering data

NRBW120



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1750 N
Average axial force for 20000 h	$F_{A,eq}$	2500 N
Average radial force for 30000 h	$F_{R,eq}$	1500 N
Average axial force for 30000 h	$F_{A,eq}$	2100 N
Maximum radial force	$F_{R,max}$	2000 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 1- and 2-stage																				
0.31	1.62	0.093	n_{2N}	r/min	375	375	300	250	200	200	150	125	100	100	100	75	60	50	30	**1FT2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	0.56	0.69	1.07	1.55	2	2.1	2.1	2.75	3.55	3.7	4.1	5.7	8	9.7	16.4	■■■ + ■■■ + . . .
0.379	1.67		M_{2_0}	Nm	0.92	1.31	1.7	2.45	2.85	3.65	3.2	4.35	5.5	5.9	7.4	9.3	12	15.1	24	
			M_{2max}	Nm	4.85	6.5	8.2	11.6	13.3	16.7	14.8	19.9	24.5	26.5	33	41.5	53	66	106	
0.92	3.61	0.139	n_{2N}	r/min	600	500	375	300	300	200	250	150	150	125	125	100	75	60	37.5	**1FT2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	1.61	2.1	3.1	4.4	4.4	6.7	4.65	7.8	8.3	10	10.8	13.8	20	25	40.5	■■■ + ■■■ + . . .
0.978	3.7		M_{2_0}	Nm	2.75	3.75	4.75	6.7	7.7	9.7	8.6	11.6	14.5	15.5	19.4	24	31	39	62	
			M_{2max}	Nm	10.9	14.6	18.3	25.5	29.5	36.5	32.5	43.5	54	58	73	91	117	146	192	
0.948	3.33	0.35	n_{2N}	r/min	600	500	375	375	300	250	250	200	150	150	125	100	75	60	37.5	**1FT2104-4AF..-0..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.1	2.85	4	4.7	6	7.5	6.3	8.1	10.9	11.3	14.7	18.5	25.5	32.5	52	■■■ + ■■■ + . . .
1.01	3.41		M_{2_0}	Nm	2.8	3.85	4.85	6.9	7.9	10	8.9	11.9	14.9	15.9	20	25	32	40	64	
			M_{2max}	Nm	10	13.5	16.9	23.5	27	34	30	40.5	50	54	67	84	108	135	192	
0.941	3.42	0.35	n_{2N}	r/min	600	500	500	375	300	250	250	200	150	150	125	100	75	60	37.5	**1FT2104-4AK..-0..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.25	3.1	3.1	5	6.7	8.4	7.1	9.2	12	12.7	16.5	20.5	27.5	34.5	55	■■■ + ■■■ + . . .
0.999	3.5		M_{2_0}	Nm	2.8	3.8	4.85	6.8	7.9	9.9	8.8	11.8	14.8	15.8	19.8	24.5	31.5	39.5	63	
			M_{2max}	Nm	10.3	13.9	17.4	24	27.5	35	31	41.5	52	55	69	86	111	138	192	
2.03	6.84	0.56	n_{2N}	r/min	600	500	375	300	250	200	200	150	125	125	100	100	75	60	37.5	**1FT2104-5AF..-0..0-Z**
...	...	(0.65)	M_{2N}	Nm	5.2	6.5	9.5	13.1	15.5	19.5	17	22.5	28	30	38	36.5	56	70	112	■■■ + ■■■ + . . .
2.08	7.02		M_{2_0}	Nm	6	8.1	10.2	14.4	16.5	20.5	18.5	24.5	30.5	33	41	51	66	82	120	
			M_{2max}	Nm	20.5	28	35	49	56	70	62	83	104	111	138	173	220	275	192	
2.02	6.93	0.56	n_{2N}	r/min	600	500	375	300	250	200	200	150	125	125	100	100	75	60	37.5	**1FT2104-5AK..-0..0-Z**
...	...	(0.65)	M_{2N}	Nm	5.1	6.4	9.4	12.9	15.4	19.4	16.8	22.5	28	30	38	36	55	68	110	■■■ + ■■■ + . . .
2.07	7.12		M_{2_0}	Nm	6	8.1	10.2	14.3	16.4	20.5	18.3	24.5	30.5	32.5	41	51	65	82	120	
			M_{2max}	Nm	21	28	35.5	49.5	56	71	63	84	105	112	140	175	225	280	192	
2.75	9.18	0.76	n_{2N}	r/min	500	500	375	300	250	200	200	150	125	125	100	75	60	50	37.5	**1FT2104-6AF..-0..0-Z**
...	...	(0.84)	M_{2N}	Nm	7.8	7.9	12	15.9	19.6	25	23	30.5	37	37.5	49	65	85	103	120	■■■ + ■■■ + . . .
2.81	9.44		M_{2_0}	Nm	8.3	11.1	13.9	19.6	22	28	25	33	41.5	44.5	55	69	89	111	120	
			M_{2max}	Nm	28	37.5	47	65	75	94	84	112	140	149	186	230	295	368	192	

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Planetary gearbox data																
Gearbox type:			NRBW120, 1-stage						NRBW120, 2-stage							
1. Order code			A46						A47							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380
	$J_{1.G}$	kg cm²	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855
	$\varphi_{2,G}$	'	11						13								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 1- and 2-stage (continued)																			
4.4 ... 4.51	13.9 ... 14.3	1.71 (2.55)	n_{2N}	r/min	600	500	375	300	250	200	200	150	125	125	100	75	60	50	37.5	**1FT2105-4AF..-0..0-Z**
			M_{2N}	Nm	10.2	12.1	18.5	23.5	29.5	38	34	45.5	56	55	72	95	123	151	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.4	17.9	22	31.5	36	45	40	53	67	71	89	111	142	178	120	
			M_{2max}	Nm	42.5	57	71	99	114	142	127	169	210	225	280	350	416	368	192	
4.43 ... 4.54	13.9 ... 14.3	1.71 (2.55)	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	11.3	15.4	16.8	26	26.5	34.5	32	43	51	50	66	90	117	139	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.5	18	22.5	31.5	36	45	40	53	67	71	89	112	143	179	120	
			M_{2max}	Nm	42.5	57	71	99	114	142	127	169	210	225	280	350	416	368	192	
7.22 ... 7.41	22.3 ... 23	2.65 (3.5)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	50	37.5	**1FT2105-6AF..-0..0-Z**
			M_{2N}	Nm	17	23	30	37.5	48	63	43	72	90	90	122	152	188	179	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22	29.5	36.5	51	59	74	66	88	110	117	146	183	230	230	120	
			M_{2max}	Nm	68	91	114	160	183	152	200	270	340	360	416	368	416	368	192	
7.66 ... 7.8	24.2 ... 24.9	4.6 (6.3)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	50	37.5	**1FT2106-3AF..-0..0-Z**
			M_{2N}	Nm	17.6	24	31	39	49.5	63	44.5	74	93	93	125	156	194	184	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	23	31	38.5	54	62	78	69	93	116	124	154	193	245	230	120	
			M_{2max}	Nm	74	99	124	174	192	152	220	295	368	390	416	368	416	368	192	
9.97 ... 10.1	30.8 ... 31.7	6 (7.6)	n_{2N}	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	50	37.5	**1FT2106-4AF..-0..0-Z**
			M_{2N}	Nm	20.5	28.5	37	55	57	78	70	86	107	106	146	182	220	196	120	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30	40.5	50	70	81	95	90	121	151	161	200	230	260	230	120	
			M_{2max}	Nm	95	126	158	216	192	152	280	375	368	416	416	368	416	368	192	
14.1 ... 14.4	42.5 ... 43.8	8.7 (10.4)	n_{2N}	r/min	375	300	250	200	200	150	150	100	75	75	60	60	50	50	–	**1FT2106-6AF..-0..0-Z**
			M_{2N}	Nm	34.5	44	54	70	69	94	87	129	170	171	215	210	255	220	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	43	57	71	100	115	95	128	171	210	225	260	230	260	230	–	
			M_{2max}	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 1- and 2-stage																			
0.297 ... 0.367	1.52 ... 1.58	0.2 (0.22)	n_{2N}	r/min	375	375	300	250	200	150	150	125	100	100	75	75	60	50	30	**1FT2203-2AK..-0..0-Z**
			M_{2N}	Nm	0.52	0.66	1.06	1.45	1.95	2.6	2	2.6	3.35	3.55	5	5.2	7.5	9	15.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	0.88	1.26	1.64	2.35	2.75	3.5	3.1	4.2	5.3	5.7	7.1	9	11.6	14.5	23	
			M_{2max}	Nm	4.55	6.1	7.7	10.9	12.5	15.7	14	18.7	23	25	31	39	50	62	100	
0.903 ... 0.961	3.33 ... 3.41	0.35 (0.37)	n_{2N}	r/min	600	500	375	300	250	200	200	150	150	125	100	100	75	60	37.5	**1FT2203-4AK..-0..0-Z**
			M_{2N}	Nm	1.85	2.4	3.5	4.95	5.9	7.6	6.6	8.9	9.3	11.4	15	14.9	22	27.5	44.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.7	3.65	4.65	6.6	7.6	9.5	8.5	11.4	14.3	15.2	19.1	23.5	30.5	38	61	
			M_{2max}	Nm	10	13.5	16.9	23.5	27	34	30	40.5	50	54	67	84	108	135	192	
1.99 ... 2.04	6.47 ... 6.64	1.23 (1.31)	n_{2N}	r/min	600	500	375	300	250	200	200	150	125	125	100	75	75	60	37.5	**1FT2204-5AF..-0..0-Z**
			M_{2N}	Nm	5	6.1	9	12.3	14.6	18.5	16.4	22	27	28	36	46.5	52	65	105	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.9	8	10	14.2	16.2	20	18.1	24	30	32	40	50	64	81	120	
			M_{2max}	Nm	19.8	26	33	46	53	66	59	78	98	105	131	164	210	260	192	
2 ... 2.05	6.47 ... 6.64	1.23 (1.31)	n_{2N}	r/min	600	500	375	300	250	200	200	150	125	125	100	75	75	60	37.5	**1FT2204-5AK..-0..0-Z**
			M_{2N}	Nm	5.1	6.2	9.3	12.6	15.2	19.1	16.6	22	27.5	29.5	37.5	47	53	66	107	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6	8	10.1	14.3	16.3	20.5	18.2	24	30.5	32.5	40.5	50	65	81	120	
			M_{2max}	Nm	19.8	26	33	46	53	66	59	78	98	105	131	164	210	260	192	

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Planetary gearbox data																
Gearbox type:			NRBW120, 1-stage						NRBW120, 2-stage							
1. Order code			A46						A47							
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
	$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855
	$\varphi_{2,G}$	'	11						13								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRBW120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 1- and 2-stage (continued)																				
2.74 ... 2.8	8.71 ... 8.95	1.61 (1.69)	n_{2N} r/min	600	500	375	300	250	200	200	150	125	125	100	75	60	50	37.5	**1FT2204-6AF..-0..0-Z**
			M_{2N} Nm	6.8	8.2	12.6	16.5	20.5	26	23	31	38.5	39	51	65	84	105	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	8.2	11	13.8	19.5	22	27.5	24.5	33	41.5	44	55	69	88	111	120	
			M_{2max} Nm	26.5	35.5	44.5	62	71	89	79	106	132	141	177	220	280	350	192	
2.99 ... 3.03	9.93 ... 10.2	3.15 (4.05)	n_{2N} r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	**1FT2205-2AC..-0..0-Z**
			M_{2N} Nm	6.7	9.1	10.5	15.9	17.1	22	19.7	26	32.5	32.5	43	55	72	88	105	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	8.9	12	15	21	24	30	27	36	45	48	60	75	96	120	120	
			M_{2max} Nm	30.5	40.5	50	71	81	102	91	121	151	161	200	250	320	368	192	
3.02 ... 3.06	9.93 ... 10.2	3.15 (4.05)	n_{2N} r/min	600	500	375	300	250	200	200	150	125	125	100	75	75	60	37.5	**1FT2205-2AF..-0..0-Z**
			M_{2N} Nm	6.6	8.1	11.6	15.9	18.8	23.5	21	28	34.5	36.5	46.5	59	65	81	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	9	12.1	15.2	21	24	30.5	27	36.5	45.5	48.5	61	76	97	122	120	
			M_{2max} Nm	30.5	40.5	50	71	81	102	91	121	151	161	200	250	320	368	192	
2.96 ... 3	9.93 ... 10.2	3.15 (4.05)	n_{2N} r/min	600	375	375	300	250	200	200	150	125	125	100	75	60	50	37.5	**1FT2205-2AH..-0..0-Z**
			M_{2N} Nm	5.9	9.3	11	14.2	17.9	22.5	20	26.5	33	34.5	44	56	73	90	114	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	8.8	11.8	14.9	20.5	23.5	30	26.5	35.5	44.5	47.5	59	74	95	119	120	
			M_{2max} Nm	30.5	40.5	50	71	81	102	91	121	151	161	200	250	320	368	192	
5.14 ... 5.23	16.7 ... 17.2	5.1 (6)	n_{2N} r/min	500	375	300	250	200	200	200	150	100	100	100	75	60	50	37.5	**1FT2205-4AF..-0..0-Z**
			M_{2N} Nm	11.9	16.5	21	27	33.5	33.5	31.5	42.5	63	65	64	88	115	135	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	15.5	20.5	26	36.5	41.5	52	46.5	62	78	83	103	129	166	205	120	
			M_{2max} Nm	51	68	85	120	137	152	153	200	250	270	335	368	416	368	192	
5.15 ... 5.27	16.7 ... 17.2	7.8 (9.4)	n_{2N} r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	30	**1FT2206-2AC..-0..0-Z**
			M_{2N} Nm	10.7	15	19.8	30.5	31	42.5	39.5	48	60	60	83	104	127	170	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	15.7	20.5	26	36.5	42	52	47	62	78	83	104	130	167	205	119	
			M_{2max} Nm	51	68	85	120	137	152	153	200	250	270	335	368	416	368	192	
5.29 ... 5.39	16.7 ... 17.2	7.8 (9.4)	n_{2N} r/min	600	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	**1FT2206-2AF..-0..0-Z**
			M_{2N} Nm	10.4	16.9	18.9	29	30	38.5	35.5	47.5	57	55	72	99	128	152	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	16	21	26.5	37.5	43	53	48	64	80	85	107	133	171	210	120	
			M_{2max} Nm	51	68	85	120	137	152	153	200	250	270	335	368	416	368	192	
5.13 ... 5.23	16.7 ... 17.2	7.8 (9.4)	n_{2N} r/min	500	375	300	250	200	150	200	125	100	100	75	75	50	50	37.5	**1FT2206-2AH..-0..0-Z**
			M_{2N} Nm	11.8	16.5	20.5	26.5	33.5	42.5	30.5	50	62	65	84	85	133	129	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	15.5	20.5	26	36.5	41.5	52	46.5	62	77	83	103	129	166	205	120	
			M_{2max} Nm	51	68	85	120	137	152	153	200	250	270	335	368	416	368	192	
7.8 ... 7.95	25.1 ... 25.9	11.5 (13.1)	n_{2N} r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	25	**1FT2206-3AB..-0..0-Z**
			M_{2N} Nm	16	22	28.5	44	45	61	56	68	85	85	117	145	179	230	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	23.5	31.5	39.5	55	63	79	71	94	118	126	157	197	250	230	120	
			M_{2max} Nm	77	103	129	180	192	152	230	305	368	405	416	368	416	368	192	
7.68 ... 7.82	25.1 ... 25.9	11.5 (13.1)	n_{2N} r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	37.5	**1FT2206-3AF..-0..0-Z**
			M_{2N} Nm	15.1	21	27.5	42.5	43	58	54	65	82	81	112	140	171	225	120	■■■ + ■■■ + . . .
			$M_{2,0}$ Nm	23	31	38.5	54	62	78	70	93	116	124	155	193	245	230	120	
			M_{2max} Nm	77	103	129	180	192	152	230	305	368	405	416	368	416	368	192	

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Planetary gearbox data																
Gearbox type:			**NRBW120, 1-stage**						**NRBW120, 2-stage**							
1. Order code			**A46**						**A47**							
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
	$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120
	$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380
	$J_{1,G}$	kg cm²	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855
	$\varphi_{2,G}$	'	11						13								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 1- and 2-stage (continued)																			
10.6	35.5	15.1	n_{2N}	r/min	375	250	200	150	150	125	125	100	75	75	60	50	37.5	37.5	30	**1FT2206-4AC..-0..0-Z**
...	...	(16.8)	M_{2N}	Nm	20.5	31.5	40	54	55	67	64	80	107	107	135	160	215	199	120	■■■ + ■■■ + . . .
10.8	36.5		$M_{2,0}$	Nm	32	43	54	75	86	95	96	128	160	171	210	230	260	230	120	
			M_{2max}	Nm	109	145	182	216	192	152	325	416	368	416	416	368	416	368	192	
10.4	33.6	15.1	n_{2N}	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	50	37.5	**1FT2206-4AF..-0..0-Z**
...	...	(16.8)	M_{2N}	Nm	21	29	37.5	58	58	79	73	87	109	107	148	184	225	199	120	■■■ + ■■■ + . . .
10.6	34.6		$M_{2,0}$	Nm	31.5	42	52	74	84	95	94	126	158	168	210	230	260	230	120	
			M_{2max}	Nm	103	138	172	216	192	152	305	405	368	416	416	368	416	368	192	
9.93	33.6	15.1	n_{2N}	r/min	375	300	250	200	150	150	150	100	75	75	60	50	37.5	37.5	37.5	**1FT2206-4AH..-0..0-Z**
...	...	(16.8)	M_{2N}	Nm	23.5	30	37.5	48	63	65	61	92	120	122	154	185	245	230	113	■■■ + ■■■ + . . .
10.1	34.6		$M_{2,0}$	Nm	30	40	50	70	80	95	90	120	150	160	200	230	260	230	119	
			M_{2max}	Nm	103	138	172	216	192	152	305	405	368	416	416	368	416	368	192	

Planetary gearbox data																
Gearbox type:			**NRBW120, 1-stage**						**NRBW120, 2-stage**							
1. Order code			**A46**						**A47**							
i			**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**
$M_{2N,G}$		Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120
$M_{2max,G}$		Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192
$M_{2Em.Off}$		Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380
$J_{1,G}$		kg cm²	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855
$\varphi_{2,G}$		'	11						13								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRBW120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox									Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 3-stage												
0.31 ... 0.379	1.62 ... 1.67	0.093 (0.112)	n_{2N}	r/min	30	25	20	15	12.5	10	7.5	6	**1FT2103-2AH..-0..0-Z**
			M_{2N}	Nm	12.9	17.9	22.5	26.5	40.5	50	67	84	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30	37.5	45	60	75	96	120	
			M_{2max}	Nm	99	131	164	197	260	325	416	368	
0.92 ... 0.978	3.61 ... 3.7	0.139 (0.158)	n_{2N}	r/min	37.5	30	25	20	15	12.5	10	7.5	**1FT2103-4AH..-0..0-Z**
			M_{2N}	Nm	34.5	48	58	66	102	124	157	205	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	58	77	96	116	155	193	245	230	
			M_{2max}	Nm	215	285	360	368	416	368	416	368	
0.948 ... 1.01	3.33 ... 3.41	0.35 (0.43)	n_{2N}	r/min	37.5	30	25	20	15	15	10	10	**1FT2104-4AF..-0..0-Z**
			M_{2N}	Nm	45	62	75	86	131	139	200	178	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	59	79	99	119	159	198	250	230	
			M_{2max}	Nm	200	265	330	368	416	368	416	368	
0.941 ... 0.999	3.42 ... 3.5	0.35 (0.43)	n_{2N}	r/min	37.5	30	25	20	15	15	10	10	**1FT2104-4AK..-0..0-Z**
			M_{2N}	Nm	48	66	82	96	137	149	215	188	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	59	79	98	118	158	197	250	230	
			M_{2max}	Nm	205	270	340	368	416	368	416	368	
2.03 ... 2.08	6.84 ... 7.02	0.56 (0.65)	n_{2N}	r/min	37.5	30	25	20	15	15	10	10	**1FT2104-5AF..-0..0-Z**
			M_{2N}	Nm	100	131	152	176	260	210	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	122	163	200	230	260	230	260	230	
			M_{2max}	Nm	410	416	416	368	416	368	416	368	
2.02 ... 2.07	6.93 ... 7.12	0.56 (0.65)	n_{2N}	r/min	37.5	30	20	20	15	15	10	10	**1FT2104-5AK..-0..0-Z**
			M_{2N}	Nm	98	129	188	174	260	210	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	122	162	200	230	260	230	260	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
2.75 ... 2.81	9.18 ... 9.44	0.76 (0.84)	n_{2N}	r/min	30	25	20	20	15	15	12.5	10	**1FT2104-6AF..-0..0-Z**
			M_{2N}	Nm	155	198	245	205	260	230	230	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	165	220	260	230	260	230	260	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
4.4 ... 4.51	13.9 ... 14.3	1.71 (2.55)	n_{2N}	r/min	30	25	25	20	15	15	12.5	10	**1FT2105-4AF..-0..0-Z**
			M_{2N}	Nm	225	260	225	230	260	230	210	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	260	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
4.43 ... 4.54	13.9 ... 14.3	1.71 (2.55)	n_{2N}	r/min	30	25	20	20	15	12.5	10	7.5	**1FT2105-4AH..-0..0-Z**
			M_{2N}	Nm	215	255	260	220	260	230	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	260	225	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
7.22 ... 7.41	22.3 ... 23	2.65 (3.5)	n_{2N}	r/min	30	25	25	20	15	15	10	–	**1FT2105-6AF..-0..0-Z**
			M_{2N}	Nm	260	260	230	230	260	210	260	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	260	–	
			M_{2max}	Nm	416	416	416	368	416	368	416	–	

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Planetary gearbox data									
Gearbox type:			**NRBW120, 3-stage**						
1. Order code			**A48**						
i			**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**
$M_{2N,G}$		Nm	260	260	260	230	260	230	260	230
$M_{2max,G}$		Nm	416	416	416	368	416	368	416	368
$M_{2Em.Off}$		Nm	520	520	520	500	520	500	520	500
$J_{1,G}$		kg cm²	2.681	2.011	2.005	2.663	1.857	1.857	1.855	1.855
$\varphi_{2,G}$		'	15							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox									Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 3-stage (continued)												
7.66 ... 7.8	24.2 ... 24.9	4.6 (6.3)	n_{2N}	r/min	30	30	25	20	15	15	–	–	**1FT2106-3AF..-0..0-Z**
			M_{2N}	Nm	260	215	235	230	260	215	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	230	–	–	
			M_{2max}	Nm	416	416	416	368	416	368	–	–	
9.97 ... 10.1	30.8 ... 31.7	6 (7.6)	n_{2N}	r/min	30	25	25	20	15	–	–	–	**1FT2106-4AF..-0..0-Z**
			M_{2N}	Nm	260	260	210	230	260	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	230	260	–	–	–	
			M_{2max}	Nm	416	416	416	368	416	–	–	–	
14.1 ... 14.4	42.5 ... 43.8	8.7 (10.4)	n_{2N}	r/min	30	30	20	–	–	–	–	–	**1FT2106-6AF..-0..0-Z**
			M_{2N}	Nm	260	225	260	–	–	–	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	260	260	260	–	–	–	–	–	
			M_{2max}	Nm	416	416	416	–	–	–	–	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 3-stage												
0.297 ... 0.367	1.52 ... 1.58	0.2 (0.22)	n_{2N}	r/min	30	25	20	15	12.5	10	7.5	6	**1FT2203-2AK..-0..0-Z**
			M_{2N}	Nm	12.1	16.3	20.5	25	38	47.5	64	80	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21.5	29	36	43.5	58	72	93	116	
			M_{2max}	Nm	93	124	155	186	245	310	395	368	
0.903 ... 0.961	3.33 ... 3.41	0.35 (0.37)	n_{2N}	r/min	37.5	30	25	20	15	12.5	10	7.5	**1FT2203-4AK..-0..0-Z**
			M_{2N}	Nm	39	53	63	73	113	136	170	225	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	57	76	95	114	152	190	240	230	
			M_{2max}	Nm	200	265	330	368	416	368	416	368	
1.99 ... 2.04	6.47 ... 6.64	1.23 (1.31)	n_{2N}	r/min	37.5	30	20	15	15	12.5	10	10	**1FT2204-5AF..-0..0-Z**
			M_{2N}	Nm	93	122	181	220	260	230	260	194	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	120	160	200	230	260	230	260	230	
			M_{2max}	Nm	385	416	416	368	416	368	416	368	
2 ... 2.05	6.47 ... 6.64	1.23 (1.31)	n_{2N}	r/min	37.5	30	20	15	15	12.5	10	10	**1FT2204-5AK..-0..0-Z**
			M_{2N}	Nm	95	125	186	220	260	230	260	197	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	121	161	200	230	260	230	260	230	
			M_{2max}	Nm	385	416	416	368	416	368	416	368	
2.74 ... 2.8	8.71 ... 8.95	1.61 (1.69)	n_{2N}	r/min	30	25	20	20	15	15	10	10	**1FT2204-6AF..-0..0-Z**
			M_{2N}	Nm	154	205	255	205	260	215	260	220	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	165	215	260	230	260	230	260	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
2.99 ... 3.03	9.93 ... 10.2	3.15 (4.05)	n_{2N}	r/min	30	25	20	15	12.5	10	10	7.5	**1FT2205-2AC..-0..0-Z**
			M_{2N}	Nm	132	173	215	230	260	230	260	230	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	180	240	260	230	260	230	260	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
3.02 ... 3.06	9.93 ... 10.2	3.15 (4.05)	n_{2N}	r/min	37.5	25	20	20	15	15	10	10	**1FT2205-2AF..-0..0-Z**
			M_{2N}	Nm	117	185	230	200	255	197	260	190	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	182	240	260	230	255	230	255	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	

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Planetary gearbox data									
Gearbox type:			**NRBW120, 3-stage**						
1. Order code			**A48**						
	i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**
	$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230
	$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368
	$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	500
	$J_{1,G}$	kg cm²	2.681	2.011	2.005	2.663	1.857	1.857	1.855	1.855
	$\varphi_{2,G}$	'	15							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRBW120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox									Servomotors with planetary gearbox
Servomotoren SIMOTICS S-1FK2 and S-1FT2 Compact mit planetary gearbox NRBW120 3-stage (continued)												
2.96	9.93	3.15	n_{2N}	r/min	30	25	20	15	15	12.5	10	7.5	**1FT2205-2AH..-0..0-Z**
...	...	(4.05)	M_{2N}	Nm	135	176	220	230	260	225	260	230	■■■ + ■■■ + . . .
3	10.2		$M_{2,0}$	Nm	178	235	260	230	260	225	260	225	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
5.14	16.7	5.1	n_{2N}	r/min	30	25	20	20	15	12.5	10	7.5	**1FT2205-4AF..-0..0-Z**
...	...	(6)	M_{2N}	Nm	210	250	260	210	260	230	260	230	■■■ + ■■■ + . . .
5.23	17.2		$M_{2,0}$	Nm	260	260	260	230	260	230	260	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
5.15	16.7	7.8	n_{2N}	r/min	25	25	20	15	12.5	10	10	7.5	**1FT2206-2AC..-0..0-Z**
...	...	(9.4)	M_{2N}	Nm	240	205	255	230	260	230	250	225	■■■ + ■■■ + . . .
5.27	17.2		$M_{2,0}$	Nm	260	260	260	230	260	225	255	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
5.29	16.7	7.8	n_{2N}	r/min	30	25	20	20	15	12.5	10	7.5	**1FT2206-2AF..-0..0-Z**
...	...	(9.4)	M_{2N}	Nm	235	260	260	225	260	230	260	230	■■■ + ■■■ + . . .
5.39	17.2		$M_{2,0}$	Nm	260	260	255	230	255	225	260	230	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
5.13	16.7	7.8	n_{2N}	r/min	30	25	20	20	15	12.5	10	7.5	**1FT2206-2AH..-0..0-Z**
...	...	(9.4)	M_{2N}	Nm	205	240	255	175	260	230	255	225	■■■ + ■■■ + . . .
5.23	17.2		$M_{2,0}$	Nm	260	255	255	230	260	230	260	225	
			M_{2max}	Nm	416	416	416	368	416	368	416	368	
7.8	25.1	11.5	n_{2N}	r/min	25	20	15	12.5	10	7.5	–	–	**1FT2206-3AB..-0..0-Z**
...	...	(13.1)	M_{2N}	Nm	260	260	260	230	260	230	–	–	■■■ + ■■■ + . . .
7.95	25.9		$M_{2,0}$	Nm	260	260	260	230	255	230	–	–	
			M_{2max}	Nm	416	416	416	368	416	368	–	–	
7.68	25.1	11.5	n_{2N}	r/min	30	25	20	20	15	12.5	–	–	**1FT2206-3AF..-0..0-Z**
...	...	(13.1)	M_{2N}	Nm	245	260	260	187	260	230	–	–	■■■ + ■■■ + . . .
7.82	25.9		$M_{2,0}$	Nm	260	260	260	230	260	230	–	–	
			M_{2max}	Nm	416	416	416	368	416	368	–	–	
10.6	35.5	15.1	n_{2N}	r/min	25	20	15	15	12.5	–	–	–	**1FT2206-4AC..-0..0-Z**
...	...	(16.8)	M_{2N}	Nm	260	260	260	230	260	–	–	–	■■■ + ■■■ + . . .
10.8	36.5		$M_{2,0}$	Nm	260	260	260	230	260	–	–	–	
			M_{2max}	Nm	416	416	416	368	416	–	–	–	
10.4	33.6	15.1	n_{2N}	r/min	30	25	25	20	15	–	–	–	**1FT2206-4AF..-0..0-Z**
...	...	(16.8)	M_{2N}	Nm	260	260	215	230	260	–	–	–	■■■ + ■■■ + . . .
10.6	34.6		$M_{2,0}$	Nm	260	260	260	230	260	–	–	–	
			M_{2max}	Nm	416	416	416	368	416	–	–	–	
9.93	33.6	15.1	n_{2N}	r/min	30	25	20	15	15	–	–	–	**1FT2206-4AH..-0..0-Z**
...	...	(16.8)	M_{2N}	Nm	250	260	260	230	260	–	–	–	■■■ + ■■■ + . . .
10.1	34.6		$M_{2,0}$	Nm	260	260	260	230	255	–	–	–	
			M_{2max}	Nm	416	416	416	368	416	–	–	–	

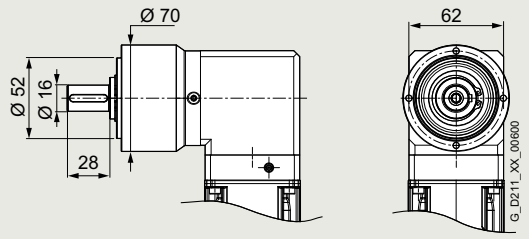
Planetary gearbox data									
Gearbox type:			**NRBW120, 3-stage**						
1. Order code			**A48**						
	i		**60**	**80**	**100**	**120**	**160**	**200**	**256**	**320**
2. Order code			**R60**	**R80**	**R01**	**R21**	**R61**	**R02**	**R52**	**R23**
	$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230
	$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368
	$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	500
	$J_{1,G}$	kg cm²	2.681	2.011	2.005	2.663	1.857	1.857	1.855	1.855
	$\varphi_{2,G}$	'	15							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NRKW070



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1050 N
Average axial force for 20000 h	$F_{A,eq}$	1350 N
Average radial force for 30000 h	$F_{R,eq}$	900 N
Average axial force for 30000 h	$F_{A,eq}$	1000 N
Maximum radial force	$F_{R,max}$	1650 N
Maximum axial force	$F_{A,max}$	2100 N

Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW070 1- and 2-stage																					
0.461	1.78	0.093	n_{2N}	r/min	600	500	500	375	300	250	300	250	200	200	150	125	100	75	50	37.5	**1FT2103-2AH..-2..0-Z**
...	...	(0.112)	M_{2N}	Nm	0.91	1.28	1.43	2.15	2.7	3.4	2.8	3.35	4.65	4.35	6.4	7.8	9.9	13.2	18	15	■■■ + ■■■ + . . .
0.508	1.81		$M_{2.0}$	Nm	1.38	1.89	2.4	3.4	3.95	4.95	4.45	5.9	7.5	8	10	12.6	16.1	20	18	15	
			M_{2max}	Nm	5.3	7.1	8.9	12.6	14.4	18	16.1	21.5	26.5	28.5	35.5	44.5	53	48	29	24	
0.948	3.79	0.139	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	60	37.5	**1FT2103-4AH..-2..0-Z**
...	...	(0.158)	M_{2N}	Nm	1.92	2.6	3.65	5	5.2	6.4	6.2	8.1	11.1	11.2	13.8	17.4	23	29	18	15	■■■ + ■■■ + . . .
0.989	3.83		$M_{2.0}$	Nm	2.8	3.8	4.8	6.8	7.8	9.8	8.8	11.7	14.7	15.7	19.7	24.5	31.5	30	18	15	
			M_{2max}	Nm	11.4	15.2	19.1	26.5	29	24	34	45.5	53	53	53	48	53	48	29	24	
1.1	3.5	0.368	n_{2N}	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	30	**1FT2104-4AF..-2..0-Z**
...	...	(0.448)	M_{2N}	Nm	2.25	3.25	4.2	6.1	5.9	7.8	7.6	9.1	12.2	11.7	16.6	19.9	25	30	18	15	■■■ + ■■■ + . . .
1.14	3.54		$M_{2.0}$	Nm	3.3	4.45	5.6	7.9	9	11.3	10.1	13.5	16.9	18	22.5	28	33	30	18	15	
			M_{2max}	Nm	10.5	14.1	17.6	24.5	28	24	31.5	42	52	53	53	48	53	48	29	24	
1.1	3.6	0.368	n_{2N}	r/min	600	600	500	375	300	250	300	200	200	150	150	100	100	75	60	37.5	**1FT2104-4AK..-2..0-Z**
...	...	(0.448)	M_{2N}	Nm	2.95	3.4	4.4	6.3	8	10	7.9	12	12.7	16.2	17.3	25	26	30	18	15	■■■ + ■■■ + . . .
1.13	3.64		$M_{2.0}$	Nm	3.25	4.4	5.5	7.8	9	11.3	10	13.4	16.8	17.9	22.5	28	33	30	18	15	
			M_{2max}	Nm	10.8	14.4	18.1	25	29	24	32	43	53	53	53	48	53	48	29	24	
2.19	7.07	0.578	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	125	100	75	50	–	**1FT2104-5AF..-2..0-Z**
...	...	(0.668)	M_{2N}	Nm	4.85	6.3	8.8	11.7	12	14.7	14	17.7	24.5	24	29.5	26.5	32.5	30	18	–	■■■ + ■■■ + . . .
2.22	7.16		$M_{2.0}$	Nm	6.5	8.7	11	15.4	17.6	15	19.7	26	32.5	33	33	30	33	30	18	–	
			M_{2max}	Nm	21	28.5	35.5	40	29	24	53	53	53	53	53	48	53	48	29	–	
2.17	7.16	0.578	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	125	100	75	60	–	**1FT2104-5AK..-2..0-Z**
...	...	(0.668)	M_{2N}	Nm	4.75	6.2	8.6	11.5	11.7	14.5	13.8	17.5	24	24	29	26.5	32.5	30	18	–	■■■ + ■■■ + . . .
2.2	7.26		$M_{2.0}$	Nm	6.5	8.7	10.9	15.3	17.5	15	19.6	26	32.5	33	33	30	33	30	18	–	
			M_{2max}	Nm	21.5	28.5	36	40	29	24	53	53	53	53	53	48	53	48	29	–	
2.92	9.45	0.778	n_{2N}	r/min	600	500	375	300	300	300	250	200	150	150	125	125	100	75	–	–	**1FT2104-6AF..-2..0-Z**
...	...	(0.858)	M_{2N}	Nm	5.8	7.5	10.4	13.8	13.9	12.5	16.2	20.5	28	28	32.5	29.5	33	30	–	–	■■■ + ■■■ + . . .
2.95	9.57		$M_{2.0}$	Nm	8.7	11.7	14.6	20.5	18	15	26	33	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	–	–	

Planetary gearbox data																		
Gearbox type:			NRKW070, 1-stage						NRKW070, 2-stage									
1. Order code			B26						B27									
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	14	19	24	25	18	15	33	33	33	33	33	30	33	30	18	15
	$M_{2max,G}$	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	29	24
	$M_{2Em.Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80
	$J_{1,G}$	kg cm²	0.329	0.23	0.224	0.22	0.219	0.218	0.326	0.326	0.224	0.228	0.223	0.223	0.219	0.219	0.219	0.218
	$\varphi_{2,G}$	'	16						18									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

8.1

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Gearbox type NRKW070

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW070 1- and 2-stage																				
0.452 ... 0.495	1.68 ... 1.71	0.2 (0.22)	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	50	37.5	1FT2203-2AK..-2..0-Z
			M_{2N}	Nm	0.8	1.12	1.6	2.2	2.25	2.8	2.7	3.55	4.95	4.95	6.1	7.7	10.4	13.1	14.6	13.7	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.35	1.85	2.35	3.35	3.85	4.85	4.3	5.8	7.3	7.8	9.8	12.3	15.7	19.7	18	15	
			M_{2max}	Nm	5	6.7	8.4	11.9	13.6	17.1	15.2	20	25	27	33.5	42.5	53	48	29	24	
1.06 ... 1.09	3.5 ... 3.54	0.35 (0.37)	n_{2N}	r/min	600	500	375	300	250	200	250	200	150	150	125	100	75	60	50	37.5	1FT2203-4AK..-2..0-Z
			M_{2N}	Nm	2.05	2.75	3.95	5.3	6.5	8.3	6.5	8.2	11.7	11.5	13.9	17.7	24	29.5	18	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	3.15	4.25	5.3	7.6	8.7	10.9	9.7	13	16.3	17.3	21.5	27	33	30	18	15	
			M_{2max}	Nm	10.5	14.1	17.6	24.5	28	24	31.5	42	52	53	53	48	53	48	29	24	
2.15 ... 2.18	6.69 ... 6.77	1.248 (1.328)	n_{2N}	r/min	600	500	375	300	250	250	250	200	150	125	100	100	100	75	50	–	1FT2204-5AF..-2..0-Z
			M_{2N}	Nm	4.55	5.9	8.3	10.9	13.3	13.2	12.9	16.2	22.5	27	33	30	26.5	30	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.4	8.6	10.8	15.1	17.3	15	19.3	25.5	32	33	33	30	33	30	18	–	
			M_{2max}	Nm	20	27	33.5	40	29	24	53	53	53	53	53	48	53	48	29	–	
2.16 ... 2.19	6.69 ... 6.77	1.248 (1.328)	n_{2N}	r/min	600	500	375	300	250	250	250	150	150	125	100	100	100	75	60	–	1FT2204-5AK..-2..0-Z
			M_{2N}	Nm	4.65	6	8.4	11.1	13.5	13.4	13.1	21.5	23	27	33	30	26.5	30	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.4	8.6	10.8	15.2	17.4	15	19.5	26	32.5	33	33	30	33	30	18	–	
			M_{2max}	Nm	20	27	33.5	40	29	24	53	53	53	53	53	48	53	48	29	–	
2.91 ... 2.93	8.98 ... 9.09	1.628 (1.708)	n_{2N}	r/min	600	500	375	300	250	250	200	150	150	125	125	125	100	75	–	–	1FT2204-6AF..-2..0-Z
			M_{2N}	Nm	5.8	7.4	10.6	13.8	16.8	15	20	27	27.5	33	32	24.5	30	30	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.7	11.6	14.6	20.5	18	15	26	33	33	33	33	30	33	30	–	–	
			M_{2max}	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	–	–	

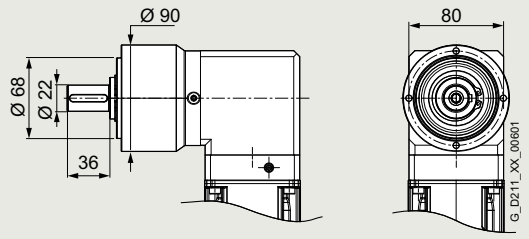
Planetary gearbox data																	
Gearbox type:			NRKW070, 1-stage						NRKW070, 2-stage								
1. Order code			B26						B27								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	14	19	24	25	18	15	33	33	33	33	33	30	33	30	18	15
	$M_{2max,G}$	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	29	24
	$M_{2Em.Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80
	$J_{1,G}$	kg cm²	0.329	0.23	0.224	0.22	0.219	0.218	0.326	0.326	0.224	0.228	0.223	0.223	0.219	0.219	0.219	0.218
	$\varphi_{2,G}$	'	16						18									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Selection and ordering data

NRKW090



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1900 N
Average axial force for 20000 h	$F_{A,eq}$	2000 N
Average radial force for 30000 h	$F_{R,eq}$	1700 N
Average axial force for 30000 h	$F_{A,eq}$	1500 N
Maximum radial force	$F_{R,max}$	3100 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW090 1- and 2-stage																				
0.379	1.69	0.093	n_{2N}	r/min	500	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	25	1FT2103-2AH..-0..0-Z
...	...	(0.112)	M_{2N}	Nm	0.66	0.79	1.24	1.8	1.85	2.3	2.15	2.85	3.95	4.05	5.1	6.5	9	11.4	18.5	28	■■■ + ■■■ + . . .
0.449	1.74		$M_{2.0}$	Nm	1.13	1.59	2.05	2.95	3.4	4.3	3.85	5.2	6.5	7	8.8	11	14.2	17.8	28.5	38	
			M_{2max}	Nm	5	6.8	8.5	12.1	13.8	17.4	15.5	20.5	25.5	27.5	34.5	43	55	69	80	61	
0.938	3.72	0.139	n_{2N}	r/min	500	375	375	300	250	200	200	150	150	125	100	100	75	60	37.5	30	1FT2103-4AH..-0..0-Z
...	...	(0.158)	M_{2N}	Nm	1.97	2.8	3.2	4.35	5.5	7.1	6.5	8.8	9.4	11.4	14.6	14.5	20.5	26	42	38	■■■ + ■■■ + . . .
1	3.77		$M_{2.0}$	Nm	2.8	3.8	4.8	6.8	7.8	9.9	8.8	11.8	14.9	15.9	19.9	24.5	31.5	39.5	50	38	
			M_{2max}	Nm	11.1	14.9	18.7	26	30	37.5	33.5	44.5	55	59	74	93	119	131	80	61	
1.02	3.43	0.35	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	30	1FT2104-4AF..-2..0-Z
...	...	(0.43)	M_{2N}	Nm	2.35	3.2	4.3	6	6.5	8.1	7.5	9.8	12.9	13.4	16.8	21	28	35	50	37.5	■■■ + ■■■ + . . .
1.07	3.48		$M_{2.0}$	Nm	3.05	4.1	5.2	7.4	8.5	10.7	9.5	12.7	16	17	21	26.5	34	42.5	50	38	
			M_{2max}	Nm	10.3	13.7	17.2	24	27.5	34.5	31	41	51	55	68	86	110	131	80	61	
1.01	3.53	0.35	n_{2N}	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	30	1FT2104-4AK..-2..0-Z
...	...	(0.43)	M_{2N}	Nm	2.6	3.45	4.75	6.6	6.9	8.5	8.2	10.6	14.1	14.7	18.2	23	30.5	38	50	38	■■■ + ■■■ + . . .
1.07	3.57		$M_{2.0}$	Nm	3	4.1	5.2	7.3	8.4	10.6	9.4	12.6	15.8	16.9	21	26.5	34	42.5	50	38	
			M_{2max}	Nm	10.5	14.1	17.7	24.5	28.5	35.5	31.5	42.5	53	56	70	88	113	131	80	61	
2.1	7	0.56	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	50	30	1FT2104-5AF..-2..0-Z
...	...	(0.65)	M_{2N}	Nm	5.5	7.8	8.4	13.4	13.8	17.8	17	23	28	28	36	47.5	61	73	46	38	■■■ + ■■■ + . . .
2.15	7.09		$M_{2.0}$	Nm	6.3	8.4	10.6	14.9	17.1	21	19.1	25.5	32	34	42.5	53	68	82	50	38	
			M_{2max}	Nm	21	28	35	49.5	56	61	63	84	105	112	140	131	144	131	80	61	
2.08	7.09	0.56	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	50	30	1FT2104-5AK..-2..0-Z
...	...	(0.65)	M_{2N}	Nm	5.4	7.7	8.3	13.2	13.6	17.5	16.7	22.5	27.5	27.5	35.5	47	60	72	46	38	■■■ + ■■■ + . . .
2.13	7.19		$M_{2.0}$	Nm	6.2	8.4	10.5	14.8	17	21	19	25	31.5	33.5	42	52	67	82	50	38	
			M_{2max}	Nm	21	28.5	35.5	50	57	61	64	85	106	113	142	131	144	131	80	61	
2.84	9.37	0.76	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	60	50	30	1FT2104-6AF..-2..0-Z
...	...	(0.84)	M_{2N}	Nm	6.7	9.5	10.1	16.1	16.5	21	20	27	33	33	42.5	56	72	69	49	38	■■■ + ■■■ + . . .
2.88	9.5		$M_{2.0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34	42.5	45.5	57	71	90	82	50	38	
			M_{2max}	Nm	28	37.5	47	66	76	61	84	112	131	144	144	131	144	131	80	61	

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Planetary gearbox data																	
Gearbox type:		NRKW090, 1-stage						NRKW090, 2-stage									
1. Order code		B36						B37									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$ Nm	40	53	67	65	50	38	97	90	82	90	90	82	90	82	50	38
	$M_{2max,G}$ Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	80	61
	$M_{2Em.Off}$ Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	170
	$J_{1,G}$ kg cm²	1.408	1.107	1.026	0.96	0.944	0.925	1.245	1.22	1.211	1.002	0.96	0.956	0.918	0.917	0.917	0.907
	$\varphi_{2,G}$ '	13						15									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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SIMOTICS S servomotors

Economy angular geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NRKW090

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW090 1- and 2-stage (continued)																				
4.52 ... 4.57	14.1 ... 14.3	1.71 (2.55)	n_{2N}	r/min	500	375	300	250	200	200	200	150	125	100	100	75	60	60	50	–	1FT2105-4AF..-0..0-Z
			M_{2N}	Nm	10.6	15	19.4	24	30.5	30.5	29.5	39.5	47.5	60	59	80	90	82	40	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.6	18.1	22.5	31.5	36.5	38	40.5	54	67	72	90	82	90	82	50	–	
			M_{2max}	Nm	42.5	57	71	100	80	61	127	144	131	144	144	131	144	131	80	–	
4.56 ... 4.61	14.1 ... 14.3	1.71 (2.55)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	75	60	60	37.5	–	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	9.6	13.7	17.9	22	28	37.5	26.5	44	55	55	74	72	89	72	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.7	18.3	22.5	32	36.5	38	41	54	68	73	90	82	90	82	50	–	
			M_{2max}	Nm	42.5	57	71	100	80	61	127	144	131	144	144	131	144	131	80	–	
7.31 ... 7.38	22.7 ... 23	2.65 (3.5)	n_{2N}	r/min	375	375	300	200	200	200	150	125	100	100	75	75	60	60	–	–	1FT2105-6AF..-0..0-Z
			M_{2N}	Nm	17.7	18.7	24	37.5	37.5	34.5	48	58	72	72	90	82	90	82	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22	29	36.5	51	50	38	66	87	82	90	90	82	90	82	–	–	
			M_{2max}	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	–	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW090 1- and 2-stage																				
0.366 ... 0.436	1.59 ... 1.64	0.2 (0.22)	n_{2N}	r/min	375	375	300	250	200	200	200	150	125	125	100	75	60	50	30	20	1FT2203-2AK..-0..0-Z
			M_{2N}	Nm	0.82	0.99	1.39	1.9	2.4	2.55	2.4	3.35	4.15	4.2	5.5	7.5	9.7	11.8	19.9	30	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.09	1.54	1.98	2.85	3.3	4.2	3.7	5	6.3	6.8	8.5	10.7	13.8	17.3	27.5	38	
			M_{2max}	Nm	4.75	6.4	8.1	11.4	13.1	16.4	14.6	19.5	24.5	26	32.5	40.5	52	65	80	61	
0.974 ... 1.03	3.43 ... 3.48	0.35 (0.37)	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	75	75	60	37.5	30	1FT2203-4AK..-0..0-Z
			M_{2N}	Nm	2.2	3.15	3.55	5.6	6	7.7	7.1	9.7	12	12.5	15.9	20.5	21.5	27	44.5	33.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.9	3.95	5	7.1	8.1	10.2	9.1	12.2	15.3	16.3	20	25.5	32.5	41	50	38	
			M_{2max}	Nm	10.3	13.7	17.2	24	27.5	34.5	31	41	51	55	68	86	110	131	80	61	
2.06 ... 2.11	6.62 ... 6.71	1.23 (1.31)	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	30	1FT2204-5AF..-2..0-Z
			M_{2N}	Nm	5.2	7.4	7.9	12.8	13	16.7	16.2	22	26.5	26.5	34	45.5	58	70	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.1	8.3	10.4	14.6	16.8	21	18.7	25	31	33	41.5	52	67	82	50	38	
			M_{2max}	Nm	20	26.5	33	46.5	53	61	59	79	99	106	132	131	144	131	80	61	
2.07 ... 2.12	6.62 ... 6.71	1.23 (1.31)	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	30	1FT2204-5AK..-2..0-Z
			M_{2N}	Nm	5.4	7.7	8.1	13.1	13.2	17.1	16.5	22	27	27	34.5	46.5	59	71	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6.2	8.3	10.4	14.7	16.9	21	18.9	25	31.5	33.5	42	52	67	82	50	38	
			M_{2max}	Nm	20	26.5	33	46.5	53	61	59	79	99	106	132	131	144	131	80	61	
2.82 ... 2.87	8.9 ... 9.02	1.61 (1.69)	n_{2N}	r/min	500	375	300	250	200	200	200	150	125	100	100	75	60	50	37.5	30	1FT2204-6AF..-2..0-Z
			M_{2N}	Nm	7	10	13	16.8	21	21.5	21	28	34	42	43.5	58	74	82	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.4	11.3	14.2	20	22.5	28.5	25.5	34	42.5	45	56	71	90	82	50	38	
			M_{2max}	Nm	27	36	45	63	72	61	80	107	131	142	144	131	144	131	80	61	

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Planetary gearbox data																	
Gearbox type:			NRKW090, 1-stage						NRKW090, 2-stage								
1. Order code			B36						B37								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	40	53	67	65	50	38	97	90	82	90	90	82	90	82	50	38
	$M_{2max,G}$	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	170
	$J_{1,G}$	kg cm²	1.408	1.107	1.026	0.96	0.944	0.925	1.245	1.22	1.211	1.002	0.96	0.956	0.918	0.917	0.917	0.907
	$\varphi_{2,G}$	'	13						15									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW090 1- and 2-stage (continued)																				
2.85	10.1	3.15	n_{2N}	r/min	500	375	300	250	200	150	200	150	100	100	100	75	60	50	37.5	–	**1FT2205-2AC..-0..0-Z**
...	...	(4.05)	M_{2N}	Nm	5.8	8.5	11.1	13.9	17.9	23	17.4	23.5	34.5	36	35	48.5	61	72	50	–	■■■ + ■■■ + . . .
2.9	10.3		$M_{2,0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34.5	43	46	57	72	90	82	49.5	–	
			M_{2max}	Nm	30.5	41	51	71	80	61	91	122	131	144	144	131	144	131	80	–	
2.89	10.1	3.15	n_{2N}	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	–	**1FT2205-2AF..-0..0-Z**
...	...	(4.05)	M_{2N}	Nm	7	9.6	10.4	16.6	16.8	21.5	21	28	34	34	43	58	74	82	50	–	■■■ + ■■■ + . . .
2.94	10.3		$M_{2,0}$	Nm	8.6	11.6	14.5	20.5	23	29	26	35	43.5	46.5	58	73	90	82	50	–	
			M_{2max}	Nm	30.5	41	51	71	80	61	91	122	131	144	144	131	144	131	80	–	
2.85	10.1	3.15	n_{2N}	r/min	500	375	300	250	200	200	200	150	125	100	100	75	60	50	37.5	–	**1FT2205-2AH..-0..0-Z**
...	...	(4.05)	M_{2N}	Nm	6.4	9.1	11.7	15.1	18.8	18.8	18.8	25.5	30.5	37.5	38	52	66	78	49.5	–	■■■ + ■■■ + . . .
2.9	10.3		$M_{2,0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34.5	43	46	57	72	90	82	49.5	–	
			M_{2max}	Nm	30.5	41	51	71	80	61	91	122	131	144	144	131	144	131	80	–	
4.98	17	5.1	n_{2N}	r/min	500	375	300	200	200	150	150	125	100	100	75	75	60	50	37.5	–	**1FT2205-4AF..-0..0-Z**
...	...	(6)	M_{2N}	Nm	9.3	13.4	17.4	27	27.5	37	35	43	54	54	72	70	88	82	50	–	■■■ + ■■■ + . . .
5.02	17.2		$M_{2,0}$	Nm	14.9	19.9	25	35	40	38	44.5	59	74	79	90	82	90	82	50	–	
			M_{2max}	Nm	51	68	86	104	80	61	153	144	131	144	144	131	144	131	80	–	

Planetary gearbox data																	
Gearbox type:			**NRKW090, 1-stage**						**NRKW090, 2-stage**								
1. Order code			**B36**						**B37**								
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**	**100**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**	**R00**
	$M_{2N,G}$	Nm	40	53	67	65	50	38	97	90	82	90	90	82	90	82	50	38
	$M_{2max,G}$	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	80	61
	$M_{2Em.Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	170
	$J_{1,G}$	kg cm²	1.408	1.107	1.026	0.96	0.944	0.925	1.245	1.22	1.211	1.002	0.96	0.956	0.918	0.917	0.917	0.907
	$\varphi_{2,G}$	'	13						15									

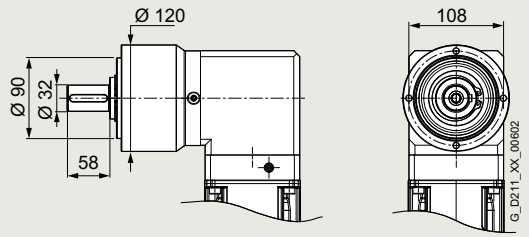
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NRKW120

Selection and ordering data

NRKW120



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	2500 N
Average axial force for 20000 h	$F_{A,eq}$	4000 N
Average radial force for 30000 h	$F_{R,eq}$	2150 N
Average axial force for 30000 h	$F_{A,eq}$	3000 N
Maximum radial force	$F_{R,max}$	4000 N
Maximum axial force	$F_{A,max}$	5900 N

Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																			
Nm	Nm	kg cm²																			
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW120 1- and 2-stage																					
0.249	1.56	0.093	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	60	50	30	20	**1FT2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	0.38	0.68	0.88	1.44	1.54	2.25	1.88	2.4	3.2	3.3	4.9	6.3	7	8.5	14.7	22.5	■■■ + ■■■ + . . .
0.379	1.67		$M_{2.0}$	Nm	0.74	1.13	1.52	2.3	2.65	3.45	3.05	4.2	5.3	5.7	7.2	9.1	11.8	14.9	24	37.5	
			M_{2max}	Nm	4.65	6.3	8	11.4	13.1	16.5	14.7	19.7	24.5	26	33	41	53	66	106	152	
0.86	3.59	0.139	n_{2N}	r/min	375	375	300	250	250	200	200	150	125	125	100	75	60	50	30	20	**1FT2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	1.7	2.15	3	4.25	4.25	5.9	5.2	7.3	9.1	9.4	12.4	16.3	21.5	26	43.5	67	■■■ + ■■■ + . . .
0.978	3.68		$M_{2.0}$	Nm	2.55	3.55	4.55	6.5	7.5	9.5	8.4	11.4	14.3	15.3	19.2	24	31	38.5	62	95	
			M_{2max}	Nm	10.7	14.4	18.2	25.5	29	36.5	32.5	43.5	54	58	73	91	117	146	192	152	
0.888	3.3	0.35	n_{2N}	r/min	500	375	375	300	250	200	200	150	150	125	100	100	75	60	37.5	25	**1FT2104-4AF..-0..0-Z**
...	...	(0.43)	M_{2N}	Nm	1.89	2.85	3.4	4.95	6	7.8	6.8	9.4	10.1	12.2	16	16.2	24	30	48.5	75	■■■ + ■■■ + . . .
1.01	3.39		$M_{2.0}$	Nm	2.65	3.65	4.7	6.7	7.7	9.8	8.7	11.7	14.7	15.7	19.8	24.5	31.5	39.5	64	95	
			M_{2max}	Nm	9.9	13.3	16.7	23.5	27	33.5	30	40	50	53	67	84	107	134	192	152	
0.881	3.4	0.35	n_{2N}	r/min	500	375	375	300	250	200	200	150	150	125	100	100	75	60	37.5	25	**1FT2104-4AK..-0..0-Z**
...	...	(0.43)	M_{2N}	Nm	2.05	3	3.85	5.4	6.6	8.5	7.2	9.8	11	13.2	17	17.1	26.5	33.5	54	84	■■■ + ■■■ + . . .
0.998	3.49		$M_{2.0}$	Nm	2.6	3.65	4.65	6.7	7.7	9.7	8.6	11.6	14.6	15.6	19.6	24.5	31.5	39.5	63	95	
			M_{2max}	Nm	10.2	13.7	17.2	24	27.5	34.5	31	41	51	55	69	86	110	138	192	152	
1.97	6.93	0.56	n_{2N}	r/min	500	375	300	250	250	200	200	150	125	100	100	75	60	50	30	25	**1FT2104-5AF..-0..0-Z**
...	...	(0.65)	M_{2N}	Nm	4.6	7.1	9.4	12.8	12.6	16.7	15.7	21.5	26	30.5	34.5	47	61	74	120	95	■■■ + ■■■ + . . .
2.07	7.01		$M_{2.0}$	Nm	5.9	8	10.1	14.3	16.4	20.5	18.3	24.5	30.5	32.5	41	51	65	82	120	95	
			M_{2max}	Nm	20.5	27.5	34.5	48.5	55	70	62	83	104	111	138	173	220	275	192	152	
1.96	7.03	0.56	n_{2N}	r/min	500	375	300	250	250	200	200	150	125	100	100	75	60	50	30	25	**1FT2104-5AK..-0..0-Z**
...	...	(0.65)	M_{2N}	Nm	4.5	7	9.3	12.6	12.4	16.4	15.4	21	25.5	30	34	46.5	60	72	120	95	■■■ + ■■■ + . . .
2.05	7.1		$M_{2.0}$	Nm	5.8	7.9	10	14.2	16.2	20	18.2	24	30.5	32.5	40.5	51	65	81	120	95	
			M_{2max}	Nm	21	28	35	49.5	56	71	63	84	105	112	140	175	225	275	192	152	
2.71	9.3	0.76	n_{2N}	r/min	500	375	300	250	200	200	200	125	100	100	100	75	60	50	37.5	25	**1FT2104-6AF..-0..0-Z**
...	...	(0.84)	M_{2N}	Nm	5.7	8.8	12	15.6	20	20	19	31.5	39.5	40.5	41	56	73	88	105	95	■■■ + ■■■ + . . .
2.8	9.42		$M_{2.0}$	Nm	8.1	10.9	13.7	19.4	22	27.5	24.5	33	41.5	44	55	69	89	111	120	95	
			M_{2max}	Nm	28	37	46.5	65	75	94	83	111	139	149	186	230	295	275	192	152	

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Planetary gearbox data																	
Gearbox type:		NRKW120, 1-stage						NRKW120, 2-stage									
1. Order code		B46						B47									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
	$J_{1.G}$	kg cm²	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818
	$\varphi_{2,G}$	'	11						13									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW120 1- and 2-stage (continued)																				
4.41 ... 4.49	14.1 ... 14.2	1.71 (2.55)	n_{2N}	r/min	500	375	300	250	200	150	200	150	100	100	75	75	60	50	37.5	25	1FT2105-4AF..-0..0-Z
			M_{2N}	Nm	9.5	14.4	19.4	24	31	40	28.5	39	59	61	79	83	107	126	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.2	17.7	22	31	35.5	44.5	40	53	66	71	89	111	142	172	120	95	
			M_{2max}	Nm	42.5	56	71	99	113	142	127	169	210	225	280	275	312	275	192	152	
4.44 ... 4.52	14.1 ... 14.2	1.71 (2.55)	n_{2N}	r/min	375	375	300	250	200	150	150	125	100	100	75	60	50	37.5	37.5	25	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	11.6	13.1	17.9	21.5	29	38.5	34.5	45	56	58	76	95	120	154	110	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	13.3	17.8	22	31.5	36	45	40	53	67	71	89	112	143	172	120	95	
			M_{2max}	Nm	42.5	56	71	99	113	142	127	169	210	225	280	275	312	275	192	152	
7.32 ... 7.39	22.6 ... 22.9	2.65 (3.5)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	50	37.5	25	1FT2105-6AF..-0..0-Z
			M_{2N}	Nm	18	24	30	40	40	55	51	62	78	77	107	133	163	144	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21.5	29	36.5	51	59	73	65	87	109	117	146	172	195	172	120	95	
			M_{2max}	Nm	68	91	114	160	183	152	200	270	275	312	312	275	312	275	192	152	
7.64 ... 7.72	24.5 ... 24.8	4.6 (6.3)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	50	37.5	–	1FT2106-3AF..-0..0-Z
			M_{2N}	Nm	18.7	24.5	31	41.5	41.5	57	53	64	81	80	111	139	169	149	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30.5	38	53	61	77	69	92	115	122	153	172	195	172	120	–	
			M_{2max}	Nm	74	99	124	173	192	152	220	295	275	312	312	275	312	275	192	–	
9.94 ... 10	31.1 ... 31.6	6 (7.6)	n_{2N}	r/min	375	300	250	200	150	150	150	100	100	75	60	60	50	50	37.5	–	1FT2106-4AF..-0..0-Z
			M_{2N}	Nm	23	30	37.5	49	64	67	62	94	92	125	158	157	189	152	116	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29.5	39.5	50	70	80	95	89	119	149	159	195	172	195	172	120	–	
			M_{2max}	Nm	94	126	157	216	192	152	251	312	275	312	312	275	312	275	192	–	
14.1 ... 14.2	43 ... 43.7	8.7 (10.4)	n_{2N}	r/min	375	300	250	200	150	150	125	100	75	75	60	60	50	50	–	–	1FT2106-6AF..-0..0-Z
			M_{2N}	Nm	28.5	37	46	58	80	80	90	114	151	152	190	172	195	171	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	42.5	56	71	99	113	95	127	169	172	195	195	172	195	172	–	–	
			M_{2max}	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	–	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW120 1- and 2-stage																				
0.236 ... 0.366	1.46 ... 1.57	0.2 (0.22)	n_{2N}	r/min	300	250	250	200	150	150	150	125	100	100	75	60	50	37.5	25	15	1FT2203-2AK..-0..0-Z
			M_{2N}	Nm	0.34	0.63	0.87	1.39	1.89	2.15	1.87	2.3	3.1	3.1	4.8	6.2	8	10.8	16.8	27.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	0.7	1.08	1.46	2.2	2.55	3.3	2.9	4.05	5.1	5.5	7	8.8	11.4	14.4	23	36.5	
			M_{2max}	Nm	4.35	5.9	7.5	10.7	12.3	15.5	13.8	18.5	23	24.5	31	39	50	62	100	152	
0.843 ... 0.961	3.3 ... 3.39	0.35 (0.37)	n_{2N}	r/min	375	375	300	250	200	200	200	150	125	125	100	75	60	50	30	20	1FT2203-4AK..-0..0-Z
			M_{2N}	Nm	2	2.5	3.5	4.85	6	6.7	6	8.3	10.3	10.6	13.9	18.4	24	29.5	49	75	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.5	3.5	4.45	6.4	7.4	9.3	8.3	11.2	14.1	15	18.9	23.5	30.5	38	61	95	
			M_{2max}	Nm	9.9	13.3	16.7	23.5	27	33.5	30	40	50	53	67	84	107	134	192	152	
1.93 ... 2.03	6.55 ... 6.62	1.23 (1.31)	n_{2N}	r/min	500	375	300	250	200	200	200	150	125	100	100	75	60	50	30	25	1FT2204-5AF..-0..0-Z
			M_{2N}	Nm	4.35	6.8	9	12.2	14.9	15.6	14.9	20.5	24.5	29.5	32.5	44.5	58	69	116	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.7	7.8	9.9	14	16	20	17.9	24	30	32	40	50	64	80	120	95	
			M_{2max}	Nm	19.6	26	32.5	46	52	66	59	78	98	104	131	163	205	260	192	152	
1.94 ... 2.04	6.55 ... 6.62	1.23 (1.31)	n_{2N}	r/min	500	375	300	250	200	200	200	150	125	100	100	75	60	50	30	25	1FT2204-5AK..-0..0-Z
			M_{2N}	Nm	4.5	7	9.2	12.5	15.1	16	15.3	21	25.5	30	33	46	59	71	119	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.8	7.9	9.9	14.1	16.1	20	18.1	24	30	32	40.5	50	65	81	120	95	
			M_{2max}	Nm	19.6	26	32.5	46	52	66	59	78	98	104	131	163	205	260	192	152	

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Planetary gearbox data																	
Gearbox type:		NRKW120, 1-stage						NRKW120, 2-stage									
1. Order code		B46						B47									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$ Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$ Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$ Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
	$J_{1,G}$ kg cm²	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818
	$\varphi_{2,G}$ '	11						13									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NRKW120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW120 1- and 2-stage (continued)																				
2.69 ... 2.78	8.83 ... 8.94	1.61 (1.69)	n_{2N}	r/min	500	375	300	250	200	200	200	150	100	100	100	75	60	50	37.5	25	1FT2204-6AF..-0..0-Z
			M_{2N}	Nm	6.1	9.4	12.9	16.5	21	20.5	19.9	27	39	41.5	42.5	59	76	91	102	95	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	8	10.8	13.7	19.3	22	27.5	24.5	33	41	44	55	69	88	110	120	95	
			M_{2max}	Nm	26.5	35.5	44.5	62	71	89	79	106	132	141	176	220	280	275	192	152	
2.89 ... 2.98	10.1 ... 10.2	3.15 (4.05)	n_{2N}	r/min	375	375	300	250	200	150	200	125	100	100	75	75	60	50	30	20	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	6.7	7.8	10.9	13.3	17.8	23	16	27	34	35.5	46	48.5	63	74	119	94	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	8.6	11.6	14.6	20.5	23.5	29.5	26.5	35.5	44.5	47.5	59	74	95	119	120	95	
			M_{2max}	Nm	30	40.5	50	71	81	101	90	121	151	161	200	250	312	275	192	152	
2.92 ... 3.01	10.1 ... 10.2	3.15 (4.05)	n_{2N}	r/min	500	375	300	250	250	200	200	150	125	125	100	75	60	50	37.5	25	1FT2205-2AF..-0..0-Z
			M_{2N}	Nm	6.1	9	11.6	16	15.4	20.5	19.8	27	32.5	31.5	42	57	74	90	99	95	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	8.7	11.8	14.8	20.5	23.5	30	26.5	35.5	45	48	60	75	96	120	120	95	
			M_{2max}	Nm	30	40.5	50	71	81	101	90	121	151	161	200	250	312	275	192	152	
2.86 ... 2.95	10.1 ... 10.2	3.15 (4.05)	n_{2N}	r/min	500	375	300	250	200	150	200	150	125	100	100	75	60	50	30	25	1FT2205-2AH..-0..0-Z
			M_{2N}	Nm	5.3	8.4	11.2	14.5	18.3	23.5	17.5	24	28.5	36.5	36.5	52	67	79	119	95	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	8.5	11.5	14.5	20.5	23.5	29.5	26	35	44	47	58	73	94	117	119	94	
			M_{2max}	Nm	30	40.5	50	71	81	101	90	121	151	161	200	250	312	275	192	152	
5.08 ... 5.16	16.9 ... 17.1	5.1 (6)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	37.5	25	1FT2205-4AF..-0..0-Z
			M_{2N}	Nm	12.3	16.6	21	28	28.5	39.5	37	45	57	56	78	98	120	160	102	95	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	15.2	20	25.5	36	41	51	46	61	77	82	102	128	164	172	120	95	
			M_{2max}	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152	
5.18 ... 5.26	16.9 ... 17.1	7.8 (9.4)	n_{2N}	r/min	375	300	250	200	150	125	150	100	100	75	75	50	37.5	37.5	30	20	1FT2206-2AC..-0..0-Z
			M_{2N}	Nm	11.7	15.6	19.7	25.5	35	43	34	52	51	69	70	107	143	146	120	95	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	15.5	20.5	26	36.5	41.5	52	46.5	62	78	83	104	130	166	172	120	95	
			M_{2max}	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152	
5.25 ... 5.33	16.9 ... 17.1	7.8 (9.4)	n_{2N}	r/min	500	375	300	250	200	150	200	125	100	100	75	75	50	37.5	37.5	25	1FT2206-2AF..-0..0-Z
			M_{2N}	Nm	10	15.2	20.5	24.5	32.5	42.5	29	49.5	62	64	84	84	132	170	114	94	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	15.7	21	26	37	42.5	53	47.5	63	79	84	105	132	169	172	120	95	
			M_{2max}	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152	
5.09 ... 5.17	16.9 ... 17.1	7.8 (9.4)	n_{2N}	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	30	25	1FT2206-2AH..-0..0-Z
			M_{2N}	Nm	12.5	16.7	21	28	28	39	37	44.5	56	55	78	97	119	159	119	91	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	15.2	20	25.5	36	41	51	46	61	77	82	102	128	164	172	119	95	
			M_{2max}	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152	
7.78 ... 7.85	25.4 ... 25.8	11.5 (13.1)	n_{2N}	r/min	375	300	250	200	150	150	150	100	100	75	75	60	50	37.5	25	–	1FT2206-3AB..-0..0-Z
			M_{2N}	Nm	17.2	22.5	28.5	37.5	50	52	49	73	73	98	101	126	153	172	120	–	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	23	31	39	54	62	78	70	93	117	124	155	172	195	172	120	–	
			M_{2max}	Nm	77	103	128	180	192	152	230	305	275	312	312	275	312	275	192	–	
7.65 ... 7.72	25.4 ... 25.8	11.5 (13.1)	n_{2N}	r/min	375	300	250	200	150	125	150	100	75	75	60	50	37.5	37.5	30	–	1FT2206-3AF..-0..0-Z
			M_{2N}	Nm	16.5	21.5	27.5	35.5	48.5	59	47	71	93	95	120	145	193	172	120	–	■■■ + ■■■ + ...
			$M_{2,0}$	Nm	22.5	30.5	38	53	61	77	69	92	115	122	153	172	195	172	120	–	
			M_{2max}	Nm	77	103	128	180	192	152	230	305	275	312	312	275	312	275	192	–	

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Planetary gearbox data																
Gearbox type:		NRKW120, 1-stage						NRKW120, 2-stage								
1. Order code		B46						B47								
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95
$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152
$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
$J_{1,G}$	kg cm²	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818
$\varphi_{2,G}$	'	11						13									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW120 1- and 2-stage (continued)																				
10.7	35.9	15.1	n_{2N}	r/min	300	250	200	150	125	100	100	75	75	60	50	50	37.5	37.5	25	–	**1FT2206-4AC..-0..0-Z**
...	...	(16.8)	M_{2N}	Nm	21	26	34	46.5	56	72	68	91	92	115	141	134	185	153	120	–	■■■ + ■■■ + . . .
10.8	36.5		$M_{2,0}$	Nm	32	43	53	75	86	95	96	128	160	171	195	172	195	172	120	–	
			M_{2max}	Nm	109	145	182	216	192	152	251	312	275	312	312	275	312	275	192	–	
10.4	34	15.1	n_{2N}	r/min	375	300	250	200	150	150	150	100	75	75	60	60	50	50	37.5	–	**1FT2206-4AF..-0..0-Z**
...	...	(16.8)	M_{2N}	Nm	23	30.5	38	49.5	66	68	63	95	126	127	161	160	191	158	118	–	■■■ + ■■■ + . . .
10.5	34.5		$M_{2,0}$	Nm	31	41.5	52	73	83	95	93	125	156	166	195	172	195	172	120	–	
			M_{2max}	Nm	103	138	172	216	192	152	251	312	275	312	312	275	312	275	192	–	
9.93	34	15.1	n_{2N}	r/min	375	250	250	150	150	125	125	100	75	75	60	50	50	37.5	30	–	**1FT2206-4AH..-0..0-Z**
...	...	(16.8)	M_{2N}	Nm	19.1	30	31	53	55	67	64	80	107	107	136	163	152	172	120	–	■■■ + ■■■ + . . .
10	34.5		$M_{2,0}$	Nm	29.5	39.5	49.5	70	80	95	89	119	149	159	195	172	195	172	120	–	
			M_{2max}	Nm	103	138	172	216	192	152	251	312	275	312	312	275	312	275	192	–	

Planetary gearbox data																		
Gearbox type:			**NRKW120, 1-stage**						**NRKW120, 2-stage**									
1. Order code			**B46**						**B47**									
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**	**100**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**	**R00**
	$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95
	$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
	$J_{1,G}$	kg cm²	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818
	$\varphi_{2,G}$	'	11						13									

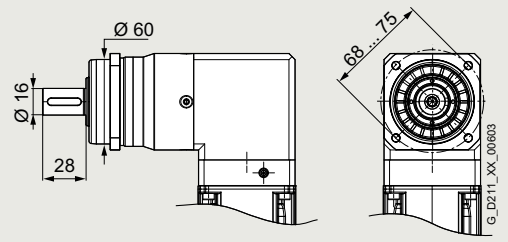
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NLCW060

Selection and ordering data

NLCW060



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	3200 N
Average axial force for 20000 h	$F_{A,eq}$	4400 N
Average radial force for 30000 h	$F_{R,eq}$	3200 N
Average axial force for 30000 h	$F_{A,eq}$	3900 N
Maximum radial force	$F_{R,max}$	3200 N
Maximum axial force	$F_{A,max}$	4400 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW060 1- and 2-stage																				
0.309 ... 0.489	1.63 ... 1.81	0.093 (0.112)	n_{2N}	r/min	375	300	300	250	250	200	150	150	125	125	100	75	75	60	37.5	30	**1FT2103-2AH..-2..0-Z**
			M_{2N}	Nm	0.455	0.91	1.2	1.94	2.05	3	2.75	3.25	4.5	4.45	6.1	8.5	8.9	11.7	18	14.9	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	0.92	1.43	1.95	2.95	3.45	4.5	3.85	5.3	6.8	7.3	9.3	11.7	15.2	19.2	18	15	
			M_{2max}	Nm	4.85	6.6	8.5	12.1	13.9	17.6	15.8	21	26.5	28.5	35.5	44.5	57	64	29	24	
0.795 ... 0.962	3.66 ... 3.83	0.139 (0.158)	n_{2N}	r/min	300	300	250	250	200	200	150	125	125	100	100	75	60	50	50	30	**1FT2103-4AH..-2..0-Z**
			M_{2N}	Nm	1.77	2.3	3.25	4.05	5.4	5.9	5.7	7.7	8.5	10.6	11.4	15.9	20.5	25.5	17.3	15	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.35	3.35	4.35	6.3	7.3	9.3	8.1	11	13.9	14.9	18.7	23.5	30	38	18	15	
			M_{2max}	Nm	10.9	14.8	18.6	26	29	24	34	45.5	57	60	70	64	70	64	29	24	
0.952 ... 1.14	3.37 ... 3.54	0.368 (0.448)	n_{2N}	r/min	375	375	300	250	250	200	200	150	125	125	100	100	75	60	50	30	**1FT2104-4AF..-2..0-Z**
			M_{2N}	Nm	2.3	2.95	4.25	6.1	6.7	8.9	6.8	10.1	13.3	13.4	17.7	17.8	25.5	33	18	15	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.85	4	5.1	7.4	8.6	10.9	9.7	13.2	16.7	17.8	22	28	36	40	18	15	
			M_{2max}	Nm	10.1	13.6	17.2	24	27.5	24	31	42	52	56	70	64	70	64	29	24	
0.945 ... 1.14	3.46 ... 3.64	0.368 (0.448)	n_{2N}	r/min	375	375	300	250	250	200	200	150	125	125	100	75	75	60	50	37.5	**1FT2104-4AK..-2..0-Z**
			M_{2N}	Nm	2.5	3.1	4.6	6.6	7	9.6	7.1	10.6	13.9	14	18.5	25	26.5	34.5	18	15	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	2.8	3.95	5.1	7.4	8.5	10.8	9.7	13.1	16.6	17.7	22	28	36	40	18	15	
			M_{2max}	Nm	10.3	14	17.6	24.5	28.5	24	32	43	54	57	70	64	70	64	29	24	
2.03 ... 2.22	7 ... 7.15	0.578 (0.668)	n_{2N}	r/min	375	300	300	250	200	200	150	150	125	125	100	75	75	60	50	–	**1FT2104-5AF..-2..0-Z**
			M_{2N}	Nm	4.45	6.6	7.5	10.5	13.6	14.6	14.9	16.3	21	20.5	27.5	38	38	40	18	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	6.1	8.3	10.5	15	17.2	15	19.4	26	32.5	35	43.5	40	44	40	18	–	
			M_{2max}	Nm	20.5	28	35	40	29	24	63	70	70	70	70	64	70	64	29	–	
2.02 ... 2.2	7.09 ... 7.24	0.578 (0.668)	n_{2N}	r/min	375	300	300	250	200	200	150	150	125	125	100	75	75	60	50	–	**1FT2104-5AK..-2..0-Z**
			M_{2N}	Nm	4.35	6.5	7.4	10.3	13.4	14.5	14.6	16.1	21	20.5	27	37.5	37.5	40	18	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	6	8.2	10.4	14.9	17.1	15	19.3	25.5	32.5	34.5	43.5	40	44	40	18	–	
			M_{2max}	Nm	21	28.5	35.5	40	29	24	64	70	70	70	70	64	70	64	29	–	
2.77 ... 2.94	9.42 ... 9.55	0.778 (0.858)	n_{2N}	r/min	375	300	300	250	200	200	150	150	125	100	100	75	75	75	–	–	**1FT2104-6AF..-2..0-Z**
			M_{2N}	Nm	5.5	8.1	9.1	12.5	16.3	15	17.9	19.4	25	31	32.5	40	43.5	33.5	–	–	■■■ + ■■■ + . . .
			$M_{2.0}$	Nm	8.3	11.2	14.2	20	18	15	26	34.5	43.5	44	44	40	44	40	–	–	
			M_{2max}	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	–	–	

Planetary gearbox data																	
Gearbox type:			NLCW060, 1-stage						NLCW060, 2-stage								
1. Order code			C26						C27								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18	15
	$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29	24
	$M_{2Em.Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80
	$J_{1,G}$	kg cm²	0.406	0.275	0.253	0.234	0.23	0.225	0.355	0.35	0.234	0.242	0.233	0.231	0.223	0.222	0.222	0.22
	$\varphi_{2,G}$	'	16						18									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NLCW060

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW060 1- and 2-stage																				
0.301 ... 0.497	1.53 ... 1.72	0.2 (0.22)	n_{2N}	r/min	300	300	250	250	200	200	150	150	125	125	100	75	60	50	37.5	30	1FT2203-2AK..-2..0-Z
			M_{2N}	Nm	0.55	0.83	1.27	1.67	2.25	2.55	2.6	3	4.05	4.05	5.4	7.6	10	12.3	17.1	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	0.9	1.4	1.91	2.9	3.4	4.4	3.9	5.4	6.9	7.4	9.4	11.9	15.5	19.5	18	15	
			M_{2max}	Nm	4.55	6.3	8	11.4	13.2	16.6	14.9	20	25	27	33.5	42.5	54	64	29	24	
0.907 ... 1.1	3.37 ... 3.54	0.35 (0.37)	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	75	75	60	50	37.5	30	1FT2203-4AK..-2..0-Z
			M_{2N}	Nm	2.1	2.65	3.75	5.5	5.9	8.3	6.4	8.4	11.4	11.5	15.9	16.6	21.5	26.5	18	15	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.7	3.8	4.9	7.1	8.2	10.4	9.3	12.6	16	17.1	21.5	27	34.5	40	18	15	
			M_{2max}	Nm	10.1	13.6	17.2	24	27.5	24	31	42	52	56	70	64	70	64	29	24	
1.99 ... 2.18	6.61 ... 6.76	1.248 (1.328)	n_{2N}	r/min	375	300	300	250	200	200	150	125	100	100	100	75	60	60	50	–	1FT2204-5AF..-2..0-Z
			M_{2N}	Nm	4.25	6.4	7.1	9.8	12.9	13.6	14.3	18.5	24	24.5	25	35.5	44	40	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.9	8.1	10.3	14.7	16.9	15	19.1	25.5	32	34	43	40	44	40	18	–	
			M_{2max}	Nm	19.8	26.5	33	40	29	24	60	70	70	70	70	64	70	64	29	–	
2.01 ... 2.19	6.61 ... 6.76	1.248 (1.328)	n_{2N}	r/min	375	300	300	250	200	200	150	125	125	100	100	75	60	60	50	–	1FT2204-5AK..-2..0-Z
			M_{2N}	Nm	4.35	6.5	7.3	10	13.2	13.9	14.5	18.8	20	25	25.5	36	44	40	18	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	6	8.2	10.4	14.8	17	15	19.2	25.5	32	34.5	43	40	44	40	18	–	
			M_{2max}	Nm	19.8	26.5	33	40	29	24	60	70	70	70	70	64	70	64	29	–	
2.76 ... 2.93	8.93 ... 9.07	1.628 (1.708)	n_{2N}	r/min	375	300	250	200	200	200	150	125	100	100	75	75	75	60	–	–	1FT2204-6AF..-2..0-Z
			M_{2N}	Nm	5.7	8.5	11.2	15.8	16.7	15	18.5	23.5	31.5	31.5	43	40	40	40	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8.2	11.2	14.1	20	18	15	25.5	34.5	43.5	44	44	40	44	40	–	–	
			M_{2max}	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	–	–	

Planetary gearbox data																	
Gearbox type:		NLCW060, 1-stage						NLCW060, 2-stage									
1. Order code		C26						C27									
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18	15
$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29	24
$M_{2Em.Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm²	0.406	0.275	0.253	0.234	0.23	0.225	0.355	0.35	0.234	0.242	0.233	0.231	0.223	0.222	0.222	0.22
$\varphi_{2,G}$	'	16						18									

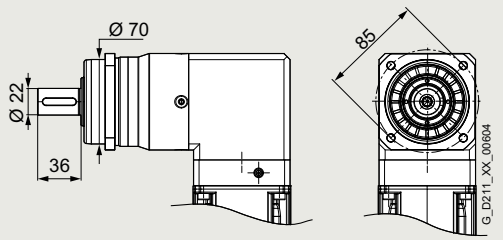
Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NLCW080

Selection and ordering data

NLCW080



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5500 N
Average axial force for 20000 h	$F_{A,eq}$	6400 N
Average radial force for 30000 h	$F_{R,eq}$	4800 N
Average axial force for 30000 h	$F_{A,eq}$	5700 N
Maximum radial force	$F_{R,max}$	5500 N
Maximum axial force	$F_{A,max}$	6400 N

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW080 1- and 2-stage																				
0.223	1.53	0.093	n_{2N}	r/min	–	200	200	200	200	150	150	125	100	100	75	75	60	50	30	20	**1FT2103-2AH..-0..0-Z**
...	...	(0.112)	M_{2N}	Nm	–	0.495	0.8	1.3	1.49	2.35	1.83	2.65	3.65	3.8	5.4	6.1	8.4	10.5	18.2	28.5	■■■ + ■■■ + . . .
0.447	1.75		$M_{2.0}$	Nm	–	0.89	1.35	2.25	2.7	3.6	3.15	4.55	5.9	6.3	8.2	10.4	13.7	17.3	28	38	
			M_{2max}	Nm	–	6.1	7.8	11.4	13.1	16.7	14.9	20	25	27	34	43	55	69	80	61	
0.695	3.49	0.139	n_{2N}	r/min	300	250	250	200	200	150	150	100	100	100	75	60	50	37.5	30	25	**1FT2103-4AH..-0..0-Z**
...	...	(0.158)	M_{2N}	Nm	1.27	2.1	2.55	4.15	4.3	6.6	5.1	8.4	9.2	9.2	13.5	17.6	22.5	30	40	37	■■■ + ■■■ + . . .
0.975	3.76		$M_{2.0}$	Nm	2.05	3.05	4.05	6.1	7.1	9.1	7.9	10.9	13.8	14.8	18.7	23.5	30.5	38	50	38	
			M_{2max}	Nm	10.4	14.2	18	25.5	29	36.5	33	44.5	55	59	74	93	120	150	80	61	
0.782	3.2	0.35	n_{2N}	r/min	375	300	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	**1FT2104-4AF..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	1.62	2.7	3.25	4.9	6.4	7.1	7.4	8.4	10.8	13.6	14.8	21	27.5	34.5	44.5	37.5	■■■ + ■■■ + . . .
1.08	3.48		$M_{2.0}$	Nm	2.3	3.4	4.5	6.7	7.8	9.9	8.9	12.1	15.4	16.5	20.5	26	34	42.5	50	38	
			M_{2max}	Nm	9.5	13	16.5	23.5	27	34	30.5	41	51	54	68	86	110	138	80	61	
0.776	3.3	0.35	n_{2N}	r/min	375	300	250	250	200	200	150	125	100	100	100	75	60	50	37.5	30	**1FT2104-4AK..-2..0-Z**
...	...	(0.43)	M_{2N}	Nm	1.77	3.05	4.15	5.1	7.1	7.5	8.2	11	14.2	14.9	15.6	22.5	30	37	46.5	32.5	■■■ + ■■■ + . . .
1.07	3.57		$M_{2.0}$	Nm	2.3	3.4	4.45	6.6	7.7	9.9	8.8	12	15.3	16.4	20.5	26	33.5	42	50	38	
			M_{2max}	Nm	9.8	13.4	17	24	27.5	35	31	42	52	56	70	88	113	142	80	61	
1.87	6.83	0.56	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	50	37.5	30	**1FT2104-5AF..-2..0-Z**
...	...	(0.65)	M_{2N}	Nm	4.9	7	8.1	12	12.5	18	14.8	19.1	25	25	35	45	57	57	50	35.5	■■■ + ■■■ + . . .
2.16	7.08		$M_{2.0}$	Nm	5.5	7.7	9.9	14.2	16.4	20.5	18.6	25	31.5	33.5	42	53	68	85	50	38	
			M_{2max}	Nm	20	27.5	34.5	48.5	56	61	63	84	105	112	141	176	192	176	80	61	
1.85	6.93	0.56	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	60	50	37.5	30	**1FT2104-5AK..-2..0-Z**
...	...	(0.65)	M_{2N}	Nm	4.8	6.9	7.9	11.7	12.3	17.7	14.5	18.7	24.5	24.5	34.5	44.5	47	56	50	35.5	■■■ + ■■■ + . . .
2.14	7.17		$M_{2.0}$	Nm	5.5	7.7	9.8	14.1	16.3	20.5	18.4	24.5	31	33.5	42	52	67	85	50	38	
			M_{2max}	Nm	20.5	27.5	35	49.5	56	61	64	85	107	114	143	176	192	176	80	61	
2.6	9.25	0.76	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	37.5	30	**1FT2104-6AF..-2..0-Z**
...	...	(0.84)	M_{2N}	Nm	6.2	8.8	10	14.6	15.2	21.5	18	23	30	30.5	42.5	54	68	91	50	37.5	■■■ + ■■■ + . . .
2.88	9.48		$M_{2.0}$	Nm	7.8	10.7	13.6	19.4	22	28	25	33.5	42.5	45	57	71	91	110	50	38	
			M_{2max}	Nm	27.5	37	46.5	65	75	61	84	113	141	151	189	176	192	176	80	61	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:		NLCW080, 1-stage						NLCW080, 2-stage									
1. Order code		C36						C37									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$ Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50	38
	$M_{2max,G}$ Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80	61
	$M_{2Em.Off}$ Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	200
	$J_{1.G}$ kg cm²	1.394	1.089	1.016	0.951	0.937	0.921	1.246	1.218	1.21	1.001	0.959	0.956	0.918	0.917	0.917	0.906
	$\varphi_{2,G}$ '	13						15									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW080 1- and 2-stage (continued)																				
4.3 ... 4.57	14.1 ... 14.3	1.71 (2.55)	n_{2N}	r/min	300	250	250	200	150	150	150	100	100	75	75	60	50	50	37.5	–	1FT2105-4AF..-0..0-Z
			M_{2N}	Nm	10.9	15	16.4	23	31.5	34	28.5	44.5	46	61	65	83	104	94	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	12.9	17.5	22	31	35.5	38	40	54	67	72	90	110	120	110	50	–	
			M_{2max}	Nm	42	56	70	99	80	61	128	171	176	192	192	176	192	176	80	–	
4.33 ... 4.6	14.1 ... 14.3	1.71 (2.55)	n_{2N}	r/min	300	250	200	200	150	125	125	100	75	75	60	50	50	37.5	37.5	–	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	10.2	14	18.9	20.5	29.5	37	31.5	41.5	56	57	73	90	92	110	50	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	12.9	17.6	22	31	36	38	40.5	54	68	73	91	110	120	110	50	–	
			M_{2max}	Nm	42	56	70	99	80	61	128	171	176	192	192	176	192	176	80	–	
7.09 ... 7.28	22.8 ... 23	2.65 (3.5)	n_{2N}	r/min	300	250	200	150	150	150	125	100	75	75	60	60	50	50	–	–	1FT2105-6AF..-0..0-Z
			M_{2N}	Nm	14.7	19.9	26.5	39	41	38	44	57	77	78	101	100	120	101	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21	28.5	35.5	50	50	38	64	86	108	115	120	110	120	110	–	–	
			M_{2max}	Nm	64	85	107	104	80	61	205	192	176	192	192	176	192	176	–	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW080 1- and 2-stage																				
0.209 ... 0.434	1.44 ... 1.65	0.2 (0.22)	n_{2N}	r/min	–	200	150	150	150	125	125	100	100	75	75	60	50	37.5	25	20	1FT2203-2AK..-0..0-Z
			M_{2N}	Nm	–	0.52	1.04	1.61	1.83	2.55	2	3	3.25	4.45	5	6.7	8.7	12	19.1	24	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	–	0.83	1.28	2.15	2.6	3.5	3.05	4.35	5.7	6.1	7.9	10.1	13.2	16.8	27	38	
			M_{2max}	Nm	–	5.7	7.4	10.7	12.4	15.7	14	19	24	25.5	32	40.5	52	65	80	61	
0.738 ... 1.04	3.2 ... 3.48	0.35 (0.37)	n_{2N}	r/min	300	250	250	200	200	150	150	100	100	100	75	60	50	37.5	30	25	1FT2203-4AK..-0..0-Z
			M_{2N}	Nm	1.65	2.55	3.05	4.8	4.85	7.5	5.9	9.5	10.5	10.3	15.4	19.8	25	33	43	30.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	2.2	3.25	4.3	6.4	7.4	9.5	8.5	11.6	14.7	15.8	20	25	32.5	40.5	50	38	
			M_{2max}	Nm	9.5	13	16.5	23.5	27	34	30.5	41	51	54	68	86	110	138	80	61	
1.83 ... 2.11	6.44 ... 6.69	1.23 (1.31)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	37.5	25	1FT2204-5AF..-2..0-Z
			M_{2N}	Nm	4.75	6.8	7.8	11.4	11.8	17.3	14.1	18.1	23.5	23.5	33.5	43	54	73	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.4	7.6	9.7	14	16.1	20	18.2	24.5	30.5	33	41.5	52	67	84	50	38	
			M_{2max}	Nm	19.3	26	32.5	46	52	61	59	79	99	106	133	166	192	176	80	61	
1.84 ... 2.13	6.44 ... 6.69	1.23 (1.31)	n_{2N}	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	37.5	25	1FT2204-5AK..-2..0-Z
			M_{2N}	Nm	4.9	7	8	11.7	12.1	17.6	14.5	18.5	24	24	34.5	44	55	74	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5.5	7.6	9.7	14	16.2	20	18.3	24.5	31	33	41.5	52	67	84	50	38	
			M_{2max}	Nm	19.3	26	32.5	46	52	61	59	79	99	106	133	166	192	176	80	61	
2.59 ... 2.87	8.77 ... 9	1.61 (1.69)	n_{2N}	r/min	300	250	250	200	150	150	150	125	100	100	75	60	50	37.5	37.5	25	1FT2204-6AF..-2..0-Z
			M_{2N}	Nm	6.7	9.4	10.6	15.3	20.5	22.5	18.9	23.5	31	31	44.5	56	71	95	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.7	10.6	13.5	19.3	22	27.5	25	33.5	42	45	56	71	91	110	50	38	
			M_{2max}	Nm	26	35	44	62	71	61	80	107	134	143	179	176	192	176	80	61	
2.6 ... 2.85	10 ... 10.3	3.15 (4.05)	n_{2N}	r/min	300	250	200	150	150	150	125	100	75	75	60	50	50	37.5	30	20	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	5.8	8.2	11	16	18	19	19.2	25.5	34.5	35.5	45.5	56	58	80	50	38	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.8	10.7	13.6	19.4	22	28	24.5	33	42	44.5	56	70	90	110	50	38	
			M_{2max}	Nm	30	40	50	71	80	61	91	122	153	163	192	176	192	176	80	61	
2.64 ... 2.89	10 ... 10.3	3.15 (4.05)	n_{2N}	r/min	300	300	250	200	200	150	150	125	100	100	75	60	50	37.5	37.5	25	1FT2205-2AF..-0..0-Z
			M_{2N}	Nm	6.5	7.9	10.9	15.6	15.9	23	19.3	24	31.5	31.5	45	57	72	95	50	37.5	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.9	10.8	13.8	19.7	22.5	28.5	25	33.5	42.5	45.5	57	71	92	110	50	38	
			M_{2max}	Nm	30	40	50	71	80	61	91	122	153	163	192	176	192	176	80	61	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:		NLCW080, 1-stage						NLCW080, 2-stage									
1. Order code		C36						C37									
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50	38
$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80	61
$M_{2Em.Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	200
$J_{1,G}$	kg cm²	1.394	1.089	1.016	0.951	0.937	0.921	1.246	1.218	1.21	1.001	0.959	0.956	0.918	0.917	0.917	0.906
$\varphi_{2,G}$	'	13						15									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type NLCW080

Servomotor data

$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)
Nm	Nm	kg cm²
2.61 ... 2.86	10 ... 10.3	3.15 (4.05)
4.73 ... 4.94	17 ... 17.2	5.1 (6)

Selection data servomotors with planetary gearbox

Servomotors with planetary gearbox

SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW080 1- and 2-stage (continued)

n_{2N}	r/min	300	250	250	200	150	150	125	100	100	75	75	60	50	37.5	37.5	25	**1FT2205-2AH..-0..0-Z**		
M_{2N}	Nm	6.2	8.7	9.6	13.9	18.6	20.5	20.5	27	28	37.5	40	51	64	87	44	37.5	■■■	+	■■■ + . . .
$M_{2,0}$	Nm	7.8	10.7	13.6	19.4	22	28	24.5	33.5	42	45	56	70	90	110	50	37.5			
M_{2max}	Nm	30	40	50	71	80	61	91	122	153	163	192	176	192	176	80	61			
n_{2N}	r/min	300	250	200	150	150	125	125	100	75	75	60	50	50	37.5	37.5	–	**1FT2205-4AF..-0..0-Z**		
M_{2N}	Nm	9.9	13.6	18.5	27	29	36.5	30.5	40.5	55	56	72	88	90	110	47	–	■■■	+	■■■ + . . .
$M_{2,0}$	Nm	14.1	19.2	24	34	39	38	43.5	58	73	78	98	110	120	110	50	–			
M_{2max}	Nm	50	68	85	104	80	61	154	192	176	192	192	176	192	176	80	–			

Planetary gearbox data

Gearbox type:		**NLCW080, 1-stage**						**NLCW080, 2-stage**									
1. Order code		**C36**						**C37**									
i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**	**100**
2. Order code		**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**	**R00**
$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50	38
$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80	61
$M_{2Em.Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	200
$J_{1,G}$	kg cm²	1.394	1.089	1.016	0.951	0.937	0.921	1.246	1.218	1.21	1.001	0.959	0.956	0.918	0.917	0.917	0.906
$\varphi_{2,G}$	'	13						15									

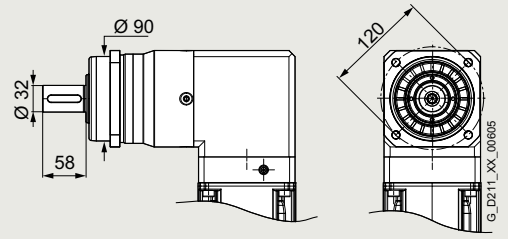
Color legend:

	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data

NLCW120



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	6000 N
Average axial force for 20000 h	$F_{A,eq}$	8000 N
Average radial force for 30000 h	$F_{R,eq}$	5400 N
Average axial force for 30000 h	$F_{A,eq}$	7000 N
Maximum radial force	$F_{R,max}$	6000 N
Maximum axial force	$F_{A,max}$	8000 N

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW120 1- and 2-stage																					
0.132 ... 0.375	1.44 ... 1.68	0.093 (0.112)	n_{2N}	r/min	–	–	150	150	150	150	100	100	75	75	75	60	50	37.5	30	20	1FT2103-2AH..-0..0-Z
			M_{2N}	Nm	–	–	0.255	0.85	1.12	1.54	1.35	1.77	2.85	3	3.6	4.95	7	9.8	13.2	21	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	–	–	0.65	1.43	1.82	2.6	2.2	3.35	4.5	4.9	6.4	8.4	11.1	14.2	23.5	37	
			M_{2max}	Nm	–	–	7.1	10.5	12.2	15.6	13.9	19	24	25.5	32.5	40.5	52	66	106	152	
0.569 ... 0.981	3.3 ... 3.69	0.139 (0.158)	n_{2N}	r/min	300	300	300	250	250	200	150	125	100	100	75	75	60	50	30	20	1FT2103-4AH..-0..0-Z
			M_{2N}	Nm	0.98	1.56	2.1	3.45	3.75	5.4	4.9	6.6	8.8	9.3	13	14.6	20	25	42	66	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.7	2.7	3.7	5.6	6.6	8.6	7.6	10.6	13.6	14.6	18.6	23.5	30.5	38.5	62	95	
			M_{2max}	Nm	9.9	13.6	17.3	24.5	28	35.5	32	43	54	58	73	91	117	147	192	152	
0.597 ... 1.01	3.01 ... 3.41	0.35 (0.43)	n_{2N}	r/min	375	375	300	300	250	200	150	150	125	125	100	75	75	60	37.5	25	1FT2104-4AF..-0..0-Z
			M_{2N}	Nm	1.27	1.87	2.95	4.05	5.2	7.1	6.5	7.7	9.9	10.1	14.2	19.2	21	27.5	47	73	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.79	2.8	3.8	5.8	6.9	8.9	7.9	11	14	15	19.1	24	31	39.5	64	95	
			M_{2max}	Nm	9	12.4	15.8	22.5	26	33	29.5	39.5	50	53	67	84	108	135	192	152	
0.59 ... 1	3.11 ... 3.5	0.35 (0.43)	n_{2N}	r/min	375	375	375	300	250	200	200	150	125	125	100	75	75	60	37.5	25	1FT2104-4AK..-0..0-Z
			M_{2N}	Nm	1.31	2.1	2.5	4.6	5.8	7.6	5.2	8.7	11.1	10.9	16	20.5	22	29.5	51	77	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.77	2.75	3.8	5.8	6.8	8.8	7.8	10.9	13.9	14.9	19	24	31	39	63	95	
			M_{2max}	Nm	9.3	12.8	16.3	23	26.5	33.5	30	41	51	55	69	86	111	139	192	152	
1.68 ... 2.08	6.64 ... 7.01	0.56 (0.65)	n_{2N}	r/min	375	375	300	250	250	200	150	125	100	100	100	75	60	50	30	25	1FT2104-5AF..-0..0-Z
			M_{2N}	Nm	4.55	5.6	8.5	12.4	12.5	17.7	16.4	21.5	28	29	28.5	42	57	69	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	5	7.1	9.2	13.4	15.5	19.7	17.6	23.5	30	32	40.5	51	65	82	120	95	
			M_{2max}	Nm	19.9	26.5	33.5	48	55	69	62	83	104	111	139	174	220	275	192	152	
1.67 ... 2.07	6.74 ... 7.1	0.56 (0.65)	n_{2N}	r/min	375	375	300	250	250	200	150	125	100	100	75	75	60	50	30	25	1FT2104-5AK..-0..0-Z
			M_{2N}	Nm	4.5	5.4	8.4	12.2	12.3	17.3	16.2	21	27.5	28.5	37.5	41	56	68	118	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	4.95	7	9.1	13.3	15.4	19.6	17.5	23.5	29.5	32	40	50	65	82	120	95	
			M_{2max}	Nm	20	27	34	48.5	55	70	63	84	105	112	141	176	225	280	192	152	
2.42 ... 2.81	9.06 ... 9.41	0.76 (0.84)	n_{2N}	r/min	375	300	300	250	200	200	150	125	100	100	75	60	60	50	37.5	25	1FT2104-6AF..-0..0-Z
			M_{2N}	Nm	6.5	9.5	11	15.5	20	21.5	21	26.5	35	35.5	51	64	69	83	98	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.2	10	12.9	18.5	21	27	24	32.5	41	44	55	69	89	111	120	95	
			M_{2max}	Nm	27	36.5	46	64	74	93	83	112	140	149	187	230	300	368	192	152	

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Planetary gearbox data																	
Gearbox type:			NLCW120, 1-stage						NLCW120, 2-stage								
1. Order code			C46						C47								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95
	$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
	$J_{1,G}$	kg cm²	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818
	$\varphi_{2,G}$	'	11						13									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NLCW120

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW120 1- and 2-stage (continued)																					
4.11 ... 4.5	13.9 ... 14.2	1.71 (2.55)	n_{2N}	r/min	375	300	300	250	200	200	150	125	100	100	75	60	50	50	37.5	25	1FT2105-4AF..-0..0-Z
			M_{2N}	Nm	11	15.2	18.4	24.5	31	32.5	34.5	43	56	56	78	99	126	123	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	12.3	16.8	21	30	34.5	44	39.5	53	66	71	89	111	143	179	120	95	
			M_{2max}	Nm	41.5	55	70	98	112	141	127	169	210	225	280	350	416	368	192	152	
4.15 ... 4.53	13.9 ... 14.2	1.71 (2.55)	n_{2N}	r/min	375	300	300	250	200	200	150	125	100	100	75	60	50	37.5	37.5	25	1FT2105-4AH..-0..0-Z
			M_{2N}	Nm	10.5	14.6	16.9	22	29.5	29	32	39.5	51	51	75	94	120	154	97	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	12.4	17	21.5	30.5	35	44	39.5	53	67	71	89	112	144	180	120	95	
			M_{2max}	Nm	41.5	55	70	98	112	141	127	169	210	225	280	350	416	368	192	152	
7.03 ... 7.39	22.6 ... 22.9	2.65 (3.5)	n_{2N}	r/min	375	300	250	200	200	150	125	100	100	75	75	60	50	37.5	37.5	25	1FT2105-6AF..-0..0-Z
			M_{2N}	Nm	16	22.5	30	42	42.5	61	54	71	71	98	103	131	164	220	119	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	21	28.5	35.5	50	58	73	65	87	110	117	147	184	235	230	120	95	
			M_{2max}	Nm	67	90	113	159	182	152	205	270	340	365	416	368	416	368	192	152	
7.48 ... 7.75	24.6 ... 24.8	4.6 (6.3)	n_{2N}	r/min	375	300	250	200	200	150	150	100	100	75	75	60	50	37.5	37.5	–	1FT2106-3AF..-0..0-Z
			M_{2N}	Nm	16.8	23.5	30.5	43	44	62	47	74	74	101	107	136	171	230	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22	30	38	53	61	77	68	91	114	122	153	192	245	230	120	–	
			M_{2max}	Nm	73	98	123	172	192	152	220	295	368	395	416	368	416	368	192	–	
9.85 ... 10.1	31.3 ... 31.5	6 (7.6)	n_{2N}	r/min	375	300	250	200	200	150	125	100	75	75	60	50	50	37.5	37.5	–	1FT2106-4AF..-0..0-Z
			M_{2N}	Nm	20.5	29	37.5	52	51	74	69	89	120	123	158	193	194	230	105	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29.5	39.5	49.5	70	80	95	89	119	149	159	199	230	260	230	120	–	
			M_{2max}	Nm	93	125	157	216	192	152	280	375	368	416	416	368	416	368	192	–	
14.1 ... 14.4	43.4 ... 43.6	8.7 (10.4)	n_{2N}	r/min	300	250	250	200	150	150	125	100	75	75	60	50	50	50	–	–	1FT2106-6AF..-0..0-Z
			M_{2N}	Nm	33.5	44.5	46.5	63	88	90	85	109	148	151	195	225	225	177	–	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	42	56	71	100	114	95	127	169	210	225	260	230	260	230	–	–	
			M_{2max}	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	–	–	
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW120 1- and 2-stage																					
0.192 ... 0.362	1.42 ... 1.58	0.2 (0.22)	n_{2N}	r/min	–	–	–	150	150	150	125	100	75	75	60	50	50	37.5	25	15	1FT2203-2AK..-0..0-Z
			M_{2N}	Nm	–	–	–	0.76	1.02	1.47	1.01	1.73	2.7	2.95	4.3	5.6	6.6	9.5	15.2	27	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	–	–	–	1.34	1.72	2.45	2.05	3.2	4.3	4.7	6.2	8	10.7	13.7	22.5	36	
			M_{2max}	Nm	–	–	–	9.9	11.5	14.7	13.1	17.8	22.5	24	30.5	38.5	49.5	62	100	152	
0.552 ... 0.964	3.01 ... 3.41	0.35 (0.37)	n_{2N}	r/min	375	300	300	250	250	200	150	125	100	100	75	75	60	50	30	20	1FT2203-4AK..-0..0-Z
			M_{2N}	Nm	1.07	1.99	2.55	4.1	4.45	6.2	5.7	7.7	10.2	10.7	15	16.5	22.5	28	47.5	74	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	1.65	2.6	3.6	5.5	6.5	8.5	7.5	10.4	13.3	14.3	18.2	23	30	37.5	61	95	
			M_{2max}	Nm	9	12.4	15.8	22.5L	26	33	29.5	39.5	50	53	67	84	108	135	192	152	
1.64 ... 2.04	6.26 ... 6.62	1.23 (1.31)	n_{2N}	r/min	375	375	300	250	250	200	150	125	100	100	75	75	60	50	30	25	1FT2204-5AF..-0..0-Z
			M_{2N}	Nm	4.4	5.2	8.1	11.7	11.6	16.6	15.7	20.5	26.5	27.5	37	39.5	54	65	114	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	4.9	6.9	L9	13.1	15.2	19.3	17.2	23	29.5	31.5	39.5	50	64	80	120	95	
			M_{2max}	Nm	18.7	25	32	45	52	65	58	78	98	105	131	164	210	260	192	152	
1.65 ... 2.06	6.26 ... 6.62	1.23 (1.31)	n_{2N}	r/min	375	375	300	250	250	200	150	125	100	100	75	75	60	50	30	25	1FT2204-5AK..-0..0-Z
			M_{2N}	Nm	4.45	5.4	8.3	12.1	12	17	16	21	27.5	28.5	37.5	40.5	55	66	116	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	4.95	7	9.1	13.2	15.3	19.4	17.4	23.5	29.5	31.5	40	50	65	81	120	95	
			M_{2max}	Nm	18.7	25	32	45	52	65	58	78	98	105	131	164	210	260	192	152	

➥ Continued on the next page

Planetary gearbox data																	
Gearbox type:		NLCW120, 1-stage						NLCW120, 2-stage									
1. Order code		C46						C47									
	i	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152
$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
$J_{1,G}$	kg cm²	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818
$\varphi_{2,G}$	'	11						13									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW120 1- and 2-stage (continued)																				
2.4 ... 2.8	8.58 ... 8.93	1.61 (1.69)	n_{2N}	r/min	375	375	300	250	200	200	150	125	100	100	75	75	60	50	30	25	1FT2204-6AF..-0..0-Z
			M_{2N}	Nm	6.7	7.6	11.9	16.4	20	22.5	22.5	28.5	37.5	37.5	52	52	72	86	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.2	10	12.8	18.4	21	26.5	24	32.5	40.5	43.5	55	69	88	111	120	95	
			M_{2max}	Nm	25.5	34.5	43.5	61	70	88	79	106	133	142	177	220	285	355	192	152	
2.66 ... 2.99	9.84 ... 10.2	3.15 (4.05)	n_{2N}	r/min	375	300	300	250	200	200	150	125	100	100	75	60	50	37.5	30	20	1FT2205-2AC..-0..0-Z
			M_{2N}	Nm	5.6	8.1	9.9	13.4	17.3	17.9	19.2	23.5	31.5	31	44.5	56	72	93	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.9	11	14.1	20	23	29.5	25.5	34.5	43.5	46.5	58	73	95	119	120	95	
			M_{2max}	Nm	29.5	39.5	49.5	70	80	101	90	121	151	162	200	250	325	368	192	152	
2.69 ... 3.03	9.84 ... 10.2	3.15 (4.05)	n_{2N}	r/min	375	375	300	250	250	200	150	125	100	100	75	75	60	50	30	25	1FT2205-2AF..-0..0-Z
			M_{2N}	Nm	6	7.6	10.7	15.3	15.7	22	20	27	34.5	36	47.5	52	71	85	119	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	8	11.1	14.2	20.5	23.5	29.5	26	35	44	47	59	74	96	120	120	95	
			M_{2max}	Nm	29.5	39.5	49.5	70	80	101	90	121	151	162	200	250	325	368	192	152	
2.63 ... 2.97	9.84 ... 10.2	3.15 (4.05)	n_{2N}	r/min	375	300	300	250	200	200	150	125	100	100	75	60	60	50	30	25	1FT2205-2AH..-0..0-Z
			M_{2N}	Nm	5.8	8.3	10.3	14.3	17.7	19.4	19.8	25.5	33	33.5	45.5	57	62	74	120	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	7.8	10.9	13.9	20	23	29	25.5	34.5	43.5	46.5	58	73	94	118	120	94	
			M_{2max}	Nm	29.5	39.5	49.5	70	80	101	90	121	151	162	200	250	325	368	192	152	
4.88 ... 5.17	16.8 ... 17.1	5.1 (6)	n_{2N}	r/min	375	300	250	200	200	150	150	100	100	75	75	60	50	37.5	30	25	1FT2205-4AF..-0..0-Z
			M_{2N}	Nm	10.7	15.6	20	29	30	41.5	31.5	49.5	50	68	73	93	118	159	120	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.6	19.9	25	35.5	41	51	45.5	61	76	81	102	128	164	205	120	95	
			M_{2max}	Nm	50	67	84	118	136	152	153	200	255	270	340	368	416	368	192	152	
4.89 ... 5.27	16.8 ... 17.1	7.8 (9.4)	n_{2N}	r/min	300	300	250	200	150	150	125	100	75	75	60	50	37.5	37.5	30	20	1FT2206-2AC..-0..0-Z
			M_{2N}	Nm	12.7	14.5	19.5	27	35.5	39.5	36	46.5	64	65	85	103	142	143	119	95	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.6	19.9	25	35.5	41	51	46	62	78	83	104	130	168	210	120	95	
			M_{2max}	Nm	50	67	84	118	136	152	153	200	255	270	340	368	416	368	192	152	
5.04 ... 5.33	16.8 ... 17.1	7.8 (9.4)	n_{2N}	r/min	375	300	300	250	200	200	150	125	100	100	75	60	50	37.5	37.5	25	1FT2206-2AF..-0..0-Z
			M_{2N}	Nm	11.8	16.3	19.5	25	32.5	32.5	37	45.5	59	59	83	104	133	170	105	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	15.1	20.5	25.5	36.5	42	53	47	63	79	84	105	132	170	210	120	95	
			M_{2max}	Nm	50	67	84	118	136	152	153	200	255	270	340	368	416	368	192	152	
4.87 ... 5.17	16.8 ... 17.1	7.8 (9.4)	n_{2N}	r/min	375	300	250	200	200	150	150	100	100	75	75	60	50	37.5	30	20	1FT2206-2AH..-0..0-Z
			M_{2N}	Nm	10.9	15.7	20	28.5	29.5	41	31.5	50	49.5	67	72	93	116	158	119	94	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	14.6	19.8	25	35.5	40.5	51	45.5	61	76	81	102	128	165	205	119	95	
			M_{2max}	Nm	50	67	84	118	136	152	153	200	255	270	340	368	416	368	192	152	
7.62 ... 7.89	25.5 ... 25.8	11.5 (13.1)	n_{2N}	r/min	375	300	250	200	200	150	125	100	75	75	60	50	50	37.5	25	–	1FT2206-3AB..-0..0-Z
			M_{2N}	Nm	15.2	21.5	28.5	40	40	57	52	68	92	94	122	148	154	205	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22.5	30.5	38.5	54	62	78	69	93	116	124	156	195	250	230	120	–	
			M_{2max}	Nm	76	102	128	179	192	152	230	305	368	410	416	368	416	368	192	–	
7.49 ... 7.76	25.5 ... 25.8	11.5 (13.1)	n_{2N}	r/min	300	300	250	200	150	150	125	100	75	75	60	50	37.5	37.5	30	–	1FT2206-3AF..-0..0-Z
			M_{2N}	Nm	18.4	20.5	27.5	38	50	55	50	65	88	90	117	143	196	198	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	22	30	38	53	61	77	68	91	114	122	153	192	245	230	120	–	
			M_{2max}	Nm	76	102	128	179	192	152	230	305	368	410	416	368	416	368	192	–	

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Planetary gearbox data																	
Gearbox type:			NLCW120, 1-stage						NLCW120, 2-stage								
1. Order code			C46						C47								
	i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
	$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95
	$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
	$J_{1,G}$	kg cm²	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818
	$\varphi_{2,G}$	'	11						13									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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Gearbox type NLCW120

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																		
Nm	Nm	kg cm²																		
SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW120 1- and 2-stage (continued)																				
10.5 ... 10.8	36.2 ... 36.3	15.1 (16.8)	n_{2N}	r/min	250	200	200	150	125	100	100	75	60	60	50	37.5	30	30	25	–	**1FT2206-4AC..-0..0-Z**
			M_{2N}	Nm	24	33	35.5	51	63	81	63	86	110	111	138	185	235	225	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	31	42	53	74	85	95	96	128	161	172	215	230	260	230	120	–	
			M_{2max}	Nm	108	144	181	216	192	152	325	416	368	416	416	368	416	368	192	–	
10.3 ... 10.6	34.2 ... 34.4	15.1 (16.8)	n_{2N}	r/min	375	300	250	200	150	150	125	100	75	75	60	50	50	37.5	37.5	–	**1FT2206-4AF..-0..0-Z**
			M_{2N}	Nm	21	29.5	38.5	52	70	75	70	91	122	125	161	196	199	230	109	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	30.5	41.5	52	73	84	95	93	124	156	166	205	230	260	230	120	–	
			M_{2max}	Nm	102	137	171	216	192	152	305	410	368	416	416	368	416	368	192	–	
9.81 ... 10.1	34.2 ... 34.4	15.1 (16.8)	n_{2N}	r/min	300	250	200	150	150	125	125	100	75	75	60	50	37.5	37.5	30	–	**1FT2206-4AH..-0..0-Z**
			M_{2N}	Nm	22.5	30	40	57	60	75	58	74	102	103	134	161	220	215	120	–	■■■ + ■■■ + . . .
			$M_{2,0}$	Nm	29	39.5	49.5	70	80	95	89	119	149	159	199	230	260	230	120	–	
			M_{2max}	Nm	102	137	171	216	192	152	305	410	368	416	416	368	416	368	192	–	

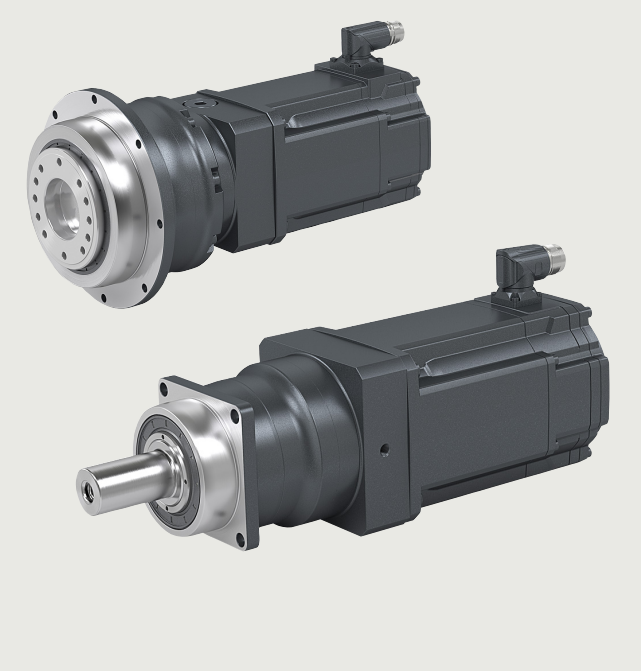
Planetary gearbox data																		
Gearbox type:			**NLCW120, 1-stage**						**NLCW120, 2-stage**									
1. Order code			**C46**						**C47**									
	i		**3**	**4**	**5**	**7**	**8**	**10**	**9**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**64**	**100**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R08**	**R10**	**R09**	**R12**	**R15**	**R16**	**R20**	**R25**	**R32**	**R40**	**R64**	**R00**
	$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95
	$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152
	$M_{2Em.Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
	$J_{1,G}$	kg cm²	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818
	$\varphi_{2,G}$	'	11						13									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data



SIMOTICS S-1FT2 precision geared motors SP+ and TP+

The following pages show the permissible combinations of **servo motors for 400 V 3AC** converters

and the precision planetary gearboxes **SP+ and TP+.**

They show the most important component data of the motor and gearbox as well as the rating of the system geared motor.

The rated operating points of the geared motors are adapted to the converter supply voltage.

More information on selection is provided in the section "Information on Selection".

SP+

The low backlash, coaxial SP+ precision gearbox sets itself apart as a result of the high positioning precision and is suitable for high dynamic cyclic operation. Thanks to the preloaded tapered roller bearing, it is suitable for high radial and axial loads.

The IP65 seal provides protection against dust and water.

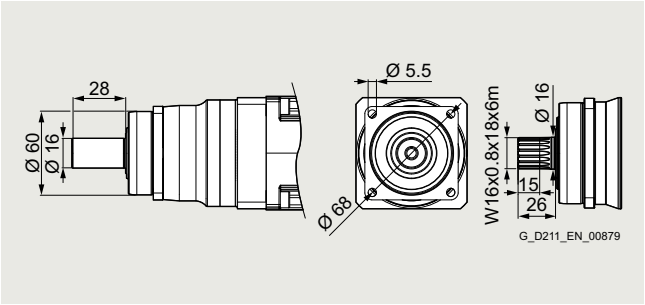
TP+

The coaxial TP+ gearbox sets itself apart as a result of its extremely compact design with output flange. It offers a low torsional backlash with the highest torsional rigidity and is designed to address demanding applications with high torques and large external loads.

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Gearbox type SP060

Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1700 N
Average axial force for 20000 h	$F_{A,eq}$	2400 N
Average radial force for 30000 h	$F_{R,eq}$	1500 N
Average axial force for 30000 h	$F_{A,eq}$	2100 N
Maximum radial force	$F_{R,max}$	2800 N
Maximum axial force	$F_{A,max}$	2400 N

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FT2, SH 30, High Dynamic with planetary gearbox SP060 1- and 2-stage																			
0.355	1.22	0.036	n_{2N}	r/min	600	500	375	300	250	150	150	125	125	100	75	60	50	30	1FT2103-2AH..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	1.06	1.25	1.81	2.5	3.45	6.2	7.3	9.2	9.6	12.1	15.1	18.2	20.5	30	■■■ + ■■■ + . . .
0.53	1.86		$M_{2.0}$	Nm	1.56	2	2.45	3.45	5	8.4	10.6	13.1	14.6	17.9	20	23.5	29	35	NEW
			M_{2max}	Nm	5.5	7.3	9.1	12.8	18.3	29.5	37	45.5	50	61	57	67	56	48	
0.673	2.42	0.036	n_{2N}	r/min	600	500	375	300	250	150	150	125	100	100	75	60	37.5	30	1FT2103-4AH..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	2	2.4	3.45	4.6	6.1	11.6	12.5	15.8	19.8	19.3	25.5	29.5	43.5	38	■■■ + ■■■ + . . .
1.01	3.9		$M_{2.0}$	Nm	2.95	3.9	4.85	6.8	9.7	16.1	20	24.5	27.5	33.5	37.5	44.5	50	38	NEW
			M_{2max}	Nm	11.6	15.6	19.4	27	38.5	57	57	67	57	67	57	67	56	48	
SIMOTICS S-1FT2, SH 30, Compact with planetary gearbox SP060 1- and 2-stage																			
0.357	1.16	0.036	n_{2N}	r/min	600	500	375	300	250	150	125	100	100	75	75	60	37.5	25	1FT2203-2AK..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	0.97	1.14	1.65	2.2	2.95	5.5	7.1	9.3	9.6	12.6	12.6	14.9	22.5	30	■■■ + ■■■ + . . .
0.535	1.76		$M_{2.0}$	Nm	1.57	2	2.5	3.5	5	8.5	10.7	13.3	14.7	18	20	23.5	29	35.5	NEW
			M_{2max}	Nm	5.2	7	8.6	12.1	17.3	28	35	43	48	58	57	67	56	48	
0.76	2.26	0.036	n_{2N}	r/min	500	375	375	250	200	150	125	100	100	75	60	50	37.5	30	1FT2203-4AK..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	2.6	3.45	3.65	5.7	7.9	11.8	15.1	19.5	19.3	25.5	30.5	34.5	41.5	36.5	■■■ + ■■■ + . . .
1.14	3.62		$M_{2.0}$	Nm	3.35	4.45	5.5	7.7	11.1	18.2	22.5	28	31	38	42.5	50	50	38	NEW
			M_{2max}	Nm	10.8	14.4	17.9	25	35.5	57	57	67	57	67	57	67	56	48	

Planetary gearbox data																
Gearbox type:			SP060, 1-stage					SP060, 2-stage								
1. Order code			J21					J22								
	i		3	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	29	38	48	50	38	50	50	50	50	50	50	50	50	38
	$M_{2max,G}$	Nm	29	38	48	60	51	57	57	67	57	67	57	67	56	48
	$M_{2Em.Off}$	Nm	40	50	50	67	95	109	109	109	109	109	109	109	109	100
	$J_{1,G}$	kg cm²	0.21	0.15	0.12	0.1	0.09	0.08	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06
	$\varphi_{2,G}$	'	4					6								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 40, High Dynamic with planetary gearbox SP060 1- and 2-stage																	
1.06	3.14	0.036	n_{2N}	r/min	750	500	500	375	300	200	150	125	100	100	75	60	1FT2104-4AF..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	2.45	3.8	4.15	6	8.2	13.6	19	23.5	27.5	30	37.5	45	■■■ + ■■■ + . . .
1.19	3.61		$M_{2.0}$	Nm	3.45	4.55	5.7	8	11.5	18.9	23.5	29	32	39.5	44	50	NEW
			M_{2max}	Nm	10.7	14.3	17.9	25	35.5	57	57	67	57	67	57	67	
1.05	3.22	0.036	n_{2N}	r/min	750	500	500	375	250	200	150	125	100	100	75	60	1FT2104-4AK..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	2.55	4.1	4.35	6.2	10.4	14.2	20	25.5	29.5	31.5	40	46.5	■■■ + ■■■ + . . .
1.18	3.7		$M_{2.0}$	Nm	3.45	4.55	5.7	8	11.5	18.8	23.5	29	32	39	44	50	NEW
			M_{2max}	Nm	11	14.7	18.4	25.5	36.5	57	57	67	57	67	57	67	
2.11	6.5	0.036	n_{2N}	r/min	600	500	375	300	250	150	150	100	100	–	75	–	1FT2104-5AF..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	5.3	6.6	9.2	12.1	15.7	27.5	28.5	42.5	43	–	50	–	■■■ + ■■■ + . . .
2.27	7.26		$M_{2.0}$	Nm	6.7	8.9	11.2	15.6	22	36	45	50	50	–	50	–	NEW
			M_{2max}	Nm	21.5	29	36	50	51	57	57	67	57	–	57	–	
2.09	6.58	0.036	n_{2N}	r/min	600	500	375	300	250	150	125	125	100	–	75	–	1FT2104-5AK..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	5.2	6.5	9	12	15.5	27	33.5	34	42.5	–	50	–	■■■ + ■■■ + . . .
2.26	7.36		$M_{2.0}$	Nm	6.7	8.9	11.1	15.5	22	36	44.5	50	50	–	50	–	NEW
			M_{2max}	Nm	22	29	36.5	51	51	57	57	67	57	–	57	–	
2.78	8.55	0.036	n_{2N}	r/min	600	500	375	300	250	150	125	–	–	–	75	–	1FT2104-6AF..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	6.5	8.1	11.2	14.6	18.5	32	39.5	–	–	–	50	–	■■■ + ■■■ + . . .
3.01	9.72		$M_{2.0}$	Nm	8.9	11.9	14.9	20.5	29.5	48	50	–	–	–	50	–	NEW
			M_{2max}	Nm	29	38.5	48.5	67	51	57	57	–	–	–	57	–	
SIMOTICS S-1FT2, SH 40, Compact with planetary gearbox SP060 1- and 2-stage																	
2.07	6.18	0.036	n_{2N}	r/min	600	500	375	300	250	150	125	100	100	–	75	–	1FT2204-5AF..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	5	6.1	8.6	11.2	14	25	31	39	38.5	–	46	–	■■■ + ■■■ + . . .
2.23	6.88		$M_{2.0}$	Nm	6.6	8.7	11	15.4	22	35.5	44	50	50	–	50	–	NEW
			M_{2max}	Nm	20.5	27	34	47.5	51	57	57	67	57	–	57	–	
2.08	6.18	0.036	n_{2N}	r/min	600	500	375	300	250	150	125	100	100	–	75	–	1FT2204-5AK..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	5.1	6.2	8.8	11.5	14.3	25.5	31.5	39.5	39	–	46	–	■■■ + ■■■ + . . .
2.24	6.88		$M_{2.0}$	Nm	6.6	8.8	11	15.4	22	35.5	44.5	50	50	–	50	–	NEW
			M_{2max}	Nm	20.5	27	34	47.5	51	57	57	67	57	–	57	–	
2.78	8.15	0.036	n_{2N}	r/min	600	500	375	300	200	150	125	–	–	–	75	–	1FT2204-6AF..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	6.6	8.1	11.4	14.6	22.5	31.5	38.5	–	–	–	50	–	■■■ + ■■■ + . . .
2.99	9.22		$M_{2.0}$	Nm	8.9	11.8	14.8	20.5	29.5	47.5	50	–	–	–	50	–	NEW

Planetary gearbox data

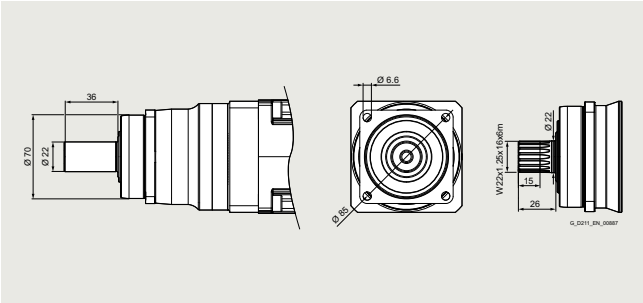
Gearbox type:		SP060, 1-stage					SP060, 2-stage						
1. Order code		J21					J22						
i		3	4	5	7	10	16	20	25	28	35	40	50
2. Order code		R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50
$M_{2N,G}$	Nm	36	50	50	50	38	50	50	50	50	50	50	50
$M_{2max,G}$	Nm	48	67	67	67	51	57	57	67	57	67	57	67
$M_{2Em.Off}$	Nm	96	109	109	109	100	109	109	109	109	109	109	109
$J_{1,G}$	kg cm²	0.28	0.22	0.2	0.18	0.16	0.17	0.16	0.16	0.16	0.16	0.15	0.15
$\varphi_{2,G}$	'	4					6						

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type SP075

Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	2400 N
Average axial force for 20000 h	$F_{A,eq}$	3350 N
Average radial force for 30000 h	$F_{R,eq}$	2100 N
Average axial force for 30000 h	$F_{A,eq}$	3000 N
Maximum radial force	$F_{R,max}$	4200 N
Maximum axial force	$F_{A,max}$	3350 N

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FT2, SH 20, 30, 40, High Dynamic with planetary gearbox SP075 1- and 2-stage																			
0.328	1.63	0.036	n_{2N}	r/min	375	375	375	300	250	200	150	125	125	100	75	75	60	37.5	1FT2103-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	0.54	0.98	1.38	2.4	3.6	5	7.5	9.9	10.8	14.3	17.6	20	22.5	33	■■■ + ■■■ + . . .
0.522	1.8		$M_{2.0}$	Nm	0.98	1.49	2.05	3.15	4.45	8.1	10.2	12.7	14.3	18	20.5	25.5	35.5	47.5	NEW
			M_{2max}	Nm	4.85	6.6	8.4	12	17.2	28.5	35.5	44	49.5	62	70	87	113	105	
0.837	3.39	0.036	n_{2N}	r/min	375	375	300	300	250	150	150	125	125	100	75	75	50	30	1FT2103-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	1.57	2.25	3.7	4.95	7.1	12.9	14.9	19.7	20.5	27	33	37.5	47.5	70	■■■ + ■■■ + . . .
1.02	3.79		$M_{2.0}$	Nm	2.5	3.45	4.5	6.6	9.4	16.3	20	25	28	35.5	40.5	50	69	93	NEW
			M_{2max}	Nm	11	14.7	18.5	26	37	60	74	92	103	129	126	158	113	105	
0.96	3.14	0.036	n_{2N}	r/min	375	375	375	375	300	200	150	125	100	100	75	60	50	30	1FT2104-4AF..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	2.45	3.5	4.55	5.8	9	14.6	19.8	25	29.5	35	42	52	65	94	■■■ + ■■■ + . . .
1.14	3.51		$M_{2.0}$	Nm	2.85	3.95	5.1	7.4	10.6	18.2	22.5	28	31.5	39.5	45	56	77	104	NEW
			M_{2max}	Nm	10.1	13.5	17	24	34	56	69	85	96	119	126	158	113	105	
0.953	3.22	0.036	n_{2N}	r/min	375	375	375	375	300	200	150	125	100	100	75	60	50	30	1FT2104-4AK..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	2.7	3.85	4.9	6	9.4	15.9	21	27	31.5	37.5	45	56	70	102	■■■ + ■■■ + . . .
1.13	3.6		$M_{2.0}$	Nm	2.85	3.95	5.1	7.4	10.5	18.1	22	27.5	31	39	45	55	76	103	NEW
			M_{2max}	Nm	10.4	13.9	17.5	24.5	35	57	71	88	98	122	126	158	113	105	
2.04	6.54	0.036	n_{2N}	r/min	375	375	375	300	250	150	150	125	100	100	75	60	50	–	1FT2104-5AF..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	5	6.6	8.2	12.7	17.3	32	35	45	54	58	73	90	93	–	■■■ + ■■■ + . . .
2.2	7.09		$M_{2.0}$	Nm	6.1	8.2	10.4	14.9	21	35	43.5	54	60	75	86	107	113	–	NEW
			M_{2max}	Nm	21	28	35	49.5	70	112	126	158	126	158	126	158	113	–	
2.02	6.63	0.036	n_{2N}	r/min	375	375	375	300	250	150	150	125	100	100	75	60	50	–	1FT2104-5AK..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	4.9	6.5	8	12.5	17.1	31.5	34.5	44.5	54	57	73	89	92	–	■■■ + ■■■ + . . .
2.18	7.17		$M_{2.0}$	Nm	6	8.1	10.3	14.8	21	34.5	43	53	60	75	85	106	113	–	NEW
			M_{2max}	Nm	21	28.5	35.5	50	71	114	126	158	126	158	126	158	113	–	
2.77	8.63	0.036	n_{2N}	r/min	375	375	375	300	250	150	150	125	100	100	75	60	50	–	1FT2104-6AF..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	6.2	8.2	10	15.5	20.5	38	41	52	63	66	84	102	103	–	■■■ + ■■■ + . . .
2.92	9.51		$M_{2.0}$	Nm	8.3	11.1	14	20	28.5	46.5	57	71	80	99	113	132	113	–	NEW
			M_{2max}	Nm	28	37.5	47	66	94	126	126	158	126	158	126	158	113	–	

Planetary gearbox data																
Gearbox type:			SP075, 1-stage					SP075, 2-stage								
1. Order code			J31					J32								
	i		3	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	96	113	132	132	114	126	126	132	126	132	126	132	113	105
	$M_{2max,G}$	Nm	96	113	144	176	152	126	126	158	126	158	126	158	113	105
	$M_{2Em.Off}$	Nm	100	125	160	213	213	250	250	250	250	250	250	250	250	250
	$J_{1,G}$	kg cm²	0.86	0.61	0.51	0.42	0.38	0.16	0.13	0.13	0.1	0.1	0.09	0.09	0.09	0.09
	$\varphi_{2,G}$	'	4					6								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 20, 30, 40 Compact with planetary gearbox SP075 1- and 2-stage																			
0.315	1.53	0.036	n_{2N}	r/min	300	300	300	300	250	150	150	125	100	100	75	60	37.5	30	**1FT2203-2AK..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	0.66	1.12	1.57	2.1	3.1	5.7	6.3	8.4	10.8	11.8	16	20	27.5	33	■■■ + ■■■ + . . .
0.508	1.71		$M_{2.0}$	Nm	0.94	1.44	1.99	3.05	4.3	7.9	9.9	12.4	14	17.6	20	25	34.5	46.5	NEW
			M_{2max}	Nm	4.55	6.2	7.9	11.4	16.2	27	33.5	41.5	47	58	67	83	113	105	
0.913	3.14	0.036	n_{2N}	r/min	300	300	300	300	250	150	150	125	125	100	75	75	37.5	25	**1FT2203-4AK..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	2.3	3.25	4.15	5.2	7.2	13.7	14.7	19.4	19.5	25.5	33.5	34	59	83	■■■ + ■■■ + . . .
1.09	3.51		$M_{2.0}$	Nm	2.7	3.8	4.9	7.1	10.1	17.5	21.5	27	30	38	43.5	54	74	100	NEW
			M_{2max}	Nm	10.1	13.5	17	24	34	56	69	85	96	119	126	158	113	105	
2	6.2	0.036	n_{2N}	r/min	375	375	375	300	250	150	125	125	100	100	75	60	37.5	–	**1FT2204-5AF..-2..0-Z**
...	...	(0.04)	M_{2N}	Nm	4.8	6.3	7.6	11.8	15.7	29.5	37.5	40	50	50	67	82	113	–	■■■ + ■■■ + . . .
2.16	6.7		$M_{2.0}$	Nm	5.9	8	10.2	14.6	20.5	34.5	42.5	53	59	74	84	105	113	–	NEW
			M_{2max}	Nm	19.9	26.5	33	46.5	66	106	126	158	126	158	126	158	113	–	
2.01	6.2	0.036	n_{2N}	r/min	375	375	375	300	250	150	125	125	100	100	75	60	37.5	–	**1FT2204-5AK..-2..0-Z**
...	...	(0.04)	M_{2N}	Nm	4.9	6.4	7.8	12.1	16	30.5	38.5	41	51	51	69	84	113	–	■■■ + ■■■ + . . .
2.17	6.7		$M_{2.0}$	Nm	6	8.1	10.3	14.7	20.5	34.5	43	53	59	74	85	105	113	–	NEW
			M_{2max}	Nm	19.9	26.5	33	46.5	66	106	126	158	126	158	126	158	113	–	
2.76	8.21	0.036	n_{2N}	r/min	375	375	375	300	250	150	125	125	100	75	75	60	50	–	**1FT2204-6AF..-2..0-Z**
...	...	(0.04)	M_{2N}	Nm	6.6	8.6	10.2	15.8	20	38.5	48.5	50	63	82	82	99	91	–	■■■ + ■■■ + . . .
2.91	9.03		$M_{2.0}$	Nm	8.2	11.1	14	19.9	28	46.5	57	71	79	99	113	132	113	–	NEW
			M_{2max}	Nm	26.5	35.5	44.5	63	89	126	126	158	126	158	126	158	113	–	

Planetary gearbox data																
Gearbox type:		**SP075, 1-stage**					**SP075, 2-stage**									
1. Order code		**J31**					**J32**									
i		**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**	
2. Order code		**R03**	**R04**	**R05**	**R07**	**R10**	**R16**	**R20**	**R25**	**R28**	**R35**	**R40**	**R50**	**R70**	**R00**	
$M_{2N,G}$	Nm	96	113	132	132	114	126	126	132	126	132	126	132	113	105	
$M_{2max,G}$	Nm	96	113	144	176	152	126	126	158	126	158	126	158	113	105	
$M_{2Em.Off}$	Nm	100	125	160	213	213	250	250	250	250	250	250	250	250	250	
$J_{1,G}$	kg cm²	0.86	0.61	0.51	0.42	0.38	0.16	0.13	0.13	0.1	0.1	0.09	0.09	0.09	0.09	
$\varphi_{2,G}$	'	4					6									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type SP075

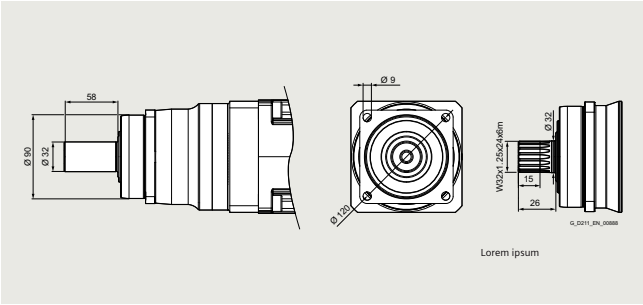
Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																
Nm	Nm	kg cm²																
SIMOTICS S-1FT2, SH 48, 52, High Dynamic with planetary gearbox SP075 1- and 2-stage																		
4.31	12.7	0.036	n_{2N}	r/min	375	375	375	300	250	150	125	100	100	75	–	60	50	1FT2105-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	12	15.4	18.3	27	33.5	60	73	91	90	113	–	130	113	■■■ + ■■■ + . . .
4.58	14.4		$M_{2.0}$	Nm	13.4	17.7	22.5	31.5	45	73	90	112	125	132	–	132	113	NEW
			M_{2max}	Nm	43	57	71	100	142	126	126	158	126	158	–	158	113	
4.34	12.7	0.036	n_{2N}	r/min	375	375	375	300	200	150	125	100	100	75	–	60	50	1FT2105-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	11.1	13.8	16	23.5	36.5	53	65	82	79	102	–	115	96	■■■ + ■■■ + . . .
4.62	14.4		$M_{2.0}$	Nm	13.4	17.9	22.5	32	45.5	73	91	112	126	132	–	132	113	NEW
			M_{2max}	Nm	43	57	71	100	142	126	126	158	126	158	–	158	113	
6.97	20.3	0.036	n_{2N}	r/min	375	375	375	300	200	125	125	100	–	75	–	–	–	1FT2105-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	16.2	20	23	33.5	49	84	83	101	–	120	–	–	–	■■■ + ■■■ + . . .
7.29	23.2		$M_{2.0}$	Nm	21.5	28.5	36	50	72	116	126	132	–	132	–	–	–	NEW
			M_{2max}	Nm	69	92	115	161	152	126	126	158	–	158	–	–	–	
SIMOTICS S-1FT2, SH 48, 52, Compact with planetary gearbox SP075 1- and 2-stage																		
2.7	9.29	0.036	n_{2N}	r/min	375	300	300	250	200	125	100	100	75	60	50	50	30	1FT2205-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	5.4	8.7	10.5	15.1	20	37	46.5	50	64	79	92	94	113	■■■ + ■■■ + . . .
2.88	10.3		$M_{2.0}$	Nm	8	10.7	13.7	19.5	27.5	45.5	56	70	78	98	112	132	113	NEW
			M_{2max}	Nm	30.5	40.5	51	72	101	126	126	158	126	158	126	158	113	
2.74	9.29	0.036	n_{2N}	r/min	375	375	375	300	250	150	125	100	100	75	75	60	37.5	1FT2205-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	6.8	8.8	10.4	15.9	20	38	47.5	61	61	80	78	95	113	■■■ + ■■■ + . . .
2.91	10.3		$M_{2.0}$	Nm	8.2	10.9	13.9	19.8	28	46.5	57	71	80	99	113	132	113	NEW
			M_{2max}	Nm	30.5	40.5	51	72	101	126	126	158	126	158	126	158	113	
2.7	9.29	0.036	n_{2N}	r/min	375	375	300	250	200	150	125	100	100	75	60	50	37.5	1FT2205-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	6.1	7.6	11.5	16.4	22	32.5	41	53	52	70	85	100	113	■■■ + ■■■ + . . .
2.88	10.3		$M_{2.0}$	Nm	8.1	10.8	13.8	19.6	28	46	57	70	79	98	112	132	113	NEW
			M_{2max}	Nm	30.5	40.5	51	72	101	126	126	158	126	158	126	158	113	
4.63	14.9	0.036	n_{2N}	r/min	375	375	300	250	200	125	100	100	75	60	60	50	37.5	1FT2205-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	9.5	11.7	17.4	24.5	31	56	70	70	91	109	106	122	113	■■■ + ■■■ + . . .
4.94	17.3		$M_{2.0}$	Nm	14.4	19.1	24	34	48.5	78	97	120	126	132	126	132	113	NEW
			M_{2max}	Nm	51	68	86	121	152	126	126	158	126	158	126	158	113	

Planetary gearbox data															
Gearbox type:			SP075, 1-stage					SP075, 2-stage							
1. Order code			J31					J32							
	i		3	4	5	7	10	16	20	25	28	35	40	50	70
2. Order code			R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70
	$M_{2N,G}$	Nm	102	132	132	132	114	126	126	132	126	132	126	132	113
	$M_{2max,G}$	Nm	136	176	176	176	152	126	126	158	126	158	126	158	113
	$M_{2Em.Off}$	Nm	139	185	250	250	250	250	250	250	250	250	250	250	250
	$J_{1,G}$	kg cm²	1.03	0.78	0.68	0.59	0.54	0.55	0.53	0.52	0.5	0.5	0.49	0.49	0.49
	$\varphi_{2,G}$	'	4					6							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	3800 N
Average axial force for 20000 h	$F_{A,eq}$	5650 N
Average radial force for 30000 h	$F_{R,eq}$	3400 N
Average axial force for 30000 h	$F_{A,eq}$	5000 N
Maximum radial force	$F_{R,max}$	6300 N
Maximum axial force	$F_{A,max}$	5650 N

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FT2, SH 30, 40, 48, 52, High Dynamic with planetary gearbox SP100 1- and 2-stage																			
0.342	1.64	0.036	n_{2N}	r/min	300	300	250	250	250	150	150	100	100	75	75	60	60	37.5	1FT2103-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	0.75	0.76	1.33	2.2	3.85	7.2	9.5	13.2	15.1	19	21.5	26.5	31	36.5	■■■ + ■■■ + . . .
0.557	1.84		$M_{2.0}$	Nm	1.35	1.36	1.8	2.8	4.3	8.5	11	13.7	15.5	18.7	21.5	26	36.5	47	NEW
			M_{2max}	Nm	5.3	6.7	8.3	11.7	16.9	29	36.5	45	51	63	72	89	123	164	
0.96	3.42	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	60	37.5	1FT2103-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	1.59	2.4	3	5.1	8.4	14.6	18.5	25	28	36	40	49.5	58	75	■■■ + ■■■ + . . .
1.15	3.87		$M_{2.0}$	Nm	3.2	3.8	4.8	6.9	10.1	18.1	23	28	32	39	45	55	77	101	NEW
			M_{2max}	Nm	11.5	14.9	18.6	25.5	36.5	61	76	94	105	131	149	187	181	193	
0.99	3.12	0.036	n_{2N}	r/min	500	375	375	375	250	150	150	100	100	75	75	60	50	30	1FT2104-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	2.15	3.15	4	5.5	10.5	17.5	22.5	29	32.5	41	47	58	79	105	■■■ + ■■■ + . . .
1.16	3.57		$M_{2.0}$	Nm	3.25	3.95	4.95	7.1	10.3	18.5	23	28.5	32	39.5	45.5	57	78	102	NEW
			M_{2max}	Nm	10.6	13.8	17.1	23.5	33.5	56	70	87	97	121	138	173	235	259	
0.982	3.21	0.036	n_{2N}	r/min	500	500	375	375	250	150	150	100	100	75	75	60	50	30	1FT2104-4AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	2.25	2.45	4.2	6.2	10.4	17.4	22	28.5	32.5	41	46.5	58	79	106	■■■ + ■■■ + . . .
1.16	3.67		$M_{2.0}$	Nm	3.25	3.9	4.95	7.1	10.3	18.3	23	28.5	32	39.5	45	56	77	102	NEW
			M_{2max}	Nm	10.9	14.1	17.6	24.5	34.5	57	72	89	100	124	142	177	240	259	
1.98	6.13	0.036	n_{2N}	r/min	500	375	375	375	250	150	150	100	100	75	75	60	50	30	1FT2104-5AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	5.5	7.6	9.7	11.6	21	35	44	56	63	79	90	111	148	200	■■■ + ■■■ + . . .
2.22	7.27		$M_{2.0}$	Nm	6.5	8.3	10.4	14.6	20.5	35	44	55	61	76	87	109	150	197	NEW
			M_{2max}	Nm	21.5	28.5	35.5	49	69	113	140	174	194	240	275	347	347	259	
1.96	6.21	0.036	n_{2N}	r/min	500	375	375	375	250	150	150	100	100	75	75	60	50	30	1FT2104-5AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	5.5	7.5	9.6	11.4	21	34.5	44	55	62	78	89	111	152	205	■■■ + ■■■ + . . .
2.2	7.37		$M_{2.0}$	Nm	6.5	8.3	10.3	14.5	20.5	35	44	54	61	76	86	108	148	196	NEW
			M_{2max}	Nm	22	29	36	49.5	70	114	142	176	197	245	280	347	347	259	
2.61	8.03	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	50	30	1FT2104-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	7.6	10.6	12.6	19.5	28.5	46.5	59	74	83	104	119	148	199	250	■■■ + ■■■ + . . .
2.95	9.73		$M_{2.0}$	Nm	8.8	11.3	14.1	19.7	28	46.5	58	72	81	101	115	144	198	255	NEW
			M_{2max}	Nm	29	38.5	47.5	66	94	151	187	230	255	320	347	347	347	259	

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Planetary gearbox data																
Gearbox type:			SP100, 1-stage					SP100, 2-stage								
1. Order code			J41					J42								
	i		3	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	139	185	232	292	282	347	347	347	347	347	347	347	347	259
	$M_{2max,G}$	Nm	139	185	232	292	376	347	347	347	347	347	347	347	347	259
	$M_{2Em.Off}$	Nm	250	313	313	324	463	625	625	625	625	625	625	625	625	625
	$J_{1,G}$	kg cm²	3.29	2.35	1.92	1.6	1.38	0.81	0.7	0.68	0.6	0.59	0.55	0.54	0.54	0.54
	$\varphi_{2,G}$	'	3					5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type SP100

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 30, 40, 48, 52, High Dynamic with planetary gearbox SP100 1- and 2-stage (continued)																			
4.06	11.6	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	50	30	1FT2105-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	11.9	16.3	19.6	28	40.5	67	80	108	118	149	162	197	240	255	■■■ + ■■■ + . . .
4.67	14.7		$M_{2.0}$	Nm	14	18.3	22.5	31.5	44.5	73	91	113	127	158	180	225	305	255	NEW
			M_{2max}	Nm	44	58	72	100	142	225	280	347	347	347	347	347	347	259	
4.08	11.6	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	60	37.5	1FT2105-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	11.3	15.5	18.5	26.5	38	63	76	102	112	141	154	188	199	210	■■■ + ■■■ + . . .
4.7	14.7		$M_{2.0}$	Nm	14.1	18.4	22.5	31.5	45	74	92	114	127	159	182	225	310	255	NEW
			M_{2max}	Nm	44	58	72	100	142	225	280	347	347	347	347	347	347	259	
7.28	21.2	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	–	–	1FT2105-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	18.2	25	27.5	41.5	58	97	112	153	165	205	220	265	–	–	■■■ + ■■■ + . . .
7.67	23.6		$M_{2.0}$	Nm	22.5	30	37.5	52	73	119	148	183	205	255	290	345	–	–	NEW
			M_{2max}	Nm	70	93	116	161	225	347	347	347	347	347	347	347	–	–	
SIMOTICS S-1FT2, SH 30, 40, 48, 52, Compact with planetary gearbox SP100 1- and 2-stage																			
0.328	1.56	0.036	n_{2N}	r/min	300	300	300	250	250	150	150	100	100	75	75	60	50	30	1FT2203-2AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	0.71	0.74	1.08	2.2	3.65	7.1	9.2	12.9	14.8	18.6	21	26	31	39.5	■■■ + ■■■ + . . .
0.543	1.74		$M_{2.0}$	Nm	1.31	1.31	1.74	2.7	4.15	8.3	10.8	13.4	15.2	18.2	21	25.5	35.5	46	NEW
			M_{2max}	Nm	5	6.3	7.8	11.1	15.9	27.5	34.5	43	48	59	68	85	117	155	
0.945	3.17	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	60	37.5	1FT2203-4AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	1.88	2.8	3.45	5.7	9.2	16	19.5	27.5	30	39	42.5	52	54	71	■■■ + ■■■ + . . .
1.14	3.57		$M_{2.0}$	Nm	3.15	3.75	4.75	6.8	9.9	17.8	22.5	28	31.5	38.5	44.5	55	76	100	NEW
			M_{2max}	Nm	10.6	13.8	17.1	23.5	33.5	56	70	87	98	121	138	173	181	193	
1.94	5.82	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	50	30	1FT2204-5AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	5.3	7.4	9	13.5	20	34	41.5	54	61	77	86	106	135	185	■■■ + ■■■ + . . .
2.18	6.87		$M_{2.0}$	Nm	6.4	8.2	10.2	14.3	20.5	34.5	43.5	54	60	75	85	107	147	194	NEW
			M_{2max}	Nm	20.5	27	33.5	46.5	66	107	133	165	184	225	260	325	347	259	
1.95	5.82	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	50	30	1FT2204-5AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	5.4	7.5	9.4	14	21	34	43	55	62	77	88	109	139	191	■■■ + ■■■ + . . .
2.19	6.87		$M_{2.0}$	Nm	6.5	8.2	10.2	14.4	20.5	35	43.5	54	60	75	86	107	148	195	NEW
			M_{2max}	Nm	20.5	27	33.5	46.5	66	107	133	165	184	225	260	325	347	259	
2.6	7.66	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	50	30	1FT2204-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	7.7	10.5	13.3	19.3	28.5	46	58	74	83	103	118	145	182	250	■■■ + ■■■ + . . .
2.93	9.23		$M_{2.0}$	Nm	8.7	11.3	14	19.6	27.5	46.5	58	72	80	100	115	143	197	255	NEW
			M_{2max}	Nm	27.5	36.5	45	62	89	143	178	220	245	305	347	347	347	259	
2.72	8.62	0.036	n_{2N}	r/min	500	375	375	300	200	125	100	100	75	60	50	50	30	20	1FT2205-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	6.5	9	10.9	15.9	25.5	41.5	53	62	75	93	108	122	178	235	■■■ + ■■■ + . . .
3.13	10.5		$M_{2.0}$	Nm	9.3	12	15	20.5	29.5	49	61	75	84	105	120	150	205	255	NEW
			M_{2max}	Nm	31.5	41.5	51	71	101	163	200	250	280	347	347	347	347	259	

➥ Continued on the next page

Planetary gearbox data															
Gearbox type:		SP100, 1-stage					SP100, 2-stage								
1. Order code		J41					J42								
i		3	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code		R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
$M_{2N,G}$	Nm	139	185	232	292	282	347	347	347	347	347	347	347	347	259
$M_{2max,G}$	Nm	139	185	232	292	376	347	347	347	347	347	347	347	347	259
$M_{2Em.Off}$	Nm	250	313	313	324	463	625	625	625	625	625	625	625	625	625
$J_{1,G}$	kg cm²	3.29	2.35	1.92	1.6	1.38	0.81	0.7	0.68	0.6	0.59	0.55	0.54	0.54	0.54
$\varphi_{2,G}$	'	3					5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 30, 40, 48, 52, Compact with planetary gearbox SP100 1- and 2-stage (continued)																			
2.76	8.62	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	50	30	**1FT2205-2AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	6.9	9.6	11.8	17.4	26	43	52	70	77	97	108	132	163	230	■■■ + ■■■ + . . .
3.16	10.5		$M_{2.0}$	Nm	9.4	12.2	15.1	21	30	49.5	61	76	85	106	122	152	205	255	NEW
			M_{2max}	Nm	31.5	41.5	51	71	101	163	200	250	280	347	347	347	347	259	
2.71	8.62	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	50	30	**1FT2205-2AH..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	6.7	9.2	11.2	16.4	24	40	48	65	71	91	100	122	147	215	■■■ + ■■■ + . . .
3.1	10.5		$M_{2.0}$	Nm	9.3	11.9	14.8	20.5	29.5	48.5	60	75	84	105	120	150	205	255	NEW
			M_{2max}	Nm	31.5	41.5	51	71	101	163	200	250	280	347	347	347	347	259	
4.55	13.6	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	50	30	**1FT2205-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	11.9	16.9	18.4	28	40.5	66	77	106	114	146	156	191	210	255	■■■ + ■■■ + . . .
5.37	17.6		$M_{2.0}$	Nm	16	21	26	36	51	83	103	128	143	178	200	250	345	255	NEW
			M_{2max}	Nm	52	70	87	120	171	270	347	347	347	347	347	347	347	259	

Planetary gearbox data																
Gearbox type:		**SP100, 1-stage**					**SP100, 2-stage**									
1. Order code		**J41**					**J42**									
i		**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**	
2. Order code		**R03**	**R04**	**R05**	**R07**	**R10**	**R16**	**R20**	**R25**	**R28**	**R35**	**R40**	**R50**	**R70**	**R00**	
$M_{2N,G}$	Nm	139	185	232	292	282	347	347	347	347	347	347	347	347	259	
$M_{2max,G}$	Nm	139	185	232	292	376	347	347	347	347	347	347	347	347	259	
$M_{2Em.Off}$	Nm	250	313	313	324	463	625	625	625	625	625	625	625	625	625	
$J_{1,G}$	kg cm²	3.29	2.35	1.92	1.6	1.38	0.81	0.7	0.68	0.6	0.59	0.55	0.54	0.54	0.54	
$\varphi_{2,G}$	'	3					5									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type SP100

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 30, High Dynamic with planetary gearbox SP100 2-stage													
0.472	1.64	0.036	n_{2N}	r/min	150	150	100	100	75	75	60	60	37.5	**1FT2103-2AH..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	7.2	9.5	13.2	15.1	19	21.5	26.5	31	36.5	■■■ + ■■■ + . . .
0.557	1.84		$M_{2.0}$	Nm	8.5	11	13.7	15.5	18.7	21.5	26	36.5	47	NEW
			M_{2max}	Nm	29	36.5	45	51	63	72	89	123	164	
1.02	3.42	0.036	n_{2N}	r/min	150	150	100	100	75	75	60	60	37.5	**1FT2103-4AH..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	14.6	18.5	25	28	36	40	49.5	58	75	■■■ + ■■■ + . . .
1.15	3.83		$M_{2.0}$	Nm	18.1	23	28	32	39	45	55	77	101	NEW
			M_{2max}	Nm	61	76	94	105	131	149	187	181	193	
SIMOTICS S-1FT2, SH 30, Compact with planetary gearbox SP100 2-stage													
0.461	1.56	0.036	n_{2N}	r/min	150	150	100	100	75	75	60	50	30	**1FT2203-2AK..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	7.1	9.2	12.9	14.8	18.6	21	26	31	39.5	■■■ + ■■■ + . . .
0.543	1.74		$M_{2.0}$	Nm	8.3	10.8	13.4	15.2	18.2	21	25.5	35.5	46	NEW
			M_{2max}	Nm	27.5	34.5	43	48	59	68	85	117	155	
1	3.17	0.036	n_{2N}	r/min	150	150	100	100	75	75	60	60	37.5	**1FT2203-4AK..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	16	19.5	27.5	30	39	42.5	52	54	71	■■■ + ■■■ + . . .
1.14	3.54		$M_{2.0}$	Nm	17.8	22.5	28	31.5	38.5	44.5	55	76	100	NEW
			M_{2max}	Nm	56	70	87	98	121	138	173	181	193	

Planetary gearbox data										
Gearbox type:			**SP100, 2-stage**							
1. Order code			**J32**							
	i		**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
2. Order code			**R16**	**R20**	**R25**	**R28**	**R35**	**R40**	**R50**	**R70**	**R00**
	$M_{2N,G}$	Nm	232	232	290	232	290	232	290	181	193
	$M_{2max,G}$	Nm	232	232	290	232	290	232	290	181	193
	$M_{2Em.Off}$	Nm	512	599	599	599	625	625	625	625	625
	$J_{1,G}$	kg cm²	0.64	0.54	0.52	0.43	0.43	0.38	0.38	0.37	0.37
	$\varphi_{2,G}$	'	5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 63, High Dynamic with planetary gearbox SP100 1- and 2-stage																			
7.56	23	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	–	–	1FT2106-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	18.6	25.5	30	43	61	101	118	159	173	215	235	280	–	–	■■■ + ■■■ + . . .
7.83	25.3		$M_{2.0}$	Nm	23	30.5	38	53	76	124	153	191	210	265	300	345	–	–	NEW
			M_{2max}	Nm	75	100	125	174	245	347	347	347	347	347	347	347	–	–	
9.75	29	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	–	–	–	1FT2106-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	23	31.5	36	51	70	117	130	183	193	245	250	–	–	–	■■■ + ■■■ + . . .
10.2	32.2		$M_{2.0}$	Nm	30.5	40	50	70	100	160	198	245	275	340	345	–	–	–	NEW
			M_{2max}	Nm	96	128	159	220	315	347	347	347	347	347	347	–	–	–	
13.8	41.1	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	–	100	–	–	–	–	–	1FT2106-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	30.5	44.5	46.5	66	90	159	170	–	250	–	–	–	–	–	■■■ + ■■■ + . . .
14.5	44.7		$M_{2.0}$	Nm	43	57	71	99	141	225	275	–	345	–	–	–	–	–	NEW
			M_{2max}	Nm	133	177	220	305	376	347	347	–	347	–	–	–	–	–	
SIMOTICS S-1FT2, SH 63, Compact with planetary gearbox SP100 1- and 2-stage																			
4.7	13.6	0.036	n_{2N}	r/min	500	375	300	250	200	125	100	100	75	60	50	50	30	20	1FT2206-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	10.4	16	22	30.5	44	72	91	106	127	158	181	205	295	255	■■■ + ■■■ + . . .
5.36	17.4		$M_{2.0}$	Nm	16	20.5	26	36.5	52	85	106	132	147	184	210	260	345	255	NEW
			M_{2max}	Nm	52	69	86	120	171	270	347	347	347	347	347	347	347	259	
4.75	13.6	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	50	30	1FT2206-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	12.5	17.2	20.5	29	41	68	78	109	117	149	159	193	225	255	■■■ + ■■■ + . . .
5.42	17.4		$M_{2.0}$	Nm	16.2	21	26	37	53	86	107	133	149	186	210	265	345	255	NEW
			M_{2max}	Nm	52	69	86	120	171	270	347	347	347	347	347	347	347	259	
4.61	13.6	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	60	50	30	1FT2206-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	11.8	16.7	18.7	28	41	68	80	108	118	149	162	199	215	255	■■■ + ■■■ + . . .
5.26	17.4		$M_{2.0}$	Nm	15.7	20	25.5	35.5	51	84	104	129	145	180	205	255	345	255	NEW
			M_{2max}	Nm	52	69	86	120	171	270	347	347	347	347	347	347	347	259	
6.78	18.9	0.036	n_{2N}	r/min	500	375	300	250	150	100	75	60	60	50	37.5	30	–	15	1FT2206-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	16.9	24.5	32	43.5	67	107	137	171	186	225	265	330	–	255	■■■ + ■■■ + . . .
7.97	26.3		$M_{2.0}$	Nm	23.5	31	39	54	78	126	156	194	215	270	305	345	–	255	NEW
			M_{2max}	Nm	78	104	130	181	255	347	347	347	347	347	347	347	–	259	
6.68	18.9	0.036	n_{2N}	r/min	500	375	300	300	250	150	150	100	100	75	75	60	–	30	1FT2206-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	15.8	23.5	31	37	54	95	110	150	162	205	215	255	–	255	■■■ + ■■■ + . . .
7.83	26.3		$M_{2.0}$	Nm	23	30.5	38	53	76	123	153	191	210	265	300	345	–	255	NEW
			M_{2max}	Nm	78	104	130	181	255	347	347	347	347	347	347	347	–	259	
10.5	32.6	0.036	n_{2N}	r/min	375	300	250	200	150	125	100	75	75	60	50	37.5	–	–	1FT2206-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	23.5	29.5	38.5	53	78	109	145	189	192	225	255	310	–	–	■■■ + ■■■ + . . .
11	37		$M_{2.0}$	Nm	32.5	43	54	75	107	172	210	265	295	345	345	345	–	–	NEW
			M_{2max}	Nm	111	147	184	255	360	347	347	347	347	347	347	347	–	–	
10.2	31.5	0.036	n_{2N}	r/min	500	375	375	300	250	150	150	100	100	75	75	–	–	–	1FT2206-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	23.5	34	36.5	52	73	129	144	200	210	265	270	–	–	–	■■■ + ■■■ + . . .
10.7	35.3		$M_{2.0}$	Nm	31.5	42	52	73	104	167	205	255	285	345	345	–	–	–	NEW
			M_{2max}	Nm	105	139	174	240	340	347	347	347	347	347	347	–	–	–	

➥ Continued on the next page

Planetary gearbox data																
Gearbox type:		SP100, 1-stage					SP100, 2-stage									
1. Order code		J31					J32									
i		3	4	5	7	10	16	20	25	28	35	40	50	70	100	
2. Order code		R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00	
$M_{2N,G}$	Nm	282	378	378	378	282	347	347	347	347	347	347	347	347	259	
$M_{2max,G}$	Nm	376	495	495	428	376	347	347	347	347	347	347	347	347	259	
$M_{2Em.Off}$	Nm	500	625	625	625	625	625	625	625	625	625	625	625	625	625	
$J_{1,G}$	kg cm²	3.99	3.04	2.61	2.29	2.07	2.18	2.07	2.05	1.97	1.96	1.92	1.91	1.91	1.91	
$\varphi_{2,G}$	'	3					5									

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type SP100

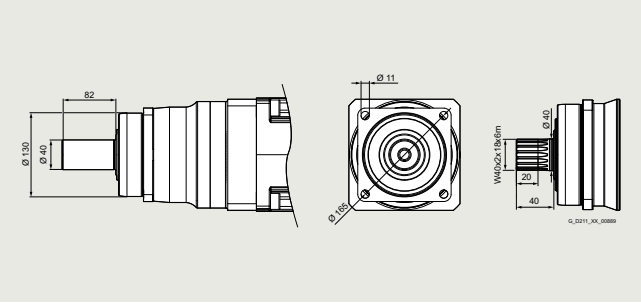
Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																
Nm	Nm	kg cm²																
SIMOTICS S-1FT2, SH 63, Compact with planetary gearbox SP100 1- and 2-stage (continued)																		
9.7	31	0.036	n_{2N}	r/min	375	375	300	250	200	150	125	100	100	75	75	60	–	–	1FT2206-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	25.5	27	38	52	75	117	149	186	195	240	230	250	–	–	■■■ + ■■■ + . . .
10.2	35.3		$M_{2.0}$	Nm	30.5	40	50	69	99	160	198	245	270	340	345	345	–	–	NEW
			M_{2max}	Nm	105	139	174	240	340	347	347	347	347	347	347	347	–	–	

Planetary gearbox data																
Gearbox type:			SP100, 1-stage					SP100, 2-stage								
1. Order code			J31					J32								
	i		3	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	282	378	378	378	282	347	347	347	347	347	347	347	347	259
	$M_{2max,G}$	Nm	376	495	495	428	376	347	347	347	347	347	347	347	347	259
	$M_{2Em.Off}$	Nm	500	625	625	625	625	625	625	625	625	625	625	625	625	625
	$J_{1,G}$	kg cm²	3.99	3.04	2.61	2.29	2.07	2.18	2.07	2.05	1.97	1.96	1.92	1.91	1.91	1.91
	$\varphi_{2,G}$	'	3					5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	6300 N
Average axial force for 20000 h	$F_{A,eq}$	9870 N
Average radial force for 30000 h	$F_{R,eq}$	5500 N
Average axial force for 30000 h	$F_{A,eq}$	8700 N
Maximum radial force	$F_{R,max}$	9600 N
Maximum axial force	$F_{A,max}$	9870 N

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	**Selection data servomotors with planetary gearbox**																**Servomotors with planetary gearbox**
SIMOTICS S-1FT2, SH 40, 48, 52, High Dynamic with planetary gearbox SP140 1- and 2-stage																			
0.73	3.08	0.036	n_{2N}	r/min	300	300	300	300	250	150	125	100	100	75	60	60	37.5	30	**1FT2104-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	1.04	2.2	3.4	4.85	9.3	13.6	18.7	25	29.5	39	45.5	56	78	99	■■■ + ■■■ + . . .
1.19	3.58		$M_{2.0}$	Nm	2.15	3.05	4.4	6.2	9.1	17	21	26.5	31.5	41	47.5	58	80	98	NEW
			M_{2max}	Nm	9.4	12.5	16.1	22.5	32.5	55	68	86	97	123	142	176	240	305	
0.727	3.16	0.036	n_{2N}	r/min	300	375	375	300	250	150	125	100	100	75	60	60	37.5	30	**1FT2104-4AK..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	1.02	1.94	3	5.2	9.3	13.7	18.5	25	29	38.5	45.5	55	78	99	■■■ + ■■■ + . . .
1.19	3.68		$M_{2.0}$	Nm	2.15	3	4.35	6.2	9.1	16.9	21	26.5	31.5	41	47	58	79	97	NEW
			M_{2max}	Nm	9.7	12.9	16.5	23	33	56	70	88	100	126	146	180	250	315	
1.81	6.16	0.036	n_{2N}	r/min	375	375	300	300	250	150	125	100	100	75	60	60	37.5	30	**1FT2104-5AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	3.7	5.6	8.9	12.5	20	31	40	52	60	77	89	110	154	205	■■■ + ■■■ + . . .
2.26	7.12		$M_{2.0}$	Nm	5.4	7.2	9.6	13.4	19.5	34	42.5	53	61	78	90	111	153	192	NEW
			M_{2max}	Nm	20	27	34	47.5	68	112	140	175	197	245	285	350	367	376	
1.79	6.24	0.036	n_{2N}	r/min	375	375	300	300	250	150	125	100	100	75	60	60	37.5	30	**1FT2104-5AK..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	3.6	5.5	8.8	12.3	20	31	40	52	59	76	88	109	153	200	■■■ + ■■■ + . . .
2.24	7.22		$M_{2.0}$	Nm	5.3	7.2	9.5	13.3	19.4	33.5	42	52	60	77	89	110	152	191	NEW
			M_{2max}	Nm	20.5	27	34.5	48	69	114	142	177	199	250	285	355	367	376	
2.54	8.16	0.036	n_{2N}	r/min	300	300	300	300	250	150	125	100	100	75	60	60	37.5	30	**1FT2104-6AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	6.5	9.5	12.6	15.7	27.5	43	55	70	80	103	119	147	205	270	■■■ + ■■■ + . . .
2.98	9.5		$M_{2.0}$	Nm	7.6	10.1	13.1	18.4	26.5	45.5	57	71	81	103	119	147	200	255	NEW
			M_{2max}	Nm	27.5	36.5	46	64	92	151	188	230	260	325	380	465	367	376	
4.02	12	0.036	n_{2N}	r/min	375	375	300	300	250	150	125	100	100	75	60	60	37.5	30	**1FT2105-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	10.2	13.6	20	25.5	40	61	79	104	116	155	184	210	305	355	■■■ + ■■■ + . . .
4.65	14.2		$M_{2.0}$	Nm	12.7	16.9	21.5	30	43	72	90	113	128	161	186	225	315	375	NEW
			M_{2max}	Nm	42	56	70	98	140	225	280	350	395	490	536	670	367	376	
4.05	12	0.036	n_{2N}	r/min	375	300	300	250	250	150	125	100	100	75	60	60	37.5	30	**1FT2105-4AH..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	9.3	15.3	19.2	27	38	57	74	98	110	147	175	200	290	330	■■■ + ■■■ + . . .
4.68	14.2		$M_{2.0}$	Nm	12.8	17	21.5	30	43.5	73	91	113	128	162	187	230	320	375	NEW
			M_{2max}	Nm	42	56	70	98	140	225	280	350	395	490	536	670	367	376	

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Planetary gearbox data															
Gearbox type:		**SP140, 1-stage**					**SP140, 2-stage**								
1. Order code		**J51**					**J52**								
i		**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
2. Order code		**R03**	**R04**	**R05**	**R07**	**R10**	**R16**	**R20**	**R25**	**R28**	**R35**	**R40**	**R50**	**R70**	**R00**
$M_{2N,G}$	Nm	454	605	681	792	636	536	536	670	536	670	536	670	367	376
$M_{2max,G}$	Nm	454	605	681	825	720	536	536	670	536	670	536	670	367	376
$M_{2Em.Off}$	Nm	500	625	756	1059	1250	741	926	1158	1297	1350	1350	1350	1350	1250
$J_{1,G}$	kg cm²	10.7	7.82	6.79	5.84	5.28	2.5	2.01	1.97	1.65	1.63	1.4	1.39	1.38	1.38
$\varphi_{2,G}$	'	3					5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type SP140

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 40, 48, 52, High Dynamic with planetary gearbox SP140 1- and 2-stage (continued)																			
6.48	18.6	0.036	n_{2N}	r/min	300	300	300	250	250	150	125	100	100	75	60	60	37.5	30	**1FT2105-6AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	18.9	25	31	43.5	59	85	116	150	166	220	260	295	365	375	■■■ + ■■■ + . . .
7.52	23		$M_{2.0}$	Nm	21.5	28.5	36	50	72	118	148	184	205	260	300	370	365	375	NEW
			M_{2max}	Nm	69	91	114	159	225	360	450	560	536	670	536	670	367	376	
SIMOTICS S-1FT2, SH 40, 48, 52, Compact with planetary gearbox SP140 1- and 2-stage																			
1.77	5.83	0.036	n_{2N}	r/min	375	375	300	300	250	150	125	100	100	75	60	60	37.5	30	**1FT2204-5AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	3.5	5.3	8.6	11.6	19.6	29.5	39	50	58	75	87	107	150	190	■■■ + ■■■ + . . .
2.22	6.75		$M_{2.0}$	Nm	5.3	7.1	9.4	13.2	19.1	33.5	41.5	52	60	76	88	109	150	189	NEW
			M_{2max}	Nm	19.2	25	32	44.5	64	106	132	165	186	230	270	330	367	376	
1.78	5.83	0.036	n_{2N}	r/min	375	375	300	300	250	150	125	100	100	75	60	60	37.5	30	**1FT2204-5AK..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	3.65	5.5	8.7	12	19.8	30.5	39.5	51	58	75	87	108	151	197	■■■ + ■■■ + . . .
2.23	6.75		$M_{2.0}$	Nm	5.3	7.1	9.4	13.2	19.2	33.5	42	52	60	77	89	110	151	190	NEW
			M_{2max}	Nm	19.2	25	32	44.5	64	106	132	165	186	230	270	330	367	376	
2.52	7.76	0.036	n_{2N}	r/min	375	375	300	300	250	150	125	100	100	75	60	60	37.5	30	**1FT2204-6AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	5.6	8	12.5	16.5	27	42.5	54	70	79	102	118	146	200	265	■■■ + ■■■ + . . .
2.98	9.02		$M_{2.0}$	Nm	7.5	10.1	13.1	18.3	26.5	45.5	56	71	81	102	118	146	200	255	NEW
			M_{2max}	Nm	26	34.5	43.5	60	87	143	178	220	250	310	360	445	367	376	
2.81	8.79	0.036	n_{2N}	r/min	300	300	300	250	200	125	100	100	75	60	50	50	30	20	**1FT2205-2AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	5.9	8.5	11	16.1	25	38.5	50	59	76	98	116	133	195	250	■■■ + ■■■ + . . .
3.25	10.3		$M_{2.0}$	Nm	8.4	11.2	14.5	20	29	50	62	78	89	112	130	160	220	280	NEW
			M_{2max}	Nm	30	39.5	50	69	99	163	200	250	280	355	410	500	367	376	
2.83	8.79	0.036	n_{2N}	r/min	375	375	300	300	250	150	125	100	100	75	60	60	37.5	30	**1FT2205-2AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	5.3	8	11.7	15.7	25	38	50	66	75	100	119	141	200	240	■■■ + ■■■ + . . .
3.28	10.3		$M_{2.0}$	Nm	8.6	11.4	14.7	20.5	29.5	50	63	78	89	113	131	162	220	280	NEW
			M_{2max}	Nm	30	39.5	50	69	99	163	200	250	280	355	410	500	367	376	
2.77	8.79	0.036	n_{2N}	r/min	375	300	300	300	250	150	125	100	100	75	60	60	37.5	30	**1FT2205-2AH..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	4.95	8.6	11.2	13.7	23.5	35.5	46.5	62	70	93	111	130	187	220	■■■ + ■■■ + . . .
3.22	10.3		$M_{2.0}$	Nm	8.4	11.1	14.4	20	29	49.5	61	77	87	111	128	158	215	275	NEW
			M_{2max}	Nm	30	39.5	50	69	99	163	200	250	280	355	410	500	367	376	
4.7	14.3	0.036	n_{2N}	r/min	300	300	300	250	250	150	125	100	100	75	60	60	37.5	25	**1FT2205-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	12.2	16.6	20.5	29.5	40	60	79	104	115	153	183	205	300	375	■■■ + ■■■ + . . .
5.45	17.1		$M_{2.0}$	Nm	15.2	20	25.5	35.5	51	85	106	132	149	188	215	265	365	375	NEW
			M_{2max}	Nm	51	67	85	118	169	270	335	420	470	590	536	670	367	376	

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Planetary gearbox data															
Gearbox type:		SP140, 1-stage					SP140, 2-stage								
1. Order code		J51					J52								
i		3	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code		R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
$M_{2N,G}$	Nm	454	605	681	792	636	536	536	670	536	670	536	670	367	376
$M_{2max,G}$	Nm	454	605	681	825	720	536	536	670	536	670	536	670	367	376
$M_{2Em.Off}$	Nm	500	625	756	1059	1250	741	926	1158	1297	1350	1350	1350	1350	1250
$J_{1,G}$	kg cm²	10.7	7.82	6.79	5.84	5.28	2.5	2.01	1.97	1.65	1.63	1.4	1.39	1.38	1.38
$\varphi_{2,G}$	'	3					5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 63, High Dynamic with planetary gearbox SP140 1- and 2-stage																			
0.73	3.08	0.036	n_{2N}	r/min	375	300	300	250	250	150	125	100	100	75	60	60	37.5	25	1FT2104-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	15.6	25.5	31.5	44.5	60	87	119	155	172	225	270	310	450	490	■■■ + ■■■ + . . .
1.19	3.58		$M_{2.0}$	Nm	23	30.5	38.5	53	77	126	157	196	220	275	315	395	530	580	NEW
			M_{2max}	Nm	74	99	124	172	245	390	490	610	680	670	726	670	726	583	
0.727	3.16	0.036	n_{2N}	r/min	375	300	300	250	250	125	125	100	100	75	60	60	37.5	–	1FT2104-4AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	20	32	39.5	54	68	120	134	180	195	260	320	350	520	–	■■■ + ■■■ + . . .
1.19	3.68		$M_{2.0}$	Nm	30.5	40	50	70	101	164	200	255	285	355	410	510	680	–	NEW
			M_{2max}	Nm	95	126	158	220	310	500	620	670	726	670	726	670	726	–	
1.81	6.16	0.036	n_{2N}	r/min	300	300	300	250	200	125	100	100	100	75	60	60	–	–	1FT2104-5AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	35.5	46.5	55	74	109	160	210	240	260	350	430	455	–	–	■■■ + ■■■ + . . .
2.26	7.12		$M_{2.0}$	Nm	43.5	57	72	100	144	230	285	360	400	500	570	670	–	–	NEW
			M_{2max}	Nm	132	175	215	305	430	690	726	670	726	670	726	670	–	–	
SIMOTICS S-1FT2, SH 63, Compact with planetary gearbox SP140 1- and 2-stage																			
4.6	13.9	0.036	n_{2N}	r/min	300	300	300	250	200	125	100	100	75	60	50	50	30	20	1FT2206-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	12.7	16.6	19.4	26.5	44	68	87	103	128	166	194	225	325	415	■■■ + ■■■ + . . .
5.38	17.1		$M_{2.0}$	Nm	15	19.9	25	35	50	84	105	131	148	187	210	265	360	455	NEW
			M_{2max}	Nm	51	67	85	118	169	270	335	420	470	590	670	670	726	583	
4.76	13.9	0.036	n_{2N}	r/min	375	375	300	300	250	150	125	100	100	75	60	60	37.5	30	1FT2206-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	11.1	14.5	21	25.5	40	62	79	104	114	154	185	205	305	335	■■■ + ■■■ + . . .
5.58	17.1		$M_{2.0}$	Nm	15.7	20.5	26	36.5	53	87	109	136	153	194	220	275	370	475	NEW
			M_{2max}	Nm	51	67	85	118	169	270	335	420	470	590	670	670	726	583	
4.62	13.9	0.036	n_{2N}	r/min	300	300	300	250	250	150	125	100	100	75	60	60	37.5	25	1FT2206-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	12	16.5	20.5	29	37.5	56	79	104	116	154	183	210	305	375	■■■ + ■■■ + . . .
5.4	17.1		$M_{2.0}$	Nm	15.2	20	25.5	35.5	51	84	105	132	148	188	215	265	360	460	NEW
			M_{2max}	Nm	51	67	85	118	169	270	335	420	470	590	670	670	726	583	
6.9	20	0.036	n_{2N}	r/min	300	300	300	250	150	100	75	60	60	50	37.5	30	25	15	1FT2206-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	19.1	25	30.5	42.5	68	104	135	173	191	240	290	355	475	580	■■■ + ■■■ + . . .
8.1	26		$M_{2.0}$	Nm	23.5	31	39.5	55	78	128	160	200	220	280	320	400	540	580	NEW
			M_{2max}	Nm	77	103	128	179	255	410	500	630	726	670	726	670	726	583	
6.8	20	0.036	n_{2N}	r/min	300	300	300	250	200	125	100	100	100	75	60	60	37.5	25	1FT2206-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	18.6	24.5	29	40	63	96	123	147	163	215	255	295	430	430	■■■ + ■■■ + . . .
7.98	26		$M_{2.0}$	Nm	23	30.5	38.5	54	77	126	157	197	220	275	315	395	530	580	NEW
			M_{2max}	Nm	77	103	128	179	255	410	500	630	726	670	726	670	726	583	

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Planetary gearbox data															
Gearbox type:		SP140, 1-stage					SP140, 2-stage								
1. Order code		J51					J52								
i		3	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code		R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
$M_{2N,G}$	Nm	454	605	681	792	636	726	726	670	726	670	726	670	726	583
$M_{2max,G}$	Nm	454	605	681	825	720	726	726	670	726	670	726	670	726	583
$M_{2Em.Off}$	Nm	500	625	756	1059	1250	1350	1350	1350	1350	1350	1350	1350	1350	1250
$J_{1,G}$	kg cm²	10.7	7.82	6.79	5.84	5.28	3.19	2.71	2.67	2.34	2.32	2.1	2.08	2.08	2.07
$\varphi_{2,G}$	'	3					5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type SP140

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FT2, SH 63, Compact with planetary gearbox SP140 1- and 2-stage (continued)																			
9.12	26.5	0.036	n_{2N}	r/min	250	250	250	200	150	100	75	75	75	60	50	37.5	30	15	**1FT2206-4AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	26	31.5	35.5	49	78	117	165	181	197	270	325	415	520	570	■■■ + ■■■ + . . .
10.8	36.7		$M_{2.0}$	Nm	32	42	53	74	106	172	215	265	300	375	430	530	720	580	NEW
			M_{2max}	Nm	110	146	182	250	360	570	726	670	726	670	726	670	726	583	
10.3	31.9	0.036	n_{2N}	r/min	300	300	300	250	200	125	100	100	100	75	60	60	37.5	–	**1FT2206-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	26.5	35	42.5	58	86	131	169	198	215	285	345	380	560	–	■■■ + ■■■ + . . .
10.7	35		$M_{2.0}$	Nm	31.5	42	53	73	105	171	210	265	295	370	425	530	720	–	NEW
			M_{2max}	Nm	104	138	173	240	340	540	670	670	726	670	726	670	726	–	
8.66	25.4	0.036	n_{2N}	r/min	300	300	250	200	200	100	100	100	100	75	60	60	37.5	20	**1FT2206-4AH..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	23.5	29	42	58	73	132	149	165	185	270	320	360	530	530	■■■ + ■■■ + . . .
10.2	35		$M_{2.0}$	Nm	30	40	50	70	100	163	200	250	280	355	405	500	680	580	NEW
			M_{2max}	Nm	104	138	173	240	340	540	670	670	726	670	726	670	726	583	

Planetary gearbox data																
Gearbox type:			**SP140, 1-stage**					**SP140, 2-stage**								
1. Order code			**J51**					**J52**								
	i		**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R10**	**R16**	**R20**	**R25**	**R28**	**R35**	**R40**	**R50**	**R70**	**R00**
	$M_{2N,G}$	Nm	454	605	681	792	636	726	726	670	726	670	726	670	726	583
	$M_{2max,G}$	Nm	454	605	681	825	720	726	726	670	726	670	726	670	726	583
	$M_{2Em.Off}$	Nm	500	625	756	1059	1250	1350	1350	1350	1350	1350	1350	1350	1350	1250
	$J_{1,G}$	kg cm²	10.7	7.82	6.79	5.84	5.28	3.19	2.71	2.67	2.34	2.32	2.1	2.08	2.08	2.07
	$\varphi_{2,G}$	'	3					5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 80, High Dynamic with planetary gearbox SP140 1- and 2-stage																		
21	80	0.036	n_{2N}	r/min	300	250	250	200	150	100	75	75	75	60	50	–	–	1FT2108-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	48	68	79	106	157	220	305	335	375	520	650	–	–	■■■ + ■■■ + . . .
21.4	85		$M_{2.0}$	Nm	64	84	105	148	210	340	420	520	580	670	720	–	–	NEW
			M_{2max}	Nm	255	335	420	580	720	726	726	670	726	670	726	–	–	
25.8	96.1	0.036	n_{2N}	r/min	300	300	250	200	150	100	75	60	60	–	–	–	–	1FT2108-5AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	59	69	96	129	187	260	350	460	510	–	–	–	–	■■■ + ■■■ + . . .
26.4	103		$M_{2.0}$	Nm	79	104	130	182	260	415	510	640	720	–	–	–	–	NEW
			M_{2max}	Nm	305	405	510	710	720	726	726	670	726	–	–	–	–	
25.5	96.1	0.036	n_{2N}	r/min	300	250	250	200	150	100	75	75	75	–	–	–	–	1FT2108-5AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	54	76	87	116	170	235	325	350	390	–	–	–	–	■■■ + ■■■ + . . .
26.1	103		$M_{2.0}$	Nm	78	103	129	180	255	410	510	630	710	–	–	–	–	NEW
			M_{2max}	Nm	305	405	510	710	720	726	726	670	726	–	–	–	–	
32.3	127	0.036	n_{2N}	r/min	300	250	250	200	150	100	75	60	60	–	–	–	–	1FT2108-7AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	69	96	110	145	200	275	375	495	550	–	–	–	–	■■■ + ■■■ + . . .
33.3	137		$M_{2.0}$	Nm	99	131	165	230	325	520	650	670	720	–	–	–	–	NEW
			M_{2max}	Nm	410	540	680	825	720	726	726	670	726	–	–	–	–	
31.8	127	0.036	n_{2N}	r/min	300	250	250	200	150	75	75	60	60	–	–	–	–	1FT2108-7AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	67	93	105	137	194	350	360	480	520	–	–	–	–	■■■ + ■■■ + . . .
32.8	137		$M_{2.0}$	Nm	98	129	162	225	320	510	640	670	720	–	–	–	–	NEW
			M_{2max}	Nm	410	540	680	825	720	726	726	670	726	–	–	–	–	
31.5	127	0.036	n_{2N}	r/min	250	250	200	150	150	75	75	60	60	–	–	–	–	1FT2108-7AE..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	76	86	120	165	176	330	335	445	485	–	–	–	–	■■■ + ■■■ + . . .
32.5	137		$M_{2.0}$	Nm	97	128	160	220	320	510	630	670	720	–	–	–	–	NEW
			M_{2max}	Nm	410	540	680	825	720	726	726	670	726	–	–	–	–	
SIMOTICS S-1FT2, SH 80, Compact with planetary gearbox SP140 1- and 2-stage																		
10.1	33.6	0.036	n_{2N}	r/min	300	300	300	250	200	125	100	100	100	75	60	60	37.5	1FT2208-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	24.5	32.5	39	52	76	119	152	174	187	250	305	330	500	■■■ + ■■■ + . . .
10.6	36.7		$M_{2.0}$	Nm	31	40.5	51	72	103	168	210	260	290	365	420	520	710	NEW
			M_{2max}	Nm	110	145	182	250	360	570	726	670	726	670	726	670	726	
15.9	47.2	0.036	n_{2N}	r/min	250	250	250	200	150	100	75	60	60	50	37.5	30	–	1FT2208-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	41	48.5	56	77	118	175	240	320	360	455	540	670	–	■■■ + ■■■ + . . .
16.2	49.7		$M_{2.0}$	Nm	48.5	63	80	112	160	255	320	400	445	560	640	670	–	NEW
			M_{2max}	Nm	148	196	245	340	485	726	726	670	726	670	726	670	–	
15.4	47.2	0.036	n_{2N}	r/min	300	300	300	200	200	100	100	75	75	60	50	50	–	1FT2208-3AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	38	47.5	54	87	105	192	205	290	315	405	480	510	–	■■■ + ■■■ + . . .
15.7	49.7		$M_{2.0}$	Nm	46.5	61	77	108	154	250	310	385	430	540	620	670	–	NEW
			M_{2max}	Nm	148	196	245	340	485	726	726	670	726	670	726	670	–	

➥ Continued on the next page

Planetary gearbox data															
Gearbox type:			SP140, 1-stage					SP140, 2-stage							
1. Order code			J51					J52							
	i		3	4	5	7	10	16	20	25	28	35	40	50	70
2. Order code			R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70
	$M_{2N,G}$	Nm	468	792	792	792	636	726	726	670	726	670	726	670	726
	$M_{2max,G}$	Nm	624	1056	1056	825	720	726	726	670	726	670	726	670	726
	$M_{2Em.Off}$	Nm	1250	1350	1350	1350	1250	1350	1350	1350	1350	1350	1350	1350	1350
	$J_{1,G}$	kg cm²	13.8	11	9.95	9.01	8.44	10.2	9.77	9.73	9.41	9.39	9.16	9.15	9.14
	$\varphi_{2,G}$	'	3					5							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type SP140

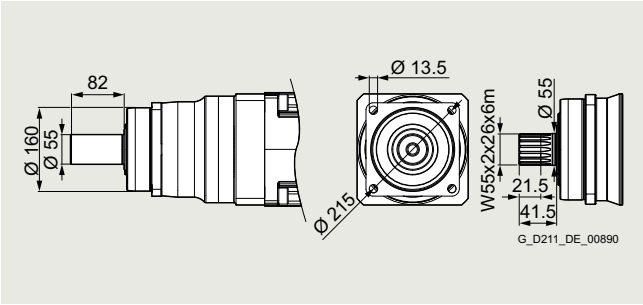
Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 80, Compact with planetary gearbox SP140 1- and 2-stage (continued)																		
15.2	47.2	0.036	n_{2N}	r/min	300	300	250	200	200	100	100	75	75	75	60	50	–	1FT2208-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	37.5	45	63	86	98	192	197	295	320	350	440	520	–	■■■ + ■■■ + . . .
15.4	49.7		$M_{2.0}$	Nm	46	60	76	106	152	245	305	380	425	530	610	670	–	NEW
			M_{2max}	Nm	148	196	245	340	485	726	726	670	726	670	726	670	–	
19.3	60.8	0.036	n_{2N}	r/min	250	200	200	150	125	75	75	60	60	50	37.5	30	–	1FT2208-4AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	43	60	68	97	128	215	220	305	335	445	590	670	–	■■■ + ■■■ + . . .
19.8	64.3		$M_{2.0}$	Nm	59	77	97	136	195	310	390	485	540	670	720	670	–	NEW
			M_{2max}	Nm	193	255	315	445	630	726	726	670	726	670	726	670	–	
19.1	60.8	0.036	n_{2N}	r/min	300	300	250	200	150	100	75	75	75	60	50	50	–	1FT2208-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	47	54	76	103	148	215	290	325	350	450	540	540	–	■■■ + ■■■ + . . .
19.5	64.3		$M_{2.0}$	Nm	58	76	96	134	192	310	385	480	530	670	720	670	–	NEW
			M_{2max}	Nm	193	255	315	445	630	726	726	670	726	670	726	670	–	
18.2	60.8	0.036	n_{2N}	r/min	300	300	300	200	200	100	100	75	75	60	60	50	–	1FT2208-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	43.5	54	60	94	111	200	215	295	315	405	415	485	–	■■■ + ■■■ + . . .
18.5	64.3		$M_{2.0}$	Nm	55	73	91	128	183	295	365	455	510	640	720	670	–	NEW
			M_{2max}	Nm	193	255	315	445	630	726	726	670	726	670	726	670	–	
23.1	73.9	0.036	n_{2N}	r/min	300	250	250	200	150	100	75	60	60	50	37.5	–	–	1FT2208-5AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	52	73	84	113	166	230	320	420	460	580	710	–	–	■■■ + ■■■ + . . .
23.6	78.3		$M_{2.0}$	Nm	70	93	116	163	230	375	465	580	640	670	720	–	–	NEW
			M_{2max}	Nm	230	310	385	540	720	726	726	670	726	670	726	–	–	
22.9	73.9	0.036	n_{2N}	r/min	300	250	250	200	150	100	75	60	60	60	50	–	–	1FT2208-5AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	52	73	84	111	161	225	310	415	450	495	590	–	–	■■■ + ■■■ + . . .
23.4	78.3		$M_{2.0}$	Nm	70	92	115	162	230	370	460	570	640	670	720	–	–	NEW
			M_{2max}	Nm	230	310	385	540	720	726	726	670	726	670	726	–	–	

Planetary gearbox data														
Gearbox type:			SP140, 1-stage					SP140, 2-stage							
1. Order code			J51					J52							
	i		3	4	5	7	10	16	20	25	28	35	40	50	70
2. Order code			R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70
	$M_{2N,G}$	Nm	468	792	792	792	636	726	726	670	726	670	726	670	726
	$M_{2max,G}$	Nm	624	1056	1056	825	720	726	726	670	726	670	726	670	726
	$M_{2Em.Off}$	Nm	1250	1350	1350	1350	1250	1350	1350	1350	1350	1350	1350	1350	1350
	$J_{1,G}$	kg cm²	13.8	11	9.95	9.01	8.44	10.2	9.77	9.73	9.41	9.39	9.16	9.15	9.14
	$\varphi_{2,G}$	'	3					5							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	11300 N
Average axial force for 20000 h	$F_{A,eq}$	15570 N
Average radial force for 30000 h	$F_{R,eq}$	10000 N
Average axial force for 30000 h	$F_{A,eq}$	13800 N
Maximum radial force	$F_{R,max}$	15000 N
Maximum axial force	$F_{A,max}$	15570 N

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FT2 High Dynamic with planetary gearbox SP180 1- and 2-stage																			
0.815	2.91	0.036	n_{2N}	r/min	–	–	–	–	–	100	100	100	75	75	60	50	37.5	30	1FT2104-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	7.7	12.7	19.2	25	33.5	40.5	51	68	74	■■■ + ■■■ + . . .
1.12	3.49		$M_{2.0}$	Nm	–	–	–	–	–	13.9	19.9	27	30.5	39	44.5	53	69	81	NEW
			M_{2max}	Nm	–	–	–	–	–	52	67	86	97	122	139	172	230	290	
0.81	2.99	0.036	n_{2N}	r/min	–	–	–	–	–	100	125	100	75	75	60	50	37.5	30	1FT2104-4AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	7.6	10.7	19	25	33.5	40.5	51	67	75	■■■ + ■■■ + . . .
1.12	3.6		$M_{2.0}$	Nm	–	–	–	–	–	13.8	19.8	26.5	30.5	39	44	53	69	80	NEW
			M_{2max}	Nm	–	–	–	–	–	54	69	89	100	125	143	176	235	295	
1.76	6	0.036	n_{2N}	r/min	–	–	–	–	–	125	125	100	75	75	60	50	37.5	30	1FT2104-5AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	22.5	29.5	46.5	55	72	84	106	143	182	■■■ + ■■■ + . . .
2.19	7.07		$M_{2.0}$	Nm	–	–	–	–	–	31	41	53	60	76	87	106	141	175	NEW
			M_{2max}	Nm	–	–	–	–	–	110	139	176	197	245	280	345	470	590	
1.74	6.08	0.036	n_{2N}	r/min	–	–	–	–	–	125	125	100	75	75	60	50	37.5	30	1FT2104-5AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	22	28.5	46	55	71	84	105	142	181	■■■ + ■■■ + . . .
2.17	7.16		$M_{2.0}$	Nm	–	–	–	–	–	30.5	41	53	60	76	86	106	140	174	NEW
			M_{2max}	Nm	–	–	–	–	–	112	141	178	200	250	285	350	475	600	
2.39	8.02	0.036	n_{2N}	r/min	–	–	–	–	–	125	100	100	75	75	60	50	37.5	30	1FT2104-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	30	49.5	65	76	98	114	143	195	235	■■■ + ■■■ + . . .
2.91	9.44		$M_{2.0}$	Nm	–	–	–	–	–	42.5	56	71	81	101	116	142	190	235	NEW
			M_{2max}	Nm	–	–	–	–	–	149	187	235	260	330	375	465	630	800	
3.85	12	0.036	n_{2N}	r/min	–	–	–	–	–	125	100	100	75	75	60	50	37.5	30	1FT2105-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	54	81	101	124	157	182	225	305	315	■■■ + ■■■ + . . .
4.58	14.2		$M_{2.0}$	Nm	–	–	–	–	–	70	89	113	128	160	182	225	300	385	NEW
			M_{2max}	Nm	–	–	–	–	–	225	280	355	395	495	560	700	940	1238	
3.88	12	0.036	n_{2N}	r/min	–	–	–	–	–	100	100	100	75	75	60	50	37.5	25	1FT2105-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	61	76	96	121	149	179	220	290	360	■■■ + ■■■ + . . .
4.61	14.2		$M_{2.0}$	Nm	–	–	–	–	–	70	90	114	128	161	183	225	305	385	NEW
			M_{2max}	Nm	–	–	–	–	–	225	280	355	395	495	560	700	940	1238	

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Planetary gearbox data															
Gearbox type:		SP180, 1-stage					SP180, 2-stage								
1. Order code		J61					J62								
	i	3	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code		R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	1164	1452	1452	1452	1164	1452	1452	1452	1452	1452	1452	1452	1356	1164
	$M_{2max,G}$	1552	1936	1936	1936	1552	1485	1485	1857	1485	1857	1485	1857	1356	1238
	$M_{2Em.Off}$	2400	2750	2750	2750	2750	2420	2750	2750	2750	2750	2750	2750	2750	2750
	$J_{1,G}$	50.8	33.9	27.9	22.2	19.2	9.27	7.72	7.48	6.32	6.2	5.51	5.45	5.39	5.36
	$\varphi_{2,G}$	3					5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type SP180

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic with planetary gearbox SP180 1- and 2-stage (continued)																			
6.33	18.8	0.036	n_{2N}	r/min	–	–	–	–	–	100	100	100	75	75	60	50	37.5	25	1FT2105-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	101	124	151	189	225	270	335	435	500	■■■ + ■■■ + . . .
7.46	22.8		$M_{2.0}$	Nm	–	–	–	–	–	116	147	185	205	260	295	365	495	630	NEW
			M_{2max}	Nm	–	–	–	–	–	365	455	560	630	790	900	1120	1356	1238	
7.03	20.3	0.036	n_{2N}	r/min	375	375	300	250	200	100	100	100	75	75	60	50	37.5	25	1FT2106-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	19.9	21	30.5	39	52	102	127	156	193	230	275	340	450	510	■■■ + ■■■ + . . .
8.53	25.5		$M_{2.0}$	Nm	25.5	33.5	42	59	84	130	164	205	230	285	325	405	550	700	NEW
			M_{2max}	Nm	76	101	126	177	250	395	490	610	690	850	970	1210	1356	1238	
9.12	25.3	0.036	n_{2N}	r/min	375	300	300	250	150	100	100	100	75	75	60	50	37.5	20	1FT2106-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	25.5	33.5	38.5	48	85	128	155	184	235	275	330	405	520	700	■■■ + ■■■ + . . .
11.1	32.4		$M_{2.0}$	Nm	33	43.5	54	77	109	170	210	265	300	375	425	530	710	910	NEW
			M_{2max}	Nm	97	128	161	225	320	500	620	780	870	1090	1240	1530	1356	1238	
12.6	33.7	0.036	n_{2N}	r/min	375	300	300	200	150	100	100	100	75	75	60	50	37.5	20	1FT2106-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	37	48.5	54	85	121	183	215	250	320	370	450	540	680	790	■■■ + ■■■ + . . .
15.4	44.7		$M_{2.0}$	Nm	46	60	76	107	151	235	295	370	415	520	590	730	990	1160	NEW
			M_{2max}	Nm	134	178	220	310	440	690	860	1080	1200	1500	1485	1857	1356	1238	
SIMOTICS S-1FT2 Compact with planetary gearbox SP180 1- and 2-stage																			
1.72	5.67	0.036	n_{2N}	r/min	–	–	–	–	–	125	100	100	75	75	60	50	37.5	30	1FT2204-5AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	21	33.5	45	54	70	82	103	139	169	■■■ + ■■■ + . . .
2.15	6.69		$M_{2.0}$	Nm	–	–	–	–	–	30.5	40.5	52	59	75	85	104	139	172	NEW
			M_{2max}	Nm	–	–	–	–	–	104	132	166	187	230	265	330	445	560	
1.73	5.67	0.036	n_{2N}	r/min	–	–	–	–	–	125	125	100	75	75	60	50	37.5	30	1FT2204-5AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	21.5	27	45.5	54	70	83	104	140	177	■■■ + ■■■ + . . .
2.16	6.69		$M_{2.0}$	Nm	–	–	–	–	–	30.5	40.5	53	60	75	86	105	139	173	NEW
			M_{2max}	Nm	–	–	–	–	–	104	132	166	187	230	265	330	445	560	
2.38	7.62	0.036	n_{2N}	r/min	–	–	–	–	–	125	100	100	75	75	60	50	37.5	30	1FT2204-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	32.5	49	64	76	97	113	142	193	240	■■■ + ■■■ + . . .
2.9	8.97		$M_{2.0}$	Nm	–	–	–	–	–	42.5	55	71	80	101	115	142	189	235	NEW
			M_{2max}	Nm	–	–	–	–	–	141	178	220	250	310	355	440	590	760	
2.63	8.66	0.036	n_{2N}	r/min	–	–	–	–	–	100	100	100	75	60	50	50	30	20	1FT2205-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	34	44.5	54	74	99	118	136	193	240	■■■ + ■■■ + . . .
3.18	10.2		$M_{2.0}$	Nm	–	–	–	–	–	47	61	78	88	111	127	156	205	260	NEW
			M_{2max}	Nm	–	–	–	–	–	161	200	255	285	355	405	500	680	860	
2.74	8.66	0.036	n_{2N}	r/min	–	–	–	–	–	125	100	100	75	75	60	50	37.5	30	1FT2205-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	30	47.5	61	79	99	119	149	196	220	■■■ + ■■■ + . . .
3.31	10.2		$M_{2.0}$	Nm	–	–	–	–	–	49	63	81	92	115	131	162	215	270	NEW
			M_{2max}	Nm	–	–	–	–	–	161	200	255	285	355	405	500	680	860	

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Planetary gearbox data															
Gearbox type:		SP180, 1-stage					SP180, 2-stage								
1. Order code		J61					J62								
i		3	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code		R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
$M_{2N,G}$	Nm	1164	1452	1452	1452	1164	1452	1452	1452	1452	1452	1452	1452	1356	1164
$M_{2max,G}$	Nm	1552	1936	1936	1936	1552	1485	1485	1857	1485	1857	1485	1857	1356	1238
$M_{2Em.Off}$	Nm	2400	2750	2750	2750	2750	2420	2750	2750	2750	2750	2750	2750	2750	2750
$J_{1,G}$	kg cm²	50.8	33.9	27.9	22.2	19.2	9.27	7.72	7.48	6.32	6.2	5.51	5.45	5.39	5.36
$\varphi_{2,G}$	'	3					5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact with planetary gearbox SP180 1- and 2-stage (continued)																			
2.68	8.66	0.036	n_{2N}	r/min	–	–	–	–	–	100	100	100	75	75	60	50	37.5	30	1FT2205-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	34	45	57	74	92	111	139	182	199	■■■ + ■■■ + . . .
3.23	10.2		$M_{2.0}$	Nm	–	–	–	–	–	48	62	80	90	113	128	158	210	265	NEW
			M_{2max}	Nm	–	–	–	–	–	161	200	255	285	355	405	500	680	860	
4.68	14.3	0.036	n_{2N}	r/min	–	–	–	–	–	100	100	100	75	75	60	50	37.5	25	1FT2205-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	–	66	83	102	128	155	186	230	300	385	■■■ + ■■■ + . . .
5.54	17.1		$M_{2.0}$	Nm	–	–	–	–	–	85	108	137	154	193	220	270	365	465	NEW
			M_{2max}	Nm	–	–	–	–	–	270	340	425	475	590	670	840	1130	1238	
4.51	14.3	0.036	n_{2N}	r/min	375	300	250	200	150	100	100	100	75	60	50	50	30	20	1FT2206-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	13.4	17.7	22.5	31.5	46.5	68	85	98	132	172	200	235	330	430	■■■ + ■■■ + . . .
5.47	17.6		$M_{2.0}$	Nm	16.4	21.5	26.5	38	53	82	105	132	149	186	210	260	350	450	NEW
			M_{2max}	Nm	52	69	87	122	174	270	340	425	475	590	670	840	1130	1238	
4.86	14.3	0.036	n_{2N}	r/min	375	375	300	250	200	125	100	100	75	75	60	50	37.5	25	1FT2206-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	13	14.8	19.5	26.5	37	54	83	101	129	155	188	230	300	380	■■■ + ■■■ + . . .
5.9	17.6		$M_{2.0}$	Nm	17.7	23	29	41	58	88	113	143	160	200	225	280	380	485	NEW
			M_{2max}	Nm	52	69	87	122	174	270	340	425	475	590	670	840	1130	1238	
4.71	14.3	0.036	n_{2N}	r/min	375	300	300	200	150	100	100	100	75	75	60	50	37.5	25	1FT2206-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	12.6	16.7	19	30	44	65	82	102	128	156	187	230	305	365	■■■ + ■■■ + . . .
5.73	17.6		$M_{2.0}$	Nm	17.1	22.5	28	39.5	56	86	109	138	155	194	220	270	370	470	NEW
			M_{2max}	Nm	52	69	87	122	174	270	340	425	475	590	670	840	1130	1238	
7.03	21	0.036	n_{2N}	r/min	375	300	300	200	150	100	75	60	60	50	37.5	30	25	15	1FT2206-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	20	26	28	46.5	67	100	138	181	199	250	300	370	480	640	■■■ + ■■■ + . . .
8.5	26.5		$M_{2.0}$	Nm	25.5	33.5	42	59	84	130	164	205	230	285	330	405	550	700	NEW
			M_{2max}	Nm	79	105	131	184	260	410	510	640	710	890	1010	1250	1356	1238	
6.94	21	0.036	n_{2N}	r/min	375	300	250	200	150	100	100	100	75	75	60	50	37.5	20	1FT2206-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	19.6	25.5	32.5	46	66	99	123	150	187	225	270	330	430	570	■■■ + ■■■ + . . .
8.4	26.5		$M_{2.0}$	Nm	25	33	41	58	82	128	162	200	225	285	325	400	540	690	NEW
			M_{2max}	Nm	79	105	131	184	260	410	510	640	710	890	1010	1250	1356	1238	
9.18	28.8	0.036	n_{2N}	r/min	375	250	250	200	125	75	75	75	75	60	50	37.5	30	15	1FT2206-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	25	38.5	40	54	96	150	181	210	220	295	350	450	510	680	■■■ + ■■■ + . . .
11.1	37.3		$M_{2.0}$	Nm	33	44	55	77	110	171	215	270	300	375	430	530	720	910	NEW
			M_{2max}	Nm	112	148	185	260	370	580	720	900	1000	1250	1420	1760	1356	1238	
9.48	27.4	0.036	n_{2N}	r/min	375	300	300	200	150	100	100	100	75	75	60	50	37.5	20	1FT2206-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	27.5	36.5	40.5	64	93	140	170	200	255	300	360	440	560	700	■■■ + ■■■ + . . .
11.5	35.3		$M_{2.0}$	Nm	34.5	45.5	56	80	113	177	220	275	310	390	445	550	740	940	NEW
			M_{2max}	Nm	106	140	175	245	350	550	680	850	950	1180	1350	1670	1356	1238	
9.05	27.4	0.036	n_{2N}	r/min	375	300	250	200	150	100	100	100	75	75	60	50	37.5	20	1FT2206-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	25.5	34	43	60	86	127	146	164	235	280	335	410	510	610	■■■ + ■■■ + . . .
11	35.3		$M_{2.0}$	Nm	33	43.5	54	76	108	168	210	265	295	370	420	520	710	900	NEW
			M_{2max}	Nm	106	140	175	245	350	550	680	850	950	1180	1350	1670	1356	1238	

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Planetary gearbox data															
Gearbox type:		SP180, 1-stage					SP180, 2-stage								
1. Order code		J61					J62								
	i	3	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code		R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$ Nm	1164	1452	1452	1452	1164	1452	1452	1452	1452	1452	1452	1452	1356	1164
	$M_{2max,G}$ Nm	1552	1936	1936	1936	1552	1485	1485	1857	1485	1857	1485	1857	1356	1238
	$M_{2Em.Off}$ Nm	2400	2750	2750	2750	2750	2420	2750	2750	2750	2750	2750	2750	2750	2750
	$J_{1,G}$ kg cm²	50.8	33.9	27.9	22.2	19.2	9.27	7.72	7.48	6.32	6.2	5.51	5.45	5.39	5.36
	$\varphi_{2,G}$ '	3					5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type SP180

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																	
Nm	Nm	kg cm²																	
SIMOTICS S-1FT2 Compact with planetary gearbox SP180 1- and 2-stage (continued)																			
9.23	28.8	0.036	n_{2N}	r/min	375	300	250	200	150	100	100	100	75	75	60	50	37.5	20	1FT2208-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	25	33.5	42	58	83	126	151	174	225	260	315	385	495	640	■■■ + ■■■ + . . .
11.2	37.3		$M_{2.0}$	Nm	33.5	44	55	78	110	172	215	270	300	380	430	530	720	920	NEW
			M_{2max}	Nm	112	148	185	260	370	580	720	900	1000	1250	1420	1760	1356	1238	
13.6	37.2	0.036	n_{2N}	r/min	375	250	250	200	125	75	75	60	60	50	37.5	30	25	15	1FT2208-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	37.5	58	60	81	143	225	270	350	385	485	570	700	820	850	■■■ + ■■■ + . . .
16.7	50.3		$M_{2.0}$	Nm	50	66	82	116	165	255	320	400	450	560	640	790	1070	1160	NEW
			M_{2max}	Nm	150	199	245	345	495	780	970	1210	1350	1680	1485	1857	1356	1238	
13.7	37.2	0.036	n_{2N}	r/min	375	300	250	200	150	100	100	75	75	60	50	50	30	20	1FT2208-3AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	39.5	52	65	89	127	193	215	310	330	425	500	540	790	730	■■■ + ■■■ + . . .
16.8	50.3		$M_{2.0}$	Nm	50	66	83	117	166	260	325	405	455	560	640	800	1080	1160	NEW
			M_{2max}	Nm	150	199	245	345	495	780	970	1210	1350	1680	1485	1857	1356	1238	
13.4	37.2	0.036	n_{2N}	r/min	375	300	250	200	150	100	100	75	75	75	60	50	30	20	1FT2208-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	39	51	64	89	127	184	200	310	335	365	455	550	760	690	■■■ + ■■■ + . . .
16.4	50.3		$M_{2.0}$	Nm	49	65	81	114	162	250	315	395	445	550	630	780	1050	1160	NEW
			M_{2max}	Nm	150	199	245	345	495	780	970	1210	1350	1680	1485	1857	1356	1238	
16.4	45.9	0.036	n_{2N}	r/min	300	250	200	150	125	75	75	60	60	50	37.5	30	25	15	1FT2208-4AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	51	62	81	117	145	240	270	385	415	520	630	770	760	760	■■■ + ■■■ + . . .
20.2	65		$M_{2.0}$	Nm	60	80	100	141	200	310	390	490	540	680	780	960	1300	1160	NEW
			M_{2max}	Nm	195	255	320	450	640	1010	1250	1560	1485	1857	1485	1857	1356	1238	
16.8	45.9	0.036	n_{2N}	r/min	375	300	250	200	150	100	75	75	75	60	50	50	30	15	1FT2208-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	48	63	78	107	152	215	310	360	380	485	570	590	800	980	■■■ + ■■■ + . . .
20.8	65		$M_{2.0}$	Nm	62	82	103	144	205	320	400	500	560	700	800	990	1330	1160	NEW
			M_{2max}	Nm	195	255	320	450	640	1010	1250	1560	1485	1857	1485	1857	1356	1238	
15.8	45.9	0.036	n_{2N}	r/min	375	300	250	200	150	100	100	75	75	60	60	50	30	15	1FT2208-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	43.5	57	70	96	136	200	225	315	330	425	440	510	780	980	■■■ + ■■■ + . . .
19.6	65		$M_{2.0}$	Nm	58	77	97	136	193	300	375	470	530	660	750	930	1250	1160	NEW
			M_{2max}	Nm	195	255	320	450	640	1010	1250	1560	1485	1857	1485	1857	1356	1238	
19.9	53.2	0.036	n_{2N}	r/min	375	300	250	200	150	100	75	60	60	50	37.5	30	25	15	1FT2208-5AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	56	72	91	121	172	240	355	460	495	610	740	910	1000	990	■■■ + ■■■ + . . .
25	79		$M_{2.0}$	Nm	75	99	124	174	245	385	485	600	670	840	960	1180	1350	1160	NEW
			M_{2max}	Nm	235	310	390	550	780	1220	1485	1857	1485	1857	1485	1857	1356	1238	
19.8	53.2	0.036	n_{2N}	r/min	375	300	250	200	150	100	75	75	75	60	50	37.5	25	15	1FT2208-5AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	56	72	91	120	167	225	355	400	415	530	640	810	970	970	■■■ + ■■■ + . . .
24.9	79		$M_{2.0}$	Nm	74	98	123	173	245	385	480	600	670	830	950	1180	1350	1160	NEW
			M_{2max}	Nm	235	310	390	550	780	1220	1485	1857	1485	1857	1485	1857	1356	1238	
16	42.5	0.036	n_{2N}	r/min	375	300	250	200	150	100	100	100	75	60	50	50	30	15	1FT2210-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	45.5	59	74	101	144	215	245	265	370	475	560	580	850	1060	■■■ + ■■■ + . . .
19.7	59		$M_{2.0}$	Nm	59	78	97	137	194	305	380	475	530	660	760	940	1260	1160	NEW
			M_{2max}	Nm	177	235	290	410	580	920	1140	1420	1485	1857	1485	1857	1356	1238	

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Planetary gearbox data																
Gearbox type:			SP180, 1-stage					SP180, 2-stage								
1. Order code			J61					J62								
	i		3	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R03	R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	1164	1452	1452	1452	1164	1452	1452	1452	1452	1452	1452	1452	1356	1164
	$M_{2max,G}$	Nm	1552	1936	1936	1936	1552	1485	1485	1857	1485	1857	1485	1857	1356	1238
	$M_{2Em.Off}$	Nm	2400	2750	2750	2750	2750	2420	2750	2750	2750	2750	2750	2750	2750	2750
	$J_{1,G}$	kg cm²	50.8	33.9	27.9	22.2	19.2	9.27	7.72	7.48	6.32	6.2	5.51	5.45	5.39	5.36
	$\varphi_{2,G}$	'	3					5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact with planetary gearbox SP180 1- and 2-stage (continued)																			
15.7	42.5	0.036	n_{2N}	r/min	375	300	250	200	150	100	100	75	75	75	60	50	30	15	1FT2210-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	46	60	75	103	146	220	245	350	375	410	510	610	850	1020	■■■ + ■■■ + . . .
19.4	59		$M_{2.0}$	Nm	58	76	96	135	191	300	375	470	520	650	740	920	1250	1160	NEW
			M_{2max}	Nm	177	235	290	410	580	920	1140	1420	1485	1857	1485	1857	1356	1238	
22.8	57.8	0.036	n_{2N}	r/min	375	300	250	200	125	100	75	60	60	50	37.5	30	25	12.5	1FT2210-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	74	93	117	153	255	320	485	620	650	780	990	1200	1130	1160	■■■ + ■■■ + . . .
28.9	88.7		$M_{2.0}$	Nm	86	114	143	200	285	445	560	700	780	970	1100	1370	1350	1160	NEW
			M_{2max}	Nm	265	350	440	610	880	1380	1485	1857	1485	1857	1485	1857	1356	1238	
22.8	57.8	0.036	n_{2N}	r/min	375	300	250	200	150	100	75	75	75	60	50	37.5	30	12.5	1FT2210-3AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	74	93	116	152	210	320	480	560	570	750	880	1060	950	1160	■■■ + ■■■ + . . .
28.9	88.7		$M_{2.0}$	Nm	86	114	143	200	285	445	560	690	780	970	1100	1370	1350	1160	NEW
			M_{2max}	Nm	265	350	440	610	880	1380	1485	1857	1485	1857	1485	1857	1356	1238	
22.4	57.8	0.036	n_{2N}	r/min	375	300	250	200	125	100	75	75	75	60	60	37.5	25	15	1FT2210-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	66	84	105	134	220	270	415	470	490	620	620	940	1040	1020	■■■ + ■■■ + . . .
28.4	88.7		$M_{2.0}$	Nm	85	112	141	198	280	440	550	680	760	950	1090	1350	1350	1160	NEW
			M_{2max}	Nm	265	350	440	610	880	1380	1485	1857	1485	1857	1485	1857	1356	1238	
29.7	69	0.036	n_{2N}	r/min	375	250	250	150	125	75	75	60	60	50	37.5	30	25	6	1FT2210-4AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	86	130	133	225	300	495	550	730	770	930	1170	1300	1130	1160	■■■ + ■■■ + . . .
38.7	119		$M_{2.0}$	Nm	116	154	192	270	380	600	750	930	1040	1300	1450	1450	1350	1160	NEW
			M_{2max}	Nm	355	470	590	820	1170	1485	1485	1857	1485	1857	1485	1857	1356	1238	
29.5	69	0.036	n_{2N}	r/min	375	250	250	150	125	75	75	60	60	50	50	37.5	25	6	1FT2210-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	85	128	131	225	295	485	550	720	770	930	910	1070	1130	1160	■■■ + ■■■ + . . .
38.3	119		$M_{2.0}$	Nm	115	152	190	265	380	590	740	920	1030	1280	1450	1450	1350	1160	NEW
			M_{2max}	Nm	355	470	590	820	1170	1485	1485	1857	1485	1857	1485	1857	1356	1238	
28.9	69	0.036	n_{2N}	r/min	375	250	250	150	125	75	75	60	60	50	50	37.5	25	15	1FT2210-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	82	122	126	210	285	465	530	690	740	900	870	1030	1080	1040	■■■ + ■■■ + . . .
37.7	119		$M_{2.0}$	Nm	112	149	186	260	370	580	730	900	1010	1260	1430	1450	1350	1160	NEW
			M_{2max}	Nm	355	470	590	820	1170	1485	1485	1857	1485	1857	1485	1857	1356	1238	
34.4	76.1	0.036	n_{2N}	r/min	375	300	250	200	125	75	75	60	60	50	37.5	30	25	5	1FT2210-5AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	102	130	162	205	335	540	620	790	850	1030	1260	1420	1220	1160	■■■ + ■■■ + . . .
45.7	148		$M_{2.0}$	Nm	137	181	225	315	450	710	880	1100	1230	1450	1450	1450	1350	1160	NEW
			M_{2max}	Nm	440	590	730	1030	1460	1485	1485	1857	1485	1857	1485	1857	1356	1238	
35.4	76.1	0.036	n_{2N}	r/min	375	250	200	150	125	75	75	60	60	50	37.5	30	25	3.75	1FT2210-5AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	93	148	187	260	315	540	570	770	780	940	1200	1310	1090	1160	■■■ + ■■■ + . . .
47.3	148		$M_{2.0}$	Nm	141	188	235	325	465	730	910	1140	1270	1450	1450	1450	1350	1160	NEW
			M_{2max}	Nm	440	590	730	1030	1460	1485	1485	1857	1485	1857	1485	1857	1356	1238	

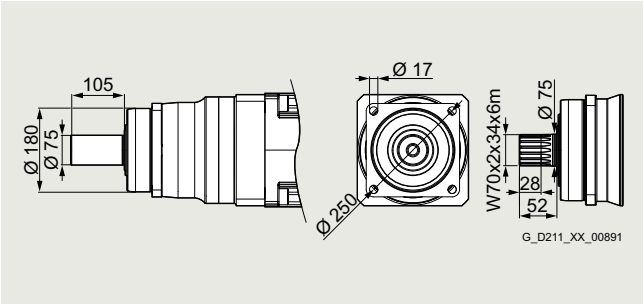
Planetary gearbox data																
Gearbox type:			**SP180, 1-stage**					**SP180, 2-stage**								
1. Order code			**J61**					**J62**								
	i		**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
2. Order code			**R03**	**R04**	**R05**	**R07**	**R10**	**R16**	**R20**	**R25**	**R28**	**R35**	**R40**	**R50**	**R70**	**R00**
	$M_{2N,G}$	Nm	1164	1452	1452	1452	1164	1452	1452	1452	1452	1452	1452	1452	1356	1164
	$M_{2max,G}$	Nm	1552	1936	1936	1936	1552	1485	1485	1857	1485	1857	1485	1857	1356	1238
	$M_{2Em.Off}$	Nm	2400	2750	2750	2750	2750	2420	2750	2750	2750	2750	2750	2750	2750	2750
	$J_{1,G}$	kg cm²	50.8	33.9	27.9	22.2	19.2	9.27	7.72	7.48	6.32	6.2	5.51	5.45	5.39	5.36
	$\varphi_{2,G}$	'	3					5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type SP210

Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	20700 N
Average axial force for 20000 h	$F_{A,eq}$	30000 N
Average radial force for 30000 h	$F_{R,eq}$	18400 N
Average axial force for 30000 h	$F_{A,eq}$	26600 N
Maximum radial force	$F_{R,max}$	21000 N
Maximum axial force	$F_{A,max}$	30000 N

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																
Nm	Nm	kg cm²																
SIMOTICS S-1FT2 High Dynamic with planetary gearbox SP210 1- and 2-stage																		
7.05	20.9	0.036	n_{2N}	r/min	–	–	–	100	100	100	75	60	60	50	37.5	20	30	**1FT2106-3AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	87	107	152	187	250	270	340	440	590	74	■■■ + ■■■ + . . .
8.28	24.6		$M_{2.0}$	Nm	–	–	–	127	161	205	225	285	325	405	550	700	81	NEW
			M_{2max}	Nm	–	–	–	390	490	610	680	850	970	1210	1640	2043	290	
9.38	26.4	0.036	n_{2N}	r/min	–	–	–	100	100	100	75	60	60	50	37.5	20	30	**1FT2106-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	108	127	181	230	305	325	410	510	680	75	■■■ + ■■■ + . . .
11	31.3		$M_{2.0}$	Nm	–	–	–	171	215	270	300	380	435	540	730	930	80	NEW
			M_{2max}	Nm	–	–	–	500	620	780	870	1090	1240	1540	2050	2043	295	
12.7	35.8	0.036	n_{2N}	r/min	–	–	–	75	75	100	75	60	60	50	37.5	15	30	**1FT2106-6AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	194	240	250	315	420	445	550	690	1080	182	■■■ + ■■■ + . . .
14.9	43.2		$M_{2.0}$	Nm	–	–	–	230	290	370	410	510	590	730	990	1270	175	NEW
			M_{2max}	Nm	–	–	–	690	860	1070	1200	1500	1710	2100	2457	2043	590	
19	64.6	0.036	n_{2N}	r/min	200	150	125	100	75	75	75	60	60	50	37.5	25	15	**1FT2108-4AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	71	90	126	183	275	315	415	500	600	660	880	1030	1060	■■■ + ■■■ + . . .
22.3	83.4		$M_{2.0}$	Nm	84	105	149	215	350	440	550	620	770	880	1100	1480	1890	NEW
			M_{2max}	Nm	330	410	580	830	1320	1650	2050	2300	2850	2880	3600	2457	2043	
23.2	75.8	0.036	n_{2N}	r/min	200	150	125	125	75	75	60	60	50	37.5	30	25	15	**1FT2108-5AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	87	110	153	179	330	385	540	570	730	860	1080	1180	1190	■■■ + ■■■ + . . .
27.4	101		$M_{2.0}$	Nm	104	130	185	265	435	540	680	760	950	1080	1350	1820	2000	NEW
			M_{2max}	Nm	400	500	700	1000	1600	1990	2450	2750	3400	2880	3600	2457	2043	
23	75.8	0.036	n_{2N}	r/min	200	150	125	100	75	60	75	60	60	50	37.5	25	15	**1FT2108-5AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	84	109	149	220	305	440	450	550	640	700	940	1090	1100	■■■ + ■■■ + . . .
27.1	101		$M_{2.0}$	Nm	103	129	183	260	430	540	670	750	940	1070	1330	1800	2000	NEW
			M_{2max}	Nm	400	500	700	1000	1600	1990	2450	2750	3400	2880	3600	2457	2043	
28.9	95.4	0.036	n_{2N}	r/min	200	150	125	100	75	75	60	60	50	37.5	30	25	15	**1FT2108-7AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	105	135	186	265	375	425	620	650	820	990	1230	1230	1220	■■■ + ■■■ + . . .
34.4	135		$M_{2.0}$	Nm	132	166	230	335	550	680	850	960	1190	1360	1690	2250	2000	NEW
			M_{2max}	Nm	530	670	940	1340	2100	2650	3300	3159	3840	2880	3600	2457	2043	

➥ Continued on the next page

Planetary gearbox data														
Gearbox type:			SP210, 1-stage				SP210, 2-stage							
1. Order code			J71				J72							
	i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	3000	3000	2880	2280	2880	3000	3000	2880	2880	2840	2880	2457	2043
	$M_{2max,G}$	Nm	4000	4000	3840	2800	3159	3159	3949	3159	3840	2880	3600	2457	2043
	$M_{2Em.Off}$	Nm	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900
	$J_{1,G}$	kg cm²	94.3	76.9	61.5	53.1	34.5	31.5	30.8	30	29.7	28.5	28.3	28.1	28
	$\varphi_{2,G}$	'	3				5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic with planetary gearbox SP210 1- and 2-stage (continued)																		
28.5	95.4	0.036	n_{2N}	r/min	200	150	125	100	75	75	75	60	60	50	37.5	25	12.5	1FT2108-7AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	103	132	180	255	360	405	510	620	670	780	1040	1180	1400	■■■ + ■■■ + . . .
33.9	135		$M_{2.0}$	Nm	130	163	230	330	540	670	840	940	1170	1340	1660	2200	2000	NEW
			M_{2max}	Nm	530	670	940	1340	2100	2650	3300	3159	3840	2880	3600	2457	2043	
28.2	95.4	0.036	n_{2N}	r/min	200	150	125	100	60	60	60	50	50	37.5	37.5	25	12.5	1FT2108-7AE..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	98	128	173	255	430	495	610	700	800	950	950	1080	1320	■■■ + ■■■ + . . .
33.5	135		$M_{2.0}$	Nm	129	161	225	325	530	660	830	930	1160	1330	1650	2200	2000	NEW
			M_{2max}	Nm	530	670	940	1340	2100	2650	3300	3159	3840	2880	3600	2457	2043	
SIMOTICS S-1FT2 Compact with planetary gearbox SP210 1- and 2-stage																		
4.46	14.6	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	75	60	50	50	30	20	1FT2206-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	70	90	119	128	173	200	235	330	375	■■■ + ■■■ + . . .
5.29	17		$M_{2.0}$	Nm	–	–	–	–	79	102	132	145	184	205	260	350	445	NEW
			M_{2max}	Nm	–	–	–	–	265	335	425	470	590	670	840	1130	1450	
4.91	14.6	0.036	n_{2N}	r/min	–	–	–	–	100	100	100	75	60	60	50	37.5	20	1FT2206-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	57	73	97	124	168	182	225	290	395	■■■ + ■■■ + . . .
5.8	17		$M_{2.0}$	Nm	–	–	–	–	88	112	145	160	200	225	285	385	490	NEW
			M_{2max}	Nm	–	–	–	–	265	335	425	470	590	670	840	1130	1450	
4.76	14.6	0.036	n_{2N}	r/min	–	–	–	–	100	75	100	75	60	60	50	37.5	20	1FT2206-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	50	85	96	123	166	183	230	295	395	■■■ + ■■■ + . . .
5.64	17		$M_{2.0}$	Nm	–	–	–	–	85	108	140	155	196	220	275	370	475	NEW
			M_{2max}	Nm	–	–	–	–	265	335	425	470	590	670	840	1130	1450	
7.02	21.7	0.036	n_{2N}	r/min	–	–	–	–	75	75	60	60	50	37.5	30	25	15	1FT2206-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	105	132	183	196	250	300	375	480	640	■■■ + ■■■ + . . .
8.24	25.6		$M_{2.0}$	Nm	–	–	–	–	127	161	205	225	285	325	405	540	700	NEW
			M_{2max}	Nm	–	–	–	–	405	500	630	710	890	1010	1260	1700	2043	
6.93	21.7	0.036	n_{2N}	r/min	–	–	–	–	75	75	100	75	60	60	50	37.5	20	1FT2206-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	103	131	131	183	245	265	335	430	520	■■■ + ■■■ + . . .
8.12	25.6		$M_{2.0}$	Nm	–	–	–	–	125	159	200	225	280	320	400	540	690	NEW
			M_{2max}	Nm	–	–	–	–	405	500	630	710	890	1010	1260	1700	2043	
9.22	30.2	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	60	60	50	37.5	25	15	1FT2206-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	138	162	210	260	305	355	465	620	700	■■■ + ■■■ + . . .
10.8	36.1		$M_{2.0}$	Nm	–	–	–	–	168	210	265	295	375	425	530	710	920	NEW
			M_{2max}	Nm	–	–	–	–	570	720	900	1000	1250	1430	1770	2457	2043	
9.53	28.7	0.036	n_{2N}	r/min	–	–	–	–	100	75	100	75	60	60	50	37.5	20	1FT2206-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	110	183	188	250	330	355	445	570	690	■■■ + ■■■ + . . .
11.1	34.1		$M_{2.0}$	Nm	–	–	–	–	174	215	275	305	385	440	540	740	950	NEW
			M_{2max}	Nm	–	–	–	–	540	680	850	950	1180	1350	1680	2250	2043	
9.29	28.7	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	75	60	60	50	37.5	15	1FT2206-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	136	171	215	230	305	335	420	470	800	■■■ + ■■■ + . . .
10.8	34.1		$M_{2.0}$	Nm	–	–	–	–	169	210	270	300	375	430	530	720	920	NEW
			M_{2max}	Nm	–	–	–	–	540	680	850	950	1180	1350	1680	2250	2043	

➥ Continued on the next page

Planetary gearbox data														
Gearbox type:		SP210, 1-stage				SP210, 2-stage								
1. Order code		J71				J72								
	i	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code		R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$ Nm	3000	3000	2880	2280	2880	3000	3000	2880	2880	2840	2880	2457	2043
	$M_{2max,G}$ Nm	4000	4000	3840	2800	3159	3159	3949	3159	3840	2880	3600	2457	2043
	$M_{2Em.Off}$ Nm	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900
	$J_{1,G}$ kg cm²	94.3	76.9	61.5	53.1	34.5	31.5	30.8	30	29.7	28.5	28.3	28.1	28
	$\varphi_{2,G}$ '	3				5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type SP210

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact with planetary gearbox SP210 1- and 2-stage (continued)																	
9.43	30.2	0.036	n_{2N}	r/min	250	200	150	125	75	75	75	75	60	60	50	37.5	15	**1FT2208-2AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	29	35	52	77	133	165	205	220	290	310	390	460	790	■■■ + ■■■ + . . .
11	36.1		$M_{2.0}$	Nm	40	50	71	103	172	215	275	305	380	435	540	730	940	NEW
			M_{2max}	Nm	140	176	245	355	570	720	900	1000	1250	1430	1770	2457	2043	
13.8	39.9	0.036	n_{2N}	r/min	200	150	125	100	75	75	60	60	50	37.5	30	25	15	**1FT2208-3AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	54	68	95	139	200	235	360	385	495	580	720	840	880	■■■ + ■■■ + . . .
16.1	48.6		$M_{2.0}$	Nm	60	76	107	156	255	315	400	445	560	640	790	1070	1380	NEW
			M_{2max}	Nm	191	235	335	480	770	960	1200	1350	1680	1910	2350	2457	2043	
14.2	39.9	0.036	n_{2N}	r/min	250	200	150	125	75	75	75	75	60	50	50	30	15	**1FT2208-3AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	42.5	49.5	82	120	205	250	310	330	435	500	560	790	1020	■■■ + ■■■ + . . .
16.6	48.6		$M_{2.0}$	Nm	61	77	109	158	260	325	415	460	570	660	820	1110	1420	NEW
			M_{2max}	Nm	191	235	335	480	770	960	1200	1350	1680	1910	2350	2457	2043	
13.8	39.9	0.036	n_{2N}	r/min	250	150	150	125	75	75	75	75	60	60	50	30	15	**1FT2208-3AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	40.5	63	78	115	205	250	315	315	435	450	550	750	970	■■■ + ■■■ + . . .
16.2	48.6		$M_{2.0}$	Nm	60	75	106	154	255	320	400	450	560	640	790	1070	1380	NEW
			M_{2max}	Nm	191	235	335	480	770	960	1200	1350	1680	1910	2350	2457	2043	
16.7	50.5	0.036	n_{2N}	r/min	200	150	125	100	60	60	60	50	50	37.5	30	25	12.5	**1FT2208-4AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	57	76	101	154	260	305	390	445	520	630	790	770	970	■■■ + ■■■ + . . .
19.6	63.1		$M_{2.0}$	Nm	74	93	132	190	310	385	485	540	680	770	960	1300	1670	NEW
			M_{2max}	Nm	245	310	435	620	1000	1250	1560	1740	2150	2450	3050	2457	2043	
17.5	50.5	0.036	n_{2N}	r/min	200	150	150	125	75	75	75	75	60	50	50	25	15	**1FT2208-4AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	63	80	96	141	250	300	365	355	500	570	590	1010	1060	■■■ + ■■■ + . . .
20.6	63.1		$M_{2.0}$	Nm	77	96	137	197	325	405	510	570	710	810	1010	1370	1750	NEW
			M_{2max}	Nm	245	310	435	620	1000	1250	1560	1740	2150	2450	3050	2457	2043	
16.4	50.5	0.036	n_{2N}	r/min	250	200	150	125	75	75	75	75	60	60	50	30	15	**1FT2208-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	49.5	57	93	132	225	265	320	325	435	435	530	800	1060	■■■ + ■■■ + . . .
19.2	63.1		$M_{2.0}$	Nm	72	90	128	185	300	380	480	530	670	760	940	1280	1640	NEW
			M_{2max}	Nm	245	310	435	620	1000	1250	1560	1740	2150	2450	3050	2457	2043	
20.9	60	0.036	n_{2N}	r/min	200	150	125	125	75	75	60	60	50	37.5	30	25	15	**1FT2208-5AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	75	95	132	155	290	335	470	495	630	750	940	1070	1090	■■■ + ■■■ + . . .
24.6	76.6		$M_{2.0}$	Nm	93	117	165	235	390	490	610	680	850	970	1210	1640	2000	NEW
			M_{2max}	Nm	300	375	530	760	1220	1520	1890	2100	2600	2880	3600	2457	2043	
20.9	60	0.036	n_{2N}	r/min	200	150	125	125	75	75	75	60	60	50	37.5	25	15	**1FT2208-5AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	75	96	133	154	290	330	410	495	550	640	840	1030	1070	■■■ + ■■■ + . . .
24.6	76.6		$M_{2.0}$	Nm	93	116	165	235	390	485	610	680	850	970	1210	1630	2000	NEW
			M_{2max}	Nm	300	375	530	760	1220	1520	1890	2100	2600	2880	3600	2457	2043	
16.6	46.3	0.036	n_{2N}	r/min	250	200	150	125	75	75	75	75	60	50	50	30	15	**1FT2210-2AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	55	67	98	140	235	285	345	355	480	550	590	870	1120	■■■ + ■■■ + . . .
19.4	57.2		$M_{2.0}$	Nm	73	91	129	187	305	385	480	540	670	770	950	1290	1650	NEW
			M_{2max}	Nm	225	280	395	570	910	1130	1420	1580	1970	2250	2750	2457	2043	

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Planetary gearbox data														
Gearbox type:			**SP210, 1-stage**				**SP210, 2-stage**							
1. Order code			**J71**				**J72**							
i			**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
2. Order code			**R04**	**R05**	**R07**	**R10**	**R16**	**R20**	**R25**	**R28**	**R35**	**R40**	**R50**	**R70**	**R00**
$M_{2N,G}$		Nm	3000	3000	2880	2280	2880	3000	3000	2880	2880	2840	2880	2457	2043
$M_{2max,G}$		Nm	4000	4000	3840	2800	3159	3159	3949	3159	3840	2880	3600	2457	2043
$M_{2Em.Off}$		Nm	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900
$J_{1,G}$		kg cm²	94.3	76.9	61.5	53.1	34.5	31.5	30.8	30	29.7	28.5	28.3	28.1	28
$\varphi_{2,G}$		'	3				5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact with planetary gearbox SP210 1- and 2-stage (continued)																	
16.3	46.3	0.036	n_{2N}	r/min	250	200	150	125	75	75	75	75	60	60	50	25	15	1FT2210-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	55	64	100	143	240	290	355	355	490	485	600	990	1050	■■■ + ■■■ + . . .
19.1	57.2		$M_{2.0}$	Nm	72	90	127	184	300	375	475	530	660	750	940	1270	1630	NEW
			M_{2max}	Nm	225	280	395	570	910	1130	1420	1580	1970	2250	2750	2457	2043	
23.7	66.5	0.036	n_{2N}	r/min	200	150	125	125	75	75	60	60	50	37.5	30	25	15	1FT2210-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	101	128	178	210	370	415	630	630	790	990	1230	1180	1210	■■■ + ■■■ + . . .
27.9	86.3		$M_{2.0}$	Nm	108	135	191	275	445	550	690	780	970	1110	1370	1850	2000	NEW
			M_{2max}	Nm	340	425	600	860	1370	1710	2100	2350	2950	2880	3600	2457	2043	
23.6	66.5	0.036	n_{2N}	r/min	200	150	125	125	75	75	75	60	60	50	37.5	25	15	1FT2210-3AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	100	127	176	210	365	415	520	640	720	780	1050	1200	1210	■■■ + ■■■ + . . .
27.9	86.3		$M_{2.0}$	Nm	108	135	191	275	445	550	690	770	970	1110	1370	1850	2000	NEW
			M_{2max}	Nm	340	425	600	860	1370	1710	2100	2350	2950	2880	3600	2457	2043	
23.2	66.5	0.036	n_{2N}	r/min	200	150	150	125	75	75	75	60	60	50	37.5	20	12.5	1FT2210-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	90	114	135	191	335	360	435	560	600	670	930	1340	1330	■■■ + ■■■ + . . .
27.4	86.3		$M_{2.0}$	Nm	106	132	187	270	435	540	680	760	950	1090	1350	1820	2000	NEW
			M_{2max}	Nm	340	425	600	860	1370	1710	2100	2350	2950	2880	3600	2457	2043	
31.3	84.6	0.036	n_{2N}	r/min	200	150	125	100	60	60	60	50	50	–	30	20	12.5	1FT2210-4AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	126	160	220	315	520	590	730	820	900	–	1330	1510	1450	■■■ + ■■■ + . . .
37.5	115		$M_{2.0}$	Nm	146	183	255	370	590	740	930	1040	1300	–	1840	2450	2000	NEW
			M_{2max}	Nm	455	570	800	1150	1830	2250	2800	3159	3840	–	3600	2457	2043	
31	84.6	0.036	n_{2N}	r/min	200	150	125	100	75	60	60	50	50	–	37.5	20	12.5	1FT2210-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	124	157	215	310	410	590	720	810	910	–	1060	1500	1450	■■■ + ■■■ + . . .
37.1	115		$M_{2.0}$	Nm	144	181	255	365	590	740	920	1030	1290	–	1820	2450	2000	NEW
			M_{2max}	Nm	455	570	800	1150	1830	2250	2800	3159	3840	–	3600	2457	2043	
30.7	84.6	0.036	n_{2N}	r/min	200	150	125	100	75	60	60	50	50	37.5	30	20	12.5	1FT2210-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	119	150	205	295	390	570	690	790	870	1050	1280	1450	1390	■■■ + ■■■ + . . .
36.7	115		$M_{2.0}$	Nm	142	178	250	360	580	730	910	1020	1270	1450	1800	2400	2000	NEW
			M_{2max}	Nm	455	570	800	1150	1830	2250	2800	3159	3840	2880	3600	2457	2043	
37.1	101	0.036	n_{2N}	r/min	200	150	125	125	75	60	60	60	50	–	30	25	12.5	1FT2210-5AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	140	177	240	280	485	670	810	790	1060	–	1490	1320	1530	■■■ + ■■■ + . . .
44.9	145		$M_{2.0}$	Nm	174	215	305	440	710	890	1110	1250	1550	–	2200	2450	2000	NEW
			M_{2max}	Nm	570	720	1010	1440	2250	2800	3500	3159	3840	–	3600	2457	2043	
38.5	101	0.036	n_{2N}	r/min	200	150	125	100	60	60	60	50	50	–	30	20	10	1FT2210-5AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	141	183	245	360	570	630	750	850	920	–	1350	1510	1740	■■■ + ■■■ + . . .
46.7	145		$M_{2.0}$	Nm	181	225	315	455	740	930	1160	1300	1620	–	2250	2450	2000	NEW
			M_{2max}	Nm	570	720	1010	1440	2250	2800	3500	3159	3840	–	3600	2457	2043	

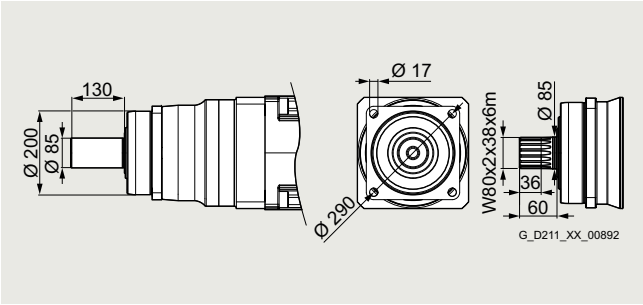
Planetary gearbox data														
Gearbox type:			**SP210, 1-stage**				**SP210, 2-stage**							
1. Order code			**J71**				**J72**							
i			**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
2. Order code			**R04**	**R05**	**R07**	**R10**	**R16**	**R20**	**R25**	**R28**	**R35**	**R40**	**R50**	**R70**	**R00**
$M_{2N,G}$		Nm	3000	3000	2880	2280	2880	3000	3000	2880	2880	2840	2880	2457	2043
$M_{2max,G}$		Nm	4000	4000	3840	2800	3159	3159	3949	3159	3840	2880	3600	2457	2043
$M_{2Em.Off}$		Nm	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900	5900
$J_{1,G}$		kg cm²	94.3	76.9	61.5	53.1	34.5	31.5	30.8	30	29.7	28.5	28.3	28.1	28
$\varphi_{2,G}$		'	3				5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type SP240

Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	22100 N
Average axial force for 20000 h	$F_{A,eq}$	33000 N
Average radial force for 30000 h	$F_{R,eq}$	19600 N
Average axial force for 30000 h	$F_{A,eq}$	29200 N
Maximum radial force	$F_{R,max}$	30000 N
Maximum axial force	$F_{A,max}$	33000 N

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																
Nm	Nm	kg cm²																
SIMOTICS S-1FT2 High Dynamic with planetary gearbox SP240 1- and 2-stage																		
6.9	21.2	0.036	n_{2N}	r/min	–	–	–	–	100	75	100	75	60	60	50	37.5	15	**1FT2106-3AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	86	128	138	182	245	265	330	415	600	■■■ + ■■■ + . . .
8.36	24.7		$M_{2.0}$	Nm	–	–	–	–	129	161	205	225	285	325	400	540	690	NEW
			M_{2max}	Nm	–	–	–	–	390	490	610	680	850	970	1210	1640	2100	
9.35	26.9	0.036	n_{2N}	r/min	–	–	–	–	100	75	100	75	60	60	50	37.5	15	**1FT2106-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	109	163	160	220	300	320	400	485	750	■■■ + ■■■ + . . .
11.1	31.4		$M_{2.0}$	Nm	–	–	–	–	174	215	275	305	380	435	540	720	930	NEW
			M_{2max}	Nm	–	–	–	–	500	620	780	870	1090	1240	1540	2050	2650	
12.7	36.9	0.036	n_{2N}	r/min	–	–	–	–	100	75	75	75	60	60	50	37.5	15	**1FT2106-6AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	148	235	295	310	420	440	540	630	1030	■■■ + ■■■ + . . .
15	43.3		$M_{2.0}$	Nm	–	–	–	–	235	290	370	410	510	590	730	980	1270	NEW
			M_{2max}	Nm	–	–	–	–	690	860	1080	1200	1500	1710	2100	2850	3642	
19.3	68.8	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	75	60	50	50	25	12.5	**1FT2108-4AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	290	335	445	410	610	710	700	1120	1300	■■■ + ■■■ + . . .
22.6	83.1		$M_{2.0}$	Nm	–	–	–	–	355	445	560	620	780	890	1100	1490	1930	NEW
			M_{2max}	Nm	–	–	–	–	1320	1650	2050	2300	2850	3250	4050	5700	3642	
23.7	81.9	0.036	n_{2N}	r/min	–	–	–	–	75	75	60	60	50	37.5	30	25	12.5	**1FT2108-5AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	345	405	550	580	740	880	1090	1290	1460	■■■ + ■■■ + . . .
27.7	100		$M_{2.0}$	Nm	–	–	–	–	440	540	690	760	960	1090	1360	1840	2350	NEW
			M_{2max}	Nm	–	–	–	–	1600	1990	2450	2750	3450	3900	4850	5700	3642	
23.5	81.9	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	60	60	50	37.5	25	12.5	**1FT2108-5AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	345	370	500	590	700	800	1040	1190	1360	■■■ + ■■■ + . . .
27.4	100		$M_{2.0}$	Nm	–	–	–	–	435	540	680	760	950	1080	1340	1820	2300	NEW
			M_{2max}	Nm	–	–	–	–	1600	1990	2450	2750	3450	3900	4850	5700	3642	
29.8	106	0.036	n_{2N}	r/min	–	–	–	–	75	75	60	60	50	37.5	30	25	12.5	**1FT2108-7AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	415	460	640	660	840	1010	1260	1370	1540	■■■ + ■■■ + . . .
34.8	134		$M_{2.0}$	Nm	–	–	–	–	550	690	860	960	1200	1370	1710	2300	2950	NEW
			M_{2max}	Nm	–	–	–	–	2100	2650	3300	3700	4600	5200	5700	5700	3642	

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Planetary gearbox data														
Gearbox type:		SP240, 1-stage				SP240, 2-stage								
1. Order code		J81				J82								
	i	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code		R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$ Nm	5400	5400	5160	4000	5400	5400	5400	5400	5400	4400	5160	4730	3642
	$M_{2max,G}$ Nm	5700	5700	5700	4000	5446	5446	5700	5446	5700	5446	5700	5700	3642
	$M_{2Em.Off}$ Nm	8500	8500	8500	6850	8500	8500	8500	8500	8500	8500	8500	8500	6850
	$J_{1,G}$ kg cm²	198	163	138	125	39.2	34.6	33.2	30.5	29.7	28.2	27.9	27.6	27.5
	$\varphi_{2,G}$ '	3				5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic with planetary gearbox SP240 1- and 2-stage (continued)																		
29.3	106	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	60	60	50	37.5	25	12.5	1FT2108-7AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	395	440	520	630	680	800	1060	1310	1480	■■■ + ■■■ + . . .
34.2	134		$M_{2.0}$	Nm	–	–	–	–	540	680	850	950	1180	1350	1680	2250	2900	NEW
			M_{2max}	Nm	–	–	–	–	2100	2650	3300	3700	4600	5200	5700	5700	3642	
29	106	0.036	n_{2N}	r/min	–	–	–	–	75	60	75	60	60	50	37.5	20	10	1FT2108-7AE..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	390	520	530	650	730	830	1100	1540	1750	■■■ + ■■■ + . . .
33.8	134		$M_{2.0}$	Nm	–	–	–	–	540	670	840	940	1170	1340	1660	2250	2900	NEW
			M_{2max}	Nm	–	–	–	–	2100	2650	3300	3700	4600	5200	5700	5700	3642	
SIMOTICS S-1FT2 Compact with planetary gearbox SP240 1- and 2-stage																		
4.27	14.6	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	75	60	50	50	30	15	1FT2206-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	69	85	115	122	169	195	225	310	405	■■■ + ■■■ + . . .
5.4	17.1		$M_{2.0}$	Nm	–	–	–	–	81	101	134	144	183	205	255	335	425	NEW
			M_{2max}	Nm	–	–	–	–	270	335	425	470	590	670	830	1130	1450	
4.77	14.6	0.036	n_{2N}	r/min	–	–	–	–	100	75	100	75	60	60	50	37.5	20	1FT2206-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	53	82	89	117	163	175	215	260	295	■■■ + ■■■ + . . .
5.92	17.1		$M_{2.0}$	Nm	–	–	–	–	90	112	148	159	200	230	280	375	475	NEW
			M_{2max}	Nm	–	–	–	–	270	335	425	470	590	670	830	1130	1450	
4.61	14.6	0.036	n_{2N}	r/min	–	–	–	–	100	75	75	75	60	60	50	37.5	15	1FT2206-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	48.5	80	110	117	161	176	220	270	380	■■■ + ■■■ + . . .
5.76	17.1		$M_{2.0}$	Nm	–	–	–	–	88	109	144	154	196	220	270	365	460	NEW
			M_{2max}	Nm	–	–	–	–	270	335	425	470	590	670	830	1130	1450	
6.88	22	0.036	n_{2N}	r/min	–	–	–	–	75	75	60	60	50	37.5	30	25	15	1FT2206-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	104	128	182	192	250	300	370	465	590	■■■ + ■■■ + . . .
8.32	25.6		$M_{2.0}$	Nm	–	–	–	–	129	160	205	225	285	325	400	530	680	NEW
			M_{2max}	Nm	–	–	–	–	405	500	640	710	890	1010	1260	1700	2200	
6.79	22	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	75	60	60	50	37.5	15	1FT2206-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	102	126	167	178	240	260	325	375	590	■■■ + ■■■ + . . .
8.24	25.6		$M_{2.0}$	Nm	–	–	–	–	127	158	205	220	280	320	395	530	670	NEW
			M_{2max}	Nm	–	–	–	–	405	500	640	710	890	1010	1260	1700	2200	
9.12	30.9	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	60	60	50	37.5	25	12.5	1FT2206-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	146	168	220	255	305	355	460	620	810	■■■ + ■■■ + . . .
10.9	36.1		$M_{2.0}$	Nm	–	–	–	–	170	210	270	295	375	425	520	710	910	NEW
			M_{2max}	Nm	–	–	–	–	570	710	900	1000	1250	1430	1770	2400	3050	
9.45	29.3	0.036	n_{2N}	r/min	–	–	–	–	100	75	75	75	60	60	50	37.5	15	1FT2206-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	112	178	230	245	325	350	435	500	820	■■■ + ■■■ + . . .
11.2	34.2		$M_{2.0}$	Nm	–	–	–	–	176	215	280	305	385	440	540	730	940	NEW
			M_{2max}	Nm	–	–	–	–	540	680	850	950	1180	1350	1680	2250	2900	
9.19	29.3	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	75	60	60	50	30	15	1FT2206-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	136	166	215	230	305	330	410	570	730	■■■ + ■■■ + . . .
10.9	34.2		$M_{2.0}$	Nm	–	–	–	–	171	210	270	295	375	430	530	710	910	NEW
			M_{2max}	Nm	–	–	–	–	540	680	850	950	1180	1350	1680	2250	2900	

➥ Continued on the next page

Planetary gearbox data														
Gearbox type:		SP240, 1-stage				SP240, 2-stage								
1. Order code		J81				J82								
	i	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code		R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	5400	5400	5160	4000	5400	5400	5400	5400	5400	4400	5160	4730	3642
	$M_{2max,G}$	Nm	5700	5700	5700	4000	5446	5446	5700	5446	5700	5446	5700	5700	3642
	$M_{2Em.Off}$	Nm	8500	8500	8500	6850	8500	8500	8500	8500	8500	8500	8500	8500	6850
	$J_{1,G}$	kg cm²	198	163	138	125	39.2	34.6	33.2	30.5	29.7	28.2	27.9	27.6	27.5
	$\varphi_{2,G}$	'	3				5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type SP240

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																
Nm	Nm	kg cm²																
SIMOTICS S-1FT2 Compact with planetary gearbox SP240 1- and 2-stage (continued)																		
9.39	30.9	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	75	60	60	50	30	15	1FT2208-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	133	160	205	215	290	305	380	530	740	■■■ + ■■■ + . . .
11.2	36.1		$M_{2.0}$	Nm	–	–	–	–	175	215	275	305	385	435	540	730	930	NEW
			M_{2max}	Nm	–	–	–	–	570	710	900	1000	1250	1430	1770	2400	3050	
13.8	41.3	0.036	n_{2N}	r/min	–	–	–	–	75	75	60	60	50	37.5	30	25	12.5	1FT2208-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	220	245	360	390	500	580	730	890	1050	■■■ + ■■■ + . . .
16.2	48.6		$M_{2.0}$	Nm	–	–	–	–	255	315	405	445	560	640	790	1070	1380	NEW
			M_{2max}	Nm	–	–	–	–	770	960	1210	1350	1680	1920	2350	3200	3642	
14.3	41.3	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	75	60	50	50	30	12.5	1FT2208-3AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	205	250	310	325	435	500	550	790	1180	■■■ + ■■■ + . . .
16.8	48.6		$M_{2.0}$	Nm	–	–	–	–	265	330	420	460	580	660	820	1110	1430	NEW
			M_{2max}	Nm	–	–	–	–	770	960	1210	1350	1680	1920	2350	3200	3642	
13.9	41.3	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	75	60	60	50	30	12.5	1FT2208-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	205	250	315	330	435	450	550	750	1130	■■■ + ■■■ + . . .
16.4	48.6		$M_{2.0}$	Nm	–	–	–	–	255	320	405	450	560	640	800	1080	1390	NEW
			M_{2max}	Nm	–	–	–	–	770	960	1210	1350	1680	1920	2350	3200	3642	
16.8	52.9	0.036	n_{2N}	r/min	–	–	–	–	75	60	60	60	50	37.5	30	20	10	1FT2208-4AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	230	325	405	415	550	650	810	1060	1270	■■■ + ■■■ + . . .
19.6	63.1		$M_{2.0}$	Nm	–	–	–	–	310	385	490	540	680	770	960	1300	1680	NEW
			M_{2max}	Nm	–	–	–	–	1000	1250	1560	1740	2150	2450	3050	4150	3642	
17.7	52.9	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	75	60	50	50	25	12.5	1FT2208-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	255	300	365	375	500	580	610	1020	1290	■■■ + ■■■ + . . .
20.6	63.1		$M_{2.0}$	Nm	–	–	–	–	325	405	510	570	710	810	1010	1370	1760	NEW
			M_{2max}	Nm	–	–	–	–	1000	1250	1560	1740	2150	2450	3050	4150	3642	
16.6	52.9	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	75	60	60	50	30	12.5	1FT2208-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	225	265	320	325	435	430	520	790	1280	■■■ + ■■■ + . . .
19.4	63.1		$M_{2.0}$	Nm	–	–	–	–	305	380	485	530	670	760	950	1280	1660	NEW
			M_{2max}	Nm	–	–	–	–	1000	1250	1560	1740	2150	2450	3050	4150	3642	
21.3	63.6	0.036	n_{2N}	r/min	–	–	–	–	75	75	60	60	50	37.5	30	25	12.5	1FT2208-5AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	295	350	475	500	640	760	950	1160	1350	■■■ + ■■■ + . . .
24.9	76.2		$M_{2.0}$	Nm	–	–	–	–	395	490	620	690	860	980	1220	1650	2100	NEW
			M_{2max}	Nm	–	–	–	–	1220	1510	1890	2100	2600	3000	3700	5000	3642	
21.3	63.6	0.036	n_{2N}	r/min	–	–	–	–	75	75	75	60	60	50	37.5	25	12.5	1FT2208-5AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	300	345	415	500	560	650	850	1120	1340	■■■ + ■■■ + . . .
24.8	76.2		$M_{2.0}$	Nm	–	–	–	–	395	490	620	680	860	980	1220	1650	2100	NEW
			M_{2max}	Nm	–	–	–	–	1220	1510	1890	2100	2600	3000	3700	5000	3642	
16.8	48.3	0.036	n_{2N}	r/min	200	200	150	125	75	75	75	75	60	50	50	30	12.5	1FT2210-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	59	66	96	130	240	280	350	355	485	560	580	860	1340	■■■ + ■■■ + . . .
19.7	58		$M_{2.0}$	Nm	76	97	137	196	310	385	490	540	680	770	960	1300	1680	NEW
			M_{2max}	Nm	225	285	405	580	910	1130	1420	1580	1980	2250	2800	3750	3642	

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Planetary gearbox data														
Gearbox type:			SP240, 1-stage				SP240, 2-stage							
1. Order code			J81				J82							
	i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	5400	5400	5160	4000	5400	5400	5400	5400	5400	4400	5160	4730	3642
	$M_{2max,G}$	Nm	5700	5700	5700	4000	5446	5446	5700	5446	5700	5446	5700	5700	3642
	$M_{2Em.Off}$	Nm	8500	8500	8500	6850	8500	8500	8500	8500	8500	8500	8500	8500	6850
	$J_{1,G}$	kg cm²	198	163	138	125	39.2	34.6	33.2	30.5	29.7	28.2	27.9	27.6	27.5
	$\varphi_{2,G}$	'	3				5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact with planetary gearbox SP240 1- and 2-stage (continued)																	
16.5	48.3	0.036	n_{2N}	r/min	200	200	150	100	75	75	75	75	60	60	50	30	12.5	**1FT2210-2AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	60	66	98	154	245	290	355	365	495	500	610	820	1300	■■■ + ■■■ + . . .
19.4	58		$M_{2.0}$	Nm	75	95	135	193	305	380	480	530	670	760	940	1280	1650	NEW
			M_{2max}	Nm	225	285	405	580	910	1130	1420	1580	1980	2250	2800	3750	3642	
24	71	0.036	n_{2N}	r/min	200	150	150	100	75	75	60	60	50	37.5	30	20	12.5	**1FT2210-3AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	101	131	154	255	400	445	640	650	810	1020	1270	1640	1530	■■■ + ■■■ + . . .
28.2	87.4		$M_{2.0}$	Nm	110	139	197	280	445	550	700	770	970	1110	1370	1860	2400	NEW
			M_{2max}	Nm	345	435	610	870	1370	1710	2100	2350	2950	3350	4150	5700	3642	
24	71	0.036	n_{2N}	r/min	200	150	150	100	75	75	75	60	60	50	37.5	25	12.5	**1FT2210-3AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	100	130	154	250	400	445	580	670	780	900	1160	1330	1530	■■■ + ■■■ + . . .
28.2	87.4		$M_{2.0}$	Nm	110	139	197	280	445	550	700	770	970	1110	1370	1860	2400	NEW
			M_{2max}	Nm	345	435	610	870	1370	1710	2100	2350	2950	3350	4150	5700	3642	
23.6	71	0.036	n_{2N}	r/min	200	150	150	100	75	75	75	60	60	50	37.5	25	10	**1FT2210-3AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	89	116	142	220	350	395	480	570	640	750	980	1180	1780	■■■ + ■■■ + . . .
27.7	87.4		$M_{2.0}$	Nm	108	137	193	275	435	540	680	760	950	1090	1350	1830	2350	NEW
			M_{2max}	Nm	345	435	610	870	1370	1710	2100	2350	2950	3350	4150	5700	3642	
32.1	92.6	0.036	n_{2N}	r/min	200	150	125	100	75	60	60	60	50	37.5	30	20	10	**1FT2210-4AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	126	165	225	315	480	630	770	770	990	1220	1500	1750	1950	■■■ + ■■■ + . . .
38	117		$M_{2.0}$	Nm	149	188	265	375	600	740	930	1040	1300	1480	1840	2500	3200	NEW
			M_{2max}	Nm	460	580	810	1160	1830	2250	2800	3150	3950	4500	5700	5700	3642	
31.8	92.6	0.036	n_{2N}	r/min	200	150	125	100	75	60	75	60	50	50	37.5	20	10	**1FT2210-4AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	124	162	220	310	475	620	610	770	1000	920	1240	1740	1940	■■■ + ■■■ + . . .
37.6	117		$M_{2.0}$	Nm	147	186	260	375	590	730	920	1030	1290	1470	1820	2450	3150	NEW
			M_{2max}	Nm	460	580	810	1160	1830	2250	2800	3150	3950	4500	5700	5700	3642	
31.4	92.6	0.036	n_{2N}	r/min	200	150	125	100	75	60	75	60	50	50	37.5	20	10	**1FT2210-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	118	153	210	295	455	590	580	740	960	870	1190	1690	1910	■■■ + ■■■ + . . .
37.1	117		$M_{2.0}$	Nm	145	184	255	370	580	730	910	1020	1270	1450	1800	2400	3100	NEW
			M_{2max}	Nm	460	580	810	1160	1830	2250	2800	3150	3950	4500	5700	5700	3642	
38.5	113	0.036	n_{2N}	r/min	200	150	150	100	75	75	60	60	50	37.5	30	20	10	**1FT2210-5AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	139	182	210	345	530	570	830	860	1090	1310	1620	1930	2050	■■■ + ■■■ + . . .
45.9	146		$M_{2.0}$	Nm	180	225	320	455	720	900	1120	1250	1570	1790	2200	3000	3600	NEW
			M_{2max}	Nm	580	720	1020	1460	2250	2850	3500	3950	4900	5446	5700	5700	3642	
39.7	113	0.036	n_{2N}	r/min	200	150	125	100	75	60	60	50	50	37.5	30	20	10	**1FT2210-5AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	146	191	260	360	510	700	850	970	1090	1330	1590	1780	1980	■■■ + ■■■ + . . .
47.3	146		$M_{2.0}$	Nm	186	235	330	470	740	930	1160	1290	1620	1840	2250	3100	3600	NEW
			M_{2max}	Nm	580	720	1020	1460	2250	2850	3500	3950	4900	5446	5700	5700	3642	

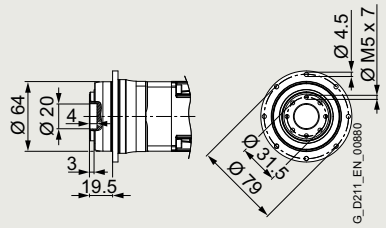
Planetary gearbox data														
Gearbox type:		**SP240, 1-stage**				**SP240, 2-stage**								
1. Order code		**J81**				**J82**								
i		**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
2. Order code		**R04**	**R05**	**R07**	**R10**	**R16**	**R20**	**R25**	**R28**	**R35**	**R40**	**R50**	**R70**	**R00**
$M_{2N,G}$	Nm	5400	5400	5160	4000	5400	5400	5400	5400	5400	4400	5160	4730	3642
$M_{2max,G}$	Nm	5700	5700	5700	4000	5446	5446	5700	5446	5700	5446	5700	5700	3642
$M_{2Em.Off}$	Nm	8500	8500	8500	6850	8500	8500	8500	8500	8500	8500	8500	8500	6850
$J_{1,G}$	kg cm²	198	163	138	125	39.2	34.6	33.2	30.5	29.7	28.2	27.9	27.6	27.5
$\varphi_{2,G}$	'	3				5								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type TP004

Selection and ordering data



Permissible output shaft loads		
Average axial force for 20000 h	$F_{A,eq}$	1630 N
Average axial force for 30000 h	$F_{A,eq}$	1400 N
Maximum axial force	$F_{A,max}$	1630 N

Radial loads: Calculation using breakdown torques, see Configuration Manual

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																
Nm	Nm	kg cm²																
SIMOTICS S-1FT2, SH 30, High Dynamic with planetary gearbox TP004 1- and 2-stage																		
0.349	1.11	0.036	n_{2N}	r/min	500	375	375	300	200	200	150	125	100	100	75	60	37.5	1FT2103-2AH..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	1.26	1.79	2.05	3.25	5.7	6.5	9.3	11	13.9	14.7	18.7	23.5	34	■■■ + ■■■ + . . .
0.525	1.82		$M_{2.0}$	Nm	1.81	2.25	3.2	4.75	8.3	10.5	13.1	14.6	17.9	20	23.5	29	34.5	NEW
			M_{2max}	Nm	7	8.8	12.3	17.7	29	36	44.5	49.5	60	57	72	56	48	
0.94	3.26	0.036	n_{2N}	r/min	500	375	300	250	200	150	150	125	100	100	75	–	–	1FT2103-4AH..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	2.55	3.75	5.2	7.4	11	15.8	17	21	26	25.5	32.5	–	–	■■■ + ■■■ + . . .
1.05	3.84		$M_{2.0}$	Nm	3.95	4.95	6.9	10.1	16.8	20.5	25.5	29	35	39.5	46.5	–	–	NEW
			M_{2max}	Nm	15.2	19	26.5	38	57	57	72	57	72	57	72	–	–	
SIMOTICS S-1FT2, SH 30, Compact with planetary gearbox TP004 1- and 2-stage																		
0.34	1.06	0.036	n_{2N}	r/min	500	375	300	250	150	150	125	100	100	75	60	50	30	1FT2203-2AK..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	1.11	1.68	2.35	3.4	6.2	7.1	9	11.3	11.4	15.4	18.6	21.5	33	■■■ + ■■■ + . . .
0.515	1.73		$M_{2.0}$	Nm	1.76	2.2	3.1	4.6	8.1	10.2	12.7	14.3	17.4	19.6	23	28.5	34	NEW
			M_{2max}	Nm	6.6	8.3	11.6	16.8	27.5	34	42	47	57	57	72	56	48	
0.992	3.04	0.036	n_{2N}	r/min	375	375	300	250	150	150	125	125	100	75	60	–	–	1FT2203-4AK..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	3.65	4.15	5.6	7.6	14.2	15.8	19.7	19.9	25	32	39	–	–	■■■ + ■■■ + . . .
1.11	3.56		$M_{2.0}$	Nm	4.15	5.2	7.3	10.6	17.7	22	27	30.5	37	42	49.5	–	–	NEW
			M_{2max}	Nm	14	17.6	24.5	35	56	57	72	57	72	57	72	–	–	

Planetary gearbox data														
Gearbox type:			TP004, 1-stage				TP004, 2-stage							
1. Order code			H21				H22							
i			4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
$M_{2N,G}$	Nm		38	48	60	42	57	57	66	57	66	57	66	56	42
$M_{2max,G}$	Nm		38	48	60	56	57	57	72	57	72	57	72	56	48
$M_{2Em.Off}$	Nm		50	50	67	95	100	100	100	100	100	100	100	100	100
$J_{1,G}$	kg cm²		0.172	0.139	0.11	0.095	0.078	0.07	0.068	0.062	0.061	0.057	0.057	0.056	0.056
$\varphi_{2,G}$	'		4				4								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 40, High Dynamic with planetary gearbox TP004 1- and 2-stage														
1.06	3.25	0.036	n_{2N}	r/min	600	500	375	300	200	150	125	100	100	75	**1FT2104-4AF..-2..0-Z**
...	...	(0.04)	M_{2N}	Nm	3.3	4.55	6.6	9.5	15.3	20	25.5	29.5	34	40.5	■■■ + ■■■ + . . .
1.16	3.56		$M_{2.0}$	Nm	4.2	5.3	7.5	11	18.4	23	28.5	31.5	38.5	43.5	NEW
			M_{2max}	Nm	13.9	17.4	24	35	56	57	72	57	72	57	
1.05	3.35	0.036	n_{2N}	r/min	600	500	375	300	200	150	125	100	–	75	**1FT2104-4AK..-2..0-Z**
...	...	(0.04)	M_{2N}	Nm	3.45	4.8	7.2	10.3	16.6	22	27.5	31.5	–	43.5	■■■ + ■■■ + . . .
1.15	3.65		$M_{2.0}$	Nm	4.2	5.3	7.5	11	18.3	22.5	28	31.5	–	43	NEW
			M_{2max}	Nm	14.2	17.9	25	36	57	57	72	57	–	57	
2.14	7.05	0.036	n_{2N}	r/min	500	500	375	250	200	150	–	–	–	–	**1FT2104-5AF..-2..0-Z**
...	...	(0.04)	M_{2N}	Nm	7	7.6	11.1	18.5	25.5	36	–	–	–	–	■■■ + ■■■ + . . .
2.23	7.14		$M_{2.0}$	Nm	8.5	10.7	15.1	21.5	35.5	44	–	–	–	–	NEW
			M_{2max}	Nm	28.5	35.5	49.5	56	57	57	–	–	–	–	
2.06	6.4	0.036	n_{2N}	r/min	500	500	375	250	200	150	–	–	–	75	**1FT2104-5AK..-2..0-Z**
...	...	(0.04)	M_{2N}	Nm	6.9	7.5	11	18.2	25	35.5	–	–	–	57	■■■ + ■■■ + . . .
2.21	7.25		$M_{2.0}$	Nm	8.4	10.6	15	21.5	35	44	–	–	–	57	NEW
			M_{2max}	Nm	28.5	36	50	56	57	57	–	–	–	57	
2.88	9.52	0.036	n_{2N}	r/min	500	500	375	250	–	–	–	–	–	–	**1FT2104-6AF..-2..0-Z**
...	...	(0.04)	M_{2N}	Nm	8.6	9.2	13.3	21.5	–	–	–	–	–	–	■■■ + ■■■ + . . .
2.92	9.58		$M_{2.0}$	Nm	11.5	14.4	20	29	–	–	–	–	–	–	NEW
			M_{2max}	Nm	38	47.5	66	56	–	–	–	–	–	–	
SIMOTICS S-1FT2, SH 40, Compact with planetary gearbox TP004 1- and 2-stage														
2.04	6	0.036	n_{2N}	r/min	500	375	300	250	150	150	–	–	–	–	**1FT2204-5AF..-2..0-Z**
...	...	(0.04)	M_{2N}	Nm	6.5	9.4	12.8	16.9	30.5	32.5	–	–	–	–	■■■ + ■■■ + . . .
2.19	6.76		$M_{2.0}$	Nm	8.3	10.5	14.8	21	35	43.5	–	–	–	–	NEW
			M_{2max}	Nm	26.5	33.5	47	56	57	57	–	–	–	–	
2.05	6	0.036	n_{2N}	r/min	500	375	300	250	150	150	–	–	–	75	**1FT2204-5AK..-2..0-Z**
...	...	(0.04)	M_{2N}	Nm	6.7	9.6	13	17.3	31.5	33	–	–	–	57	■■■ + ■■■ + . . .
2.2	6.76		$M_{2.0}$	Nm	8.4	10.6	14.9	21.5	35	43.5	–	–	–	57	NEW
			M_{2max}	Nm	26.5	33.5	47	56	57	57	–	–	–	57	
2.88	9.04	0.036	n_{2N}	r/min	500	375	300	250	–	–	–	–	–	–	**1FT2204-6AF..-2..0-Z**
...	...	(0.04)	M_{2N}	Nm	8.8	12.6	16.9	22	–	–	–	–	–	–	■■■ + ■■■ + . . .
2.9	9.1		$M_{2.0}$	Nm	11.4	14.3	20	29	–	–	–	–	–	–	NEW
			M_{2max}	Nm	36	45	63	56	–	–	–	–	–	–	

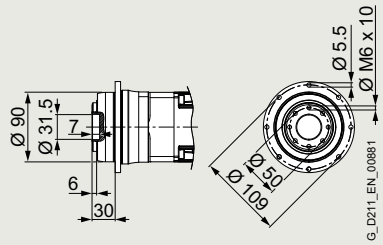
Planetary gearbox data												
Gearbox type:			**TP004, 1-stage**				**TP004, 2-stage**					
1. Order code			**H21**				**H22**					
	i		**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**
2. Order code			**R04**	**R05**	**R07**	**R10**	**R16**	**R20**	**R25**	**R28**	**R35**	**R40**
	$M_{2N,G}$	Nm	66	66	66	42	57	57	66	57	66	57
	$M_{2max,G}$	Nm	83	83	83	56	57	57	72	57	72	57
	$M_{2Em.Off}$	Nm	100	100	100	100	100	100	100	100	100	100
	$J_{1,G}$	kg cm²	0.245	0.213	0.184	0.168	0.174	0.165	0.164	0.157	0.157	0.153
	$\varphi_{2,G}$	'	4				4					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type TP010

Selection and ordering data



Permissible output shaft loads		
Average axial force for 20000 h	$F_{A,eq}$	2795 N
Average axial force for 30000 h	$F_{A,eq}$	2500 N
Maximum axial force	$F_{A,max}$	2795 N

Radial loads: Calculation using breakdown torques, see Configuration Manual

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																
Nm	Nm	kg cm²																
SIMOTICS S-1FT2, SH 20, 30, 40, High Dynamic with planetary gearbox TP010 1- and 2-stage																		
0.169	1.4	0.036	n_{2N}	r/min	–	–	250	250	200	150	125	125	100	75	75	60	37.5	1FT2103-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	1.23	2.2	4.15	6.9	9.7	11	15.2	18.8	22.5	28.5	42.5	■■■ + ■■■ + . . .
0.476	1.72		$M_{2.0}$	Nm	–	–	1.17	2.3	6	8.1	10.4	12	15.8	18.6	23.5	32.5	45	NEW
			M_{2max}	Nm	–	–	9.8	14.9	26	33.5	42	47	59	68	85	117	105	
0.53	3.2	0.036	n_{2N}	r/min	300	300	250	250	200	150	125	125	100	75	75	60	37.5	1FT2103-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	1.43	2.3	4.55	6.5	10.9	15.7	20.5	22.5	30	36.5	43	55	81	■■■ + ■■■ + . . .
1.06	3.64		$M_{2.0}$	Nm	2.1	3.15	5.1	8.1	15.5	19.9	25	28.5	36	42	52	72	98	NEW
			M_{2max}	Nm	12.8	16.4	23.5	34.5	58	72	90	101	127	145	158	157	105	
0.555	2.92	0.036	n_{2N}	r/min	300	300	300	300	200	150	125	100	100	75	60	50	30	1FT2104-4AF..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	2.2	3.35	5.4	7.7	14.1	19.9	26	30	37.5	44	55	75	105	■■■ + ■■■ + . . .
1.08	3.38		$M_{2.0}$	Nm	2.2	3.25	5.3	8.4	16	20.5	25.5	29	37	43	54	74	101	NEW
			M_{2max}	Nm	11.6	15	21.5	32	53	67	83	94	117	134	158	157	105	
0.55	3.02	0.036	n_{2N}	r/min	300	300	300	300	200	150	125	100	100	75	60	50	30	1FT2104-4AK..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	2.3	3.5	5.8	8.2	15.6	20	26	29.5	37.5	43.5	55	75	105	■■■ + ■■■ + . . .
1.08	3.46		$M_{2.0}$	Nm	2.15	3.2	5.2	8.3	15.8	20	25.5	29	37	42.5	53	73	100	NEW
			M_{2max}	Nm	12	15.4	22	32.5	55	69	86	96	121	138	158	157	105	
1.61	6.36	0.036	n_{2N}	r/min	300	300	300	250	200	150	125	100	100	75	60	50	–	1FT2104-5AF..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	6.5	8.5	11.8	18.1	29.5	41	52	60	72	86	107	140	–	■■■ + ■■■ + . . .
2.11	6.88		$M_{2.0}$	Nm	6.4	8.5	12.5	18.9	32.5	41	51	58	73	84	105	143	–	NEW
			M_{2max}	Nm	26	32.5	46.5	67	109	126	158	157	158	154	158	157	–	
1.6	6.43	0.036	n_{2N}	r/min	300	300	300	250	200	150	125	100	100	75	60	50	–	1FT2104-5AK..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	6.3	8.3	11.5	17.8	29	42	53	59	74	85	107	146	–	■■■ + ■■■ + . . .
2.09	6.95		$M_{2.0}$	Nm	6.3	8.4	12.4	18.8	32.5	41	51	58	73	83	104	142	–	NEW
			M_{2max}	Nm	26.5	33	47	68	111	126	158	157	158	154	158	157	–	
2.33	8.91	0.036	n_{2N}	r/min	300	300	250	250	200	150	125	100	100	–	–	–	–	1FT2104-6AF..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	8.3	10.8	17.7	22	35	53	69	80	91	–	–	–	–	■■■ + ■■■ + . . .
2.8	9.19		$M_{2.0}$	Nm	9.3	12	17.6	26	44	55	69	78	98	–	–	–	–	NEW
			M_{2max}	Nm	35.5	45	63	91	147	126	158	157	158	–	–	–	–	

Planetary gearbox data															
Gearbox type:			TP010, 1-stage				TP010, 2-stage								
1. Order code			H31				H32								
	i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	115	144	172	126	157	126	158	157	158	154	158	157	105
	$M_{2max,G}$	Nm	115	144	210	168	157	126	158	157	158	154	158	157	105
	$M_{2Em.Off}$	Nm	128	160	224	251	251	251	251	251	251	251	251	251	251
	$J_{1,G}$	kg cm²	0.779	0.622	0.478	0.402	0.167	0.136	0.13	0.108	0.104	0.093	0.091	0.09	0.089
	$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																
Nm	Nm	kg cm²																
SIMOTICS S-1FT2, SH 20, 30, 40, Compact with planetary gearbox TP010 1- and 2-stage																		
0.156	1.31	0.036	n_{2N}	r/min	–	–	200	200	150	150	125	125	100	75	75	50	37.5	1FT2203-2AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	1.43	2.4	4.85	6	8.7	9.3	13.6	18.1	20	28.5	36.5	■■■ + ■■■ + . . .
0.462	1.63		$M_{2.0}$	Nm	–	–	1.09	2.2	5.8	7.8	10.1	11.6	15.3	18	23	32	44	NEW
			M_{2max}	Nm	–	–	9.1	14	24.5	31.5	39.5	44.5	56	65	81	111	105	
0.512	2.92	0.036	n_{2N}	r/min	300	300	250	250	200	150	125	125	100	75	75	60	37.5	1FT2203-4AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	1.9	2.85	5.2	7.1	10.9	16.4	21.5	22.5	30	38.5	43	51	80	■■■ + ■■■ + . . .
1.04	3.38		$M_{2.0}$	Nm	2.05	3.05	5	8	15.3	19.6	24.5	28	35.5	41	52	71	97	NEW
			M_{2max}	Nm	11.6	15	21.5	32	53	67	83	94	117	134	158	157	105	
1.57	6.03	0.036	n_{2N}	r/min	300	300	250	250	200	150	125	100	100	75	60	50	–	1FT2204-5AF..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	6.2	8.1	13.1	16.6	26	37.5	48	56	65	80	100	128	–	■■■ + ■■■ + . . .
2.07	6.5		$M_{2.0}$	Nm	6.2	8.3	12.3	18.5	32	40.5	50	57	72	82	103	140	–	NEW
			M_{2max}	Nm	24.5	31	44	64	103	126	158	157	158	154	158	157	–	
1.58	6.03	0.036	n_{2N}	r/min	300	300	300	250	200	150	125	100	100	75	60	50	–	1FT2204-5AK..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	6.4	8.3	11.2	17	26.5	39	49.5	58	68	82	103	133	–	■■■ + ■■■ + . . .
2.08	6.5		$M_{2.0}$	Nm	6.3	8.3	12.4	18.7	32	40.5	51	57	72	83	103	141	–	NEW
			M_{2max}	Nm	24.5	31	44	64	103	126	158	157	158	154	158	157	–	
2.32	8.48	0.036	n_{2N}	r/min	300	300	250	250	200	150	125	100	100	–	–	–	–	1FT2204-6AF..-2..0-Z
...	...	(0.04)	M_{2N}	Nm	9.1	11.5	18.6	22	34.5	53	67	78	89	–	–	–	–	■■■ + ■■■ + . . .
2.79	8.75		$M_{2.0}$	Nm	9.2	12	17.5	26	44	55	69	77	97	–	–	–	–	NEW
			M_{2max}	Nm	33.5	42.5	60	86	139	126	158	157	158	–	–	–	–	

Planetary gearbox data															
Gearbox type:			TP010, 1-stage				TP010, 2-stage								
1. Order code			H31				H32								
	i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	115	144	172	126	157	126	158	157	158	154	158	157	105
	$M_{2max,G}$	Nm	115	144	210	168	157	126	158	157	158	154	158	157	105
	$M_{2Em.Off}$	Nm	128	160	224	251	251	251	251	251	251	251	251	251	251
	$J_{1,G}$	kg cm²	0.779	0.622	0.478	0.402	0.167	0.136	0.13	0.108	0.104	0.093	0.091	0.09	0.089
	$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type TP010

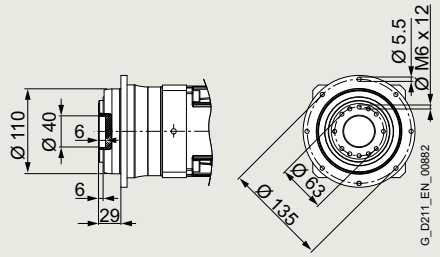
Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 48, ,52, High Dynamic with planetary gearbox TP010 1- and 2-stage																	
3.9	13.5	0.036	n_{2N}	r/min	300	300	300	250	200	150	125	–	–	–	–	–	1FT2105-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	15.4	19.7	25.5	35.5	51	74	92	–	–	–	–	–	■■■ + ■■■ + . . .
4.42	13.9		$M_{2.0}$	Nm	15.6	20	29	42.5	70	88	109	–	–	–	–	–	NEW
			M_{2max}	Nm	54	68	97	139	157	126	158	–	–	–	–	–	
3.92	13.5	0.036	n_{2N}	r/min	300	300	300	250	150	150	125	–	–	–	–	–	1FT2105-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	14.6	18.4	22.5	31	61	71	88	–	–	–	–	–	■■■ + ■■■ + . . .
4.45	13.9		$M_{2.0}$	Nm	15.7	20	29	43	71	88	110	–	–	–	–	–	NEW
			M_{2max}	Nm	54	68	97	139	157	126	158	–	–	–	–	–	
6.78	22.2	0.036	n_{2N}	r/min	300	300	250	200	150	–	–	–	–	–	–	–	1FT2105-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	21.5	27	41	56	92	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
7.25	22.6		$M_{2.0}$	Nm	27	34.5	49	71	115	–	–	–	–	–	–	–	NEW
			M_{2max}	Nm	89	112	158	168	157	–	–	–	–	–	–	–	
SIMOTICS S-1FT2, SH 48, 52, Compact with planetary gearbox TP010 1- and 2-stage																	
2.48	8.93	0.036	n_{2N}	r/min	300	300	250	200	125	100	100	75	60	50	50	30	1FT2205-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	7.3	9.4	15.6	23	39.5	50	58	70	88	103	117	157	■■■ + ■■■ + . . .
3	9.94		$M_{2.0}$	Nm	9.9	13.1	19.2	28.5	47.5	59	74	83	105	120	149	157	NEW
			M_{2max}	Nm	38	48.5	68	99	157	126	158	157	158	154	158	157	
2.52	9.36	0.036	n_{2N}	r/min	300	300	300	250	200	150	125	100	100	–	60	–	1FT2205-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	8.5	11.2	15	21.5	31.5	48.5	61	71	80	–	125	–	■■■ + ■■■ + . . .
3.03	9.94		$M_{2.0}$	Nm	10	13.2	19.4	28.5	48	60	75	84	106	–	150	–	NEW
			M_{2max}	Nm	38	48.5	68	99	157	126	158	157	158	–	158	–	
2.45	8.93	0.036	n_{2N}	r/min	300	300	250	200	150	150	125	125	100	75	75	50	1FT2205-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	8	10.2	16.2	23.5	38	44.5	56	57	72	93	97	139	■■■ + ■■■ + . . .
2.98	9.94		$M_{2.0}$	Nm	9.7	12.9	19	28	47	59	73	82	104	118	147	157	NEW
			M_{2max}	Nm	38	48.5	68	99	157	126	158	157	158	154	158	157	
4.65	16.1	0.036	n_{2N}	r/min	300	250	250	200	150	125	100	–	–	–	–	–	1FT2205-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	13.2	19.9	26	37	62	79	100	–	–	–	–	–	■■■ + ■■■ + . . .
5.1	16.9		$M_{2.0}$	Nm	18.5	23.5	34	50	81	101	126	–	–	–	–	–	NEW
			M_{2max}	Nm	66	83	117	168	157	126	158	–	–	–	–	–	

Planetary gearbox data														
Gearbox type:			**TP010, 1-stage**				**TP010, 2-stage**							
1. Order code			**H31**				**H32**							
	i		**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**
2. Order code			**R04**	**R05**	**R07**	**R10**	**R16**	**R20**	**R25**	**R28**	**R35**	**R40**	**R50**	**R70**
	$M_{2N,G}$	Nm	172	172	172	126	157	126	158	157	158	154	158	157
	$M_{2max,G}$	Nm	185	210	210	168	157	126	158	157	158	154	158	157
	$M_{2Em.Off}$	Nm	250	250	251	251	251	251	251	251	251	251	251	251
	$J_{1,G}$	kg cm²	0.945	0.788	0.645	0.568	0.564	0.533	0.527	0.506	0.502	0.491	0.489	0.488
	$\varphi_{2,G}$	'	3				3							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Selection and ordering data



Permissible output shaft loads		
Average axial force for 20000 h	$F_{A,eq}$	4800 N
Average axial force for 30000 h	$F_{A,eq}$	4300 N
Maximum axial force	$F_{A,max}$	4800 N

Radial loads: Calculation using breakdown torques, see Configuration Manual

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M.Br}$)																
Nm	Nm	kg cm²																
SIMOTICS S-1FT2, SH 30, 40, 48, 52, High Dynamic with planetary gearbox TP025 1- and 2-stage																		
0.137	1.42	0.036	n_{2N}	r/min	–	–	200	200	150	125	100	100	75	60	60	50	37.5	1FT2103-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	0.6	2.3	5.5	8.3	11.2	13.1	16.9	19.7	24.5	33.5	39.5	■■■ + ■■■ + . . .
0.48	1.75		$M_{2.0}$	Nm	–	–	0.95	2.25	6.6	9	11.4	13.1	16.1	18.9	24	33	43	NEW
			M_{2max}	Nm	–	–	9.9	14.8	27	34.5	43	48.5	60	69	87	120	159	
0.49	3.28	0.036	n_{2N}	r/min	200	250	250	250	150	125	100	100	75	60	60	50	37.5	1FT2103-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	1.31	1.82	3.5	6.3	13.1	18.3	24	27	35	41.5	50	65	80	■■■ + ■■■ + . . .
1.07	3.7		$M_{2.0}$	Nm	1.96	2.95	5	8	16.1	20.5	26	29.5	36.5	42.5	53	74	97	NEW
			M_{2max}	Nm	13.1	16.7	24	34.5	59	73	92	103	128	147	184	250	352	
0.517	2.98	0.036	n_{2N}	r/min	250	250	250	250	150	125	100	100	75	60	60	50	30	1FT2104-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	1.6	2.65	4.75	8.1	15.8	21	27	30.5	39	45	56	77	105	■■■ + ■■■ + . . .
1.1	3.42		$M_{2.0}$	Nm	2.05	3.1	5.2	8.3	16.6	21	26.5	30	37.5	43.5	54	75	99	NEW
			M_{2max}	Nm	11.9	15.2	22	31.5	54	68	85	95	119	136	170	235	305	
0.512	3.08	0.036	n_{2N}	r/min	300	300	300	250	150	125	100	100	75	60	60	50	30	1FT2104-4AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	1.48	2.5	4.1	8.5	15.7	20.5	27	30.5	38.5	44.5	56	77	104	■■■ + ■■■ + . . .
1.09	3.52		$M_{2.0}$	Nm	2	3.05	5.2	8.2	16.5	21	26.5	30	37.5	43	54	75	99	NEW
			M_{2max}	Nm	12.3	15.7	22.5	32.5	55	70	87	97	122	140	175	240	315	
1.62	6.13	0.036	n_{2N}	r/min	300	250	250	250	150	125	100	100	75	60	60	50	30	1FT2104-5AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	5.5	8.1	12.5	18.4	33	42.5	54	61	77	88	110	151	205	■■■ + ■■■ + . . .
2.14	6.95		$M_{2.0}$	Nm	6.4	8.5	12.7	18.8	33.5	42	52	59	74	85	107	147	194	NEW
			M_{2max}	Nm	26.5	33.5	47	67	111	138	172	192	240	270	340	352	352	
1.6	6.21	0.036	n_{2N}	r/min	300	250	250	250	150	125	100	100	75	60	60	50	30	1FT2104-5AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	5.3	8	12.3	18.1	32.5	42.5	53	60	76	87	109	150	205	■■■ + ■■■ + . . .
2.12	7.06		$M_{2.0}$	Nm	6.4	8.4	12.6	18.6	33	42	52	59	73	84	106	146	193	NEW
			M_{2max}	Nm	27	34	48	68	112	140	174	195	240	275	345	352	352	
2.37	8.06	0.036	n_{2N}	r/min	250	250	250	250	150	125	100	100	75	60	60	50	30	1FT2104-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	9	11.7	16	22.5	45	57	72	82	102	117	146	200	265	■■■ + ■■■ + . . .
2.85	9.31		$M_{2.0}$	Nm	9.4	12.2	17.8	26	45	56	70	79	99	113	142	196	255	NEW
			M_{2max}	Nm	36.5	45.5	64	91	149	185	230	255	320	352	380	352	352	

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Planetary gearbox data														
Gearbox type:			TP025, 1-stage				TP025, 2-stage							
1. Order code			H41				H42							
	i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	185	232	292	318	352	352	380	352	380	352	380	352	292
	$M_{2max,G}$	Nm	185	232	292	352	352	352	380	352	380	352	380	352	352
	$M_{2Em.Off}$	Nm	313	313	324	424	625	625	625	625	625	625	625	625	625
	$J_{1.G}$	kg cm²	2.59	2.11	1.69	1.45	0.828	0.714	0.695	0.607	0.597	0.549	0.545	0.54	0.538
	$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type TP025

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 30, 40, 48, 52, High Dynamic with planetary gearbox TP025 1- and 2-stage (continued)																		
4.04	11.7	0.036	n_{2N}	r/min	300	250	250	250	150	125	100	100	75	60	60	50	30	1FT2105-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	14.2	19.7	27	34	67	86	109	120	153	179	205	255	290	■■■ + ■■■ + . . .
4.49	14.1		$M_{2.0}$	Nm	16.4	20.5	29.5	42.5	71	89	111	124	156	178	220	305	290	NEW
			M_{2max}	Nm	56	70	98	140	220	275	345	352	380	352	380	352	352	
4.06	11.7	0.036	n_{2N}	r/min	300	250	250	200	150	125	100	100	75	60	60	50	37.5	1FT2105-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	12.9	18.8	24	39	63	81	104	114	146	170	197	245	235	■■■ + ■■■ + . . .
4.51	14.1		$M_{2.0}$	Nm	16.5	21	29.5	43	72	90	112	125	157	179	220	305	290	NEW
			M_{2max}	Nm	56	70	98	140	220	275	345	352	380	352	380	352	352	
7.08	21.4	0.036	n_{2N}	r/min	250	250	200	200	150	125	100	100	75	60	60	–	–	1FT2105-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	25	29.5	45	59	97	124	156	169	215	250	280	–	–	■■■ + ■■■ + . . .
7.31	23		$M_{2.0}$	Nm	28	35.5	50	71	117	146	181	200	250	285	360	–	–	NEW
			M_{2max}	Nm	92	114	160	225	352	352	380	352	380	352	380	–	–	
SIMOTICS S-1FT2, SH 30, 40, 48, 52, Compact with planetary gearbox TP025 1- and 2-stage																		
0.125	1.32	0.036	n_{2N}	r/min	–	–	200	200	150	125	100	100	75	60	60	50	30	1FT2203-2AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	0.52	2.1	5.2	8	10.9	12.7	16.5	19.2	24	32	42.5	■■■ + ■■■ + . . .
0.468	1.65		$M_{2.0}$	Nm	–	–	0.87	2.15	6.4	8.8	11	12.7	15.7	18.3	23	32	41.5	NEW
			M_{2max}	Nm	–	–	9.2	13.9	25.5	32.5	40.5	45.5	57	65	82	114	150	
0.475	2.98	0.036	n_{2N}	r/min	250	250	250	250	150	125	100	100	75	60	60	50	37.5	1FT2203-4AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	1.42	2.35	4.2	7	14.6	20	26	29.5	37.5	43	53	68	79	■■■ + ■■■ + . . .
1.05	3.42		$M_{2.0}$	Nm	1.89	2.85	4.95	7.9	15.9	20.5	25.5	29	36	41.5	52	72	95	NEW
			M_{2max}	Nm	11.9	15.2	22	31.5	54	68	85	95	119	136	170	235	305	
1.58	5.81	0.036	n_{2N}	r/min	300	250	250	250	150	125	100	100	75	60	60	50	30	1FT2204-5AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	5.2	7.9	12	16.9	32	41.5	52	59	75	86	107	142	196	■■■ + ■■■ + . . .
2.1	6.56		$M_{2.0}$	Nm	6.3	8.3	12.4	18.4	32.5	41.5	51	58	72	83	105	144	191	NEW
			M_{2max}	Nm	25	31.5	44.5	63	105	131	162	182	225	260	320	352	352	
1.59	5.81	0.036	n_{2N}	r/min	300	250	250	250	150	125	100	100	75	60	60	50	30	1FT2204-5AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	5.4	7.9	12.2	17.3	32.5	41.5	53	60	75	86	107	147	200	■■■ + ■■■ + . . .
2.12	6.56		$M_{2.0}$	Nm	6.3	8.4	12.5	18.5	33	41.5	52	58	73	84	105	145	192	NEW
			M_{2max}	Nm	25	31.5	44.5	63	105	131	162	182	225	260	320	352	352	
2.36	7.68	0.036	n_{2N}	r/min	300	250	250	250	150	125	100	100	75	60	60	50	30	1FT2204-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	8.1	11.8	17.1	23	44.5	57	72	81	101	116	144	190	265	■■■ + ■■■ + . . .
2.84	8.88		$M_{2.0}$	Nm	9.4	12.1	17.7	25.5	44.5	56	70	78	98	113	141	195	255	NEW
			M_{2max}	Nm	34.5	43	61	87	141	176	215	240	300	352	380	352	352	
2.65	8.67	0.036	n_{2N}	r/min	250	250	250	200	125	100	100	75	60	50	50	30	20	1FT2205-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	8	10.3	13.5	23.5	41	53	62	76	96	112	128	187	250	■■■ + ■■■ + . . .
3.12	10.1		$M_{2.0}$	Nm	10.6	13.6	19.7	28.5	49	62	77	86	108	124	155	210	280	NEW
			M_{2max}	Nm	39.5	49.5	69	99	161	200	245	275	345	352	380	352	352	

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Planetary gearbox data														
Gearbox type:		TP025, 1-stage				TP025, 2-stage								
1. Order code		H41				H42								
i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code		R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
$M_{2N,G}$	Nm	185	232	292	318	352	352	380	352	380	352	380	352	292
$M_{2max,G}$	Nm	185	232	292	352	352	352	380	352	380	352	380	352	352
$M_{2Em.Off}$	Nm	313	313	324	424	625	625	625	625	625	625	625	625	625
$J_{1,G}$	kg cm²	2.59	2.11	1.69	1.45	0.828	0.714	0.695	0.607	0.597	0.549	0.545	0.54	0.538
$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 30, 40, 48, 52, Compact with planetary gearbox TP025 1- and 2-stage (continued)																	
2.75	8.67	0.036	n_{2N}	r/min	300	300	250	250	150	125	100	100	75	60	60	50	30	**1FT2205-2AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	7.8	9.3	16	22	41.5	54	70	78	99	115	137	172	240	■■■ + ■■■ + . . .
3.14	10.1		$M_{2.0}$	Nm	10.9	14.1	20	29.5	49.5	62	78	87	109	125	157	215	285	NEW
			M_{2max}	Nm	39.5	49.5	69	99	161	200	245	275	345	352	380	352	352	
2.68	8.67	0.036	n_{2N}	r/min	300	250	250	200	150	125	100	100	75	60	60	50	30	**1FT2205-2AH..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	7	10.6	14.6	24	39	51	65	72	92	108	127	156	225	■■■ + ■■■ + . . .
3.08	10.1		$M_{2.0}$	Nm	10.6	13.7	19.8	28.5	48.5	61	76	85	107	122	153	210	275	NEW
			M_{2max}	Nm	39.5	49.5	69	99	161	200	245	275	345	352	380	352	352	
4.71	13.8	0.036	n_{2N}	r/min	250	250	200	200	150	125	100	100	75	60	60	50	30	**1FT2205-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	16.3	19.2	30	40.5	66	84	107	117	150	176	199	225	290	■■■ + ■■■ + . . .
5.27	17.1		$M_{2.0}$	Nm	20	25	35.5	51	84	105	130	146	183	205	260	350	290	NEW
			M_{2max}	Nm	68	85	119	168	270	330	380	352	380	352	380	352	352	

Planetary gearbox data

Gearbox type:		TP025, 1-stage				TP025, 2-stage								
1. Order code		H41				H42								
i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code		R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
$M_{2N,G}$	Nm	185	232	292	318	352	352	380	352	380	352	380	352	292
$M_{2max,G}$	Nm	185	232	292	352	352	352	380	352	380	352	380	352	352
$M_{2Em.Off}$	Nm	313	313	324	424	625	625	625	625	625	625	625	625	625
$J_{1,G}$	kg cm²	2.59	2.11	1.69	1.45	0.828	0.714	0.695	0.607	0.597	0.549	0.545	0.54	0.538
$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type TP025

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)											
Nm	Nm	kg cm²											
SIMOTICS S-1FT2, SH 30, High Dynamic with planetary gearbox TP025 2-stage													
0.414	1.59	0.036	n_{2N}	r/min	150	125	100	100	75	60	60	50	37.5	**1FT2103-2AH..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	5.5	8.3	11.2	13.1	16.9	19.7	24.5	33.5	39.5	■■■ + ■■■ + . . .
0.48	1.75		$M_{2.0}$	Nm	6.6	9	11.4	13.1	16.1	18.9	24	33	43	NEW
			M_{2max}	Nm	27	34.5	43	48.5	60	69	87	120	159	
0.974	3.35	0.036	n_{2N}	r/min	150	125	100	100	75	60	60	50	37.5	**1FT2103-4AH..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	13.1	18.3	24	27	35	41.5	50	65	80	■■■ + ■■■ + . . .
1.07	3.7		$M_{2.0}$	Nm	16.1	20.5	26	29.5	36.5	42.5	53	74	97	NEW
			M_{2max}	Nm	59	73	92	103	128	147	184	250	352	
SIMOTICS S-1FT2, SH 30, Compact with planetary gearbox TP025 2-stage													
0.401	1.51	0.036	n_{2N}	r/min	150	125	100	100	75	60	60	50	30	**1FT2203-2AK..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	5.2	8	10.9	12.7	16.5	19.2	24	32	42.5	■■■ + ■■■ + . . .
0.468	1.65		$M_{2.0}$	Nm	6.4	8.8	11	12.7	15.7	18.3	23	32	41.5	NEW
			M_{2max}	Nm	25.5	32.5	40.5	45.5	57	65	82	114	150	
0.959	3.1	0.036	n_{2N}	r/min	150	125	100	100	75	60	60	50	37.5	**1FT2203-4AK..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	14.6	20	26	29.5	37.5	43	53	68	79	■■■ + ■■■ + . . .
1.05	3.42		$M_{2.0}$	Nm	15.9	20.5	25.5	29	36	41.5	52	72	95	NEW
			M_{2max}	Nm	54	68	85	95	119	136	170	235	305	

Planetary gearbox data										
Gearbox type:			**TP025, 2-stage**							
1. Order code			**J32**							
	i		**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
2. Order code			**R16**	**R20**	**R25**	**R28**	**R35**	**R40**	**R50**	**R70**	**R00**
	$M_{2N,G}$	Nm	352	352	380	352	380	352	380	352	292
	$M_{2max,G}$	Nm	352	352	380	352	380	352	380	352	352
	$M_{2Em.Off}$	Nm	512	625	625	625	625	625	625	625	625
	$J_{1,G}$	kg cm²	0.661	0.548	0.529	0.44	0.431	0.383	0.378	0.374	0.372
	$\varphi_{2,G}$	'	3							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 63, High Dynamic with planetary gearbox TP025 1- and 2-stage																		
7.58	23.3	0.036	n_{2N}	r/min	300	250	250	200	150	125	100	100	75	60	–	–	–	1FT2106-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	21	30.5	37.5	61	101	128	162	177	220	260	–	–	–	■■■ + ■■■ + . . .
7.94	24.7		$M_{2.0}$	Nm	30	38	54	78	127	158	196	215	270	310	–	–	–	NEW
			M_{2max}	Nm	98	123	173	245	352	352	380	352	380	352	–	–	–	
10.1	29.2	0.036	n_{2N}	r/min	250	250	200	200	150	125	100	100	75	60	–	–	–	1FT2106-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	32.5	39	57	72	118	149	188	200	255	300	–	–	–	■■■ + ■■■ + . . .
10.3	31.6		$M_{2.0}$	Nm	40	50	71	102	165	205	250	280	350	350	–	–	–	NEW
			M_{2max}	Nm	126	157	220	310	352	352	380	352	380	352	–	–	–	
14.4	42.2	0.036	n_{2N}	r/min	250	250	200	200	150	125	–	–	–	–	–	–	–	1FT2106-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	45	51	78	91	150	198	–	–	–	–	–	–	–	■■■ + ■■■ + . . .
14.6	43.8		$M_{2.0}$	Nm	57	72	102	145	230	285	–	–	–	–	–	–	–	NEW
			M_{2max}	Nm	175	215	305	352	352	352	–	–	–	–	–	–	–	
SIMOTICS S-1FT2, SH 63, Compact with planetary gearbox TP025 1- and 2-stage																		
4.68	13.8	0.036	n_{2N}	r/min	250	200	200	150	125	100	100	75	60	50	50	30	20	1FT2206-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	15.3	22	28.5	46.5	73	94	110	132	165	190	215	315	290	■■■ + ■■■ + . . .
5.25	17		$M_{2.0}$	Nm	19	24	34.5	50	83	104	130	145	182	205	260	350	290	NEW
			M_{2max}	Nm	67	84	118	168	270	330	380	352	380	352	380	352	352	
4.91	13.8	0.036	n_{2N}	r/min	300	300	250	200	150	125	100	100	75	60	60	50	30	1FT2206-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	15.5	17.4	28	42.5	68	87	110	119	154	181	200	245	290	■■■ + ■■■ + . . .
5.5	17		$M_{2.0}$	Nm	20	25.5	36.5	53	87	109	136	152	190	215	270	350	290	NEW
			M_{2max}	Nm	67	84	118	168	270	330	380	352	380	352	380	352	352	
4.76	13.8	0.036	n_{2N}	r/min	250	250	200	200	150	125	100	100	75	60	60	37.5	30	1FT2206-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	16.1	19.3	30	39	68	87	110	121	154	180	205	290	280	■■■ + ■■■ + . . .
5.33	17		$M_{2.0}$	Nm	19.4	24.5	35.5	51	85	106	132	148	185	210	260	350	290	NEW
			M_{2max}	Nm	67	84	118	168	270	330	380	352	380	352	380	352	352	
7.72	23.8	0.036	n_{2N}	r/min	250	250	200	150	100	75	60	60	50	37.5	30	–	–	1FT2206-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	23.5	27.5	43.5	67	109	141	176	193	235	280	340	–	–	■■■ + ■■■ + . . .
8.12	25.8		$M_{2.0}$	Nm	30.5	39	55	79	129	161	200	220	275	315	380	–	–	NEW
			M_{2max}	Nm	102	128	179	255	352	352	380	352	380	352	380	–	–	
7.6	23.8	0.036	n_{2N}	r/min	250	250	200	200	150	125	100	100	75	60	60	–	–	1FT2206-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	23	26	41.5	51	90	122	155	169	215	250	250	–	–	■■■ + ■■■ + . . .
8	25.8		$M_{2.0}$	Nm	30	38	54	78	127	158	197	220	275	310	380	–	–	NEW
			M_{2max}	Nm	102	128	179	255	352	352	380	352	380	352	380	–	–	
10.4	32.8	0.036	n_{2N}	r/min	200	200	150	125	100	75	75	60	50	50	37.5	–	–	1FT2206-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	30.5	34	54	75	119	164	171	210	250	245	305	–	–	■■■ + ■■■ + . . .
10.7	36.5		$M_{2.0}$	Nm	41.5	52	73	105	170	210	260	290	365	350	380	–	–	NEW
			M_{2max}	Nm	145	182	250	352	352	352	380	352	380	352	380	–	–	
10.5	31.8	0.036	n_{2N}	r/min	250	250	200	200	150	125	100	100	–	60	–	–	–	1FT2206-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	34	39.5	60	73	121	161	205	210	–	320	–	–	–	■■■ + ■■■ + . . .
10.8	34.6		$M_{2.0}$	Nm	42	52	74	106	172	210	265	295	–	350	–	–	–	NEW
			M_{2max}	Nm	138	172	240	340	352	352	380	352	–	352	–	–	–	

➥ Continued on the next page

Planetary gearbox data														
Gearbox type:		TP025, 1-stage				TP025, 2-stage								
1. Order code		H41				H42								
i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code		R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
$M_{2N,G}$	Nm	352	380	352	318	352	352	380	352	380	352	380	352	292
$M_{2max,G}$	Nm	352	380	352	352	352	352	380	352	380	352	380	352	352
$M_{2Em.Off}$	Nm	625	625	625	625	625	625	625	625	625	625	625	625	625
$J_{1,G}$	kg cm²	3.28	2.8	2.38	2.14	2.2	2.08	2.06	1.98	1.97	1.92	1.92	1.91	1.91
$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type TP025

Servomotor data			Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)														
Nm	Nm	kg cm²														
SIMOTICS S-1FT2, SH 63, Compact with planetary gearbox TP025 1- and 2-stage (continued)																
9.98	31.8	0.036	n_{2N}	r/min	250	200	200	150	125	100	100	100	75	60	–	–	–	1FT2206-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	27.5	39.5	48	77	119	160	169	173	225	270	–	–	–	■■■ + ■■■ + . . .
10.2	34.6		$M_{2.0}$	Nm	39.5	50	70	101	164	200	250	280	350	350	–	–	–	NEW
			M_{2max}	Nm	138	172	240	340	352	352	380	352	380	352	–	–	–	

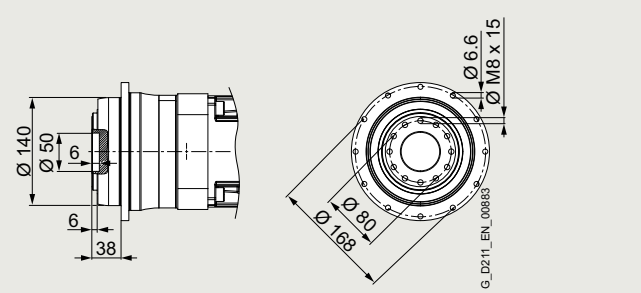
Planetary gearbox data														
Gearbox type:			TP025, 1-stage				TP025, 2-stage							
1. Order code			H41				H42							
i			4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	352	380	352	318	352	352	380	352	380	352	380	352	292
	$M_{2max,G}$	Nm	352	380	352	352	352	352	380	352	380	352	380	352	352
	$M_{2Em.Off}$	Nm	625	625	625	625	625	625	625	625	625	625	625	625	625
	$J_{1,G}$	kg cm²	3.28	2.8	2.38	2.14	2.2	2.08	2.06	1.98	1.97	1.92	1.92	1.91	1.91
	$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data



Permissible output shaft loads		
Average axial force for 20000 h	$F_{A,eq}$	6130 N
Average axial force for 30000 h	$F_{A,eq}$	5400 N
Maximum axial force	$F_{A,max}$	6130 N

Radial loads: Calculation using breakdown torques, see Configuration Manual

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																
Nm	Nm	kg cm²																
SIMOTICS S-1FT2, SH 40, 48, 52, High Dynamic with planetary gearbox TP050 1- and 2-stage																		
0.552	2.85	0.036	n_{2N}	r/min	150	200	200	200	150	125	100	100	75	60	60	37.5	30	1FT2104-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	1.32	2	3.6	6.9	9.5	14.7	22	26	35.5	42.5	53	75	96	■■■ + ■■■ + . . .
1.11	3.45		$M_{2.0}$	Nm	2.2	3.15	4.3	6.5	13.4	16.7	22.5	27	37	44	55	75	90	NEW
			M_{2max}	Nm	11.4	14.6	20	29.5	51	64	81	93	119	138	171	230	295	
0.545	2.95	0.036	n_{2N}	r/min	150	250	200	200	150	125	100	100	75	60	60	37.5	30	1FT2104-4AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	1.29	1.59	3.55	7	10.9	15.5	21.5	26	35.5	42.5	52	74	95	■■■ + ■■■ + . . .
1.1	3.55		$M_{2.0}$	Nm	2.15	3.1	4.2	6.4	13.3	16.6	22	26.5	37	44	55	74	89	NEW
			M_{2max}	Nm	11.7	15	20.5	30.5	53	66	84	95	122	141	176	240	305	
1.57	6.02	0.036	n_{2N}	r/min	250	250	200	200	125	125	100	100	75	60	60	37.5	30	1FT2104-5AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	4.9	6.6	11.1	17.9	28.5	36.5	49	56	74	86	107	151	200	■■■ + ■■■ + . . .
2.16	6.98		$M_{2.0}$	Nm	6.2	8.2	11.3	16.8	30.5	38	49	56	74	86	107	146	184	NEW
			M_{2max}	Nm	25.5	32	44.5	65	109	136	170	192	240	275	345	470	594	
1.56	6.1	0.036	n_{2N}	r/min	250	250	200	200	125	125	100	100	75	60	60	37.5	30	1FT2104-5AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	4.85	6.5	11	17.6	28.5	36	48.5	56	73	85	106	150	200	■■■ + ■■■ + . . .
2.15	7.08		$M_{2.0}$	Nm	6.2	8.1	11.2	16.6	30	37.5	48.5	56	73	85	106	145	182	NEW
			M_{2max}	Nm	26	32.5	45.5	66	110	137	173	194	245	280	350	475	594	
2.28	7.98	0.036	n_{2N}	r/min	250	250	200	200	125	100	100	100	75	60	60	37.5	30	1FT2104-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	7	8.9	15.6	22	40	52	67	77	100	116	144	200	265	■■■ + ■■■ + . . .
2.88	9.32		$M_{2.0}$	Nm	9.1	11.7	16.2	23.5	42	52	67	76	99	115	143	195	245	NEW
			M_{2max}	Nm	35	44	61	88	147	183	230	255	320	370	460	620	594	
3.92	11.8	0.036	n_{2N}	r/min	250	250	200	200	125	125	100	100	75	60	60	37.5	30	1FT2105-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	13.8	16.7	26.5	36.5	61	67	98	110	151	182	210	310	345	■■■ + ■■■ + . . .
4.53	14		$M_{2.0}$	Nm	15.7	19.9	27.5	40	69	86	108	123	156	180	220	305	390	NEW
			M_{2max}	Nm	54	68	95	136	220	275	345	385	485	550	690	770	594	
3.94	11.8	0.036	n_{2N}	r/min	250	200	200	200	125	100	100	100	75	60	60	37.5	30	1FT2105-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	12.9	19	25	32	58	76	93	105	144	173	200	295	315	■■■ + ■■■ + . . .
4.55	14		$M_{2.0}$	Nm	15.8	20	27.5	40.5	69	86	109	124	158	182	225	305	390	NEW
			M_{2max}	Nm	54	68	95	136	220	275	345	385	485	550	690	770	594	

➥ Continued on the next page

Planetary gearbox data														
Gearbox type:			TP050, 1-stage				TP050, 2-stage							
1. Order code			H51				H52							
	i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	605	681	840	648	667	825	825	825	825	825	825	770	594
	$M_{2max,G}$	Nm	605	681	868	720	667	825	825	825	825	825	825	770	594
	$M_{2Em.Off}$	Nm	625	756	1059	1190	741	926	1158	1250	1250	1250	1250	1250	1250
	$J_{1.G}$	kg cm²	9.47	7.85	6.39	5.54	2.53	2.08	2.01	1.67	1.64	1.44	1.42	1.41	1.4
	$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type TP050

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 40, 48, 52, High Dynamic with planetary gearbox TP050 1- and 2-stage (continued)																		
6.34	18.1	0.036	n_{2N}	r/min	200	200	150	150	100	100	100	100	75	60	60	37.5	25	1FT2105-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	25	31.5	46	64	101	119	136	157	215	260	295	440	460	■■■ + ■■■ + . . .
7.35	22.6		$M_{2.0}$	Nm	27	34	47.5	68	115	143	180	200	255	290	365	495	590	NEW
			M_{2max}	Nm	89	111	155	220	360	445	550	620	780	825	825	770	594	
SIMOTICS S-1FT2, SH 40, 48, 52, Compact with planetary gearbox TP050 1- and 2-stage																		
1.53	5.7	0.036	n_{2N}	r/min	250	250	200	200	125	125	100	100	75	60	60	37.5	30	1FT2204-5AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	4.7	6.3	10.8	16.8	28	33.5	47.5	55	72	84	104	147	191	■■■ + ■■■ + . . .
2.12	6.6		$M_{2.0}$	Nm	6.1	8	11	16.4	30	37	48	55	72	84	105	144	180	NEW
			M_{2max}	Nm	24	30	42	61	103	128	161	181	225	260	325	445	594	
1.55	5.7	0.036	n_{2N}	r/min	250	250	200	200	125	125	100	100	75	60	60	37.5	30	1FT2204-5AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	4.75	6.5	10.9	17.3	28	34.5	48	55	72	84	105	148	197	■■■ + ■■■ + . . .
2.14	6.6		$M_{2.0}$	Nm	6.1	8.1	11.1	16.5	30	37.5	48	55	73	85	106	144	181	NEW
			M_{2max}	Nm	24	30	42	61	103	128	161	181	225	260	325	445	594	
2.26	7.59	0.036	n_{2N}	r/min	250	250	200	200	125	125	100	100	75	60	60	37.5	30	1FT2204-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	7.7	9.7	16.2	23.5	40	46.5	67	76	99	115	143	200	265	■■■ + ■■■ + . . .
2.85	8.85		$M_{2.0}$	Nm	9	11.6	16.1	23.5	42	52	66	76	98	114	142	193	245	NEW
			M_{2max}	Nm	33	41.5	58	84	139	174	215	240	305	350	435	590	594	
2.55	8.6	0.036	n_{2N}	r/min	250	200	200	200	125	100	100	75	60	50	50	30	20	1FT2205-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	6.4	10.3	13.9	18.2	34	45.5	54	71	95	114	131	197	250	■■■ + ■■■ + . . .
3.15	10.1		$M_{2.0}$	Nm	10.1	13	18.1	26.5	46.5	58	74	84	108	125	156	210	270	NEW
			M_{2max}	Nm	38	48	67	96	159	198	245	275	350	400	500	670	594	
2.68	8.6	0.036	n_{2N}	r/min	250	250	200	200	125	125	100	100	75	60	60	37.5	30	1FT2205-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	7	9.5	15	22.5	36.5	44.5	61	71	97	117	138	200	240	■■■ + ■■■ + . . .
3.25	10.1		$M_{2.0}$	Nm	10.6	13.6	18.9	27.5	48	60	76	87	112	129	161	215	275	NEW
			M_{2max}	Nm	38	48	67	96	159	198	245	275	350	400	500	670	594	
2.6	8.6	0.036	n_{2N}	r/min	250	250	200	200	125	125	100	100	75	60	60	37.5	30	1FT2205-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	6.8	8.4	14.5	19.7	34.5	37.5	57	65	90	109	128	187	225	■■■ + ■■■ + . . .
3.18	10.1		$M_{2.0}$	Nm	10.3	13.3	18.4	27	47	58	74	85	109	126	157	210	270	NEW
			M_{2max}	Nm	38	48	67	96	159	198	245	275	350	400	500	670	594	
4.68	13.9	0.036	n_{2N}	r/min	200	200	150	150	125	100	100	100	75	60	60	37.5	25	1FT2205-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	16.1	20.5	30	43.5	56	82	96	110	150	181	205	305	375	■■■ + ■■■ + . . .
5.4	16.8		$M_{2.0}$	Nm	19.4	24.5	34	49.5	83	104	131	148	187	215	265	365	465	NEW
			M_{2max}	Nm	66	82	115	165	265	335	415	465	580	670	825	770	594	

Planetary gearbox data														
Gearbox type:			TP050, 1-stage				TP050, 2-stage							
1. Order code			H51				H52							
	i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	605	681	840	648	667	825	825	825	825	825	825	770	594
	$M_{2max,G}$	Nm	605	681	868	720	667	825	825	825	825	825	825	770	594
	$M_{2Em.Off}$	Nm	625	756	1059	1190	741	926	1158	1250	1250	1250	1250	1250	1250
	$J_{1,G}$	kg cm²	9.47	7.85	6.39	5.54	2.53	2.08	2.01	1.67	1.64	1.44	1.42	1.41	1.4
	$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 63, High Dynamic with planetary gearbox TP050 1- and 2-stage																	
6.87	19.4	0.036	n_{2N}	r/min	250	200	200	150	125	100	100	100	75	60	60	37.5	25	1FT2106-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	21	31.5	39	65	84	124	143	165	225	270	310	455	480	■■■ + ■■■ + . . .
8	24.4		$M_{2.0}$	Nm	30	38	53	76	125	156	196	220	275	315	395	530	590	NEW
			M_{2max}	Nm	97	121	169	240	390	485	600	670	825	825	825	770	594	
9.99	29.3	0.036	n_{2N}	r/min	250	200	200	150	100	100	100	100	75	60	60	37.5	–	1FT2106-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	27	40.5	48	81	126	144	157	179	260	315	350	520	–	■■■ + ■■■ + . . .
10.3	31.2		$M_{2.0}$	Nm	40	50	70	101	164	200	255	285	360	410	510	690	–	NEW
			M_{2max}	Nm	124	155	215	310	495	610	770	825	825	825	825	770	–	
14.3	42	0.036	n_{2N}	r/min	200	200	150	150	100	100	75	75	75	60	60	–	–	1FT2106-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	47.5	57	84	107	168	177	270	300	350	430	455	–	–	■■■ + ■■■ + . . .
14.6	43.4		$M_{2.0}$	Nm	57	71	100	144	230	290	360	405	500	580	720	–	–	NEW
			M_{2max}	Nm	173	215	300	430	680	825	825	825	825	825	825	–	–	
SIMOTICS S-1FT2, SH 63, Compact with planetary gearbox TP050 1- and 2-stage																	
4.57	13.9	0.036	n_{2N}	r/min	200	200	150	150	100	100	75	75	60	50	50	30	20	1FT2206-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	16.7	20	31	40	69	72	112	126	164	194	225	330	405	■■■ + ■■■ + . . .
5.28	16.8		$M_{2.0}$	Nm	18.7	23.5	32.5	47.5	81	101	127	144	183	210	260	355	455	NEW
			M_{2max}	Nm	66	82	115	165	265	335	415	465	580	670	825	770	594	
4.81	13.9	0.036	n_{2N}	r/min	250	250	200	200	125	100	100	100	75	60	60	37.5	25	1FT2206-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	15	18.3	28	36.5	63	83	99	110	150	183	205	305	390	■■■ + ■■■ + . . .
5.55	16.8		$M_{2.0}$	Nm	20	25.5	35	51	85	107	135	152	193	220	275	375	480	NEW
			M_{2max}	Nm	66	82	115	165	265	335	415	465	580	670	825	770	594	
4.66	13.9	0.036	n_{2N}	r/min	250	200	150	150	100	100	100	100	75	60	60	37.5	25	1FT2206-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	12.8	20	30	43	67	81	92	104	151	182	210	305	360	■■■ + ■■■ + . . .
5.4	16.8		$M_{2.0}$	Nm	19.4	24.5	34	49.5	82	103	130	147	187	215	265	360	465	NEW
			M_{2max}	Nm	66	82	115	165	265	335	415	465	580	670	825	770	594	
7.01	20	0.036	n_{2N}	r/min	200	200	150	150	100	75	60	60	50	37.5	30	25	15	1FT2206-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	25	30.5	46	61	100	131	169	188	240	290	360	475	590	■■■ + ■■■ + . . .
8.15	25.4		$M_{2.0}$	Nm	30.5	38	53	77	128	160	200	225	280	325	405	550	590	NEW
			M_{2max}	Nm	101	126	176	250	405	500	620	700	825	825	825	770	594	
6.91	20	0.036	n_{2N}	r/min	200	200	150	150	100	100	75	100	75	60	60	37.5	25	1FT2206-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	24.5	29.5	45	58	98	105	158	134	215	255	295	435	415	■■■ + ■■■ + . . .
8.02	25.4		$M_{2.0}$	Nm	30	37.5	52	76	126	157	197	220	275	320	395	540	590	NEW
			M_{2max}	Nm	101	126	176	250	405	500	620	700	825	825	825	770	594	

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Planetary gearbox data														
Gearbox type:		TP050, 1-stage				TP050, 2-stage								
1. Order code		H51				H52								
	i	4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code		R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	605	681	840	648	825	825	825	825	825	825	825	770	594
	$M_{2max,G}$	Nm	605	681	868	720	825	825	825	825	825	825	825	770	594
	$M_{2Em.Off}$	Nm	625	756	1059	1190	1250	1250	1250	1250	1250	1250	1250	1250	1250
	$J_{1,G}$	kg cm²	9.47	7.85	6.39	5.54	3.22	2.77	2.7	2.37	2.33	2.13	2.12	2.1	2.09
	$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type TP050

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 63, Compact with planetary gearbox TP050 1- and 2-stage (continued)																	
9.09	26.6	0.036	n_{2N}	r/min	200	150	150	125	75	60	60	60	50	50	37.5	30	15	1FT2206-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	27	41.5	46.5	66	129	169	190	210	285	305	400	470	560	■■■ + ■■■ + . . .
10.7	36		$M_{2.0}$	Nm	40.5	51	71	102	169	210	260	295	370	425	530	710	590	NEW
			M_{2max}	Nm	144	179	250	355	570	710	825	825	825	825	825	770	594	
10.5	33.2	0.036	n_{2N}	r/min	200	200	200	150	100	100	75	75	75	60	60	–	–	1FT2206-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	35.5	43	49	84	135	145	215	240	285	345	385	–	–	■■■ + ■■■ + . . .
10.8	34		$M_{2.0}$	Nm	41.5	52	73	105	171	210	265	295	375	430	530	–	–	NEW
			M_{2max}	Nm	136	170	235	335	540	670	825	825	825	825	825	–	–	
8.79	25.5	0.036	n_{2N}	r/min	200	200	150	150	100	75	75	75	75	60	50	37.5	20	1FT2206-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	30	35.5	54	67	111	161	185	210	240	320	390	500	520	■■■ + ■■■ + . . .
10.3	34		$M_{2.0}$	Nm	39.5	49.5	69	100	163	200	250	285	355	410	510	690	590	NEW
			M_{2max}	Nm	136	170	235	335	540	670	825	825	825	825	825	770	594	

Planetary gearbox data														
Gearbox type:			**TP050, 1-stage**				**TP050, 2-stage**							
1. Order code			**H51**				**H52**							
	i		**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
2. Order code			**R04**	**R05**	**R07**	**R10**	**R16**	**R20**	**R25**	**R28**	**R35**	**R40**	**R50**	**R70**	**R00**
	$M_{2N,G}$	Nm	605	681	840	648	825	825	825	825	825	825	825	770	594
	$M_{2max,G}$	Nm	605	681	868	720	825	825	825	825	825	825	825	770	594
	$M_{2Em.Off}$	Nm	625	756	1059	1190	1250	1250	1250	1250	1250	1250	1250	1250	1250
	$J_{1,G}$	kg cm²	9.47	7.85	6.39	5.54	3.22	2.77	2.7	2.37	2.33	2.13	2.12	2.1	2.09
	$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary**

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 80, High Dynamic with planetary gearbox TP050 1- and 2-stage																
21.2	80	0.036	n_{2N}	r/min	200	200	150	125	75	75	60	60	–	–	–	–	**1FT2108-4AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	60	68	102	140	250	260	360	400	–	–	–	–	■■■ + ■■■ + . . .
21.4	83.8		$M_{2.0}$	Nm	84	106	149	210	340	425	530	590	–	–	–	–	NEW
			M_{2max}	Nm	330	415	580	720	825	825	825	825	–	–	–	–	
26	96.1	0.036	n_{2N}	r/min	200	200	150	125	75	75	60	60	–	–	–	–	**1FT2108-5AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	74	85	125	170	290	305	415	465	–	–	–	–	■■■ + ■■■ + . . .
26.4	101		$M_{2.0}$	Nm	104	131	184	260	420	520	650	720	–	–	–	–	NEW
			M_{2max}	Nm	405	500	700	720	825	825	825	825	–	–	–	–	
25.8	96.1	0.036	n_{2N}	r/min	200	200	150	125	75	75	60	60	–	–	–	–	**1FT2108-5AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	68	76	113	152	270	275	380	425	–	–	–	–	■■■ + ■■■ + . . .
26.1	101		$M_{2.0}$	Nm	103	130	182	260	415	510	640	720	–	–	–	–	NEW
			M_{2max}	Nm	405	500	700	720	825	825	825	825	–	–	–	–	
32.7	126	0.036	n_{2N}	r/min	200	200	150	125	75	60	–	60	–	–	–	–	**1FT2108-7AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	86	97	143	189	320	410	–	495	–	–	–	–	■■■ + ■■■ + . . .
33.4	136		$M_{2.0}$	Nm	133	166	230	330	530	650	–	820	–	–	–	–	NEW
			M_{2max}	Nm	540	670	868	720	825	825	–	825	–	–	–	–	
32.2	126	0.036	n_{2N}	r/min	200	200	150	125	75	60	–	60	–	–	–	–	**1FT2108-7AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	83	93	136	179	310	395	–	465	–	–	–	–	■■■ + ■■■ + . . .
32.8	136		$M_{2.0}$	Nm	130	163	225	325	520	640	–	820	–	–	–	–	NEW
			M_{2max}	Nm	540	670	868	720	825	825	–	825	–	–	–	–	
31.9	126	0.036	n_{2N}	r/min	200	150	125	100	75	60	50	50	–	–	–	–	**1FT2108-7AE..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	77	115	150	200	285	370	470	510	–	–	–	–	■■■ + ■■■ + . . .
32.5	136		$M_{2.0}$	Nm	129	162	225	320	510	640	800	820	–	–	–	–	NEW
			M_{2max}	Nm	540	670	868	720	825	825	825	825	–	–	–	–	
SIMOTICS S-1FT2, SH 80, Compact with planetary gearbox TP050 1- and 2-stage																
10.1	33.6	0.036	n_{2N}	r/min	250	200	150	150	100	100	75	75	75	60	60	37.5	**1FT2208-2AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	26.5	41.5	59	77	126	128	197	215	250	310	325	500	■■■ + ■■■ + . . .
10.6	35.9		$M_{2.0}$	Nm	40	50	71	102	168	210	260	290	365	420	520	710	NEW
			M_{2max}	Nm	143	179	250	355	570	710	825	825	825	825	825	770	
15.5	47	0.036	n_{2N}	r/min	200	150	150	125	75	75	60	60	50	37.5	30	–	**1FT2208-3AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	42.5	64	72	101	191	200	280	310	425	550	660	–	■■■ + ■■■ + . . .
16	48.6		$M_{2.0}$	Nm	61	77	109	156	255	315	395	440	550	630	790	–	NEW
			M_{2max}	Nm	193	240	335	480	760	825	825	825	825	825	825	–	
15.5	47.1	0.036	n_{2N}	r/min	200	200	150	150	100	75	75	75	60	50	–	–	**1FT2208-3AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	49.5	58	87	103	166	235	260	290	405	485	–	–	■■■ + ■■■ + . . .
15.8	48.6		$M_{2.0}$	Nm	62	77	109	156	250	315	390	440	550	630	–	–	NEW
			M_{2max}	Nm	193	240	335	480	760	825	825	825	825	825	–	–	

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Planetary gearbox data													
Gearbox type:		TP050, 1-stage				TP050, 2-stage							
1. Order code		H51				H52							
i		4	5	7	10	16	20	25	28	35	40	50	70
2. Order code		R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70
$M_{2N,G}$	Nm	840	840	840	648	825	825	825	825	825	825	825	770
$M_{2max,G}$	Nm	992	992	868	720	825	825	825	825	825	825	825	770
$M_{2Em.Off}$	Nm	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
$J_{1,G}$	kg cm²	12.6	11	9.55	8.7	10.3	9.83	9.77	9.43	9.4	9.2	9.18	9.17
$\varphi_{2,G}$	'	3				3							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type TP050

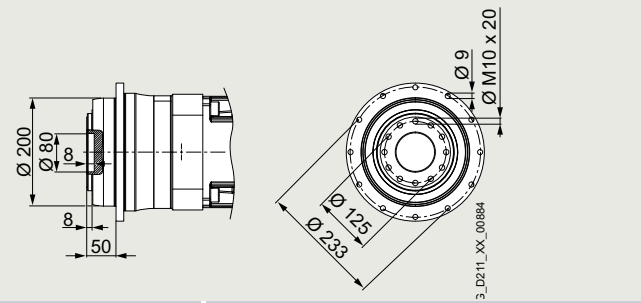
Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FT2, SH 80, Compact with planetary gearbox TP050 1- and 2-stage (continued)																	
15.2	47.1	0.036	n_{2N}	r/min	200	200	150	125	100	75	75	75	60	60	–	–	1FT2208-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	47.5	55	82	115	155	225	245	275	395	425	–	–	■■■ + ■■■ + . . .
15.5	48.6		$M_{2.0}$	Nm	60	76	106	153	245	305	385	430	540	620	–	–	NEW
			M_{2max}	Nm	193	240	335	480	760	825	825	825	825	825	–	–	
19	60.6	0.036	n_{2N}	r/min	150	150	125	100	60	60	50	50	50	37.5	30	–	1FT2208-4AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	57	64	83	116	225	235	305	335	380	530	630	–	■■■ + ■■■ + . . .
19.4	63.2		$M_{2.0}$	Nm	75	95	133	191	310	385	480	530	670	770	820	–	NEW
			M_{2max}	Nm	250	315	440	620	825	825	825	825	825	825	825	–	
19.4	61.1	0.036	n_{2N}	r/min	200	200	150	125	75	75	60	60	60	50	–	–	1FT2208-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	59	67	100	138	245	255	350	390	430	550	–	–	■■■ + ■■■ + . . .
19.6	63.2		$M_{2.0}$	Nm	77	97	136	195	310	390	485	540	680	780	–	–	NEW
			M_{2max}	Nm	250	315	440	620	825	825	825	825	825	825	–	–	
18.2	61.1	0.036	n_{2N}	r/min	200	200	150	125	100	75	75	75	60	60	–	–	1FT2208-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	58	67	100	138	176	255	275	305	405	420	–	–	■■■ + ■■■ + . . .
18.6	63.2		$M_{2.0}$	Nm	72	91	128	184	295	365	460	510	640	730	–	–	NEW
			M_{2max}	Nm	250	315	440	620	825	825	825	825	825	825	–	–	
23.4	73.6	0.036	n_{2N}	r/min	200	200	150	125	75	75	60	60	–	–	–	–	1FT2208-5AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	65	74	110	149	260	275	375	415	–	–	–	–	■■■ + ■■■ + . . .
23.6	76.8		$M_{2.0}$	Nm	93	117	165	235	375	470	580	650	–	–	–	–	NEW
			M_{2max}	Nm	305	380	530	720	825	825	825	825	–	–	–	–	
23.3	73.6	0.036	n_{2N}	r/min	200	200	150	125	75	60	60	60	–	–	–	–	1FT2208-5AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	66	74	110	148	260	335	365	400	–	–	–	–	■■■ + ■■■ + . . .
23.5	76.8		$M_{2.0}$	Nm	93	117	164	235	375	465	580	650	–	–	–	–	NEW
			M_{2max}	Nm	305	380	530	720	825	825	825	825	–	–	–	–	

Planetary gearbox data														
Gearbox type:			TP050, 1-stage				TP050, 2-stage							
1. Order code			H51				H52							
	i		4	5	7	10	16	20	25	28	35	40	50	70
2. Order code			R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70
	$M_{2N,G}$	Nm	840	840	840	648	825	825	825	825	825	825	825	770
	$M_{2max,G}$	Nm	992	992	868	720	825	825	825	825	825	825	825	770
	$M_{2Em.Off}$	Nm	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
	$J_{1,G}$	kg cm²	12.6	11	9.55	8.7	10.3	9.83	9.77	9.43	9.4	9.2	9.18	9.17
	$\varphi_{2,G}$	'	3				3							

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Selection and ordering data



Permissible output shaft loads		
Average axial force for 20000 h	$F_{A,eq}$	10050 N
Average axial force for 30000 h	$F_{A,eq}$	8900 N
Maximum axial force	$F_{A,max}$	10050 N

Radial loads: Calculation using breakdown torques, see Configuration Manual

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic with planetary gearbox TP110 1- and 2-stage																		
0.669	2.78	0.036	n_{2N}	r/min	–	–	–	–	75	75	100	75	60	60	50	37.5	30	**1FT2104-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	5.4	10.6	14	21	30.5	36.5	47	63	66	■■■ + ■■■ + . . .
0.99	3.37		$M_{2.0}$	Nm	–	–	–	–	10.6	16.3	23	26.5	34.5	39.5	48	61	67	NEW
			M_{2max}	Nm	–	–	–	–	49	64	82	93	117	134	166	220	275	
0.662	2.86	0.036	n_{2N}	r/min	–	–	–	–	75	100	100	75	60	60	50	37.5	30	**1FT2104-4AK..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	5.2	8.4	14.9	20.5	30.5	36	47	62	70	■■■ + ■■■ + . . .
0.982	3.46		$M_{2.0}$	Nm	–	–	–	–	10.5	16.2	22.5	26.5	34	39	47.5	60	67	NEW
			M_{2max}	Nm	–	–	–	–	50	66	84	95	120	138	171	225	285	
1.62	5.89	0.036	n_{2N}	r/min	–	–	–	–	100	100	100	75	60	60	50	37.5	30	**1FT2104-5AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	21	30.5	42.5	51	69	80	101	138	166	■■■ + ■■■ + . . .
2.05	6.91		$M_{2.0}$	Nm	–	–	–	–	27.5	37.5	49.5	56	71	82	101	133	162	NEW
			M_{2max}	Nm	–	–	–	–	106	135	171	193	240	275	340	460	580	
1.61	5.97	0.036	n_{2N}	r/min	–	–	–	–	100	100	100	75	60	60	50	37.5	30	**1FT2104-5AK..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	20.5	30	42	51	68	79	101	137	163	■■■ + ■■■ + . . .
2.04	7		$M_{2.0}$	Nm	–	–	–	–	27.5	37.5	49	56	71	81	100	132	161	NEW
			M_{2max}	Nm	–	–	–	–	108	137	174	195	245	280	345	465	590	
2.26	7.92	0.036	n_{2N}	r/min	–	–	–	–	100	100	100	75	60	60	50	37.5	25	**1FT2104-6AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	31	41.5	55	72	95	110	139	190	250	■■■ + ■■■ + . . .
2.78	9.29		$M_{2.0}$	Nm	–	–	–	–	39.5	52	67	76	97	110	137	182	225	NEW
			M_{2max}	Nm	–	–	–	–	145	183	230	255	320	370	460	620	790	
3.73	11.9	0.036	n_{2N}	r/min	–	–	–	–	100	100	100	75	60	60	50	37.5	25	**1FT2105-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	55	71	89	119	154	178	220	295	365	■■■ + ■■■ + . . .
4.43	14		$M_{2.0}$	Nm	–	–	–	–	66	85	109	123	155	177	220	295	370	NEW
			M_{2max}	Nm	–	–	–	–	220	275	350	390	490	550	690	940	1190	
3.76	11.9	0.036	n_{2N}	r/min	–	–	–	–	100	100	100	75	60	60	50	37.5	25	**1FT2105-4AH..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	52	64	78	113	151	170	210	280	345	■■■ + ■■■ + . . .
4.47	14		$M_{2.0}$	Nm	–	–	–	–	67	86	110	124	156	178	220	295	375	NEW
			M_{2max}	Nm	–	–	–	–	220	275	350	390	490	550	690	940	1190	

➥ Continued on the next page

Planetary gearbox data														
Gearbox type:			TP110, 1-stage				TP110 2-stage							
1. Order code			H61				H62							
	i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	1920	1920	1920	1680	1760	1760	1760	1760	1760	1760	1760	1760	1540
	$M_{2max,G}$	Nm	2560	2560	2560	2240	1760	1760	1760	1760	1760	1760	1760	1760	1540
	$M_{2Em.Off}$	Nm	3075	3075	3075	3075	2420	3025	3075	3075	3075	3075	3075	3075	3075
	$J_{1.G}$	kg cm²	44.5	34.6	25.5	20.6	8.51	8.21	7.82	6.57	6.37	5.63	5.54	5.44	5.4
	$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type TP110

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)																
Nm	Nm	kg cm²																
SIMOTICS S-1FT2 High Dynamic with planetary gearbox TP110 1- and 2-stage (continued)																		
6.22	18.9	0.036	n_{2N}	r/min	–	–	–	–	100	75	75	75	60	60	50	37.5	20	1FT2105-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	80	130	162	180	235	260	325	425	570	■■■ + ■■■ + . . .
7.31	22.6		$M_{2.0}$	Nm	–	–	–	–	113	143	181	200	255	290	360	485	620	NEW
			M_{2max}	Nm	–	–	–	–	360	450	560	630	780	890	1110	1500	1540	
6.96	20.4	0.036	n_{2N}	r/min	200	150	150	125	100	100	75	75	60	60	50	37.5	20	1FT2106-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	22	31.5	44	64	84	100	165	183	240	265	330	435	580	■■■ + ■■■ + . . .
8.17	25		$M_{2.0}$	Nm	32	40	57	80	127	161	200	225	285	325	400	540	690	NEW
			M_{2max}	Nm	99	124	174	245	390	485	610	680	850	970	1200	1620	1540	
9.12	25.5	0.036	n_{2N}	r/min	200	150	150	125	100	75	75	75	60	60	50	37.5	20	1FT2106-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	29.5	41.5	57	81	103	165	200	220	290	320	395	500	640	■■■ + ■■■ + . . .
10.9	31.9		$M_{2.0}$	Nm	43	54	76	108	168	210	265	295	370	425	530	710	910	NEW
			M_{2max}	Nm	126	158	220	315	495	620	770	870	1080	1230	1530	1760	1540	
12.5	34.1	0.036	n_{2N}	r/min	200	150	150	125	75	75	75	75	60	60	50	37.5	20	1FT2106-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	41	61	84	118	192	235	285	310	400	435	530	620	720	■■■ + ■■■ + . . .
14.9	44.1		$M_{2.0}$	Nm	59	73	104	148	230	290	365	410	510	580	730	980	1250	NEW
			M_{2max}	Nm	175	215	305	435	690	860	1070	1200	1490	1760	1760	1760	1540	
18.3	58	0.036	n_{2N}	r/min	150	150	125	100	75	75	60	60	60	50	37.5	25	15	1FT2108-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	76	86	127	175	260	300	440	470	500	620	780	900	910	■■■ + ■■■ + . . .
22.6	85		$M_{2.0}$	Nm	89	112	158	220	350	435	540	610	760	870	1080	1460	1540	NEW
			M_{2max}	Nm	335	420	590	840	1320	1650	1760	1760	1760	1760	1760	1760	1540	
22.3	66.2	0.036	n_{2N}	r/min	150	150	125	100	75	75	60	60	50	37.5	30	25	15	1FT2108-5AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	92	105	154	210	315	365	520	550	700	850	1040	1010	1000	■■■ + ■■■ + . . .
27.9	103		$M_{2.0}$	Nm	110	138	194	275	430	530	670	750	930	1070	1320	1760	1540	NEW
			M_{2max}	Nm	410	510	710	1020	1600	1760	1760	1760	1760	1760	1760	1760	1540	
22	66.2	0.036	n_{2N}	r/min	150	150	125	100	75	60	60	60	50	50	37.5	25	15	1FT2108-5AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	87	98	143	197	290	420	480	500	650	660	820	930	930	■■■ + ■■■ + . . .
27.6	103		$M_{2.0}$	Nm	109	137	192	270	425	530	660	740	920	1050	1310	1760	1540	NEW
			M_{2max}	Nm	410	510	710	1020	1600	1760	1760	1760	1760	1760	1760	1760	1540	
27.5	78.2	0.036	n_{2N}	r/min	150	150	125	100	75	60	60	60	50	37.5	30	25	15	1FT2108-7AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	111	125	181	245	360	510	580	610	770	970	1120	1030	1010	■■■ + ■■■ + . . .
35.1	137		$M_{2.0}$	Nm	139	174	245	345	540	670	840	940	1180	1340	1660	1760	1540	NEW
			M_{2max}	Nm	540	680	950	1360	1760	1760	1760	1760	1760	1760	1760	1760	1540	
27.1	78.2	0.036	n_{2N}	r/min	150	150	125	100	75	60	60	60	50	50	37.5	25	12.5	1FT2108-7AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	109	122	177	240	345	495	550	580	740	730	900	990	1140	■■■ + ■■■ + . . .
34.6	137		$M_{2.0}$	Nm	137	172	240	340	530	660	830	930	1160	1320	1630	1760	1540	NEW
			M_{2max}	Nm	540	680	950	1360	1760	1760	1760	1760	1760	1760	1760	1760	1540	
26.9	78.2	0.036	n_{2N}	r/min	150	150	125	100	60	60	60	50	50	37.5	37.5	20	12.5	1FT2108-7AE..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	104	115	166	220	410	465	510	640	670	890	820	1130	1080	■■■ + ■■■ + . . .
34.1	137		$M_{2.0}$	Nm	136	170	235	340	520	660	820	920	1150	1310	1620	1760	1540	NEW
			M_{2max}	Nm	540	680	950	1360	1760	1760	1760	1760	1760	1760	1760	1760	1540	

Planetary gearbox data														
Gearbox type:			TP110, 1-stage				TP110 2-stage							
1. Order code			H61				H62							
	i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	1920	1920	1920	1680	1760	1760	1760	1760	1760	1760	1760	1760	1540
	$M_{2max,G}$	Nm	2560	2560	2560	2240	1760	1760	1760	1760	1760	1760	1760	1760	1540
	$M_{2Em.Off}$	Nm	3075	3075	3075	3075	2420	3025	3075	3075	3075	3075	3075	3075	3075
	$J_{1,G}$	kg cm²	44.5	34.6	25.5	20.6	8.51	8.21	7.82	6.57	6.37	5.63	5.54	5.44	5.4
	$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact with planetary gearbox TP110 1- and 2-stage																		
1.59	5.56	0.036	n_{2N}	r/min	–	–	–	–	100	100	100	75	60	60	50	37.5	30	1FT2204-5AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	20	29	40	50	67	78	99	135	150	■■■ + ■■■ + . . .
2.01	6.54		$M_{2.0}$	Nm	–	–	–	–	27	36.5	48.5	55	70	80	99	130	158	NEW
			M_{2max}	Nm	–	–	–	–	100	128	162	182	225	260	320	435	550	
1.6	5.56	0.036	n_{2N}	r/min	–	–	–	–	100	100	100	75	60	60	50	37.5	30	1FT2204-5AK..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	20.5	29.5	41	50	67	78	99	135	154	■■■ + ■■■ + . . .
2.02	6.54		$M_{2.0}$	Nm	–	–	–	–	27	37	49	55	70	80	99	131	159	NEW
			M_{2max}	Nm	–	–	–	–	100	128	162	182	225	260	320	435	550	
2.25	7.52	0.036	n_{2N}	r/min	–	–	–	–	100	100	100	75	60	60	50	37.5	25	1FT2204-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	32	44	58	71	94	108	137	188	245	■■■ + ■■■ + . . .
2.76	8.8		$M_{2.0}$	Nm	–	–	–	–	39	52	67	76	96	110	136	181	220	NEW
			M_{2max}	Nm	–	–	–	–	137	174	215	245	305	350	435	590	750	
2.5	8.57	0.036	n_{2N}	r/min	–	–	–	–	100	75	75	75	60	50	50	30	20	1FT2205-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	26	45	60	67	92	111	128	185	230	■■■ + ■■■ + . . .
3.06	10.1		$M_{2.0}$	Nm	–	–	–	–	44	57	74	84	106	121	150	200	250	NEW
			M_{2max}	Nm	–	–	–	–	157	199	250	280	350	400	495	670	850	
2.61	8.57	0.036	n_{2N}	r/min	–	–	–	–	100	100	100	75	60	60	50	37.5	25	1FT2205-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	29	40	53	72	98	112	141	188	230	■■■ + ■■■ + . . .
3.17	10.1		$M_{2.0}$	Nm	–	–	–	–	45.5	60	77	87	110	126	156	205	260	NEW
			M_{2max}	Nm	–	–	–	–	157	199	250	280	350	400	495	670	850	
2.55	8.57	0.036	n_{2N}	r/min	–	–	–	–	100	100	100	75	60	60	50	37.5	25	1FT2205-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	27.5	36.5	46	67	92	105	132	175	215	■■■ + ■■■ + . . .
3.1	10.1		$M_{2.0}$	Nm	–	–	–	–	44.5	58	75	85	108	123	153	200	250	NEW
			M_{2max}	Nm	–	–	–	–	157	199	250	280	350	400	495	670	850	
4.55	14.3	0.036	n_{2N}	r/min	–	–	–	–	100	75	75	75	60	60	50	37.5	25	1FT2205-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	–	50	86	108	121	160	179	220	290	330	■■■ + ■■■ + . . .
5.38	16.9		$M_{2.0}$	Nm	–	–	–	–	82	105	133	150	188	215	265	360	455	NEW
			M_{2max}	Nm	–	–	–	–	265	335	420	470	580	670	830	1120	1540	
4.39	14.3	0.036	n_{2N}	r/min	150	150	150	125	75	75	75	75	60	50	50	30	20	1FT2206-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	16.3	20.5	29	41	70	89	112	124	165	195	225	325	385	■■■ + ■■■ + . . .
5.2	17.1		$M_{2.0}$	Nm	20	25	36	50	78	101	128	144	181	205	255	345	435	NEW
			M_{2max}	Nm	68	84	119	170	265	335	420	470	580	670	830	1120	1540	
4.78	14.3	0.036	n_{2N}	r/min	200	200	150	150	100	100	100	75	60	60	50	37.5	25	1FT2206-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	12.9	14.9	28	35	59	73	84	121	161	179	220	290	365	■■■ + ■■■ + . . .
5.69	17.1		$M_{2.0}$	Nm	22	27.5	39.5	55	86	110	139	157	197	225	275	375	475	NEW
			M_{2max}	Nm	68	84	119	170	265	335	420	470	580	670	830	1120	1540	
4.63	14.3	0.036	n_{2N}	r/min	200	150	150	125	75	75	75	75	60	60	50	37.5	20	1FT2206-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	12.6	19.2	27.5	40.5	66	85	108	121	160	180	220	295	405	■■■ + ■■■ + . . .
5.5	17.1		$M_{2.0}$	Nm	21.5	26.5	38.5	54	83	106	135	152	191	215	270	365	460	NEW
			M_{2max}	Nm	68	84	119	170	265	335	420	470	580	670	830	1120	1540	

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Planetary gearbox data														
Gearbox type:			TP110, 1-stage				TP110 2-stage							
1. Order code			H61				H62							
	i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	1920	1920	1920	1680	1760	1760	1760	1760	1760	1760	1760	1760	1540
	$M_{2max,G}$	Nm	2560	2560	2560	2240	1760	1760	1760	1760	1760	1760	1760	1760	1540
	$M_{2Em.Off}$	Nm	3075	3075	3075	3075	2420	3025	3075	3075	3075	3075	3075	3075	3075
	$J_{1,G}$	kg cm²	44.5	34.6	25.5	20.6	8.51	8.21	7.82	6.57	6.37	5.63	5.54	5.44	5.4
	$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type TP110

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact with planetary gearbox TP110 1- and 2-stage (continued)																	
6.93	21.1	0.036	n_{2N}	r/min	200	150	150	125	75	75	60	60	50	37.5	30	25	15	1FT2206-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	19.9	32	44.5	63	104	130	174	191	240	290	365	470	630	■■■ + ■■■ + . . .
8.14	26		$M_{2.0}$	Nm	32	39.5	56	80	126	160	200	225	280	320	400	540	690	NEW
			M_{2max}	Nm	103	129	181	255	405	500	630	710	880	1010	1250	1760	1540	
6.84	21.1	0.036	n_{2N}	r/min	200	150	150	125	75	75	75	75	60	60	50	37.5	20	1FT2206-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	19.1	31	43.5	61	102	129	160	178	230	260	320	415	510	■■■ + ■■■ + . . .
8.03	26		$M_{2.0}$	Nm	31.5	39	56	79	124	158	199	220	280	320	395	530	680	NEW
			M_{2max}	Nm	103	129	181	255	405	500	630	710	880	1010	1250	1760	1540	
9.09	29	0.036	n_{2N}	r/min	150	125	125	100	75	60	60	60	50	50	37.5	25	15	1FT2206-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	36	48.5	62	87	124	188	220	235	315	325	430	540	610	■■■ + ■■■ + . . .
10.7	36.7		$M_{2.0}$	Nm	42	52	75	106	167	210	265	295	370	425	520	710	900	NEW
			M_{2max}	Nm	146	183	255	365	570	710	890	1000	1240	1420	1760	1760	1540	
9.4	27.6	0.036	n_{2N}	r/min	200	150	150	125	75	75	75	75	60	60	50	37.5	20	1FT2206-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	30	45	62	89	145	180	220	240	315	350	430	520	640	■■■ + ■■■ + . . .
11.1	34.8		$M_{2.0}$	Nm	43.5	54	77	110	173	215	275	305	385	440	540	730	940	NEW
			M_{2max}	Nm	138	173	240	345	540	680	840	950	1180	1340	1670	1760	1540	
9.03	27.6	0.036	n_{2N}	r/min	150	150	150	100	75	75	75	75	60	60	50	30	20	1FT2206-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	34	42	53	89	135	167	200	215	295	325	400	550	530	■■■ + ■■■ + . . .
10.8	34.8		$M_{2.0}$	Nm	42.5	53	75	107	166	210	260	295	370	420	520	710	900	NEW
			M_{2max}	Nm	138	173	240	345	540	680	840	950	1180	1340	1670	1760	1540	
9.21	29	0.036	n_{2N}	r/min	200	150	150	125	75	75	75	75	60	60	50	37.5	15	1FT2208-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	27.5	42	57	79	133	164	198	215	280	305	375	445	760	■■■ + ■■■ + . . .
11	36.7		$M_{2.0}$	Nm	43	54	76	108	169	210	265	300	375	430	530	720	920	NEW
			M_{2max}	Nm	146	183	255	365	570	710	890	1000	1240	1420	1760	1760	1540	
13.6	37.7	0.036	n_{2N}	r/min	150	150	125	100	75	60	60	60	50	37.5	30	25	15	1FT2208-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	55	61	91	127	192	280	330	355	470	560	700	740	780	■■■ + ■■■ + . . .
16.3	49.6		$M_{2.0}$	Nm	64	80	113	161	250	315	395	445	550	630	790	1070	1350	NEW
			M_{2max}	Nm	197	245	345	490	770	960	1200	1340	1670	1760	1760	1760	1540	
13.8	37.7	0.036	n_{2N}	r/min	150	150	150	100	75	75	75	75	60	50	50	30	15	1FT2208-3AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	54	66	83	137	205	250	295	310	415	490	520	710	890	■■■ + ■■■ + . . .
16.7	49.6		$M_{2.0}$	Nm	66	83	117	166	255	320	405	455	560	640	800	1080	1370	NEW
			M_{2max}	Nm	197	245	345	490	770	960	1200	1340	1670	1760	1760	1760	1540	
13.4	37.7	0.036	n_{2N}	r/min	150	150	125	100	75	75	75	75	60	60	50	30	15	1FT2208-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	53	65	94	135	205	240	275	285	420	425	495	670	860	■■■ + ■■■ + . . .
16.3	49.6		$M_{2.0}$	Nm	64	80	113	161	250	315	395	440	550	630	780	1060	1340	NEW
			M_{2max}	Nm	197	245	345	490	770	960	1200	1340	1670	1760	1760	1760	1540	
16.4	46.8	0.036	n_{2N}	r/min	150	125	100	75	60	60	50	50	50	37.5	30	20	12.5	1FT2208-4AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	59	79	117	167	245	280	385	405	435	590	700	820	820	■■■ + ■■■ + . . .
19.7	64.3		$M_{2.0}$	Nm	78	98	138	196	310	385	485	540	670	770	960	1290	1540	NEW
			M_{2max}	Nm	255	320	445	630	1000	1250	1550	1760	1760	1760	1760	1760	1540	

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Planetary gearbox data														
Gearbox type:		TP110, 1-stage				TP110 2-stage								
1. Order code		H61				H62								
i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code		R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
$M_{2N,G}$	Nm	1920	1920	1920	1680	1760	1760	1760	1760	1760	1760	1760	1760	1540
$M_{2max,G}$	Nm	2560	2560	2560	2240	1760	1760	1760	1760	1760	1760	1760	1760	1540
$M_{2Em.Off}$	Nm	3075	3075	3075	3075	2420	3025	3075	3075	3075	3075	3075	3075	3075
$J_{1,G}$	kg cm²	44.5	34.6	25.5	20.6	8.51	8.21	7.82	6.57	6.37	5.63	5.54	5.44	5.4
$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact with planetary gearbox TP110 1- and 2-stage (continued)																		
16.9	46.8	0.036	n_{2N}	r/min	150	150	125	100	75	75	75	60	60	50	37.5	25	15	1FT2208-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	68	82	118	167	250	290	315	420	470	560	720	870	910	■■■ + ■■■ + . . .
20.7	64.3		$M_{2.0}$	Nm	82	103	145	205	320	400	500	560	700	800	990	1340	1540	NEW
			M_{2max}	Nm	255	320	445	630	1000	1250	1550	1760	1760	1760	1760	1760	1540	
15.9	46.8	0.036	n_{2N}	r/min	200	150	150	125	75	75	75	75	60	60	50	30	15	1FT2208-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	48.5	75	96	125	225	265	305	315	415	425	500	730	910	■■■ + ■■■ + . . .
19.4	64.3		$M_{2.0}$	Nm	77	96	135	193	300	375	470	520	660	750	930	1260	1540	NEW
			M_{2max}	Nm	255	320	445	630	1000	1250	1550	1760	1760	1760	1760	1760	1540	
20.1	54.5	0.036	n_{2N}	r/min	150	150	125	100	75	75	60	60	50	37.5	30	25	15	1FT2208-5AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	81	94	137	189	280	315	445	485	600	730	900	920	930	■■■ + ■■■ + . . .
25	78		$M_{2.0}$	Nm	99	124	175	245	385	480	600	670	840	960	1190	1610	1540	NEW
			M_{2max}	Nm	310	385	540	770	1220	1510	1760	1760	1760	1760	1760	1760	1540	
20.1	54.5	0.036	n_{2N}	r/min	150	150	125	100	75	75	60	60	50	50	37.5	25	15	1FT2208-5AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	81	95	139	191	280	310	445	475	590	600	770	880	910	■■■ + ■■■ + . . .
25	78		$M_{2.0}$	Nm	99	124	174	245	385	480	600	670	840	950	1190	1600	1540	NEW
			M_{2max}	Nm	310	385	540	770	1220	1510	1760	1760	1760	1760	1760	1760	1540	
16.1	43.3	0.036	n_{2N}	r/min	200	150	150	125	75	75	75	75	60	50	50	30	15	1FT2210-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	54	78	103	137	240	285	330	350	460	550	570	810	1000	■■■ + ■■■ + . . .
19.6	58.3		$M_{2.0}$	Nm	77	97	137	194	300	380	475	530	660	760	940	1270	1540	NEW
			M_{2max}	Nm	230	290	405	580	910	1130	1410	1580	1760	1760	1760	1760	1540	
15.9	43.3	0.036	n_{2N}	r/min	200	150	150	100	75	75	75	75	60	60	50	25	15	1FT2210-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	49.5	79	98	161	240	290	340	350	470	495	560	920	960	■■■ + ■■■ + . . .
19.3	58.3		$M_{2.0}$	Nm	76	95	135	191	300	375	470	520	650	750	930	1250	1540	NEW
			M_{2max}	Nm	230	290	405	580	910	1130	1410	1580	1760	1760	1760	1760	1540	
22.9	59.5	0.036	n_{2N}	r/min	150	150	125	100	75	75	60	60	50	37.5	30	25	12.5	1FT2210-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	108	122	176	240	375	420	590	610	750	980	1150	1050	1240	■■■ + ■■■ + . . .
28.4	87.9		$M_{2.0}$	Nm	113	141	198	280	445	550	690	770	960	1100	1370	1760	1540	NEW
			M_{2max}	Nm	350	435	610	870	1370	1710	1760	1760	1760	1760	1760	1760	1540	
22.9	59.5	0.036	n_{2N}	r/min	150	150	125	100	75	75	60	60	50	50	37.5	25	12.5	1FT2210-3AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	107	121	175	235	375	420	590	620	780	790	960	1070	1240	■■■ + ■■■ + . . .
28.4	87.9		$M_{2.0}$	Nm	112	141	198	280	445	550	690	770	960	1100	1360	1760	1540	NEW
			M_{2max}	Nm	350	435	610	870	1370	1710	1760	1760	1760	1760	1760	1760	1540	
22.5	59.5	0.036	n_{2N}	r/min	150	150	125	100	75	75	60	60	50	50	37.5	20	12.5	1FT2210-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	97	116	164	220	340	365	520	550	690	670	850	1200	1150	■■■ + ■■■ + . . .
27.9	87.9		$M_{2.0}$	Nm	110	138	194	275	435	540	680	760	950	1080	1340	1760	1540	NEW
			M_{2max}	Nm	350	435	610	870	1370	1710	1760	1760	1760	1760	1760	1760	1540	
30	72	0.036	n_{2N}	r/min	150	150	125	100	75	60	60	50	50	37.5	30	20	7.5	1FT2210-4AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	131	146	205	275	420	590	640	790	810	1070	1210	1320	1540	■■■ + ■■■ + . . .
38.1	118		$M_{2.0}$	Nm	152	190	265	380	590	740	930	1040	1290	1470	1760	1760	1540	NEW
			M_{2max}	Nm	465	580	820	1160	1760	1760	1760	1760	1760	1760	1760	1760	1540	

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Planetary gearbox data														
Gearbox type:			TP110, 1-stage				TP110 2-stage							
1. Order code			H61				H62							
	i		4	5	7	10	16	20	25	28	35	40	50	70	100
2. Order code			R04	R05	R07	R10	R16	R20	R25	R28	R35	R40	R50	R70	R00
	$M_{2N,G}$	Nm	1920	1920	1920	1680	1760	1760	1760	1760	1760	1760	1760	1760	1540
	$M_{2max,G}$	Nm	2560	2560	2560	2240	1760	1760	1760	1760	1760	1760	1760	1760	1540
	$M_{2Em.Off}$	Nm	3075	3075	3075	3075	2420	3025	3075	3075	3075	3075	3075	3075	3075
	$J_{1,G}$	kg cm²	44.5	34.6	25.5	20.6	8.51	8.21	7.82	6.57	6.37	5.63	5.54	5.44	5.4
	$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary**

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Gearbox type TP110

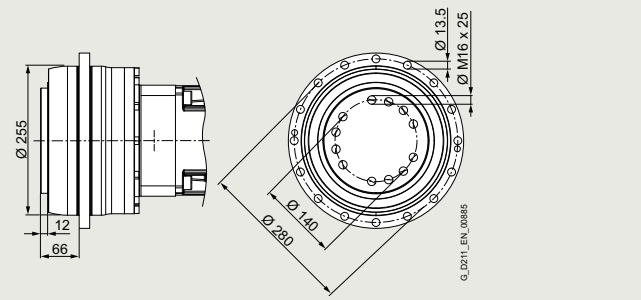
Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact with planetary gearbox TP110 1- and 2-stage (continued)																		
29.7	72	0.036	n_{2N}	r/min	150	150	125	100	75	60	60	50	50	37.5	30	20	7.5	**1FT2210-4AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	129	144	205	270	415	580	640	790	810	1060	1200	1310	1540	■■■ + ■■■ + . . .
37.7	118		$M_{2.0}$	Nm	150	188	260	375	590	730	920	1030	1280	1460	1760	1760	1540	NEW
			M_{2max}	Nm	465	580	820	1160	1760	1760	1760	1760	1760	1760	1760	1760	1540	
29.3	72	0.036	n_{2N}	r/min	150	150	125	100	75	60	60	50	50	37.5	30	20	12.5	**1FT2210-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	126	143	200	265	400	570	610	760	770	1030	1160	1270	1190	■■■ + ■■■ + . . .
37.4	118		$M_{2.0}$	Nm	149	186	260	370	580	720	900	1010	1260	1440	1760	1760	1540	NEW
			M_{2max}	Nm	465	580	820	1160	1760	1760	1760	1760	1760	1760	1760	1760	1540	
35	80.7	0.036	n_{2N}	r/min	150	150	125	100	75	60	60	60	50	37.5	30	25	7.5	**1FT2210-5AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	150	177	245	325	495	670	740	760	940	1210	1340	1140	1540	■■■ + ■■■ + . . .
45.9	147		$M_{2.0}$	Nm	182	225	320	455	710	880	1100	1230	1540	1750	1760	1760	1540	NEW
			M_{2max}	Nm	580	730	1020	1460	1760	1760	1760	1760	1760	1760	1760	1760	1540	
36.1	80.7	0.036	n_{2N}	r/min	150	150	125	100	60	60	50	50	37.5	37.5	30	20	6	**1FT2210-5AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	148	162	225	295	570	620	800	820	1090	1090	1210	1310	1530	■■■ + ■■■ + . . .
47.6	147		$M_{2.0}$	Nm	189	235	330	470	730	920	1140	1280	1590	1760	1760	1760	1540	NEW
			M_{2max}	Nm	580	730	1020	1460	1760	1760	1760	1760	1760	1760	1760	1760	1540	

Planetary gearbox data														
Gearbox type:		**TP110, 1-stage**				**TP110 2-stage**								
1. Order code		**H61**				**H62**								
i		**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
2. Order code		**R04**	**R05**	**R07**	**R10**	**R16**	**R20**	**R25**	**R28**	**R35**	**R40**	**R50**	**R70**	**R00**
$M_{2N,G}$	Nm	1920	1920	1920	1680	1760	1760	1760	1760	1760	1760	1760	1760	1540
$M_{2max,G}$	Nm	2560	2560	2560	2240	1760	1760	1760	1760	1760	1760	1760	1760	1540
$M_{2Em.Off}$	Nm	3075	3075	3075	3075	2420	3025	3075	3075	3075	3075	3075	3075	3075
$J_{1,G}$	kg cm²	44.5	34.6	25.5	20.6	8.51	8.21	7.82	6.57	6.37	5.63	5.54	5.44	5.4
$\varphi_{2,G}$	'	3				3								

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data



Permissible output shaft loads		
Average axial force for 20000 h	$F_{A,eq}$	33000 N
Average axial force for 30000 h	$F_{A,eq}$	29200 N
Maximum axial force	$F_{A,max}$	33000 N

Radial loads: Calculation using breakdown torques, see Configuration Manual

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)											
Nm	Nm	kg cm²											
SIMOTICS S-1FT2 High Dynamic with planetary gearbox TP300 1- and 2-stage													
6.96	20.9	0.036	n_{2N}	r/min	–	–	–	75	75	50	37.5	30	20	1FT2106-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	132	173	260	370	475	560	■■■ + ■■■ + . . .
8.08	24.4		$M_{2.0}$	Nm	–	–	–	158	200	280	400	540	690	NEW
			M_{2max}	Nm	–	–	–	485	610	850	1210	1640	2050	
9.37	26.4	0.036	n_{2N}	r/min	–	–	–	75	75	50	37.5	30	20	1FT2106-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	167	215	325	455	580	630	■■■ + ■■■ + . . .
10.8	31.1		$M_{2.0}$	Nm	–	–	–	210	270	375	540	730	930	NEW
			M_{2max}	Nm	–	–	–	620	770	1080	1540	2050	2800	
12.7	35.9	0.036	n_{2N}	r/min	–	–	–	75	75	50	37.5	30	15	1FT2106-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	235	300	445	620	780	1020	■■■ + ■■■ + . . .
14.7	43		$M_{2.0}$	Nm	–	–	–	290	365	510	730	980	1260	NEW
			M_{2max}	Nm	–	–	–	850	1070	1500	2100	2850	2800	
19.3	64.8	0.036	n_{2N}	r/min	150	125	100	60	60	50	37.5	25	15	1FT2108-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	82	120	184	370	465	630	820	950	990	■■■ + ■■■ + . . .
22.5	83.2		$M_{2.0}$	Nm	105	148	215	445	560	780	1110	1510	1920	NEW
			M_{2max}	Nm	410	570	830	1650	2050	2850	3600	3630	2800	
23.6	76.1	0.036	n_{2N}	r/min	150	125	100	60	60	50	30	25	15	1FT2108-5AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	99	145	220	440	540	730	1090	1090	1120	■■■ + ■■■ + . . .
27.6	101		$M_{2.0}$	Nm	130	183	265	550	690	960	1370	1850	2350	NEW
			M_{2max}	Nm	495	690	1000	1990	2450	3450	3600	3630	2800	
23.3	76.1	0.036	n_{2N}	r/min	125	125	100	60	60	50	37.5	25	12.5	1FT2108-5AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	111	135	215	410	510	690	870	990	1230	■■■ + ■■■ + . . .
27.4	101		$M_{2.0}$	Nm	128	181	265	540	680	950	1350	1830	2300	NEW
			M_{2max}	Nm	495	690	1000	1990	2450	3450	3600	3630	2800	
29.3	95.9	0.036	n_{2N}	r/min	125	125	100	60	60	50	30	25	12.5	1FT2108-7AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	138	168	265	500	630	820	1190	1130	1380	■■■ + ■■■ + . . .
34.7	135		$M_{2.0}$	Nm	165	230	335	690	860	1210	1710	2300	2800	NEW
			M_{2max}	Nm	660	930	1340	2650	3300	3949	3600	3630	2800	

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Planetary gearbox data										
Gearbox type:		TP300, 1-stage			TP300, 2-stage					
1. Order code		H71			J72					
i		5	7	10	20	25	35	50	70	100
2. Order code		R05	R07	R10	R20	R25	R35	R50	R70	R00
$M_{2N,G}$	Nm	4200	3960	2280	3850	3949	3949	3600	3630	2800
$M_{2max,G}$	Nm	5600	5250	2800	3850	3949	3949	3600	3630	2800
$M_{2Em.Off}$	Nm	9900	9900	8750	9900	9900	9900	9900	9900	8750
$J_{1.G}$	kg cm²	82.6	61.2	49.5	27.5	25.9	22.4	21.5	21.3	21.2
$\varphi_{2,G}$	'	3			3					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type TP300

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic with planetary gearbox TP300 1- and 2-stage (continued)														
29	95.9	0.036	n_{2N}	r/min	150	125	100	60	60	50	37.5	25	12.5	1FT2108-7AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	113	165	255	490	600	780	970	1070	1320	■■■ + ■■■ + . . .
34.3	135		$M_{2.0}$	Nm	162	225	330	680	850	1190	1690	2250	2800	NEW
			M_{2max}	Nm	660	930	1340	2650	3300	3949	3600	3630	2800	
28.7	95.9	0.036	n_{2N}	r/min	125	125	100	60	60	50	37.5	20	12.5	1FT2108-7AE..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	132	155	250	455	550	710	870	1240	1240	■■■ + ■■■ + . . .
33.9	135		$M_{2.0}$	Nm	161	225	330	670	840	1180	1670	2250	2800	NEW
			M_{2max}	Nm	660	930	1340	2650	3300	3949	3600	3630	2800	
SIMOTICS S-1FT2 Compact with planetary gearbox TP300 1- and 2-stage														
4.34	14.5	0.036	n_{2N}	r/min	–	–	–	75	75	50	37.5	30	20	1FT2206-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	90	119	181	260	335	340	■■■ + ■■■ + . . .
5.1	16.8		$M_{2.0}$	Nm	–	–	–	98	126	177	255	340	430	NEW
			M_{2max}	Nm	–	–	–	330	420	580	830	1130	1450	
4.87	14.5	0.036	n_{2N}	r/min	–	–	–	100	75	50	37.5	30	20	1FT2206-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	69	114	176	250	320	395	■■■ + ■■■ + . . .
5.7	16.8		$M_{2.0}$	Nm	–	–	–	110	142	199	285	380	485	NEW
			M_{2max}	Nm	–	–	–	330	420	580	830	1130	1450	
4.72	14.5	0.036	n_{2N}	r/min	–	–	–	75	75	50	37.5	30	20	1FT2206-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	84	113	173	245	320	380	■■■ + ■■■ + . . .
5.54	16.8		$M_{2.0}$	Nm	–	–	–	107	137	192	275	370	470	NEW
			M_{2max}	Nm	–	–	–	330	420	580	830	1130	1450	
6.92	21.7	0.036	n_{2N}	r/min	–	–	–	75	60	50	30	25	15	1FT2206-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	132	182	255	380	485	640	■■■ + ■■■ + . . .
8.04	25.4		$M_{2.0}$	Nm	–	–	–	157	200	280	400	540	690	NEW
			M_{2max}	Nm	–	–	–	500	630	880	1250	1700	2150	
6.83	21.7	0.036	n_{2N}	r/min	–	–	–	75	75	50	37.5	30	20	1FT2206-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	130	170	255	365	470	485	■■■ + ■■■ + . . .
7.92	25.4		$M_{2.0}$	Nm	–	–	–	155	197	275	395	530	680	NEW
			M_{2max}	Nm	–	–	–	500	630	880	1250	1700	2150	
9.14	30.3	0.036	n_{2N}	r/min	–	–	–	60	60	50	37.5	25	15	1FT2206-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	191	240	340	460	570	640	■■■ + ■■■ + . . .
10.6	35.8		$M_{2.0}$	Nm	–	–	–	205	260	370	520	710	910	NEW
			M_{2max}	Nm	–	–	–	710	890	1250	1770	2350	2800	
9.46	28.7	0.036	n_{2N}	r/min	–	–	–	75	75	50	37.5	30	15	1FT2206-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	182	230	345	490	630	860	■■■ + ■■■ + . . .
10.9	34		$M_{2.0}$	Nm	–	–	–	215	270	380	540	730	940	NEW
			M_{2max}	Nm	–	–	–	670	840	1180	1680	2250	2800	
9.2	28.7	0.036	n_{2N}	r/min	–	–	–	75	75	50	37.5	30	15	1FT2206-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	168	215	325	460	570	740	■■■ + ■■■ + . . .
10.7	34		$M_{2.0}$	Nm	–	–	–	210	265	370	530	710	920	NEW
			M_{2max}	Nm	–	–	–	670	840	1180	1680	2250	2800	

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Planetary gearbox data										
Gearbox type:		TP300, 1-stage			TP300, 2-stage					
1. Order code		H71			J72					
i		5	7	10	20	25	35	50	70	100
2. Order code		R05	R07	R10	R20	R25	R35	R50	R70	R00
$M_{2N,G}$	Nm	4200	3960	2280	3850	3949	3949	3600	3630	2800
$M_{2max,G}$	Nm	5600	5250	2800	3850	3949	3949	3600	3630	2800
$M_{2Em.Off}$	Nm	9900	9900	8750	9900	9900	9900	9900	9900	8750
$J_{1,G}$	kg cm²	82.6	61.2	49.5	27.5	25.9	22.4	21.5	21.3	21.2
$\varphi_{2,G}$	'	3			3					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact with planetary gearbox TP300 1- and 2-stage (continued)														
9.46	28.7	0.036	n_{2N}	r/min	–	–	–	75	75	50	37.5	30	15	**1FT2208-2AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	182	230	345	490	630	860	■■■ + ■■■ + . . .
10.9	34		$M_{2.0}$	Nm	–	–	–	215	270	380	540	730	940	NEW
			M_{2max}	Nm	–	–	–	670	840	1180	1680	2250	2800	
9.2	28.7	0.036	n_{2N}	r/min	–	–	–	75	75	50	37.5	30	15	**1FT2208-3AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	–	–	–	168	215	325	460	570	740	■■■ + ■■■ + . . .
10.7	34		$M_{2.0}$	Nm	–	–	–	210	265	370	530	710	920	NEW
			M_{2max}	Nm	–	–	–	670	840	1180	1680	2250	2800	
9.48	30.3	0.036	n_{2N}	r/min	150	150	125	75	75	50	37.5	30	15	**1FT2208-3AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	38	51	76	165	205	315	440	560	780	■■■ + ■■■ + . . .
11	35.8		$M_{2.0}$	Nm	49.5	70	104	215	270	380	540	730	940	NEW
			M_{2max}	Nm	174	245	355	710	890	1250	1770	2350	2800	
13.8	40	0.036	n_{2N}	r/min	150	125	100	60	60	50	30	25	12.5	**1FT2208-3AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	59	88	140	270	350	485	730	760	970	■■■ + ■■■ + . . .
15.9	48.3		$M_{2.0}$	Nm	74	105	155	315	395	550	790	1070	1370	NEW
			M_{2max}	Nm	235	330	480	960	1200	1680	2350	3200	2800	
14.3	40	0.036	n_{2N}	r/min	150	125	125	75	75	50	37.5	30	15	**1FT2208-4AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	61	88	116	250	315	475	660	730	960	■■■ + ■■■ + . . .
16.5	48.3		$M_{2.0}$	Nm	76	108	159	325	410	570	820	1110	1420	NEW
			M_{2max}	Nm	235	330	480	960	1200	1680	2350	3200	2800	
14	40	0.036	n_{2N}	r/min	150	125	125	75	75	50	37.5	30	15	**1FT2208-4AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	61	88	109	230	300	470	650	680	900	■■■ + ■■■ + . . .
16.2	48.3		$M_{2.0}$	Nm	74	105	155	320	400	560	800	1090	1390	NEW
			M_{2max}	Nm	235	330	480	960	1200	1680	2350	3200	2800	
16.7	50.7	0.036	n_{2N}	r/min	125	100	100	50	60	50	30	20	10	**1FT2208-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	79	116	146	325	335	455	720	850	1090	■■■ + ■■■ + . . .
19.4	62.8		$M_{2.0}$	Nm	91	129	190	385	480	670	960	1300	1660	NEW
			M_{2max}	Nm	305	430	620	1250	1550	2150	3050	3630	2800	
17.5	50.7	0.036	n_{2N}	r/min	150	125	125	75	75	50	37.5	25	15	**1FT2208-5AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	76	109	134	280	355	550	760	920	990	■■■ + ■■■ + . . .
20.4	62.8		$M_{2.0}$	Nm	96	136	199	405	500	710	1010	1370	1750	NEW
			M_{2max}	Nm	305	430	620	1250	1550	2150	3050	3630	2800	
16.6	50.7	0.036	n_{2N}	r/min	150	150	125	75	75	50	37.5	30	15	**1FT2208-5AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	70	84	132	270	320	490	670	750	990	■■■ + ■■■ + . . .
19.3	62.8		$M_{2.0}$	Nm	89	126	185	380	480	670	950	1290	1650	NEW
			M_{2max}	Nm	305	430	620	1250	1550	2150	3050	3630	2800	
21.2	60.3	0.036	n_{2N}	r/min	150	125	100	60	60	50	30	25	12.5	**1FT2210-2AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	88	129	191	385	475	640	950	980	1220	■■■ + ■■■ + . . .
24.8	76.4		$M_{2.0}$	Nm	116	164	240	490	610	860	1220	1660	2100	NEW
			M_{2max}	Nm	375	520	760	1510	1890	2600	3600	3630	2800	

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Planetary gearbox data										
Gearbox type:		TP300, 1-stage			TP300, 2-stage					
1. Order code		H71			J72					
i		5	7	10	20	25	35	50	70	100
2. Order code		R05	R07	R10	R20	R25	R35	R50	R70	R00
$M_{2N,G}$	Nm	4200	3960	2280	3850	3949	3949	3600	3630	2800
$M_{2max,G}$	Nm	5600	5250	2800	3850	3949	3949	3600	3630	2800
$M_{2Em.Off}$	Nm	9900	9900	8750	9900	9900	9900	9900	9900	8750
$J_{1,G}$	kg cm²	82.6	61.2	49.5	27.5	25.9	22.4	21.5	21.3	21.2
$\varphi_{2,G}$	'	3			3					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type TP300

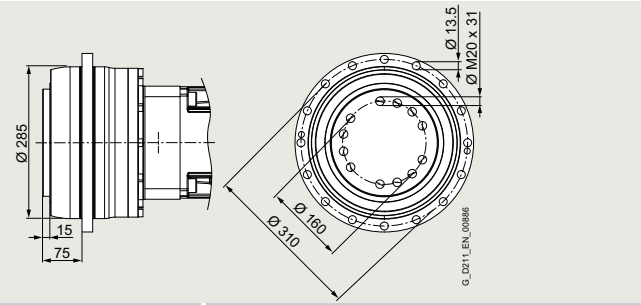
Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact with planetary gearbox TP300 1- and 2-stage (continued)													
16.6	46.5	0.036	n_{2N}	r/min	150	150	125	75	75	50	37.5	25	12.5	**1FT2210-2AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	75	94	143	275	350	540	740	920	1180	■■■ + ■■■ + . . .
19.2	57		$M_{2.0}$	Nm	89	126	185	380	480	670	950	1290	1650	NEW
			M_{2max}	Nm	275	390	560	1130	1410	1970	2750	3630	2800	
23.7	66.8	0.036	n_{2N}	r/min	150	125	100	60	60	50	30	20	12.5	**1FT2210-3AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	120	174	255	490	610	750	1170	1360	1380	■■■ + ■■■ + . . .
27.8	86.1		$M_{2.0}$	Nm	133	188	270	550	690	970	1370	1860	2350	NEW
			M_{2max}	Nm	425	590	860	1700	2100	2950	3600	3630	2800	
23.7	66.8	0.036	n_{2N}	r/min	150	125	100	60	60	50	37.5	25	12.5	**1FT2210-3AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	119	173	255	490	600	790	970	1100	1380	■■■ + ■■■ + . . .
27.8	86.1		$M_{2.0}$	Nm	133	188	270	550	690	960	1370	1860	2350	NEW
			M_{2max}	Nm	425	590	860	1700	2100	2950	3600	3630	2800	
23.3	66.8	0.036	n_{2N}	r/min	150	125	100	60	60	50	30	20	12.5	**1FT2210-3AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	111	156	225	445	540	680	1060	1230	1250	■■■ + ■■■ + . . .
27.2	86.1		$M_{2.0}$	Nm	130	184	265	540	680	950	1350	1820	2300	NEW
			M_{2max}	Nm	425	590	860	1700	2100	2950	3600	3630	2800	
31.4	84.9	0.036	n_{2N}	r/min	150	125	100	60	60	50	–	20	12.5	**1FT2210-4AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	141	200	315	550	660	810	–	1400	1380	■■■ + ■■■ + . . .
37.2	115		$M_{2.0}$	Nm	181	255	370	740	930	1300	–	2450	2800	NEW
			M_{2max}	Nm	570	800	1150	2250	2800	3949	–	3630	2800	
31.1	84.9	0.036	n_{2N}	r/min	150	125	100	60	60	50	30	20	12.5	**1FT2210-4AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	139	200	310	540	650	810	1230	1400	1380	■■■ + ■■■ + . . .
36.9	115		$M_{2.0}$	Nm	178	250	365	730	920	1280	1820	2450	2800	NEW
			M_{2max}	Nm	570	800	1150	2250	2800	3949	3600	3630	2800	
30.7	84.9	0.036	n_{2N}	r/min	150	125	100	60	60	50	30	20	12.5	**1FT2210-4AF..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	139	199	295	520	620	760	1180	1330	1310	■■■ + ■■■ + . . .
36.5	115		$M_{2.0}$	Nm	177	245	360	720	910	1270	1800	2400	2800	NEW
			M_{2max}	Nm	570	800	1150	2250	2800	3949	3600	3630	2800	
37.7	101	0.036	n_{2N}	r/min	150	125	100	60	60	50	–	20	10	**1FT2210-5AB..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	168	240	345	640	780	960	–	1530	1770	■■■ + ■■■ + . . .
45.3	145		$M_{2.0}$	Nm	215	305	445	900	1130	1580	–	3000	2800	NEW
			M_{2max}	Nm	710	1000	1440	2800	3500	3949	–	3630	2800	
38.6	101	0.036	n_{2N}	r/min	125	125	100	60	50	37.5	–	20	10	**1FT2210-5AC..-0..0-Z**
...	...	(0.04)	M_{2N}	Nm	189	220	350	580	810	1090	–	1390	1680	■■■ + ■■■ + . . .
46.4	145		$M_{2.0}$	Nm	225	320	460	920	1150	1610	–	3050	2800	NEW
			M_{2max}	Nm	710	1000	1440	2800	3500	3949	–	3630	2800	

Planetary gearbox data										
Gearbox type:		**TP300, 1-stage**			**TP300, 2-stage**					
1. Order code		**H71**			**J72**					
i		**5**	**7**	**10**	**20**	**25**	**35**	**50**	**70**	**100**
2. Order code		**R05**	**R07**	**R10**	**R20**	**R25**	**R35**	**R50**	**R70**	**R00**
$M_{2N,G}$	Nm	4200	3960	2280	3850	3949	3949	3600	3630	2800
$M_{2max,G}$	Nm	5600	5250	2800	3850	3949	3949	3600	3630	2800
$M_{2Em.Off}$	Nm	9900	9900	8750	9900	9900	9900	9900	9900	8750
$J_{1,G}$	kg cm²	82.6	61.2	49.5	27.5	25.9	22.4	21.5	21.3	21.2
$\varphi_{2,G}$	'	3			3					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary**

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Selection and ordering data



Permissible output shaft loads		
Average axial force for 20000 h	$F_{A,eq}$	50000 N
Average axial force for 30000 h	$F_{A,eq}$	44300 N
Maximum axial force	$F_{A,max}$	50000 N

Radial loads: Calculation using breakdown torques, see Configuration Manual

Servomotor data			Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	J_M ($J_{M,Br}$)												
Nm	Nm	kg cm²												
SIMOTICS S-1FT2 High Dynamic with planetary gearbox TP500 1- and 2-stage														
6.73	21.1	0.036	n_{2N}	r/min	–	–	–	60	60	37.5	37.5	30	15	1FT2106-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	125	163	250	345	440	560	■■■ + ■■■ + . . .
8	24.3		$M_{2.0}$	Nm	–	–	–	156	198	275	395	530	670	NEW
			M_{2max}	Nm	–	–	–	485	600	840	1210	1630	2100	
9.19	26.8	0.036	n_{2N}	r/min	–	–	–	60	60	37.5	37.5	30	15	1FT2106-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	162	205	320	430	530	670	■■■ + ■■■ + . . .
10.7	31		$M_{2.0}$	Nm	–	–	–	210	265	370	530	720	910	NEW
			M_{2max}	Nm	–	–	–	610	770	1080	1530	2050	2650	
12.6	36.9	0.036	n_{2N}	r/min	–	–	–	60	60	37.5	37.5	30	12.5	1FT2106-6AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	235	295	455	600	720	1030	■■■ + ■■■ + . . .
14.5	42.9		$M_{2.0}$	Nm	–	–	–	285	360	500	720	970	1250	NEW
			M_{2max}	Nm	–	–	–	850	1070	1490	2100	2850	3650	
19.4	68.9	0.036	n_{2N}	r/min	–	–	–	60	60	37.5	37.5	20	10	1FT2108-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	310	395	670	790	1140	1340	■■■ + ■■■ + . . .
22.4	82.5		$M_{2.0}$	Nm	–	–	–	445	550	780	1110	1500	1930	NEW
			M_{2max}	Nm	–	–	–	1640	2050	2850	4050	5500	4800	
23.9	82.1	0.036	n_{2N}	r/min	–	–	–	60	60	37.5	30	20	10	1FT2108-5AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	380	480	780	1080	1320	1520	■■■ + ■■■ + . . .
27.5	99.5		$M_{2.0}$	Nm	–	–	–	540	680	960	1370	1850	2350	NEW
			M_{2max}	Nm	–	–	–	1990	2450	3450	4975	5500	4800	
23.6	82.1	0.036	n_{2N}	r/min	–	–	–	50	50	37.5	37.5	20	10	1FT2108-5AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	435	540	790	840	1220	1430	■■■ + ■■■ + . . .
27.2	99.5		$M_{2.0}$	Nm	–	–	–	540	680	950	1350	1830	2350	NEW
			M_{2max}	Nm	–	–	–	1990	2450	3450	4975	5500	4800	
29.9	107	0.036	n_{2N}	r/min	–	–	–	50	50	37.5	30	20	10	1FT2108-7AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	540	660	920	1240	1430	1620	■■■ + ■■■ + . . .
34.6	133		$M_{2.0}$	Nm	–	–	–	690	860	1200	1710	2300	2950	NEW
			M_{2max}	Nm	–	–	–	2650	3300	4600	4975	5500	4800	

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Planetary gearbox data										
Gearbox type:		TP500, 1-stage			TP500, 2-stage					
1. Order code		H81			H82					
	i	5	7	10	20	25	35	50	70	100
2. Order code		R05	R07	R10	R20	R25	R35	R50	R70	R00
	$M_{2N,G}$ Nm	7200	6000	4000	5446	6808	6808	4975	5500	4800
	$M_{2max,G}$ Nm	9600	6790	4000	5446	6808	6808	4975	5500	4800
	$M_{2Em.Off}$ Nm	15000	15000	15000	15000	15000	15000	15000	15000	15000
	$J_{1.G}$ kg cm²	182	142	120	35.9	33.7	27.4	25.4	25	24.8
	$\varphi_{2,G}$ '	3			3					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type TP500

Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox												Servomotors with planetary gearbox
SIMOTICS S-1FT2 High Dynamic with planetary gearbox TP500 1- and 2-stage (continued)															
29.5	107	0.036	n_{2N}	r/min	–	–	–	50	50	37.5	30	20	10		1FT2108-7AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	520	630	890	1190	1370	1580		■■■ + ■■■ + . . .
34.2	133		$M_{2.0}$	Nm	–	–	–	680	850	1190	1690	2250	2950		NEW
			M_{2max}	Nm	–	–	–	2650	3300	4600	4975	5500	4800		
29.2	107	0.036	n_{2N}	r/min	–	–	–	50	50	37.5	30	20	10		1FT2108-7AE..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	500	600	880	1130	1280	1500		■■■ + ■■■ + . . .
33.8	133		$M_{2.0}$	Nm	–	–	–	670	840	1180	1670	2250	2900		NEW
			M_{2max}	Nm	–	–	–	2650	3300	4600	4975	5500	4800		
SIMOTICS S-1FT2 Compact with planetary gearbox TP500 1- and 2-stage															
9.3	30.9	0.036	n_{2N}	r/min	–	–	–	60	60	37.5	37.5	30	12.5		1FT2206-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	161	205	315	420	470	760		■■■ + ■■■ + . . .
10.9	35.7		$M_{2.0}$	Nm	–	–	–	210	270	375	540	720	930		NEW
			M_{2max}	Nm	–	–	–	710	890	1240	1770	2400	3050		
13.7	41.3	0.036	n_{2N}	r/min	–	–	–	50	50	37.5	30	20	10		1FT2206-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	285	355	510	720	890	1080		■■■ + ■■■ + . . .
15.8	48.1		$M_{2.0}$	Nm	–	–	–	310	390	550	780	1060	1360		NEW
			M_{2max}	Nm	–	–	–	960	1200	1670	2350	3200	4100		
14.2	41.3	0.036	n_{2N}	r/min	–	–	–	60	60	37.5	37.5	25	12.5		1FT2206-2AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	255	320	490	630	810	980		■■■ + ■■■ + . . .
16.4	48.1		$M_{2.0}$	Nm	–	–	–	325	405	570	810	1100	1410		NEW
			M_{2max}	Nm	–	–	–	960	1200	1670	2350	3200	4100		
13.9	41.3	0.036	n_{2N}	r/min	–	–	–	60	60	37.5	37.5	25	12.5		1FT2206-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	245	310	480	630	760	930		■■■ + ■■■ + . . .
16	48.1		$M_{2.0}$	Nm	–	–	–	315	400	550	800	1080	1380		NEW
			M_{2max}	Nm	–	–	–	960	1200	1670	2350	3200	4100		
16.7	53	0.036	n_{2N}	r/min	–	–	–	50	50	37.5	30	20	10		1FT2206-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	295	360	550	730	840	1030		■■■ + ■■■ + . . .
19.2	62.5		$M_{2.0}$	Nm	–	–	–	380	480	670	960	1290	1660		NEW
			M_{2max}	Nm	–	–	–	1240	1550	2150	3050	4150	4800		
17.5	53	0.036	n_{2N}	r/min	–	–	–	60	60	37.5	37.5	20	10		1FT2206-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	305	380	590	740	1090	1330		■■■ + ■■■ + . . .
20.2	62.5		$M_{2.0}$	Nm	–	–	–	400	500	700	1000	1360	1750		NEW
			M_{2max}	Nm	–	–	–	1240	1550	2150	3050	4150	4800		
16.6	53	0.036	n_{2N}	r/min	–	–	–	60	60	37.5	37.5	25	10		1FT2206-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	275	335	520	640	870	1330		■■■ + ■■■ + . . .
19.2	62.5		$M_{2.0}$	Nm	–	–	–	380	475	660	950	1290	1650		NEW
			M_{2max}	Nm	–	–	–	1240	1550	2150	3050	4150	4800		
21.4	63.7	0.036	n_{2N}	r/min	–	–	–	60	60	37.5	30	20	10		1FT2206-4AH..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	335	420	680	940	1190	1400		■■■ + ■■■ + . . .
24.6	76		$M_{2.0}$	Nm	–	–	–	490	610	860	1220	1660	2100		NEW
			M_{2max}	Nm	–	–	–	1510	1890	2600	3700	5000	4800		

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Planetary gearbox data										
Gearbox type:		TP500, 1-stage			TP500, 2-stage					
1. Order code		H81			H82					
i		5	7	10	20	25	35	50	70	100
2. Order code		R05	R07	R10	R20	R25	R35	R50	R70	R00
$M_{2N,G}$	Nm	7200	6000	4000	5446	6808	6808	4975	5500	4800
$M_{2max,G}$	Nm	9600	6790	4000	5446	6808	6808	4975	5500	4800
$M_{2Em.Off}$	Nm	15000	15000	15000	15000	15000	15000	15000	15000	15000
$J_{1,G}$	kg cm²	182	142	120	35.9	33.7	27.4	25.4	25	24.8
$\varphi_{2,G}$	'	3			3					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact with planetary gearbox TP500 1- and 2-stage (continued)														
21.4	63.7	0.036	n_{2N}	r/min	–	–	–	60	60	37.5	37.5	20	10	1FT2208-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	–	–	–	335	410	680	770	1180	1410	■■■ + ■■■ + . . .
24.7	76		$M_{2.0}$	Nm	–	–	–	490	610	860	1230	1660	2100	NEW
			M_{2max}	Nm	–	–	–	1510	1890	2600	3700	5000	4800	
16.8	48.3	0.036	n_{2N}	r/min	125	100	100	60	60	37.5	37.5	25	10	1FT2208-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	65	102	125	290	360	560	700	930	1390	■■■ + ■■■ + . . .
19.7	57.6		$M_{2.0}$	Nm	94	136	196	385	485	670	960	1310	1680	NEW
			M_{2max}	Nm	280	400	570	1130	1410	1970	2800	3750	4800	
16.6	48.3	0.036	n_{2N}	r/min	125	100	75	60	60	37.5	37.5	25	10	1FT2208-3AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	67	104	160	295	365	560	720	860	1350	■■■ + ■■■ + . . .
19.4	57.6		$M_{2.0}$	Nm	92	134	193	380	475	660	950	1280	1650	NEW
			M_{2max}	Nm	280	400	570	1130	1410	1970	2800	3750	4800	
23.9	71.1	0.036	n_{2N}	r/min	100	100	75	50	50	37.5	30	20	10	1FT2208-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	127	175	265	520	640	910	1220	1410	1630	■■■ + ■■■ + . . .
27.9	86.9		$M_{2.0}$	Nm	135	193	275	550	690	960	1370	1860	2350	NEW
			M_{2max}	Nm	425	600	860	1700	2100	2950	4150	5500	4800	
23.9	71.1	0.036	n_{2N}	r/min	100	100	75	50	50	37.5	30	20	10	1FT2208-4AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	127	174	260	510	640	900	1210	1400	1620	■■■ + ■■■ + . . .
27.9	86.9		$M_{2.0}$	Nm	134	193	275	550	690	960	1370	1860	2350	NEW
			M_{2max}	Nm	425	600	860	1700	2100	2950	4150	5500	4800	
23.5	71.1	0.036	n_{2N}	r/min	125	100	75	50	50	37.5	30	20	10	1FT2208-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	97	157	230	460	560	780	1070	1270	1530	■■■ + ■■■ + . . .
27.4	86.9		$M_{2.0}$	Nm	132	190	270	540	670	940	1340	1820	2350	NEW
			M_{2max}	Nm	425	600	860	1700	2100	2950	4150	5500	4800	
32	92.8	0.036	n_{2N}	r/min	100	100	75	50	50	37.5	30	20	10	1FT2208-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	164	210	330	610	730	1050	1310	1470	1700	■■■ + ■■■ + . . .
37.6	116		$M_{2.0}$	Nm	183	260	375	740	920	1290	1840	2450	3200	NEW
			M_{2max}	Nm	570	810	1160	2250	2800	3950	4975	5500	4800	
31.7	92.8	0.036	n_{2N}	r/min	100	100	75	50	50	37.5	30	20	10	1FT2208-5AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	161	210	325	600	720	1040	1300	1460	1680	■■■ + ■■■ + . . .
37.2	116		$M_{2.0}$	Nm	181	255	370	730	910	1280	1820	2450	3150	NEW
			M_{2max}	Nm	570	810	1160	2250	2800	3950	4975	5500	4800	
31.4	92.8	0.036	n_{2N}	r/min	100	100	75	50	50	37.5	30	20	10	1FT2208-5AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	151	205	305	590	700	1010	1240	1390	1640	■■■ + ■■■ + . . .
36.8	116		$M_{2.0}$	Nm	179	255	365	720	900	1260	1800	2400	3100	NEW
			M_{2max}	Nm	570	810	1160	2250	2800	3950	4975	5500	4800	
38.8	113	0.036	n_{2N}	r/min	125	100	75	50	50	37.5	30	20	10	1FT2210-2AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	147	245	360	700	850	1180	1500	1640	1810	■■■ + ■■■ + . . .
46.1	146		$M_{2.0}$	Nm	225	320	460	900	1120	1570	2200	3000	3850	NEW
			M_{2max}	Nm	720	1010	1450	2800	3500	4900	4975	5500	4800	

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Planetary gearbox data										
Gearbox type:		TP500, 1-stage			TP500, 2-stage					
1. Order code		H81			H82					
i		5	7	10	20	25	35	50	70	100
2. Order code		R05	R07	R10	R20	R25	R35	R50	R70	R00
$M_{2N,G}$	Nm	7200	6000	4000	5446	6808	6808	4975	5500	4800
$M_{2max,G}$	Nm	9600	6790	4000	5446	6808	6808	4975	5500	4800
$M_{2Em.Off}$	Nm	15000	15000	15000	15000	15000	15000	15000	15000	15000
$J_{1,G}$	kg cm²	182	142	120	35.9	33.7	27.4	25.4	25	24.8
$\varphi_{2,G}$	'	3			3					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary

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Gearbox type TP500

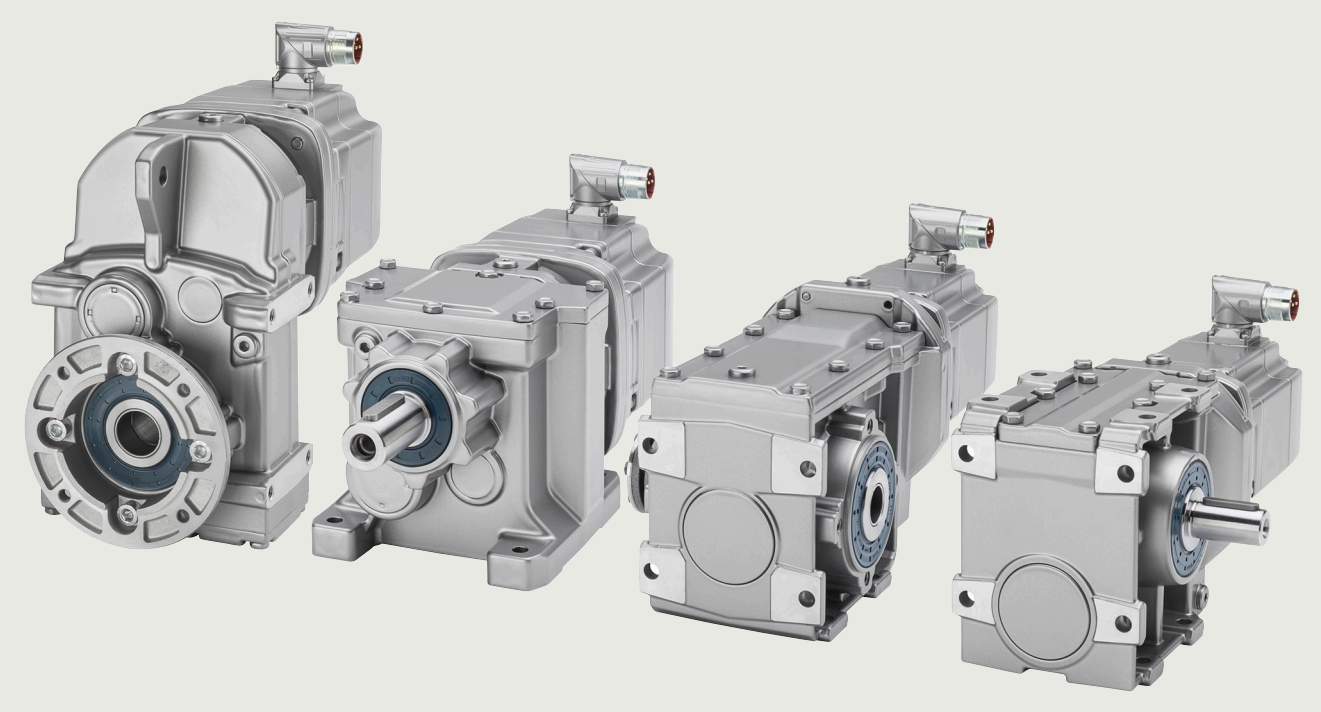
Servomotor data $M_{0,M}$ Nm	$M_{max,M}$ Nm	J_M ($J_{M,Br}$) kg cm²	Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
SIMOTICS S-1FT2 Compact with planetary gearbox TP500 1- and 2-stage (continued)													
16.6	48.3	0.036	n_{2N}	r/min	125	100	75	60	60	37.5	37.5	25	10	1FT2210-2AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	67	104	160	295	365	560	720	860	1350	■■■ + ■■■ + . . .
19.4	57.6		$M_{2.0}$	Nm	92	134	193	380	475	660	950	1280	1650	NEW
			M_{2max}	Nm	280	400	570	1130	1410	1970	2800	3750	4800	
23.9	71.1	0.036	n_{2N}	r/min	100	100	75	50	50	37.5	30	20	10	1FT2210-3AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	127	175	265	520	640	910	1220	1410	1630	■■■ + ■■■ + . . .
27.9	86.9		$M_{2.0}$	Nm	135	193	275	550	690	960	1370	1860	2350	NEW
			M_{2max}	Nm	425	600	860	1700	2100	2950	4150	5500	4800	
23.9	71.1	0.036	n_{2N}	r/min	100	100	75	50	50	37.5	30	20	10	1FT2210-3AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	127	174	260	510	640	900	1210	1400	1620	■■■ + ■■■ + . . .
27.9	86.9		$M_{2.0}$	Nm	134	193	275	550	690	960	1370	1860	2350	NEW
			M_{2max}	Nm	425	600	860	1700	2100	2950	4150	5500	4800	
23.5	71.1	0.036	n_{2N}	r/min	125	100	75	50	50	37.5	30	20	10	1FT2210-3AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	97	157	230	460	560	780	1070	1270	1530	■■■ + ■■■ + . . .
27.4	86.9		$M_{2.0}$	Nm	132	190	270	540	670	940	1340	1820	2350	NEW
			M_{2max}	Nm	425	600	860	1700	2100	2950	4150	5500	4800	
32	92.8	0.036	n_{2N}	r/min	100	100	75	50	50	37.5	30	20	10	1FT2210-4AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	164	210	330	610	730	1050	1310	1470	1700	■■■ + ■■■ + . . .
37.6	116		$M_{2.0}$	Nm	183	260	375	740	920	1290	1840	2450	3200	NEW
			M_{2max}	Nm	570	810	1160	2250	2800	3950	4975	5500	4800	
31.7	92.8	0.036	n_{2N}	r/min	100	100	75	50	50	37.5	30	20	10	1FT2210-4AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	161	210	325	600	720	1040	1300	1460	1680	■■■ + ■■■ + . . .
37.2	116		$M_{2.0}$	Nm	181	255	370	730	910	1280	1820	2450	3150	NEW
			M_{2max}	Nm	570	810	1160	2250	2800	3950	4975	5500	4800	
31.4	92.8	0.036	n_{2N}	r/min	100	100	75	50	50	37.5	30	20	10	1FT2210-4AF..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	151	205	305	590	700	1010	1240	1390	1640	■■■ + ■■■ + . . .
36.8	116		$M_{2.0}$	Nm	179	255	365	720	900	1260	1800	2400	3100	NEW
			M_{2max}	Nm	570	810	1160	2250	2800	3950	4975	5500	4800	
38.8	113	0.036	n_{2N}	r/min	125	100	75	50	50	37.5	30	20	10	1FT2210-5AB..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	147	245	360	700	850	1180	1500	1640	1810	■■■ + ■■■ + . . .
46.1	146		$M_{2.0}$	Nm	225	320	460	900	1120	1570	2200	3000	3850	NEW
			M_{2max}	Nm	720	1010	1450	2800	3500	4900	4975	5500	4800	
39.7	113	0.036	n_{2N}	r/min	100	100	75	50	50	37.5	30	15	10	1FT2210-5AC..-0..0-Z
...	...	(0.04)	M_{2N}	Nm	192	235	380	650	770	1100	1330	1980	1710	■■■ + ■■■ + . . .
47	146		$M_{2.0}$	Nm	230	325	465	920	1150	1610	2250	3100	3950	NEW
			M_{2max}	Nm	720	1010	1450	2800	3500	4900	4975	5500	4800	

Planetary gearbox data										
Gearbox type:		TP500, 1-stage			TP500, 2-stage					
1. Order code		H81			H82					
i		5	7	10	20	25	35	50	70	100
2. Order code		R05	R07	R10	R20	R25	R35	R50	R70	R00
$M_{2N,G}$	Nm	7200	6000	4000	5446	6808	6808	4975	5500	4800
$M_{2max,G}$	Nm	9600	6790	4000	5446	6808	6808	4975	5500	4800
$M_{2Em.Off}$	Nm	15000	15000	15000	15000	15000	15000	15000	15000	15000
$J_{1,G}$	kg cm²	182	142	120	35.9	33.7	27.4	25.4	25	24.8
$\varphi_{2,G}$	'	3			3					

Color legend:		
	$M_{max,M} \times i < M_{2N,G}$	**The motor and gearbox combination is fatigue-proof**
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	**Check acceleration and inertias, perform service life calculation if necessary**
	$M_{max,M} \times i > M_{2max,G}$	**The motor can destroy the gearbox, Check acceleration and inertias, perform service life calculation if necessary**

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Overview



SIMOTICS S-1FG1 - the new generation of servo geared motors from Siemens

SIMOTICS S-1FG1 servo geared motors are available as servo helical, servo parallel shaft, servo bevel and servo helical worm geared motors and are delivered as a completely assembled unit and with oil-filled gearbox. A wide range of mechanical mounting methods can be implemented with the numerous options. SIMOTICS S-1FG1 servo geared motors are designed for operation without external cooling and the heat is dissipated through the motor surface and the gearbox mounting surface.

SIMOTICS S-1FG1 servo geared motors can be combined with the SINAMICS S120/S220drive system to create a powerful system with high functionality.

The Catalog D41 presents a comprehensive overview of the portfolio of SIMOTICS S-1FG1 servo geared motors and is designed to help users make a preliminary selection of products to meet the requirements of a particular drive application. The information in the catalog relating to specific motors and gearboxes is intended as a guide so that the correct servo geared motor can be identified on the basis of a known application.

We recommend use of the "SIZER for Siemens Drives" (integrated into TIA Selection Tool) engineering tool so that SIMOTICS S-1FG1 servo geared motors can be accurately configured. This tool takes load duty cycles into account and performs a thermal and mechanical analysis of the gearbox.

Operation of SIMOTICS S-1FG1 servo geared motors on SINAMICS S210 (6SL5...) servo converters (from FW 6.4 HF2)

The following configuration options apply to the SIMOTICS S-1FG1 servo geared motors in combination with the SINAMICS S210 (6SL5...) servo converters (from FW 6.4 HF2):

- Motors: SIMOTICS S-1FG1 servo geared motors with a maximum standstill current I_0 of up to 15 A are supported.
- Brakes:

Permanent magnet brakes with a rated current I_N of up to 1 A are permitted.

The order codes **N23** and **N24** are configurable with one limitation: For motors with shaft height 100 a holding brake with increased braking torque (order code **N24**) is not possible.

Spring-applied brakes (order codes **N30** to **N34**) are generally not configurable.

Encoders: Only AM20DQI and AS20DQI DRIVE-CLiQ encoders can be used. These are marked by the letter **R** or **Q** in the 9th position of the article number.

The SIMOTICS S-1FG1 servo geared motors can be operated in two-cable technology (2CC) on the SINAMICS S210. Corresponding connection cables are available.

Further information on ordering is available on the Internet at:
https://support.industry.siemens.com/cs/document/110000555

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Notes

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SIMOTICS M main motors

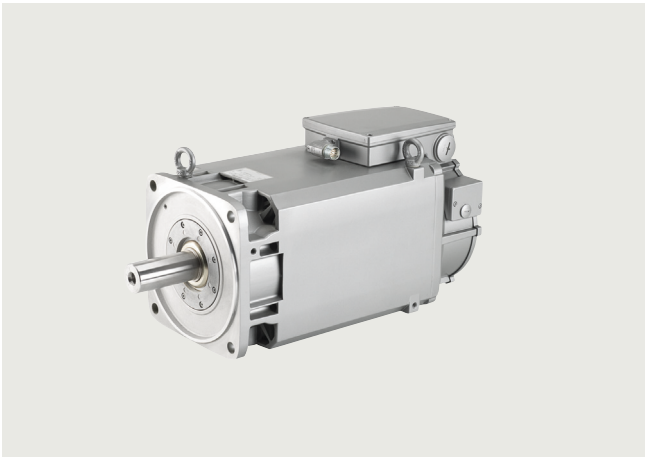


8.2/2	**SIMOTICS M-1PH8 asynchronous, synchronous reluctance and synchronous motors for SINAMICS S120/S220**
8.2/6	SIMOTICS M-1PH8 asynchronous motors
8.2/6	Forced ventilation, IP55 degree of protection
8.2/24	Forced ventilation, IP23 degree of protection
8.2/34	Water cooling, IP65 degree of protection
8.2/42	Water cooling, IP55 degree of protection
8.2/50	SIMOTICS M-1PH8 synchronous reluctance motors
8.2/50	Forced ventilation, IP55 degree of protection
8.2/56	Water cooling, IP65 degree of protection
8.2/60	SIMOTICS M-1PH8 synchronous motors
8.2/60	Forced ventilation, IP55 degree of protection
8.2/66	Water cooling, IP65 degree of protection
8.2/70	Water cooling, IP55 degree of protection
8.2/74	Article No. supplements
8.2/85	Options
8.2/89	Selection guides
8.2/89	Terminal box assignment/ Cable cross-sections
8.2/90	Ventilation data/Sound pressure level
8.2/91	Cooling data/Sound pressure level/ Water specification
8.2/92	Radial force diagrams
8.2/96	Mounted holding brakes
8.2/97	**SIMOTICS M-1FE built-in motors for SINAMICS S120/S220**
8.2/97	SIMOTICS M-1FE synchronous built-in motors
8.2/100	SIMOTICS M-1FE1 synchronous built-in motors
8.2/108	SIMOTICS M-1FE2 synchronous built-in motors
8.2/110	SIMOTICS M-1FE2 asynchronous built-in motors
8.2/118	Components for SIMOTICS M-1FE built-in motors
8.2/118	VPM Voltage Protection Module
8.2/119	**Dimensional drawings**
8.2/119	SIMOTICS M-1PH8 asynchronous and synchronous motors
8.2/163	SIMOTICS M-1FE1 synchronous built-in motors
8.2/164	SIMOTICS M-1FE2 synchronous built-in motors
8.2/165	SIMOTICS M-1FE2 asynchronous built-in motors

In addition, the Siemens Product Configurator can be used on the internet at the following address:
www.siemens.com/spc
See under:
Motors →
Motors for Motion Control →
SIMOTICS M main motors

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Overview



SIMOTICS M-1PH8 motors, forced ventilation, shaft heights 80 to 160

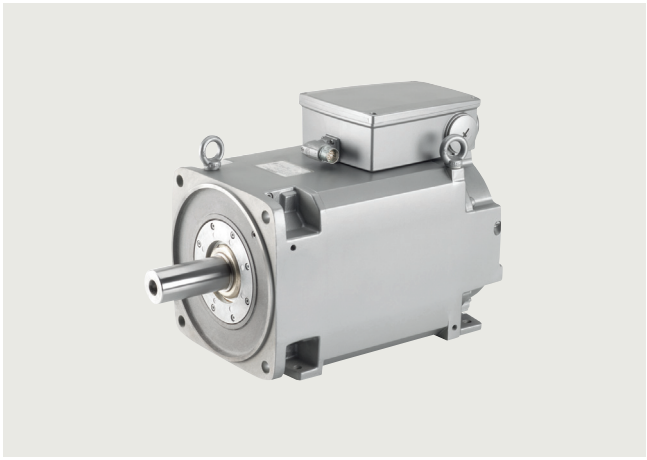
The SIMOTICS M-1PH8 motor series is a generation of motors designed for universal use in plants and machines involving motion control applications. The motors are based on a flexible, modular principle and are available as asynchronous, synchronous-reluctance and compact synchronous variants, with either forced ventilation or water cooling.

In comparison to the freely selectable performance of vector and servo control with the SINAMICS S120/S220 drive system, it is possible to select between asynchronous, synchronous-reluctance or synchronous versions in the case of the new SIMOTICS M-1PH8 motor series.

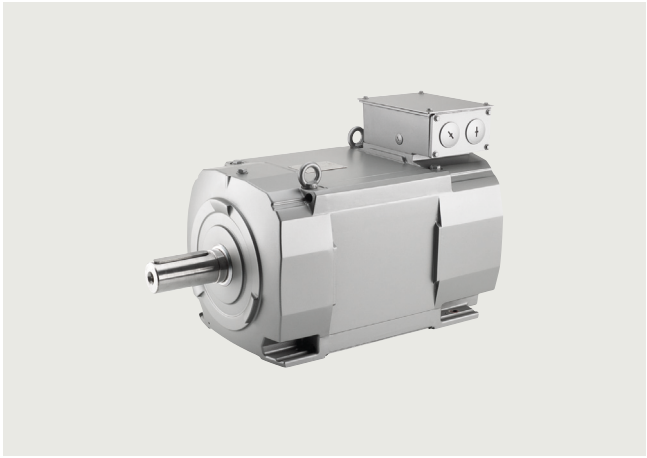
Thanks to this flexible interplay between converter and motor, it is now even easier to implement applications which involve

- extreme duty cycles
- short rise times
- high accuracy

regarding speed, torque and positioning.



SIMOTICS M-1PH8 motors, water cooling, shaft heights 80 to 160



SIMOTICS M-1PH8 motors, water cooling, shaft heights 180 to 280

SIMOTICS M-1PH8 motors have been designed specifically for use in conjunction with the SINAMICS S120/S220 drive system. Depending on the closed-loop control requirements, suitable encoder systems are available for the SIMOTICS M-1PH8 motors to acquire motor speed and the indirect position.

Encoder systems for C-axis operation are also available for machine tools.

SIMOTICS M-1PH8 motors are available with two different cooling methods:

- Forced ventilation
- Water cooling

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Benefits

- Wide power range with low construction volume
- Wide speed control ranges
- High degree of flexibility due to the choice of
  - Asynchronous, synchronous-reluctance or synchronous version
  - Forced ventilation or water cooling
  - Solid shaft or hollow shaft
  - Wide range of bearing concepts
  - Different encoder types for speed control and high-precision positioning
- Outstanding performance properties
  - Maximum speeds up to 24000 r/min
  - Excellent radial eccentricity down to 10 µm
  - Excellent vibration severity grade
  - High dynamic response (short acceleration times)
- Simple and flexible connection system
- Commissioning with electronic rating plate and DRIVE-CLiQ interface

Application

The range of applications extends across all industries and includes, for example:

- Main drives in presses and extruders
- Converting applications
- Main spindle drives in machine tools
- Rotary axes in the paper and printing industry
- Use in crane systems

The SIMOTICS M-1PH8 motors are suitable for installation in dry indoor areas without aggressive atmospheres.

Configuration

You can find the Configuration Manual for SIMOTICS M-1PH8 for SINAMICS S120 at:
https://support.industry.siemens.com/cs/ww/en/view/109744012

The compatibility list for SINAMICS S120/S220 Booksize Modules can be found at:
https://support.industry.siemens.com/cs/ww/en/view/109806050

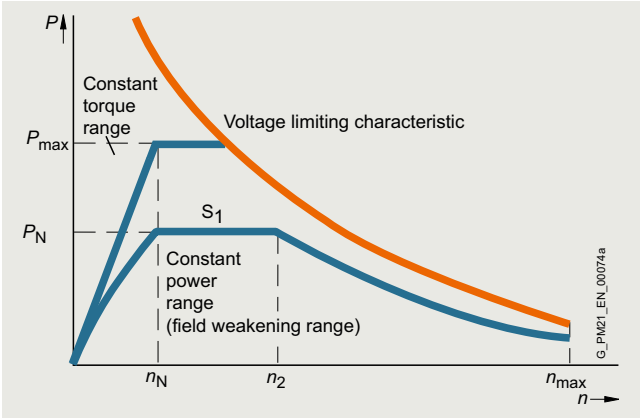
The SINAMICS S220 Booksize power units along with the Motor Modules are available at:
https://support.industry.siemens.com/cs/ww/en/view/109803552

Dimensional drawings

Dimensional drawings for the SIMOTICS motors are available via selectors through to the exact article number with the Siemens Product Configurator.
www.siemens.com/spc

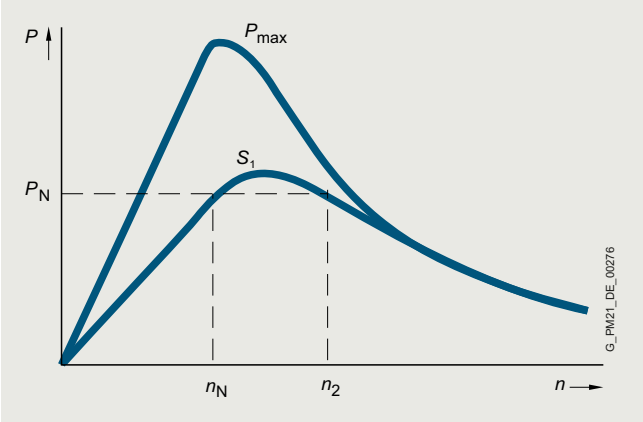
Characteristic curves

SIMOTICS M-1PH8 asynchronous motor



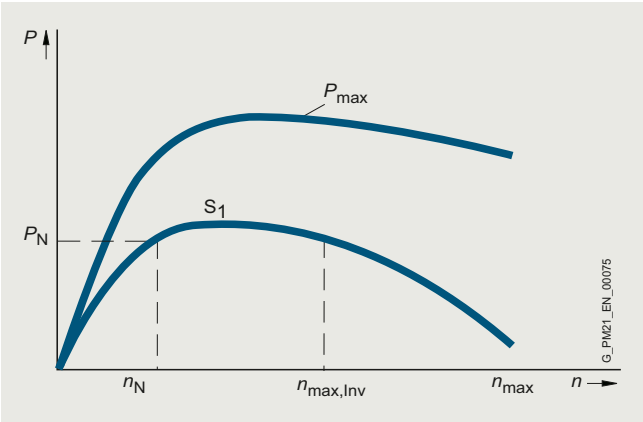
Typical speed-power characteristic for SIMOTICS M-1PH8 asynchronous motors

SIMOTICS M-1PH8 synchronous reluctance motor



Typical speed-power characteristic for SIMOTICS M-1PH8 synchronous reluctance motors

SIMOTICS M-1PH8 synchronous motor



Typical speed-power characteristic for SIMOTICS M-1PH8 synchronous motors

The characteristic curves show the typical relationship between motor speed and drive power for SIMOTICS M-1PH8 motors for duty type S1 (continuous duty) in accordance with IEC 60034-1.

The detailed characteristic curves for the voltage and winding version are provided in the SIMOTICS M-1PH8 Configuration Manual.

Characteristics for the SIMOTICS motors are available via selectors through to the exact article number with the Siemens Product Configurator.

Access to the Siemens Product Configurator

The Siemens Product Configurator can be accessed without having to register or log in:

www.siemens.com/spc

→ SIMOTICS M-1PH8 in the SPC

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SIMOTICS M-1PH8 asynchronous and synchronous motors, forced ventilation

Technical specifications

SIMOTICS M-1PH8 motor, forced ventilation	
Stator winding insulation according to EN 60034-1 (IEC 60034-1)	For an ambient temperature of up to 40 °C (104 °F) Temperature class 180 (H)
Cooling according to EN 60034-6 (IEC 60034-6)	Forced ventilation
• 1PH808 ... 1PH822	Fan mounted axially at NDE
• 1PH828	Fan mounted radially at NDE
Temperature monitoring	Pt1000 temperature sensor in the stator winding
• 1PH818 ... 1PH828	1 additional Pt1000 temperature sensor as reserve
Fan supply voltage	
• 1PH808	230 V 1 AC 50/60 Hz, 265 V 1 AC/60 Hz 400 V 2 AC 50/60 Hz (option L77)
• 1PH810 ... 1PH816	400 V 3 AC 50/60 Hz, 480 V 3 AC 60 Hz
• 1PH818 ... 1PH822	200 ... 277 V 1 AC, 50/60 Hz (EC fan) 380 V ... 480 V 3 AC 50/60 Hz (EC fan) (option L76)
• 1PH828	380 V ... 480 V 3 AC 50/60 Hz (EC fan)
Type of construction according to EN 60034-7 (IEC 60034-7)	
• 1PH808	IM B3, IM B5
• 1PH810 ... 1PH828	IM B3, IM B5, IM B35
Degree of protection according to EN 60034-5 (IEC 60034-5)	
• 1PH808 ... 1PH828	IP55 (forced ventilation)
• 1PH818 ... 1PH828	IP23 (open-circuit cooling)
Shaft end at the DE according to DIN 748-3 (IEC 60034-5)	Plain shaft or feather key full-key or half-key balancing for feather key
Shaft and flange accuracy according to DIN 42955 (IEC 60072-1) [1]	Without holding brake: Tolerance R (reduced) With holding brake: Tolerance N (normal)
Vibration severity	In accordance with Siemens/EN 60034-14 (IEC 60034-14) [1]
Sound pressure level L_{pA} (1 m) according to EN ISO 1680, max. Tolerance +3 dB	
Forced ventilation (IP55)	
• 1PH808 ... 1PH813	70 dB at a rated pulse frequency of 4 kHz and a speed range up to 5000 r/min
• 1PH816	73 dB at a rated pulse frequency of 4 kHz and a speed range up to 5000 r/min
• 1PH818	73 dB at a rated pulse frequency of 2 kHz and a speed range up to 5000 r/min
• 1PH822	73 dB at a rated pulse frequency of 2 kHz and a speed range up to 3500 r/min
• 1PH828	74 dB at a rated pulse frequency of 2 kHz and a speed range up to 3300 r/min
Forced ventilation (IP23)	
• 1PH818	73 dB at a rated pulse frequency of 2 kHz and a speed range up to 3000 r/min
• 1PH822	73 dB at a rated pulse frequency of 2 kHz and a speed range up to 2000 r/min
• 1PH828	74 dB at a rated pulse frequency of 2 kHz and a speed range up to 2800 r/min
Built-in encoder systems	Absolute and incremental encoder with or without DRIVE-CLiQ interface
Connection	Connector for signals or DRIVE-CLiQ interface (mating connector not included in the scope of supply)
Power	
• 1PH808 ... 1PH813	Power connector or terminal box
• 1PH816 ... 1PH828	Terminal box
Fan	
• 1PH808	Power connector
• 1PH810 ... 1PH813	Power connector or terminal box
• 1PH816 ... 1PH828	Terminal box
Encoder system	Connector for signals or DRIVE-CLiQ interface (mating connector not included in the scope of supply)
Rating plate	1 attached to motor 1 supplied separately with terminal box
Paint finish	Standard paint finish in anthracite RAL 7016
Certificate of suitability	cURus, CE, EAC, UKCA

[1] Radial eccentricity of the shaft end, concentricity of the centering ring, and axial eccentricity of the mounting flange to the axis of the shaft end.

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Technical specifications

SIMOTICS M-1PH8 motor, water cooling	
Stator winding insulation according to EN 60034-1 (IEC 60034-1)	For a coolant inlet temperature of up to 30 °C (86 °F) Temperature class 180 (H) [1]
Cooling according to EN 60034-6 (IEC 60034-6)	Water cooling max. cooling water pressure at inlet: 6 bar Connection thread at NDE
Temperature monitoring	Pt1000 temperature sensor in the stator winding
• 1PH808 ... 1PH816	1 additional Pt1000 temperature sensor as option (option 25)
• 1PH818 ... 1PH828	1 additional Pt1000 temperature sensor as reserve
Type of construction according to EN 60034-7 (IEC 60034-7)	
• 1PH808	IM B3, IM B5
• 1PH818 ... 1PH828	IM B3, IM B5, IM B35
Degree of protection according to EN 60034-5 (IEC 60034-5)	
• 1PH808 ... 1PH816	IP65
• 1PH818 ... 1PH828	IP55
Shaft end at the DE according to DIN 748-3 (IEC 60072-1)	Plain shaft or feather key full-key or half-key balancing for feather key
Shaft and flange accuracy according to DIN 42955 (IEC 60072-1) [2]	Without holding brake: Tolerance R (reduced) With holding brake: Tolerance N (normal)
Vibration severity	In accordance with Siemens/EN 60034-14 (IEC 60034-14) [2]
Sound pressure level L_{pA} (1 m) according to EN ISO 1680, max. tolerance +3 dB	
• 1PH808 ... 1PH813	68 dB at a rated pulse frequency of 4 kHz and speed range up to 5000 r/min
• 1PH816	69 dB at a rated pulse frequency of 4 kHz and speed range up to 5000 r/min
• 1PH818	70 dB at a rated pulse frequency of 2 or 4 kHz and a speed range up to 5000 r/min
• 1PH822	70 dB at a rated pulse frequency of 2 or 4 kHz and speed range up to 4500 r/min
• 1PH828	72 dB for a rated pulse frequency of 2 kHz and speed range up to 3300 r/min
Integrated encoder systems	Absolute and incremental encoder with or without DRIVE-CLiQ interface
Connection	Connector for signals or DRIVE-CLiQ interface (mating connector is not included in the scope of supply)
Power	
• 1PH808 ... 1PH813	Power connector or terminal box
• 1PH816 ... 1PH828	Terminal box
Encoder system	Connector for signals or DRIVE-CLiQ interface (mating connector is not included in the scope of supply)
Rating plate	1 unit attached to motor 1 supplied loose in terminal box
Paint finish	Standard paint finish in anthracite RAL 7016
Certificate of suitability	cURus, CE, EAC, UKCA

[1] The following motors are designed to conform to temperature class 155 (F): 1PH8107-1.F2/1PH8107-1.M2 1PH8138-2/1PH8164/1PH8166/1PH8168

[2] Radial eccentricity of the shaft end, concentricity of the centering ring, and axial eccentricity of the mounting flange to the axis of the shaft end.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC, Smart/Basic Line Module									
400	100	2.5 (3.4)	60 (44.3)	8.8	290	15.5	1500	7000	**1PH8107- ■■B■■-....**
	132	2.9 (3.9)	69 (50.9)	9	272	14.7	1500	6000	**1PH8131- ■■B■■-....**
		5.2 (7.0)	124 (91.5)	15.5	309	15.0	1000	6000	**1PH8133- ■■B■■-....**
		6.4 (8.6)	153 (113)	18	320	15.2	1000	6000	**1PH8135- ■■B■■-....**
		6.9 (9.3)	165 (122)	18	323	14.7	1300	6000	**1PH8137- ■■B■■-....**
	160	9.5 (12.7)	227 (167)	30	260	14.3	2150	6500	**1PH8163- ■■B■■-....**
		13 (17.4)	310 (229)	36	300	14.1	1750	6500	**1PH8165- ■■B■■-....**
	180	16.3 (21.9)	389 (287)	49	271	14.1	2800	5000	**1PH8184- ■■B■■-....**
		21.2 (28.4)	506 (373)	65	268	13.9	3000	5000	**1PH8186- ■■B■■-....**
	225	30.4 (40.8)	726 (535)	86	268	13.9	2400	4500	**1PH8224- ■■B■■-....**
		39.2 (52.6)	936 (690)	112	264	13.9	2500	4500	**1PH8226- ■■B■■-....**
		48 (64.4)	1146 (845)	132	272	13.8	2600	4500	**1PH8228- ■■B■■-....**
	280	63 (84.5)	1504 (1109)	154	325	13.6	1100	3300	**1PH8284- 1■B1■-....**
		80 (107)	1910 (1409)	186	325	13.6	1200	3300	**1PH8286- 1■B1■-....**
		103 (138)	2459 (1814)	245	325	13.6	1300	3300	**1PH8288- 1■B1■-....**
700	180	27 (36.2)	368 (271)	65	320	24.0	3300	5000	**1PH8184- ■■C■■-....**
		35 (46.9)	478 (353)	83	330	23.9	3700	5000	**1PH8186- ■■C■■-....**
	225	55 (73.8)	750 (553)	136	310	23.8	2900	4500	**1PH8224- ■■C■■-....**
		68 (91.2)	928 (684)	162	310	23.8	3100	4500	**1PH8226- ■■C■■-....**
		82 (110)	1119 (825)	188	315	23.8	3300	4500	**1PH8228- ■■C■■-....**
	280	110 (148)	1501 (1107)	240	330	23.7	2100	3300	**1PH8284- 1■C1■-....**
		138 (185)	1883 (1389)	295	325	23.7	2100	3300	**1PH8286- 1■C1■-....**
		166 (223)	2265 (1671)	365	325	23.6	2100	3300	**1PH8288- 1■C1■-....**
1000	100	3.7 (5.0)	35 (25.8)	10	333	35.8	2550	9000	**1PH8103- ■■D■■-....**
		6.3 (8.4)	60 (44.3)	17.5	307	35.5	4300	9000	**1PH8107- ■■D■■-....**
	132	7.9 (10.6)	75 (55.3)	20	316	34.8	3000	8000	**1PH8131- ■■D■■-....**
		12 (16.1)	115 (84.8)	30	319	35.0	3000	8000	**1PH8133- ■■D■■-....**
		17 (22.8)	162 (119)	43	307	34.8	4300	8000	**1PH8137- ■■D■■-....**
	160	22 (29.5)	210 (155)	55	300	34.2	2800	6500	**1PH8163- ■■D■■-....**
		28 (37.5)	267 (197)	71	292	34.2	4600	6500	**1PH8165- ■■D■■-....**
	180	39 (52.3)	372 (274)	87	340	34.0	4200	5000	**1PH8184- ■■D■■-....**
		51 (68.4)	487 (359)	112	340	34.0	4400	5000	**1PH8186- ■■D■■-....**
	225	71 (95.2)	678 (500)	158	335	33.8	3300	4500	**1PH8224- ■■D■■-....**
		92 (123)	879 (648)	194	340	33.8	3300	4500	**1PH8226- ■■D■■-....**
		113 (152)	1079 (796)	235	340	33.9	3300	4500	**1PH8228- ■■D■■-....**
	280	150 (201)	1433 (1057)	315	335	33.7	2100	3300	**1PH8284- 1■D1■-....**
		182 (244)	1738 (1282)	410	330	33.6	2100	3300	**1PH8286- 1■D1■-....**
		226 (303)	2158 (1592)	495	335	33.6	2100	3300	**1PH8288- 1■D1■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb$_f$-in-s²)	kg (lb)	Type	A	Article No.
1PH8107-. . B . . .	0.85	4.1	69	0.0289 (0.2558)	73 (161)	gk813	9	6SL3120-■TE21-0AD 0
1PH8131-. . B . . .	0.88	3.5	77	0.0590 (0.5222)	89 (196)	gk833	9	6SL3120-■TE21-0AD 0
1PH8133-. . B . . .	0.88	6.2	75	0.0760 (0.6727)	106 (234)	gk833	18	6SL3120-■TE21-8A■ 0
1PH8135-. . B . . .	0.90	5.2	74	0.0940 (0.8320)	125 (276)	gk833	18	6SL3120-■TE21-8A■ 0
1PH8137-. . B . . .	0.88	6.7	79	0.1090 (0.9648)	141 (311)	gk833	18	6SL3120-■TE21-8A■ 0
1PH8163-. . B . . .	0.91	8.1	82.3	0.2160 (1.9118)	196 (432)	gk863	30	6SL3120-1TE23-0A■ 0
1PH8165-. . B . . .	0.86	14.9	82.6	0.2320 (2.0534)	230 (507)	gk863	45	6SL3120-1TE24-5AC 0
1PH8184-. . B . . .	0.85	23	83.4	0.489 (4.328)	350 (772)	1XB7322-P05	60	6SL3120-1TE26-0AC 0
1PH8186-. . B . . .	0.83	34	85	0.652 (5.771)	422 (931)	1XB7322-P05	85	6SL3120-1TE28-5AA 3
1PH8224-. . B . . .	0.87	34	87.2	1.48 (13.10)	610 (1345)	1XB7322-P05	85 [4]	6SL3120-1TE28-5AA 3
1PH8226-. . B . . .	0.87	46	88.7	1.93 (17.08)	740 (1632)	1XB7322-P05	132	6SL3120-1TE31-3AA 3
1PH8228-. . B . . .	0.86	58	89.6	2.33 (20.62)	870 (1918)	1XB7322-P05	132	6SL3120-1TE31-3AA 3
1PH8284-1. B . . .	0.79	86	92.4	4.20 (37.17)	1200 (2646)	1XB7700-P02	200	6SL3120-1TE32-0AA 4
1PH8286-1. B . . .	0.82	98	92.8	5.20 (46.03)	1400 (3087)	1XB7700-P02	200	6SL3120-1TE32-0AA 4
1PH8288-1. B . . .	0.80	136	93.1	6.30 (55.76)	1650 (3638)	1XB7700-P02	260	6SL3320-1TE32-6AA 3
1PH8184-. . C . . .	0.84	30	88.9	0.49 (4.34)	350 (772)	1XB7322-P05	85	6SL3120-1TE28-5AA 3
1PH8186-. . C . . .	0.81	44	90.9	0.652 (5.771)	422 (931)	1XB7322-P05	85	6SL3120-1TE28-5AA 3
1PH8224-. . C . . .	0.82	67	92.5	1.48 (13.10)	610 (1345)	1XB7322-P05	132 [4]	6SL3120-1TE31-3AA 3
1PH8226-. . C . . .	0.84	76	93.2	1.93 (17.08)	740 (1632)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8228-. . C . . .	0.86	80	93.3	2.33 (20.62)	870 (1918)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8284-1. C . . .	0.85	106	94.7	4.20 (37.17)	1200 (2646)	1XB7700-P02	260	6SL3320-1TE32-6AA 3
1PH8286-1. C . . .	0.87	121	94.9	5.20 (46.03)	1400 (3087)	1XB7700-P02	310	6SL3320-1TE33-1AA 3
1PH8288-1. C . . .	0.85	171	95.3	6.30 (55.76)	1650 (3638)	1XB7700-P02	380	6SL3320-1TE33-8AA 3
1PH8103-. . D . . .	0.82	4.6	81.4	0.0172 (0.1522)	51 (112)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8107-. . D . . .	0.82	8.2	83.4	0.0289 (0.2558)	73 (161)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8131-. . D . . .	0.86	8.0	87	0.0590 (0.5222)	89 (196)	gk833	30	6SL3120-1TE23-0A■ 0
1PH8133-. . D . . .	0.88	10.1	87.1	0.0760 (0.6727)	106 (234)	gk833	30	6SL3120-1TE23-0A■ 0
1PH8137-. . D . . .	0.88	15.1	88.1	0.1090 (0.9648)	141 (311)	gk833	45	6SL3120-1TE24-5AC 0
1PH8163-. . D . . .	0.89	17.3	90.9	0.2160 (1.9118)	196 (432)	gk863	60	6SL3120-1TE26-0AC 0
1PH8165-. . D . . .	0.89	22.2	91.4	0.2320 (2.0534)	230 (507)	gk863	85	6SL3120-1TE28-5AA 3
1PH8184-. . D . . .	0.83	42	92	0.489 (4.328)	350 (772)	1XB7322-P05	85 [4]	6SL3120-1TE28-5AA 3
1PH8186-. . D . . .	0.83	56	92.6	0.652 (5.771)	422 (931)	1XB7322-P05	132	6SL3120-1TE31-3AA 3
1PH8224-. . D . . .	0.82	77	94.2	1.48 (13.10)	610 (1345)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8226-. . D . . .	0.85	86	94.4	1.93 (17.08)	740 (1632)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8228-. . D . . .	0.87	97	94.8	2.33 (20.62)	870 (1918)	1XB7422-P06	260	6SL3320-1TE32-6AA 3
1PH8284-1. D . . .	0.85	143	95.8	4.20 (37.17)	1200 (2646)	1XB7700-P02	310 [4]	6SL3320-1TE33-1AA 3
1PH8286-1. D . . .	0.81	215	96	5.20 (46.03)	1400 (3087)	1XB7700-P02	490	6SL3320-1TE35-0AA 3
1PH8288-1. D . . .	0.82	252	96.2	6.30 (55.76)	1650 (3638)	1XB7700-P02	490 [4]	6SL3320-1TE35-0AA 3

Single Motor Module	1
Double Motor Module	2
Motor Module	
For continuous load with 200 % overload (C type)	C
For highly dynamic, intermittent load cycles with 300 % overload (D type)	D

1) n_2: Maximum permissible thermal speed at constant power.
2) n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. A to H); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
3) I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system). The rated motor data are valid for 4 kHz (SH 80 to 160) or 2 kHz (SH 180 to 280).
4) The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC, Smart/Basic Line Module									
1500	80	2.8 (3.8)	18 (13.3)	7.5	346	53.3	4700	10000	**1PH8083-■■F■■-....**
		3.7 (5.0)	24 (17.7)	10	336	53.2	5200	10000	**1PH8087-■■F■■-....**
	100	3.7 (5.0)	24 (17.7)	12.5	265	52.4	5000	9000	**1PH8101-■■F■■-....**
		5.5 (7.4)	35 (25.8)	13.5	368	52.4	4200	9000	**1PH8103-■■F■■-....**
		7 (9.39)	45 (33.2)	17.5	348	51.9	5250	9000	**1PH8105-■■F■■-....**
		9 (12.1)	57 (42.0)	23.5	330	52.2	4500	9000	**1PH8107-■■F■■-....**
	132	11 (14.8)	70 (51.6)	24	360	51.4	4800	8000	**1PH8131-■■F■■-....**
		15 (20.1)	96 (70.8)	34	342	51.3	5500	8000	**1PH8133-■■F■■-....**
		18.5 (24.8)	118 (87.0)	43	330	51.3	6150	8000	**1PH8135-■■F■■-....**
		22 (29.5)	140 (103)	56	308	51.3	4300	8000	**1PH8137-■■F■■-....**
	160	30 (40.2)	191 (141)	71	319	50.8	3500	6500	**1PH8163-■■F■■-....**
		37 (49.6)	236 (174)	78	350	50.8	2800	6500	**1PH8165-■■F■■-....**
	180	51 (68.4)	325 (240)	116	335	50.6	5000	5000	**1PH8184-■■F■■-....**
		74 (99.2)	471 (347)	166	330	50.6	5000	5000	**1PH8186-■■F■■-....**
	225	95 (127)	605 (446)	200	340	50.5	3300	4500	**1PH8224-■■F■■-....**
		130 (174)	828 (611)	270	340	50.5	3300	4500	**1PH8226-■■F■■-....**
		160 (215)	1019 (752)	340	340	50.4	3300	4500	**1PH8228-■■F■■-....**
	280	196 (263)	1248 (921)	390	345	50.4	1900	3300	**1PH8284-1■F1■-....**
		250 (335)	1592 (1174)	490	345	50.4	2000	3300	**1PH8286-1■F1■-....**
		320 (429)	2037 (1502)	620	345	50.4	2100	3300	**1PH8288-1■F1■-....**
2000	80	3.7 (5.0)	18 (13.3)	11.6	293	70.2	9200	10000	**1PH8083-■■G■■-....**
		4.9 (6.6)	23 (17.0)	14.1	320	69.8	8400	10000	**1PH8087-■■G■■-....**
	100	7 (9.39)	33 (24.3)	17.5	345	69.0	6000	9000	**1PH8103-■■G■■-....**
		10.5 (14.1)	50 (36.9)	26	355	68.6	4000	9000	**1PH8107-■■G■■-....**
	132	20 (26.8)	96 (70.8)	45	350	68.1	4000	8000	**1PH8133-■■G■■-....**
		21.5 (28.8)	103 (76.0)	51	323	68.0	4000	8000	**1PH8135-■■G■■-....**
		28 (37.5)	134 (98.8)	60	350	68.1	4000	8000	**1PH8137-■■G■■-....**
	160	36 (48.3)	172 (127)	83	324	67.5	3000	6500	**1PH8163-■■G■■-....**
		41 (55.0)	196 (145)	88	350	67.4	2750	6500	**1PH8165-■■G■■-....**
2500	180	78 (105)	298 (220)	166	340	84.0	5000	5000	**1PH8184-■■L■■-....**
		106 (142)	405 (299)	230	335	83.9	5000	5000	**1PH8186-■■L■■-....**
	225	142 (190)	542 (400)	295	340	83.9	3200	4500	**1PH8224-■■L■■-....**
		168 (225)	642 (474)	350	335	83.8	3200	4500	**1PH8226-■■L■■-....**
		205 (275)	783 (578)	420	340	83.8	3200	4500	**1PH8228-■■L■■-....**
3000	80	4.1 (5.5)	13 (9.59)	13.6	298	102.6	10000	10000	**1PH8083-■■M■■-....**
		4.8 (6.4)	15 (11.1)	17.3	284	102.2	10000	10000	**1PH8087-■■M■■-....**
	100	8.4 (11.3)	27 (19.9)	25.7	297	102.1	14250	9000	**1PH8103-■■M■■-....**
		12 (16.1)	38 (28.0)	38	294	101.6	16500	9000	**1PH8107-■■M■■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magne-tizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb_f-in-s²)	kg (lb)	Type	A	Article No.
1PH8083- . . F . . .	0.80	3.8	80.9	0.0064 (0.0566)	32 (70.6)	gk803	9	6SL3120-■TE21-0AD 0
1PH8087- . . F . . .	0.81	4.9	81.7	0.0089 (0.0788)	39 (86.0)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8101- . . F . . .	0.80	6.0	83.5	0.0138 (0.1221)	42 (92.6)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8103- . . F . . .	0.80	6.5	85.2	0.0172 (0.1522)	51 (112)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8105- . . F . . .	0.79	8.8	86.7	0.0252 (0.2230)	65 (143)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8107- . . F . . .	0.81	10.8	86.9	0.0289 (0.2558)	73 (161)	gk813	30	6SL3120-1TE23-0A■ 0
1PH8131- . . F . . .	0.84	10.4	89.9	0.0590 (0.5222)	89 (196)	gk833	30	6SL3120-1TE23-0A■ 0
1PH8133- . . F . . .	0.85	14.2	89.9	0.0760 (0.6727)	106 (234)	gk833	45	6SL3120-1TE24-5AC 0
1PH8135- . . F . . .	0.85	18.1	89.8	0.0940 (0.8320)	125 (276)	gk833	45	6SL3120-1TE24-5AC 0
1PH8137- . . F . . .	0.84	24.2	90.4	0.1090 (0.9648)	141 (311)	gk833	60	6SL3120-1TE26-0AC 0
1PH8163- . . F . . .	0.87	25.6	92.3	0.2160 (1.9118)	196 (432)	gk863	85	6SL3120-1TE28-5AA 3
1PH8165- . . F . . .	0.88	27.0	92.6	0.2320 (2.0534)	230 (507)	gk863	85	6SL3120-1TE28-5AA 3
1PH8184- . . F . . .	0.80	63	94	0.489 (4.328)	350 (772)	1XB7322-P05	132	6SL3120-1TE31-3AA 3
1PH8186- . . F . . .	0.83	82	94.5	0.652 (5.771)	422 (931)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8224- . . F . . .	0.85	87	95.3	1.48 (13.10)	610 (1345)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8226- . . F . . .	0.85	119	95.7	1.93 (17.08)	740 (1632)	1XB7422-P06	310	6SL3320-1TE33-1AA 3
1PH8228- . . F . . .	0.83	170	95.9	2.33 (20.62)	870 (1918)	1XB7700-P02	380	6SL3320-1TE33-8AA 3
1PH8284-1. F . . .	0.87	162	96.3	4.20 (37.17)	1200 (2646)	1XB7700-P02	490	6SL3320-1TE35-0AA 3
1PH8286-1. F . . .	0.89	182	96.5	5.20 (46.03)	1400 (3087)	1XB7700-P02	490	6SL3320-1TE35-0AA 0
1PH8288-1. F . . .	0.89	233	96.6	6.30 (55.76)	1650 (3638)	1XB7712-P03	745	6SL3320-1TE37-5AA 3
1PH8083- . . G . . .	0.79	5.7	83.2	0.0064 (0.0566)	32 (70.6)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8087- . . G . . .	0.78	7.3	85.3	0.0089 (0.0788)	39 (86.0)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8103- . . G . . .	0.79	8.7	87.7	0.0172 (0.1522)	51 (112)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8107- . . G . . .	0.78	12.9	89.7	0.0289 (0.2558)	73 (161)	gk813	30	6SL3120-1TE23-0A■ 0
1PH8133- . . G . . .	0.85	18.1	91.8	0.0760 (0.6727)	106 (234)	gk833	45	6SL3120-1TE24-5AC 0
1PH8135- G	0.85	20.9	91.2	0.0940 (0.8320)	125 (276)	gk833	60	6SL3120-1TE26-0AC 0
1PH8137- . . G . . .	0.87	21.5	92.4	0.1090 (0.9648)	141 (311)	gk833	60	6SL3120-1TE26-0AC 0
1PH8163- . . G . . .	0.88	28.1	92.9	0.2160 (1.9118)	196 (432)	gk863	85	6SL3120-1TE28-5AA 3
1PH8165- . . G . . .	0.87	32.4	92.7	0.2320 (2.0534)	230 (507)	gk863	85 [4]	6SL3120-1TE28-5AA 3
1PH8184- . . L . . .	0.84	75	95.2	0.489 (4.328)	350 (772)	1XB7322-P05	200	6SL3120-1TE32-0AA 3
1PH8186- . . L . . .	0.84	107	95.5	0.652 (5.771)	422 (931)	1XB7422-P06	260	6SL3320-1TE32-6AA 3
1PH8224- . . L . . .	0.86	113	95.8	1.48 (13.10)	610 (1345)	1XB7700-P02	310	6SL3320-1TE33-1AA 3
1PH8226- . . L . . .	0.86	151	96.1	1.93 (17.08)	740 (1632)	1XB7700-P02	380	6SL3320-1TE33-8AA 3
1PH8228- . . L . . .	0.86	181	96.3	2.33 (20.62)	870 (1918)	1XB7700-P02	490	6SL3320-1TE35-0AA 3
1PH8083- . . M . . .	0.74	7.3	86.9	0.0064 (0.0566)	32 (70.6)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8087- . . M . . .	0.72	9.6	87.1	0.0089 (0.0788)	39 (86.0)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8103- . . M . . .	0.78	12.2	90	0.0172 (0.1522)	51 (112)	gk813	30	6SL3120-1TE23-0A■ 0
1PH8107- . . M . . .	0.76	19.2	90	0.0289 (0.2558)	73 (161)	gk813	45	6SL3120-1TE24-5AC 0

Single Motor Module	1
Double Motor Module	2
Motor Module	
For continuous load with 200 % overload (C type)	C
For highly dynamic, intermittent load cycles with 300 % overload (D type)	D

1) n_2: Maximum permissible thermal speed at constant power.
2) n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. A to H); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
3) I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system). The rated motor data are valid for 4 kHz (SH 80 to 160) or 2 kHz (SH 180 to 280).
4) The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC, Active Line Module									
500	100	3.2 (4.3)	61 (45.0)	8.8	345	18.8	1500	7000	**1PH8107-■■B■■-....**
	132	3.6 (4.8)	69 (50.9)	9	328	18.0	1500	6000	**1PH8131-■■B■■-....**
		6.5 (8.7)	124 (91.5)	15.5	363	18.5	1200	6000	**1PH8133-■■B■■-....**
		8 (10.7)	153 (113)	18	380	18.5	1000	6000	**1PH8135-■■B■■-....**
		8.6 (11.5)	165 (122)	18	391	17.8	1400	6000	**1PH8137-■■B■■-....**
	160	12 (16.1)	229 (169)	30	325	17.6	2200	6500	**1PH8163-■■B■■-....**
		16 (21.5)	306 (226)	36	365	17.5	1850	6500	**1PH8165-■■B■■-....**
	180	20.5 (27.5)	392 (289)	49	335	17.4	2900	5000	**1PH8184-■■B■■-....**
		26.5 (35.5)	506 (373)	65	335	17.2	3100	5000	**1PH8186-■■B■■-....**
	225	38 (51.0)	726 (535)	85	335	17.2	2500	4500	**1PH8224-■■B■■-....**
		49 (65.7)	936 (690)	110	330	17.2	2600	4500	**1PH8226-■■B■■-....**
		60 (80.5)	1146 (845)	132	340	17.2	2700	4500	**1PH8228-■■B■■-....**
	280	80 (107)	1529 (1128)	154	395	17.0	1600	3300	**1PH8284-1■B1■-....**
		100 (134)	1909 (1408)	188	400	17.0	1600	3300	**1PH8286-1■B1■-....**
		130 (174)	2481 (1830)	245	395	17.0	1600	3300	**1PH8288-1■B1■-....**
800	180	31 (41.6)	370 (273)	65	365	27.4	3800	5000	**1PH8184-■■C■■-....**
		40 (53.6)	478 (353)	83	360	27.3	4100	5000	**1PH8186-■■C■■-....**
	225	57 (76.4)	681 (502)	126	350	27.1	3400	4500	**1PH8224-■■C■■-....**
		73 (97.9)	872 (643)	154	350	27.1	3600	4500	**1PH8226-■■C■■-....**
		92 (123)	1098 (810)	182	360	27.2	3800	4500	**1PH8228-■■C■■-....**
	280	125 (168)	1492 (1100)	235	400	27.0	2300	3300	**1PH8284-1■C1■-....**
		155 (208)	1850 (1365)	285	385	27.0	2300	3300	**1PH8286-1■C1■-....**
		190 (255)	2268 (1673)	365	370	27.0	2300	3300	**1PH8288-1■C1■-....**
1150	100	4.3 (5.8)	36 (26.6)	10	380	40.7	2450	9000	**1PH8103-■■D■■-....**
		7.2 (9.7)	60 (44.3)	17.5	348	40.6	4750	9000	**1PH8107-■■D■■-....**
	132	9 (12.1)	75 (55.3)	20	360	39.8	3000	8000	**1PH8131-■■D■■-....**
		13.5 (18.1)	112 (82.6)	29	361	40.0	3000	8000	**1PH8133-■■D■■-....**
		19.5 (26.1)	162 (119)	43	350	39.8	4000	8000	**1PH8137-■■D■■-....**
	160	25 (33.5)	208 (153)	55	343	39.2	3550	6500	**1PH8163-■■D■■-....**
		31 (41.6)	257 (190)	69	333	39.2	4850	6500	**1PH8165-■■D■■-....**
	180	44 (59.0)	365 (269)	86	390	39.0	4800	5000	**1PH8184-■■D■■-....**
		58 (77.8)	482 (356)	112	390	38.9	5000	5000	**1PH8186-■■D■■-....**
	225	81 (109)	673 (496)	156	385	38.8	3400	4500	**1PH8224-■■D■■-....**
		105 (141)	872 (643)	192	390	38.8	3400	4500	**1PH8226-■■D■■-....**
		129 (173)	1071 (790)	235	390	38.8	3400	4500	**1PH8228-■■D■■-....**
	280	170 (228)	1414 (1043)	310	400	38.6	2200	3300	**1PH8284-1■D1■-....**
		210 (282)	1745 (1287)	410	380	38.6	2200	3300	**1PH8286-1■D1■-....**
		260 (349)	2160 (1593)	495	385	38.6	2200	3300	**1PH8288-1■D1■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb_f-in-s²)	kg (lb)	Type	A	Article No.
1PH8107-..B...	0.83	4.3	73	0.0289 (0.2558)	73 (161)	gk813	9	6SL3120-■TE21-0AD0
1PH8131-..B...	0.88	3.5	81	0.0590 (0.5222)	89 (196)	gk833	9	6SL3120-■TE21-0AD0
1PH8133-..B...	0.89	5.4	78	0.0760 (0.6727)	106 (234)	gk833	18	6SL3120-■TE21-8A■0
1PH8135-..B...	0.90	5.6	78	0.0940 (0.8320)	125 (276)	gk833	18	6SL3120-■TE21-8A■0
1PH8137-..B...	0.88	6.7	82	0.1090 (0.9648)	141 (311)	gk833	18	6SL3120-■TE21-8A■0
1PH8163-..B...	0.90	8.9	81.9	0.2160 (1.9118)	196 (432)	gk863	30	6SL3120-1TE23-0A■0
1PH8165-..B...	0.85	14.8	83	0.2320 (2.0534)	230 (507)	gk863	45	6SL3120-1TE24-5AC0
1PH8184-..B...	0.84	23	86.1	0.489 (4.328)	350 (772)	1XB7322-P05	60	6SL3120-1TE26-0AC0
1PH8186-..B...	0.80	36	87.5	0.652 (5.771)	422 (931)	1XB7322-P05	85	6SL3120-1TE28-5AA3
1PH8224-..B...	0.86	36	89.6	1.48 (13.10)	610 (1345)	1XB7322-P05	85	6SL3120-1TE28-5AA3
1PH8226-..B...	0.86	48	90.8	1.93 (17.08)	740 (1632)	1XB7322-P05	132	6SL3120-1TE31-3AA3
1PH8228-..B...	0.85	59	91.4	2.33 (20.62)	870 (1918)	1XB7322-P05	132	6SL3120-1TE31-3AA3
1PH8284-1.B...	0.81	81	93.5	4.20 (37.17)	1200 (2646)	1XB7700-P02	200	6SL3120-1TE32-0AA4
1PH8286-1.B...	0.82	96	93.9	5.20 (46.03)	1400 (3087)	1XB7700-P02	200	6SL3120-1TE32-0AA4
1PH8288-1.B...	0.82	127	94.1	6.30 (55.76)	1650 (3638)	1XB7700-P02	260	6SL3320-1TE32-6AA3
1PH8184-..C...	0.84	30	90.1	0.489 (4.328)	350 (772)	1XB7322-P05	85	6SL3120-1TE28-5AA3
1PH8186-..C...	0.84	41	91.6	0.652 (5.771)	422 (931)	1XB7322-P05	85	6SL3120-1TE28-5AA3
1PH8224-..C...	0.80	67	93.4	1.48 (13.10)	610 (1345)	1XB7322-P05	132	6SL3120-1TE31-3AA3
1PH8226-..C...	0.83	75	94	1.93 (17.08)	740 (1632)	1XB7322-P05	200	6SL3120-1TE32-0AA4
1PH8228-..C...	0.86	80	94.1	2.33 (20.62)	870 (1918)	1XB7322-P05	200	6SL3120-1TE32-0AA4
1PH8284-1.C...	0.81	124	95.2	4.20 (37.17)	1200 (2646)	1XB7700-P02	260	6SL3320-1TE32-6AA3
1PH8286-1.C...	0.85	133	95.5	5.20 (46.03)	1400 (3087)	1XB7700-P02	310	6SL3320-1TE33-1AA3
1PH8288-1.C...	0.85	171	95.7	6.30 (55.76)	1650 (3638)	1XB7700-P02	380	6SL3320-1TE33-8AA3
1PH8103-..D...	0.81	4.8	82.4	0.0172 (0.1522)	51 (112)	gk813	18	6SL3120-■TE21-8A■0
1PH8107-..D...	0.82	8.2	85.2	0.0289 (0.2558)	73 (161)	gk813	18	6SL3120-■TE21-8A■0
1PH8131-..D...	0.85	8.0	88	0.0590 (0.5222)	89 (196)	gk833	30	6SL3120-1TE23-0A■0
1PH8133-..D...	0.87	10.7	88.4	0.0760 (0.6727)	106 (234)	gk833	30	6SL3120-1TE23-0A■0
1PH8137-..D...	0.87	16.1	89.1	0.1090 (0.9648)	141 (311)	gk833	45	6SL3120-1TE24-5AC0
1PH8163-..D...	0.88	17.5	91.5	0.2160 (1.9118)	196 (432)	gk863	60	6SL3120-1TE26-0AC0
1PH8165-..D...	0.89	20.9	92.1	0.2320 (2.0534)	230 (507)	gk863	85	6SL3120-1TE28-5AA3
1PH8184-..D...	0.82	42	92.8	0.489 (4.328)	350 (772)	1XB7322-P05	85 [4]	6SL3120-1TE28-5AA3
1PH8186-..D...	0.82	57	93.3	0.652 (5.771)	422 (931)	1XB7322-P05	132	6SL3120-1TE31-3AA3
1PH8224-..D...	0.82	78	94.6	1.48 (13.10)	610 (1345)	1XB7322-P05	200	6SL3120-1TE32-0AA4
1PH8226-..D...	0.85	86	94.9	1.93 (17.08)	740 (1632)	1XB7322-P05	200	6SL3120-1TE32-0AA4
1PH8228-..D...	0.86	97	95.3	2.33 (20.62)	870 (1918)	1XB7422-P06	260	6SL3320-1TE32-6AA3
1PH8284-1.D...	0.82	157	96	4.20 (37.17)	1200 (2646)	1XB7700-P02	310	6SL3320-1TE33-1AA3
1PH8286-1.D...	0.81	217	96.2	5.20 (46.03)	1400 (3087)	1XB7700-P02	490	6SL3320-1TE35-0AA3
1PH8288-1.D...	0.82	253	96.4	6.30 (55.76)	1650 (3638)	1XB7700-P02	490 [4]	6SL3320-1TE35-0AA3

Single Motor Module	1
Double Motor Module	2

Motor Module	
For continuous load with 200 % overload (C type)	C
For highly dynamic, intermittent load cycles with 300 % overload (D type)	D

1) n_2: Maximum permissible thermal speed at constant power.
2) n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. A to H); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
3) I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system). The rated motor data are valid for 4 kHz (SH 80 to 160) or 2 kHz (SH 180 to 280).
4) The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Forced ventilation**
n_N r/min	SH	P_N kW (hp)	M_N Nm (lb_f-ft)	I_N A	U_N V	f_N Hz	n_2 r/min	n_{max} r/min	Article No.
Line voltage 400 V 3 AC, Active Line Module									
1750	80	3.3 (4.4)	18 (13.3)	7.5	398	61.7	5200	10000	**1PH8083-■■F■■-....**
		4.3 (5.8)	23 (17.0)	10	396	61.3	5850	10000	**1PH8087-■■F■■-....**
	100	4.3 (5.8)	23 (17.0)	12.5	304	60.8	5000	9000	**1PH8101-■■F■■-....**
		6.3 (8.4)	34 (25.1)	13.1	412	60.8	4000	9000	**1PH8103-■■F■■-....**
		8 (10.7)	44 (32.5)	17.5	400	60.2	5900	9000	**1PH8105-■■F■■-....**
		10 (13.4)	55 (40.6)	22	380	60.4	5000	9000	**1PH8107-■■F■■-....**
	132	13 (17.4)	71 (52.4)	24	416	59.8	5150	8000	**1PH8131-■■F■■-....**
		17.5 (23.5)	96 (70.8)	34	392	59.7	5000	8000	**1PH8133-■■F■■-....**
		21.5 (28.8)	117 (86.3)	43	383	59.6	5500	8000	**1PH8135-■■F■■-....**
		25 (33.5)	136 (100)	56	353	59.6	5000	8000	**1PH8137-■■F■■-....**
	160	34 (45.6)	186 (137)	70	366	59.2	3050	6500	**1PH8163-■■F■■-....**
		41 (55.0)	224 (165)	76	400	59.1	2650	6500	**1PH8165-■■F■■-....**
	180	60 (80.5)	327 (241)	120	390	58.9	5000	5000	**1PH8184-■■F■■-....**
		85 (114)	464 (342)	164	385	58.9	5000	5000	**1PH8186-■■F■■-....**
	225	110 (148)	600 (443)	198	395	58.9	3200	4500	**1PH8224-■■F■■-....**
		135 (181)	737 (544)	250	395	58.8	3300	4500	**1PH8226-■■F■■-....**
		179 (240)	977 (721)	330	395	58.7	3400	4500	**1PH8228-■■F■■-....**
	280	225 (302)	1228 (906)	390	400	58.7	2200	3300	**1PH8284-1■F1■-....**
		270 (362)	1474 (1087)	460	400	58.7	2200	3300	**1PH8286-1■F1■-....**
		340 (456)	1856 (1369)	580	400	58.7	2200	3300	**1PH8288-1■F1■-....**
2300	80	4.1 (5.5)	17 (12.5)	11.3	332	80.0	10000	10000	**1PH8083-■■G■■-....**
		5.4 (7.2)	22 (16.2)	13.7	353	79.8	9650	10000	**1PH8087-■■G■■-....**
	100	7.5 (10.1)	31 (22.9)	17	382	78.9	6000	9000	**1PH8103-■■G■■-....**
		12.0 (16.1)	50 (36.9)	26	406	78.6	4600	9000	**1PH8107-■■G■■-....**
	132	22.5 (30.2)	93 (68.6)	44	400	78.1	5000	8000	**1PH8133-■■G■■-....**
		24 (32.2)	100 (73.8)	50	370	77.9	5000	8000	**1PH8135-■■G■■-....**
		29 (38.9)	120 (88.5)	56	400	77.9	5000	8000	**1PH8137-■■G■■-....**
	160	38 (51.0)	158 (117)	78	370	77.4	3200	6500	**1PH8163-■■G■■-....**
		44 (59.0)	183 (135)	85	394	77.4	3000	6500	**1PH8165-■■G■■-....**
2900	180	81 (109)	267 (197)	152	395	97.3	5000	5000	**1PH8184-■■L■■-....**
		101 (135)	333 (246)	198	385	97.2	5000	5000	**1PH8186-■■L■■-....**
	225	149 (200)	491 (362)	270	395	97.2	3300	4500	**1PH8224-■■L■■-....**
		185 (248)	609 (449)	335	390	97.1	3300	4500	**1PH8226-■■L■■-....**
		215 (288)	708 (522)	390	395	97.1	3300	4500	**1PH8228-■■L■■-....**
3300	80	4.5 (6.0)	13 (9.59)	13.5	327	112.6	10000	10000	**1PH8083-■■M■■-....**
		5.2 (7.0)	15 (11.1)	17.1	303	112.3	10000	10000	**1PH8087-■■M■■-....**
	100	9.3 (12.5)	27 (19.9)	25.7	326	112.1	16000	9000	**1PH8103-■■M■■-....**
		13 (17.4)	38 (28.0)	38	314	111.7	18000	9000	**1PH8107-■■M■■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb$_f$-in-s²)	kg (lb)	Type	A	Article No.
1PH8083-. . F . . .	0.80	3.8	83.1	0.0064 (0.0566)	32 (70.6)	gk803	9	6SL3120-■TE21-0AD 0
1PH8087-. . F . . .	0.78	5.3	83.8	0.0089 (0.0788)	39 (86.0)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8101-. . F . . .	0.80	6.0	85.2	0.0138 (0.1221)	42 (92.6)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8103-. . F . . .	0.81	6.0	85.9	0.0172 (0.1522)	51 (112)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8105-. . F . . .	0.78	8.8	87.8	0.0252 (0.2230)	65 (143)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8107-. . F . . .	0.80	10.9	87.8	0.0289 (0.2558)	73 (161)	gk813	30	6SL3120-1TE23-0A■ 0
1PH8131-. . F . . .	0.84	10.3	91.4	0.0590 (0.5222)	89 (196)	gk833	30	6SL3120-1TE23-0A■ 0
1PH8133-. . F . . .	0.85	13.6	91.3	0.0760 (0.6727)	106 (234)	gk833	45	6SL3120-1TE24-5AC 0
1PH8135-. . F . . .	0.84	18.3	90.9	0.0940 (0.8320)	125 (276)	gk833	45	6SL3120-1TE24-5AC 0
1PH8137-. . F . . .	0.86	23.1	90.7	0.1090 (0.9648)	141 (311)	gk833	60	6SL3120-1TE26-0AC 0
1PH8163-. . F . . .	0.87	24.6	92.6	0.2160 (1.9118)	196 (432)	gk863	85	6SL3120-1TE28-5AA 3
1PH8165-. . F . . .	0.88	25.8	93.4	0.2320 (2.0534)	230 (507)	gk863	85	6SL3120-1TE28-5AA 3
1PH8184-. . F . . .	0.79	64	94.4	0.489 (4.328)	350 (772)	1XB7322-P05	132	6SL3120-1TE31-3AA 3
1PH8186-. . F . . .	0.82	83	94.9	0.652 (5.771)	422 (931)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8224-. . F . . .	0.85	87	95.6	1.48 (13.10)	610 (1345)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8226-. . F . . .	0.83	119	96	1.93 (17.08)	740 (1632)	1XB7422-P06	310	6SL3320-1TE33-1AA 3
1PH8228-. . F . . .	0.82	170	96.1	2.33 (20.62)	870 (1918)	1XB7700-P02	380	6SL3320-1TE33-8AA 3
1PH8284-1. F . . .	0.86	162	96.4	4.20 (37.17)	1200 (2646)	1XB7700-P02	490	6SL3320-1TE35-0AA 3
1PH8286-1. F . . .	0.88	183	96.6	5.20 (46.03)	1400 (3087)	1XB7700-P02	490	6SL3320-1TE35-0AA 3
1PH8288-1. F . . .	0.88	233	96.7	6.30 (55.76)	1650 (3638)	1XB7712-P03	745	6SL3320-1TE37-5AA 3
1PH8083-. . G . . .	0.78	5.7	85.2	0.0064 (0.0566)	32 (70.6)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8087-. . G . . .	0.79	6.8	85.9	0.0089 (0.0788)	39 (86.0)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8103-. . G . . .	0.79	8.1	89.1	0.0172 (0.1522)	51 (112)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8107-. . G . . .	0.78	13.0	90.9	0.0289 (0.2558)	73 (161)	gk813	30	6SL3120-1TE23-0A■ 0
1PH8133-. . G . . .	0.84	18.1	93.3	0.0760 (0.6727)	106 (234)	gk833	45	6SL3120-1TE24-5AC 0
1PH8135-. . G . . .	0.85	20.6	91.9	0.0940 (0.8320)	125 (276)	gk833	60	6SL3120-1TE26-0AC 0
1PH8137-. . G . . .	0.86	21.9	92.9	0.1090 (0.9648)	141 (311)	gk833	60	6SL3120-1TE26-0AC 0
1PH8163-. . G . . .	0.87	28.2	93.5	0.2160 (1.9118)	196 (432)	gk863	85	6SL3120-1TE28-5AA 3
1PH8165-. . G . . .	0.86	31.0	93.2	0.2320 (2.0534)	230 (507)	gk863	85	6SL3120-1TE28-5AA 3
1PH8184-. . L . . .	0.82	76	95.2	0.489 (4.328)	350 (772)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8186-. . L . . .	0.80	106	95.4	0.652 (5.771)	422 (931)	1XB7422-P06	260	6SL3320-1TE32-6AA 3
1PH8224-. . L . . .	0.85	115	95.7	1.48 (13.10)	610 (1345)	1XB7700-P02	310	6SL3320-1TE33-1AA 3
1PH8226-. . L . . .	0.85	152	96	1.93 (17.08)	740 (1632)	1XB7700-P02	380	6SL3320-1TE33-8AA 3
1PH8228-. . L . . .	0.84	183	96.1	2.33 (20.62)	870 (1918)	1XB7700-P02	490	6SL3320-1TE35-0AA 3
1PH8083-. . M . . .	0.74	7.3	87.5	0.0064 (0.0566)	32 (70.6)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8087-. . M . . .	0.73	9.2	87.8	0.0089 (0.0788)	39 (86.0)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8103-. . M . . .	0.78	12.2	90	0.0172 (0.1522)	51 (112)	gk813	30	6SL3120-1TE23-0A■ 0
1PH8107-. . M . . .	0.78	12.2	90	0.0289 (0.2558)	73 (161)	gk813	45	6SL3120-1TE24-5AC 0

Single Motor Module	1
Double Motor Module	2
Motor Module	
For continuous load with 200 % overload (C type)	C
For highly dynamic, intermittent load cycles with 300 % overload (D type)	D

1) n_2: Maximum permissible thermal speed at constant power.
2) n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. A to H); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
3) I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 4 kHz (SH 80 to 160) or 2 kHz (SH 180 to 280).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 480 V 3 AC, Smart/Basic Line Module									
600	100	3.8 (5.1)	60 (44.3)	8.8	406	22.0	1500	7000	**1PH8107-■■B■■-....**
	132	4.3 (5.8)	68 (50.2)	9	384	21.3	1500	6000	**1PH8131-■■B■■-....**
		7.8 (10.5)	124 (91.5)	15.5	421	21.8	1200	6000	**1PH8133-■■B■■-....**
		9.6 (12.9)	153 (113)	18	443	21.9	1000	6000	**1PH8135-■■B■■-....**
		10.3 (13.8)	165 (122)	18	458	21.4	1300	6000	**1PH8137-■■B■■-....**
	160	14.5 (19.4)	231 (170)	30	370	21.0	2150	6500	**1PH8163-■■B■■-....**
		19 (25.5)	302 (223)	35	420	20.8	1800	6500	**1PH8165-■■B■■-....**
	180	25 (33.5)	398 (294)	49	410	20.7	3000	5000	**1PH8184-■■B■■-....**
		32 (42.9)	509 (375)	66	400	20.6	3200	5000	**1PH8186-■■B■■-....**
	225	45 (60.3)	716 (528)	83	405	20.5	2600	4500	**1PH8224-■■B■■-....**
		59 (79.1)	939 (693)	110	395	20.5	2700	4500	**1PH8226-■■B■■-....**
		72 (96.6)	1146 (845)	130	410	20.5	2800	4500	**1PH8228-■■B■■-....**
	280	95 (127)	1519 (1120)	154	460	20.3	1800	3300	**1PH8284-1■B1■-....**
		120 (161)	1916 (1413)	188	460	20.3	1800	3300	**1PH8286-1■B1■-....**
		155 (208)	2474 (1825)	245	460	20.3	1800	3300	**1PH8288-1■B1■-....**
1000	180	39 (52.3)	372 (274)	65	460	34.0	3700	5000	**1PH8184-■■C■■-....**
		50 (67.0)	478 (353)	83	450	33.9	4000	5000	**1PH8186-■■C■■-....**
	225	71 (95.2)	678 (500)	126	425	33.8	3700	4500	**1PH8224-■■C■■-....**
		92 (123)	879 (648)	156	440	33.8	3900	4500	**1PH8226-■■C■■-....**
		115 (154)	1098 (810)	182	450	33.8	4000	4500	**1PH8228-■■C■■-....**
	280	150 (201)	1433 (1057)	230	455	33.7	2300	3300	**1PH8284-1■C1■-....**
		185 (248)	1767 (1303)	280	460	33.7	2300	3300	**1PH8286-1■C1■-....**
		230 (308)	2197 (1621)	355	460	33.6	2300	3300	**1PH8288-1■C1■-....**
1350	100	4.7 (6.3)	33 (24.3)	9.7	423	47.3	3500	9000	**1PH8103-■■D■■-....**
		8.0 (10.7)	57 (42.0)	17	400	47.1	5045	9000	**1PH8107-■■D■■-....**
	132	10.6 (14.2)	75 (55.3)	20	416	46.5	3000	8000	**1PH8131-■■D■■-....**
		15 (20.1)	106 (78.2)	28	417	46.5	3500	8000	**1PH8133-■■D■■-....**
		22 (29.5)	156 (115)	42	404	46.4	4000	8000	**1PH8137-■■D■■-....**
	160	28 (37.5)	198 (146)	52	400	45.8	4000	6500	**1PH8163-■■D■■-....**
		34 (45.6)	241 (178)	66	387	45.8	5600	6500	**1PH8165-■■D■■-....**
	180	50 (67.0)	354 (261)	84	450	45.7	5000	5000	**1PH8184-■■D■■-....**
		67 (89.8)	474 (350)	112	450	45.6	5000	5000	**1PH8186-■■D■■-....**
	225	92 (123)	651 (480)	154	450	45.5	3400	4500	**1PH8224-■■D■■-....**
		120 (161)	849 (626)	188	460	45.5	3400	4500	**1PH8226-■■D■■-....**
		147 (197)	1040 (767)	225	460	45.5	3400	4500	**1PH8228-■■D■■-....**
	280	200 (268)	1416 (1044)	315	460	45.3	2200	3300	**1PH8284-1■D1■-....**
		245 (329)	1733 (1278)	410	445	45.3	2200	3300	**1PH8286-1■D1■-....**
		305 (409)	2158 (1592)	495	450	45.3	2200	3300	**1PH8288-1■D1■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb_f-in-s²)	kg (lb)	Type	A	Article No.
1PH8107-. . B . . .	0.82	4.4	76	0.0289 (0.2558)	73 (161)	gk813	9	6SL3120-■TE21-0AD 0
1PH8131-. . B . . .	0.88	3.5	83	0.0590 (0.5222)	89 (196)	gk833	9	6SL3120-■TE21-0AD 0
1PH8133-. . B . . .	0.89	5.3	81	0.0760 (0.6727)	106 (234)	gk833	18	6SL3120-■TE21-8A■ 0
1PH8135-. . B . . .	0.90	5.6	81	0.0940 (0.8320)	125 (276)	gk833	18	6SL3120-■TE21-8A■ 0
1PH8137-. . B . . .	0.88	6.8	85	0.1090 (0.9648)	141 (311)	gk833	18	6SL3120-■TE21-8A■ 0
1PH8163-. . B . . .	0.90	8.1	85.1	0.2160 (1.9118)	196 (432)	gk863	30	6SL3120-1TE23-0A■ 0
1PH8165-. . B . . .	0.88	12.0	85	0.2320 (2.0534)	230 (507)	gk863	45	6SL3120-1TE24-5AC 0
1PH8184-. . B . . .	0.81	26	88.2	0.489 (4.328)	350 (772)	1XB7322-P05	60	6SL3120-1TE26-0AC 0
1PH8186-. . B . . .	0.79	37	89.2	0.652 (5.771)	422 (931)	1XB7322-P05	85	6SL3120-1TE28-5AA 3
1PH8224-. . B . . .	0.85	37	91.2	1.48 (13.10)	610 (1345)	1XB7322-P05	85	6SL3120-1TE28-5AA 3
1PH8226-. . B . . .	0.85	49	92.1	1.93 (17.08)	740 (1632)	1XB7322-P05	132	6SL3120-1TE31-3AA 3
1PH8228-. . B . . .	0.84	62	92.7	2.33 (20.62)	870 (1918)	1XB7322-P05	132	6SL3120-1TE31-3AA 3
1PH8284-1. B . . .	0.82	77	94.3	4.20 (37.17)	1200 (2646)	1XB7700-P02	200	6SL3120-1TE32-0AA 4
1PH8286-1. B . . .	0.85	88	94.5	5.20 (46.03)	1400 (3087)	1XB7700-P02	200	6SL3120-1TE32-0AA 4
1PH8288-1. B . . .	0.84	121	94.8	6.30 (55.76)	1650 (3638)	1XB7700-P02	260	6SL3320-1TE32-6AA 3
1PH8184-. . C . . .	0.82	32	91.7	0.489 (4.328)	350 (772)	1XB7322-P05	85	6SL3120-1TE28-5AA 0
1PH8186-. . C . . .	0.83	42	92.9	0.652 (5.771)	422 (931)	1XB7322-P05	85	6SL3120-1TE28-5AA 3
1PH8224-. . C . . .	0.81	64	94.3	1.48 (13.10)	610 (1345)	1XB7322-P05	132	6SL3120-1TE31-3AA 3
1PH8226-. . C . . .	0.82	77	94.8	1.93 (17.08)	740 (1632)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8228-. . C . . .	0.85	82	94.9	2.33 (20.62)	870 (1918)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8284-1. C . . .	0.86	101	95.7	4.20 (37.17)	1200 (2646)	1XB7700-P02	260	6SL3320-1TE32-6AA 3
1PH8286-1. C . . .	0.86	122	96	5.20 (46.03)	1400 (3087)	1XB7700-P02	310	6SL3320-1TE33-1AA 3
1PH8288-1. C . . .	0.84	172	96.2	6.30 (55.76)	1650 (3638)	1XB7700-P02	380	6SL3320-1TE33-8AA 3
1PH8103-. . D . . .	0.82	4.4	84.8	0.0172 (0.1522)	51 (112)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8107-. . D . . .	0.80	8.2	86.7	0.0289 (0.2558)	73 (161)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8131-. . D . . .	0.86	7.9	90	0.0590 (0.5222)	89 (196)	gk833	30	6SL3120-1TE23-0A■ 0
1PH8133-. . D . . .	0.86	10.7	90.4	0.0760 (0.6727)	106 (234)	gk833	30	6SL3120-1TE23-0A■ 0
1PH8137-. . D . . .	0.86	15.9	90.2	0.1090 (0.9648)	141 (311)	gk833	45	6SL3120-1TE24-5AC 0
1PH8163-. . D . . .	0.88	17.7	92.4	0.2160 (1.9118)	196 (432)	gk863	60	6SL3120-1TE26-0AC 0
1PH8165-. . D . . .	0.86	22.5	92.8	0.2320 (2.0534)	230 (507)	gk863	85	6SL3120-1TE28-5AA 3
1PH8184-. . D . . .	0.82	41	93.6	0.489 (4.328)	350 (772)	1XB7322-P05	85	6SL3120-1TE28-5AA 3
1PH8186-. . D . . .	0.82	55	93.9	0.652 (5.771)	422 (931)	1XB7322-P05	132	6SL3120-1TE31-3AA 3
1PH8224-. . D . . .	0.81	78	95.1	1.48 (13.10)	610 (1345)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8226-. . D . . .	0.84	88	95.4	1.93 (17.08)	740 (1632)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8228-. . D . . .	0.86	99	95.7	2.33 (20.62)	870 (1918)	1XB7422-P06	260	6SL3320-1TE32-6AA 3
1PH8284-1. D . . .	0.83	151	96.2	4.20 (37.17)	1200 (2646)	1XB7700-P02	310 [4]	6SL3320-1TE33-1AA 3
1PH8286-1. D . . .	0.81	217	96.3	5.20 (46.03)	1400 (3087)	1XB7700-P02	490	6SL3320-1TE35-0AA 3
1PH8288-1. D . . .	0.82	251	96.5	6.30 (55.76)	1650 (3638)	1XB7700-P02	490 [4]	6SL3320-1TE35-0AA 3

Single Motor Module	1
Double Motor Module	2
Motor Module	
For continuous load with 200 % overload (C type)	C
For highly dynamic, intermittent load cycles with 300 % overload (D type)	D

1) n_2: Maximum permissible thermal speed at constant power.
2) n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. A to H); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
3) I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 4 kHz (SH 80 to 160) or 2 kHz (SH 180 to 280).
4) The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Forced ventilation**
n_N r/min	SH	P_N kW (hp)	M_N Nm (lb_f-ft)	I_N A	U_N V	f_N Hz	n_2 r/min	n_{max} r/min	Article No.
Line voltage 480 V 3 AC, Smart/Basic Line Module									
2000	80	3.7 (5.0)	18 (13.3)	7.6	447	70.0	5550	10000	**1PH8083-■■F■■-....**
		4.9 (6.6)	23 (17.0)	10	435	69.9	6100	10000	**1PH8087-■■F■■-....**
	100	4.7 (6.3)	22 (16.2)	12.5	343	69.0	7500	9000	**1PH8101-■■F■■-....**
		7 (9.39)	33 (24.3)	12.7	460	69.1	4100	9000	**1PH8103-■■F■■-....**
		9 (12.1)	43 (31.7)	17	453	68.5	6180	9000	**1PH8105-■■F■■-....**
		11 (14.8)	53 (39.1)	21.5	428	68.6	5500	9000	**1PH8107-■■F■■-....**
	132	15 (20.1)	72 (53.1)	24	460	68.2	5300	8000	**1PH8131-■■F■■-....**
		20 (26.8)	96 (70.8)	34	445	68.0	6200	8000	**1PH8133-■■F■■-....**
		24 (32.2)	115 (84.8)	43	434	67.9	7100	8000	**1PH8135-■■F■■-....**
		28 (37.5)	134 (98.8)	55	401	67.9	4000	8000	**1PH8137-■■F■■-....**
	160	37 (49.6)	177 (131)	68	416	67.4	3550	6500	**1PH8163-■■F■■-....**
		45 (60.3)	215 (159)	75	440	67.5	3300	6500	**1PH8165-■■F■■-....**
	180	68 (91.2)	325 (240)	118	450	67.2	5000	5000	**1PH8184-■■F■■-....**
		94 (126)	449 (331)	160	445	67.2	5000	5000	**1PH8186-■■F■■-....**
	225	124 (166)	592 (437)	196	460	67.2	2900	4500	**1PH8224-■■F■■-....**
		153 (205)	731 (539)	245	450	67.1	3100	4500	**1PH8226-■■F■■-....**
		196 (263)	936 (690)	325	450	67.1	3200	4500	**1PH8228-■■F■■-....**
	280	255 (342)	1218 (898)	390	455	67.0	2200	3300	**1PH8284-1■F1■-....**
		310 (416)	1481 (1092)	460	455	67.0	2200	3300	**1PH8286-1■F1■-....**
		385 (516)	1838 (1356)	570	455	67.0	2200	3300	**1PH8288-1■F1■-....**
2650	80	4.6 (6.2)	17 (12.5)	11.2	376	91.6	10000	10000	**1PH8083-■■G■■-....**
		6 (8.05)	22 (16.2)	13.6	390	91.6	10000	10000	**1PH8087-■■G■■-....**
	100	8 (10.7)	29 (21.4)	16	434	90.4	7500	9000	**1PH8103-■■G■■-....**
		13.0 (17.4)	47 (34.7)	24	460	90.0	7000	9000	**1PH8107-■■G■■-....**
	132	24 (32.2)	86 (63.4)	41	456	89.6	7000	8000	**1PH8133-■■G■■-....**
		26 (34.9)	94 (69.3)	48	424	89.6	6000	8000	**1PH8135-■■G■■-....**
		30 (40.2)	108 (79.7)	52	460	89.4	4250	8000	**1PH8137-■■G■■-....**
	160	40 (53.6)	144 (106)	76	390	89.2	3500	6500	**1PH8163-■■G■■-....**
		50 (67.0)	180 (133)	85	440	89.0	3250	6500	**1PH8165-■■G■■-....**
3400	180	65 (87.2)	183 (135)	120	460	113.7	5000	5000	**1PH8184-■■L■■-....**
		81 (109)	228 (168)	158	455	113.7	5000	5000	**1PH8186-■■L■■-....**
	225	85 (114)	239 (176)	168	460	113.6	3600	4500	**1PH8224-■■L■■-....**
		90 (121)	253 (187)	205	460	113.5	3600	4500	**1PH8226-■■L■■-....**
		95 (127)	267 (197)	225	460	113.5	3600	4500	**1PH8228-■■L■■-....**
3600	80	4.9 (6.6)	13 (9.59)	14	355	122.6	10000	10000	**1PH8083-■■M■■-....**
		5.7 (7.6)	15 (11.1)	17.1	329	122.4	10000	10000	**1PH8087-■■M■■-....**
	100	10 (13.4)	27 (19.9)	25.4	355	122.1	17650	9000	**1PH8103-■■M■■-....**
		14 (18.8)	37 (27.3)	37.5	350	121.6	18000	9000	**1PH8107-■■M■■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb$_f$-in-s²)	kg (lb)	Type	A	Article No.
1PH8083-. . F . . .	0.79	3.7	85	0.0064 (0.0566)	32 (70.6)	gk803	9	6SL3120-■TE21-0AD 0
1PH8087-. . F . . .	0.80	4.9	86.4	0.0089 (0.0788)	39 (86.0)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8101-. . F . . .	0.79	6.0	87.1	0.0138 (0.1221)	42 (92.6)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8103-. . F . . .	0.81	5.8	89.4	0.0172 (0.1522)	51 (112)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8105-. . F . . .	0.78	8.7	91.1	0.0252 (0.2230)	65 (143)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8107-. . F . . .	0.79	10.8	90.1	0.0289 (0.2558)	73 (161)	gk813	30	6SL3120-1TE23-0A■ 0
1PH8131-. . F . . .	0.86	9.2	93.1	0.0590 (0.5222)	89 (196)	gk833	30	6SL3120-1TE23-0A■ 0
1PH8133-. . F . . .	0.85	13.5	93.3	0.0760 (0.6727)	106 (234)	gk833	45	6SL3120-1TE24-5AC 0
1PH8135-. . F . . .	0.84	18.1	92.9	0.0940 (0.8320)	125 (276)	gk833	45	6SL3120-1TE24-5AC 0
1PH8137-. . F . . .	0.84	23.1	93.1	0.1090 (0.9648)	141 (311)	gk833	60	6SL3120-1TE26-0AC 0
1PH8163-. . F . . .	0.86	24.6	93.2	0.2160 (1.9118)	196 (432)	gk863	85	6SL3120-1TE28-5AA 3
1PH8165-. . F . . .	0.89	23.6	93.6	0.2320 (2.0534)	230 (507)	gk863	85	6SL3120-1TE28-5AA 3
1PH8184-. . F . . .	0.78	65	94.7	0.489 (4.328)	350 (772)	1XB7322-P05	132	6SL3120-1TE31-3AA 3
1PH8186-. . F . . .	0.80	86	95.2	0.652 (5.771)	422 (931)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8224-. . F . . .	0.83	90	95.7	1.48 (13.10)	610 (1345)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8226-. . F . . .	0.83	119	96.1	1.93 (17.08)	740 (1632)	1XB7422-P06	310	6SL3320-1TE33-1AA 3
1PH8228-. . F . . .	0.81	169	96.2	2.33 (20.62)	870 (1918)	1XB7700-P02	380	6SL3320-1TE33-8AA 3
1PH8284-1. F . . .	0.86	162	96.5	4.20 (37.17)	1200 (2646)	1XB7700-P02	490	6SL3320-1TE35-0AA 3
1PH8286-1. F . . .	0.88	182	96.7	5.20 (46.03)	1400 (3087)	1XB7700-P02	490	6SL3320-1TE35-0AA 3
1PH8288-1. F . . .	0.88	232	96.7	6.30 (55.76)	1650 (3638)	1XB7712-P03	745	6SL3320-1TE37-5AA 3
1PH8083-. . G . . .	0.78	5.7	86.2	0.0064 (0.0566)	32 (70.6)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8087-. . G . . .	0.79	6.5	88.4	0.0089 (0.0788)	39 (86.0)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8103-. . G . . .	0.78	8.1	91.3	0.0172 (0.1522)	51 (112)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8107-. . G . . .	0.77	12.8	93.2	0.0289 (0.2558)	73 (161)	gk813	30	6SL3120-1TE23-0A■ 0
1PH8133-. . G . . .	0.83	18.1	94.9	0.0760 (0.6727)	106 (234)	gk833	45	6SL3120-1TE24-5AC 0
1PH8135-. . G . . .	0.84	20.6	92.3	0.0940 (0.8320)	125 (276)	gk833	60	6SL3120-1TE26-0AC 0
1PH8137-. . G . . .	0.83	22.4	94.1	0.1090 (0.9648)	141 (311)	gk833	60	6SL3120-1TE26-0AC 0
1PH8163-. . G . . .	0.89	23.1	93.6	0.2160 (1.9118)	196 (432)	gk863	85	6SL3120-1TE28-5AA 3
1PH8165-. . G . . .	0.87	28.9	93.2	0.2320 (2.0534)	230 (507)	gk863	85	6SL3120-1TE28-5AA 3
1PH8184-. . L . . .	0.72	77	94.4	0.489 (4.328)	350 (772)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8186-. . L . . .	0.69	109	94.3	0.652 (5.771)	422 (931)	1XB7422-P06	260	6SL3320-1TE32-6AA 3
1PH8224-. . L . . .	0.68	115	93.4	1.48 (13.10)	610 (1345)	1XB7700-P02	310	6SL3320-1TE33-1AA 3
1PH8226-. . L . . .	0.60	156	92.6	1.93 (17.08)	740 (1632)	1XB7700-P02	380	6SL3320-1TE33-8AA 3
1PH8228-. . L . . .	0.57	183	92.2	2.33 (20.62)	870 (1918)	1XB7700-P02	490	6SL3320-1TE35-0AA 3
1PH8083-. . M . . .	0.74	7.3	88.1	0.0064 (0.0566)	32 (70.6)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8087-. . M . . .	0.73	9.2	87.8	0.0089 (0.0788)	39 (86.0)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8103-. . M . . .	0.77	12.3	91	0.0172 (0.1522)	51 (112)	gk813	30	6SL3120-1TE23-0A■ 0
1PH8107-. . M . . .	0.77	12.3	91	0.0289 (0.2558)	73 (161)	gk813	45	6SL3120-1TE24-5AC 0

Single Motor Module	1
Double Motor Module	2
Motor Module	
For continuous load with 200 % overload (C type)	C
For highly dynamic, intermittent load cycles with 300 % overload (D type)	D

1) n_2: Maximum permissible thermal speed at constant power.
2) n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. A to H); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
3) I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 4 kHz (SH 80 to 160) or 2 kHz (SH 180 to 280).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 480 V 3 AC, Active Line Module									
700	100	4.4 (5.9)	60 (44.3)	8.7	452	25.5	1500	7000	**1PH8107-■■B■■-....**
	132	4.9 (6.6)	67 (49.4)	9	450	24.6	1500	6000	**1PH8131-■■B■■-....**
		9.1 (12.2)	124 (91.5)	15.5	480	25.2	1200	6000	**1PH8133-■■B■■-....**
		11.2 (15.0)	153 (113)	18	500	25.3	1000	6000	**1PH8135-■■B■■-....**
		11.5 (15.4)	157 (116)	17.5	500	24.9	1300	6000	**1PH8137-■■B■■-....**
	160	16.9 (22.7)	231 (170)	30	427	24.4	2250	6500	**1PH8163-■■B■■-....**
		22 (29.5)	300 (221)	35	475	24.3	1900	6500	**1PH8165-■■B■■-....**
	180	29 (38.9)	396 (292)	49	475	24.0	3100	5000	**1PH8184-■■B■■-....**
		37 (49.6)	505 (372)	65	470	23.9	3400	5000	**1PH8186-■■B■■-....**
	225	52 (69.7)	709 (523)	82	470	23.9	2700	4500	**1PH8224-■■B■■-....**
		68 (91.2)	928 (684)	108	465	23.8	2800	4500	**1PH8226-■■B■■-....**
		84 (113)	1146 (845)	130	480	23.8	2900	4500	**1PH8228-■■B■■-....**
	280	105 (141)	1433 (1057)	150	500	23.7	1400	3300	**1PH8284-1■B1■-....**
		132 (177)	1801 (1328)	184	500	23.7	1500	3300	**1PH8286-1■B1■-....**
		165 (221)	2251 (1660)	230	500	23.7	1600	3300	**1PH8288-1■B1■-....**
1100	180	42 (56.3)	365 (269)	64	500	37.3	3800	5000	**1PH8184-■■C■■-....**
		55 (73.8)	478 (353)	83	500	37.3	4100	5000	**1PH8186-■■C■■-....**
	225	78 (105)	677 (499)	126	470	37.1	3700	4500	**1PH8224-■■C■■-....**
		101 (135)	877 (647)	154	500	37.1	3900	4500	**1PH8226-■■C■■-....**
		126 (169)	1094 (807)	182	500	37.1	4000	4500	**1PH8228-■■C■■-....**
	280	155 (208)	1346 (993)	220	500	37.0	2400	3300	**1PH8284-1■C1■-....**
		191 (256)	1658 (1223)	270	500	37.0	2400	3300	**1PH8286-1■C1■-....**
		238 (319)	2066 (1524)	345	500	37.0	2400	3300	**1PH8288-1■C1■-....**
1500	100	5.2 (7.0)	33 (24.3)	9.7	470	52.2	3500	9000	**1PH8103-■■D■■-....**
		8.8 (11.8)	56 (41.3)	17.0	440	52.0	5750	9000	**1PH8107-■■D■■-....**
	132	11.7 (15.7)	74 (54.6)	20	460	51.5	3000	8000	**1PH8131-■■D■■-....**
		16.6 (22.3)	106 (78.2)	28	459	51.5	3500	8000	**1PH8133-■■D■■-....**
		24 (32.2)	153 (113)	41	447	51.5	4500	8000	**1PH8137-■■D■■-....**
	160	31 (41.6)	197 (145)	52	442	50.9	4000	6500	**1PH8163-■■D■■-....**
		37.7 (50.6)	240 (177)	65	430	50.8	5000	6500	**1PH8165-■■D■■-....**
	180	53 (71.1)	337 (249)	80	500	50.6	5000	5000	**1PH8184-■■D■■-....**
		73 (97.9)	465 (343)	110	500	50.6	5000	5000	**1PH8186-■■D■■-....**
	225	92 (123)	586 (432)	142	500	50.4	3600	4500	**1PH8224-■■D■■-....**
		120 (161)	764 (564)	174	500	50.4	3600	4500	**1PH8226-■■D■■-....**
		147 (197)	936 (690)	210	500	50.5	3600	4500	**1PH8228-■■D■■-....**
	280	200 (268)	1273 (939)	290	500	50.3	2200	3300	**1PH8284-1■D1■-....**
		245 (329)	1560 (1151)	380	495	50.3	2200	3300	**1PH8286-1■D1■-....**
		305 (409)	1942 (1432)	455	500	50.3	2200	3300	**1PH8288-1■D1■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb$_f$-in-s²)	kg (lb)	Type	A	Article No.
1PH8107-..B...	0.83	4.0	79	0.0289 (0.2558)	73 (161)	gk813	9	6SL3120-■TE21-0AD0
1PH8131-..B...	0.85	3.5	83.4	0.0590 (0.5222)	89 (196)	gk833	9	6SL3120-■TE21-0AD0
1PH8133-..B...	0.89	5.0	83	0.0760 (0.6727)	106 (234)	gk833	18	6SL3120-■TE21-8A■0
1PH8135-..B...	0.9	5.3	83	0.0940 (0.8320)	125 (276)	gk833	18	6SL3120-■TE21-8A■0
1PH8137-..B...	0.89	5.5	86	0.1090 (0.9648)	141 (311)	gk833	18	6SL3120-■TE21-8A■0
1PH8163-..B...	0.9	8.1	88	0.2160 (1.9118)	196 (432)	gk863	30	6SL3120-1TE23-0A■0
1PH8165-..B...	0.88	14.5	90	0.2320 (2.0534)	230 (507)	gk863	45	6SL3120-1TE24-5AC0
1PH8184-..B...	0.81	26	89.5	0.489 (4.328)	350 (772)	1XB7322-P05	60	6SL3120-1TE26-0AC0
1PH8186-..B...	0.77	39	90.4	0.652 (5.771)	422 (931)	1XB7322-P05	85	6SL3120-1TE28-5AA3
1PH8224-..B...	0.84	37	92.3	1.48 (13.10)	610 (1345)	1XB7322-P05	85	6SL3120-1TE28-5AA3
1PH8226-..B...	0.84	51	93.1	1.93 (17.08)	740 (1632)	1XB7322-P05	132	6SL3120-1TE31-3AA3
1PH8228-..B...	0.83	63	93.5	2.33 (20.62)	870 (1918)	1XB7322-P05	132	6SL3120-1TE31-3AA3
1PH8284-1.B...	0.85	66	94.8	4.20 (37.17)	1200 (2646)	1XB7700-P02	200	6SL3120-1TE32-0AA4
1PH8286-1.B...	0.87	76	950	5.20 (46.03)	1400 (3087)	1XB7700-P02	200	6SL3120-1TE32-0AA4
1PH8288-1.B...	0.86	104	95.3	6.30 (55.76)	1650 (3638)	1XB7700-P02	260	6SL3320-1TE32-6AA3
1PH8184-..C...	0.82	32	92.3	0.489 (4.328)	350 (772)	1XB7322-P05	85	6SL3120-1TE28-5AA3
1PH8186-..C...	0.82	43	93.4	0.652 (5.771)	422 (931)	1XB7322-P05	85	6SL3120-1TE28-5AA3
1PH8224-..C...	0.8	65	94.6	1.48 (13.10)	610 (1345)	1XB7322-P05	132	6SL3120-1TE31-3AA3
1PH8226-..C...	0.8	83	95.1	1.93 (17.08)	740 (1632)	1XB7322-P05	200	6SL3120-1TE32-0AA4
1PH8228-..C...	0.84	84	95.2	2.33 (20.62)	870 (1918)	1XB7322-P05	200	6SL3120-1TE32-0AA4
1PH8284-1.C...	0.84	102	95.9	4.20 (37.17)	1200 (2646)	1XB7700-P02	260	6SL3320-1TE32-6AA3
1PH8286-1.C...	0.85	120	96.2	5.20 (46.03)	1400 (3087)	1XB7700-P02	310	6SL3320-1TE33-1AA3
1PH8288-1.C...	0.83	168	96.3	6.30 (55.76)	1650 (3638)	1XB7700-P02	380	6SL3320-1TE33-8AA3
1PH8103-..D...	0.81	4.6	85	0.0172 (0.1522)	51 (112)	gk813	18	6SL3120-■TE21-8A■0
1PH8107-..D...	0.80	8.2	86	0.0289 (0.2558)	73 (161)	gk813	18	6SL3120-■TE21-8A■0
1PH8131-..D...	0.85	8.0	91	0.0590 (0.5222)	89 (196)	gk833	30	6SL3120-1TE23-0A■0
1PH8133-..D...	0.86	10.6	90	0.0760 (0.6727)	106 (234)	gk833	30	6SL3120-1TE23-0A■0
1PH8137-..D...	0.86	15.9	89	0.1090 (0.9648)	141 (311)	gk833	45	6SL3120-1TE24-5AC0
1PH8163-..D...	0.88	17.5	93	0.2160 (1.9118)	196 (432)	gk863	60	6SL3120-1TE26-0AC0
1PH8165-..D...	0.88	22.5	93	0.2320 (2.0534)	230 (507)	gk863	85	6SL3120-1TE28-5AA3
1PH8184-..D...	0.81	42	94	0.489 (4.328)	350 (772)	1XB7322-P05	85	6SL3120-1TE28-5AA3
1PH8186-..D...	0.82	56	94.3	0.652 (5.771)	422 (931)	1XB7322-P05	132	6SL3120-1TE31-3AA3
1PH8224-..D...	0.78	79	95.3	1.48 (13.10)	610 (1345)	1XB7322-P05	200	6SL3120-1TE32-0AA4
1PH8226-..D...	0.83	85	95.7	1.93 (17.08)	740 (1632)	1XB7322-P05	200	6SL3120-1TE32-0AA4
1PH8228-..D...	0.85	96	96	2.33 (20.62)	870 (1918)	1XB7422-P06	260	6SL3320-1TE32-6AA3
1PH8284-1.D...	0.82	145	96.3	4.20 (37.17)	1200 (2646)	1XB7700-P02	310 [4]	6SL3320-1TE33-1AA3
1PH8286-1.D...	0.78	219	96.3	5.20 (46.03)	1400 (3087)	1XB7700-P02	490	6SL3320-1TE35-0AA3
1PH8288-1.D...	0.8	253	96.5	6.30 (55.76)	1650 (3638)	1XB7700-P02	490 [4]	6SL3320-1TE35-0AA3

Single Motor Module	1
Double Motor Module	2
Motor Module	
For continuous load with 200 % overload (C type)	C
For highly dynamic, intermittent load cycles with 300 % overload (D type)	D

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. A to H); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system). The rated motor data are valid for 4 kHz (SH 80 to 160) or 2 kHz (SH 180 to 280).
[4] The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 480 V 3 AC, Active Line Module									
2200	80	4.1 (5.5)	18 (13.3)	7.6	480	76.2	6300	10000	**1PH8083-■■F■■-....**
		5.3 (7.1)	23 (17.0)	10	480	76.3	7100	10000	**1PH8087-■■F■■-....**
	100	5.1 (6.8)	22 (16.2)	12.5	363	76.0	7500	9000	**1PH8101-■■F■■-....**
		7.7 (10.3)	33 (24.3)	12.7	480	76.1	4100	9000	**1PH8103-■■F■■-....**
		9.9 (13.3)	43 (31.7)	17	485	75.3	7000	9000	**1PH8105-■■F■■-....**
		12.1 (16.2)	53 (39.1)	21.5	470	75.2	5500	9000	**1PH8107-■■F■■-....**
	132	16.5 (22.1)	72 (53.1)	24	500	75.0	4500	8000	**1PH8131-■■F■■-....**
		22 (29.5)	96 (70.8)	34	480	74.8	6200	8000	**1PH8133-■■F■■-....**
		26.4 (35.4)	115 (84.8)	43	468	74.7	6000	8000	**1PH8135-■■F■■-....**
		30 (40.2)	130 (95.9)	53	440	74.6	4500	8000	**1PH8137-■■F■■-....**
	160	40.7 (54.6)	177 (131)	68	456	74.2	3500	6500	**1PH8163-■■F■■-....**
		49.5 (66.4)	215 (159)	75	493	74.2	3500	6500	**1PH8165-■■F■■-....**
	180	68 (91.2)	295 (218)	110	500	73.8	5000	5000	**1PH8184-■■F■■-....**
		94 (126)	408 (301)	140	490	74.1	5000	5000	**1PH8186-■■F■■-....**
	225	110 (148)	478 (353)	168	500	73.7	2900	4500	**1PH8224-■■F■■-....**
		130 (174)	564 (416)	205	500	73.7	3100	4500	**1PH8226-■■F■■-....**
		170 (228)	738 (544)	275	500	73.6	3200	4500	**1PH8228-■■F■■-....**
	280	230 (308)	998 (736)	330	500	73.6	2400	3300	**1PH8284-1■F1■-....**
		279 (374)	1211 (893)	395	500	73.6	2400	3300	**1PH8286-1■F1■-....**
		347 (465)	1506 (1111)	495	500	73.6	2400	3300	**1PH8288-1■F1■-....**
2800	80	4.8 (6.4)	16 (11.8)	11.3	400	96.4	10000	10000	**1PH8083-■■G■■-....**
		6.3 (8.4)	21 (15.5)	13.5	425	96.5	10000	10000	**1PH8087-■■G■■-....**
	100	8.5 (11.4)	29 (21.4)	16	455	95.3	7000	9000	**1PH8103-■■G■■-....**
		13.7 (18.4)	47 (34.7)	24	480	95.1	7000	9000	**1PH8107-■■G■■-....**
	132	25 (33.5)	85 (62.7)	41	480	94.7	7000	8000	**1PH8133-■■G■■-....**
		26 (34.9)	89 (65.6)	47	440	94.6	6000	8000	**1PH8135-■■G■■-....**
		31 (41.6)	106 (78.2)	52	494	94.4	4000	8000	**1PH8137-■■G■■-....**
	160	42 (56.3)	143 (105)	75	447	94.1	3500	6500	**1PH8163-■■G■■-....**
		50 (67.0)	171 (126)	81	483	94.1	3500	6500	**1PH8165-■■G■■-....**
3900	80	5.3 (7.1)	13 (9.59)	14	372	132.8	10000	10000	**1PH8083-■■M■■-....**
		6.0 (8.0)	15 (11.1)	17.1	357	132.4	10000	10000	**1PH8087-■■M■■-....**
	100	10.8 (14.5)	26 (19.2)	25	383	132.1	9000	9000	**1PH8103-■■M■■-....**
		14.0 (18.8)	34 (25.1)	35	380	131.5	9000	9000	**1PH8107-■■M■■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb_f-in-s²)	kg (lb)	Type	A	Article No.
1PH8083-..F...	0.82	3.6	85	0.0064 (0.0566)	32 (70.6)	gk803	9	6SL3120-■TE21-0AD 0
1PH8087-..F...	0.78	5.1	87	0.0089 (0.0788)	39 (86.0)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8101-..F...	0.82	6.0	87	0.0138 (0.1221)	42 (92.6)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8103-..F...	0.83	5.8	88	0.0172 (0.1522)	51 (112)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8105-..F...	0.79	8.7	90	0.0252 (0.2230)	65 (143)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8107-..F...	0.78	10.9	90	0.0289 (0.2558)	73 (161)	gk813	30	6SL3120-1TE23-0A■ 0
1PH8131-..F...	0.87	10.0	92	0.0590 (0.5222)	89 (196)	gk833	30	6SL3120-1TE23-0A■ 0
1PH8133-..F...	0.89	5.0	83	0.0760 (0.6727)	106 (234)	gk833	45	6SL3120-1TE24-5AC 0
1PH8135-..F...	0.84	18.3	92	0.0940 (0.8320)	125 (276)	gk833	45	6SL3120-1TE24-5AC 0
1PH8137-..F...	0.83	23.2	92	0.1090 (0.9648)	141 (311)	gk833	60	6SL3120-1TE26-0AC 0
1PH8163-..F...	0.88	24.5	94	0.2160 (1.9118)	196 (432)	gk863	85	6SL3120-1TE28-5AA 3
1PH8165-..F...	0.88	25.1	95	0.2320 (2.0534)	230 (507)	gk863	85	6SL3120-1TE28-5AA 3
1PH8184-..F...	0.75	68	94.8	0.489 (4.328)	350 (772)	1XB7322-P05	132	6SL3120-1TE31-3AA 3
1PH8186-..F...	0.84	63	94.8	0.652 (5.771)	422 (931)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8224-..F...	0.79	90	95.7	1.48 (13.10)	610 (1345)	1XB7322-P05	200	6SL3120-1TE32-0AA 4
1PH8226-..F...	0.76	123	95.8	1.93 (17.08)	740 (1632)	1XB7422-P06	310	6SL3320-1TE33-1AA 3
1PH8228-..F...	0.74	174	95.9	2.33 (20.62)	870 (1918)	1XB7700-P02	380	6SL3320-1TE33-8AA 3
1PH8284-1.F...	0.83	163	96.3	4.20 (37.17)	1200 (2646)	1XB7700-P02	490	6SL3320-1TE35-0AA 3
1PH8286-1.F...	0.85	183	96.5	5.20 (46.03)	1400 (3087)	1XB7700-P02	490	6SL3320-1TE35-0AA 3
1PH8288-1.F...	0.84	233	96.6	6.30 (55.76)	1650 (3638)	1XB7712-P03	745	6SL3320-1TE37-5AA 3
1PH8083-..G...	0.76	5.8	86.8	0.0064 (0.0566)	32 (70.6)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8087-..G...	0.77	6.8	87	0.0089 (0.0788)	39 (86.0)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8103-..G...	0.78	8.1	90	0.0172 (0.1522)	51 (112)	gk813	18	6SL3120-■TE21-8A■ 0
1PH8107-..G...	0.77	12.8	92	0.0289 (0.2558)	73 (161)	gk813	30	6SL3120-1TE23-0A■ 0
1PH8133-..G...	0.83	18.1	92	0.0760 (0.6727)	106 (234)	gk833	45	6SL3120-1TE24-5AC 0
1PH8135-..G...	0.84	20.0	92.4	0.0940 (0.8320)	125 (276)	gk833	60	6SL3120-1TE26-0AC 0
1PH8137-..G...	0.82	22.0	92	0.1090 (0.9648)	141 (311)	gk833	60	6SL3120-1TE26-0AC 0
1PH8163-..G...	0.85	28.1	93	0.2160 (1.9118)	196 (432)	gk863	85	6SL3120-1TE28-5AA 3
1PH8165-..G...	0.87	31.9	94	0.2320 (2.0534)	230 (507)	gk863	85	6SL3120-1TE28-5AA 3
1PH8083-..M...	0.76	7.2	87	0.0064 (0.0566)	32 (70.6)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8087-..M...	0.73	9.2	89	0.0089 (0.0788)	39 (86.0)	gk803	18	6SL3120-■TE21-8A■ 0
1PH8103-..M...	0.77	12.2	90	0.0172 (0.1522)	51 (112)	gk813	30	6SL3120-1TE23-0A■ 0
1PH8107-..M...	0.73	19.4	90	0.0289 (0.2558)	73 (161)	gk813	45	6SL3120-1TE24-5AC 0

Single Motor Module	1
Double Motor Module	2
Motor Module	
For continuous load with 200 % overload (C type)	C
For highly dynamic, intermittent load cycles with 300 % overload (D type)	D

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. A to H); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 4 kHz (SH 80 to 160) or 2 kHz (SH 180 to 280).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 690 V 3 AC, Basic Line Module									
400	280	61 (81.8)	1456 (1074)	82	555	13.7	1100	3300	**1PH8284-1■H1■-....**
		77 (103)	1838 (1356)	100	555	13.7	1200	3300	**1PH8286-1■H1■-....**
		100 (134)	2388 (1761)	130	555	13.7	1300	3300	**1PH8288-1■H1■-....**
700	280	100 (134)	1364 (1006)	118	605	23.7	2100	3300	**1PH8284-1■K1■-....**
		127 (170)	1733 (1278)	158	605	23.6	2100	3300	**1PH8286-1■K1■-....**
		162 (217)	2210 (1630)	186	605	23.7	2100	3300	**1PH8288-1■K1■-....**
1000	280	143 (192)	1366 (1008)	176	600	33.6	2100	3300	**1PH8284-1■U1■-....**
		176 (236)	1681 (1240)	230	570	33.6	2100	3300	**1PH8286-1■U1■-....**
		218 (292)	2082 (1536)	275	580	33.6	2100	3300	**1PH8288-1■U1■-....**
1500	280	186 (249)	1184 (873)	220	590	50.3	1900	3300	**1PH8284-1■W1■-....**
		224 (300)	1426 (1052)	260	590	50.3	2000	3300	**1PH8286-1■W1■-....**
		282 (378)	1795 (1324)	325	590	50.3	2100	3300	**1PH8288-1■W1■-....**
Line voltage 690 V 3 AC, Active Line Module									
500	280	77 (103)	1471 (1085)	82	690	17.0	1600	3300	**1PH8284-1■H1■-....**
		96 (129)	1834 (1353)	100	690	17.0	1600	3300	**1PH8286-1■H1■-....**
		125 (168)	2388 (1761)	128	690	17.0	1600	3300	**1PH8288-1■H1■-....**
800	280	115 (154)	1373 (1013)	120	690	27.0	2300	3300	**1PH8284-1■K1■-....**
		145 (194)	1731 (1277)	158	690	26.9	2300	3300	**1PH8286-1■K1■-....**
		185 (248)	2208 (1629)	184	690	27.0	2300	3300	**1PH8288-1■K1■-....**
1150	280	164 (220)	1362 (1005)	174	690	38.6	2200	3300	**1PH8284-1■U1■-....**
		203 (272)	1686 (1244)	230	655	38.6	2200	3300	**1PH8286-1■U1■-....**
		251 (337)	2084 (1537)	275	665	38.6	2200	3300	**1PH8288-1■U1■-....**
1750	280	217 (291)	1184 (873)	220	690	58.7	2200	3300	**1PH8284-1■W1■-....**
		261 (350)	1424 (1050)	260	690	58.7	2200	3300	**1PH8286-1■W1■-....**
		329 (441)	1795 (1324)	325	690	58.7	2200	3300	**1PH8288-1■W1■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia	Weight, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	$\cos \varphi$	I_μ	η	J			I_N	
		A	%	kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
1PH8284-1.H...	0.84	39	92	4.20 (37.17)	1200 (2646)	1XB7700-P02	100	**6SL3320-1TG31-0AA3**
1PH8286-1.H...	0.87	43	92.1	5.20 (46.03)	1400 (3087)	1XB7700-P02	120	**6SL3320-1TG31-2AA3**
1PH8288-1.H...	0.87	55	92.4	6.30 (55.76)	1650 (3638)	1XB7700-P02	150	**6SL3320-1TG31-5AA3**
1PH8284-1.K...	0.85	53	94.5	4.20 (37.17)	1200 (2646)	1XB7700-P02	150	**6SL3320-1TG31-5AA3**
1PH8286-1.K...	0.81	83	95.1	5.20 (46.03)	1400 (3087)	1XB7700-P02	175	**6SL3320-1TG31-8AA3**
1PH8288-1.K...	0.88	75	94.9	6.30 (55.76)	1650 (3638)	1XB7700-P02	215	**6SL3320-1TG32-2AA3**
1PH8284-1.U...	0.82	89	95.6	4.20 (37.17)	1200 (2646)	1XB7700-P02	215	**6SL3320-1TG32-2AA3**
1PH8286-1.U...	0.81	124	95.9	5.20 (46.03)	1400 (3087)	1XB7700-P02	260	**6SL3320-1TG32-6AA3**
1PH8288-1.U...	0.82	145	96.1	6.30 (55.76)	1650 (3638)	1XB7700-P02	330	**6SL3320-1TG33-3AA3**
1PH8284-1.W...	0.86	92	96.2	4.20 (37.17)	1200 (2646)	1XB7700-P02	260	**6SL3320-1TG32-6AA3**
1PH8286-1.W...	0.88	104	96.5	5.20 (46.03)	1400 (3087)	1XB7700-P02	330	**6SL3320-1TG33-3AA3**
1PH8288-1.W...	0.88	133	96.6	6.30 (55.76)	1650 (3638)	1XB7700-P02	410	**6SL3320-1TG34-1AA3**
1PH8284-1.H...	0.84	39	93.2	4.20 (37.17)	1200 (2646)	1XB7700-P02	100	**6SL3320-1TG31-0AA3**
1PH8286-1.H...	0.86	43	93.4	5.20 (46.03)	1400 (3087)	1XB7700-P02	120	**6SL3320-1TG31-2AA3**
1PH8288-1.H...	0.87	56	93.7	6.30 (55.76)	1650 (3638)	1XB7700-P02	150	**6SL3320-1TG31-5AA3**
1PH8284-1.K...	0.85	53	95	4.20 (37.17)	1200 (2646)	1XB7700-P02	150	**6SL3320-1TG31-5AA3**
1PH8286-1.K...	0.81	83	95.4	5.20 (46.03)	1400 (3087)	1XB7700-P02	175	**6SL3320-1TG31-8AA3**
1PH8288-1.K...	0.88	76	95.3	6.30 (55.76)	1650 (3638)	1XB7700-P02	215	**6SL3320-1TG32-2AA3**
1PH8284-1.U...	0.82	90	95.9	4.20 (37.17)	1200 (2646)	1XB7700-P02	215	**6SL3320-1TG32-2AA3**
1PH8286-1.U...	0.81	124	96.1	5.20 (46.03)	1400 (3087)	1XB7700-P02	260	**6SL3320-1TG32-6AA3**
1PH8288-1.U...	0.82	145	96.3	6.30 (55.76)	1650 (3638)	1XB7700-P02	330	**6SL3320-1TG33-3AA3**
1PH8284-1.W...	0.86	93	96.3	4.20 (37.17)	1200 (2646)	1XB7700-P02	260	**6SL3320-1TG32-6AA3**
1PH8286-1.W...	0.87	105	96.6	5.20 (46.03)	1400 (3087)	1XB7700-P02	330	**6SL3320-1TG33-3AA3**
1PH8288-1.W...	0.87	134	96.7	6.30 (55.76)	1650 (3638)	1XB7700-P02	410	**6SL3320-1TG34-1AA3**

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 2 kHz (SH 180 to 280).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC, Smart/Basic Line Module									
400	180	24.5 (32.9)	585 (431)	67	300	14.3	1900	5000	**1PH8184-■■B■■-....**
		31.5 (42.2)	752 (555)	88	290	14.2	2100	5000	**1PH8186-■■B■■-....**
	225	45 (60.3)	1074 (792)	114	300	14.1	1800	4500	**1PH8224-■■B■■-....**
		57 (76.4)	1361 (1004)	144	305	13.9	2100	4500	**1PH8226-■■B■■-....**
		72 (96.6)	1719 (1268)	176	305	14.0	2200	4500	**1PH8228-■■B■■-....**
700	180	40 (53.6)	546 (403)	94	320	24.5	2200	5000	**1PH8184-■■C■■-....**
		52 (69.7)	709 (523)	116	330	24.3	2400	5000	**1PH8186-■■C■■-....**
	225	80 (107)	1091 (805)	188	310	24.1	2200	4500	**1PH8224-■■C■■-....**
		106 (142)	1446 (1067)	240	310	24.2	2200	4500	**1PH8226-■■C■■-....**
		120 (161)	1637 (1207)	265	315	24.1	2300	4500	**1PH8228-■■C■■-....**
	280	171 (229)	2333 (1721)	355	330	23.9	1200	3300	**1PH8284-1■C4■-....**
		219 (294)	2988 (2204)	455	325	23.9	1300	3300	**1PH8286-1■C4■-....**
		272 (365)	3711 (2737)	570	325	23.9	1400	3300	**1PH8288-1■C4■-....**
1000	180	57 (76.4)	544 (401)	120	340	34.4	2800	5000	**1PH8184-■■D■■-....**
		74 (99.2)	707 (521)	156	340	34.3	3000	5000	**1PH8186-■■D■■-....**
	225	105 (141)	1003 (740)	220	335	34.1	2700	4500	**1PH8224-■■D■■-....**
		135 (181)	1289 (951)	275	340	34.1	2700	4500	**1PH8226-■■D■■-....**
		165 (221)	1576 (1162)	330	340	34.1	2700	4500	**1PH8228-■■D■■-....**
	280	243 (326)	2321 (1712)	490	335	33.9	1900	3300	**1PH8284-1■D4■-....**
		309 (414)	2951 (2177)	630	330	33.8	2000	3300	**1PH8286-1■D4■-....**
		379 (508)	3619 (2669)	760	335	33.8	2100	3300	**1PH8288-1■D4■-....**
1500	180	76 (102)	484 (357)	162	335	50.9	4300	5000	**1PH8184-■■F■■-....**
		108 (145)	688 (507)	225	330	50.9	4300	5000	**1PH8186-■■F■■-....**
	225	142 (190)	904 (667)	290	340	50.8	3000	4500	**1PH8224-■■F■■-....**
		175 (235)	1114 (822)	350	340	50.7	3000	4500	**1PH8226-■■F■■-....**
		230 (308)	1464 (1080)	465	340	50.6	3000	4500	**1PH8228-■■F■■-....**
	280	319 (428)	2031 (1498)	620	345	50.6	1900	3300	**1PH8284-1■F4■-....**
		382 (512)	2432 (1794)	730	345	50.6	2000	3300	**1PH8286-1■F4■-....**
		480 (644)	3056 (2254)	910	345	50.6	2100	3300	**1PH8288-1■F4■-....**
2500	180	100 (134)	382 (282)	205	340	84.2	5000	5000	**1PH8184-■■L■■-....**
		130 (174)	497 (367)	270	335	84.1	5000	5000	**1PH8186-■■L■■-....**
	225	178 (239)	680 (502)	355	340	84.1	3500	4500	**1PH8224-■■L■■-....**
		235 (315)	898 (662)	475	335	84.0	3500	4500	**1PH8226-■■L■■-....**
		265 (355)	1012 (746)	530	340	83.9	3500	4500	**1PH8228-■■L■■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb$_f$-in-s²)	kg (lb)	Type	A	Article No.
1PH8184- . . B . . .	0.88	25	80.1	0.489 (4.328)	350 (772)	1XB7322-P05	85	**6SL3120-1TE28-5AA3**
1PH8186- . . B . . .	0.87	37	82.2	0.652 (5.771)	422 (931)	1XB7322-P05	85 [4]	**6SL3120-1TE28-5AA3**
1PH8224- . . B . . .	0.89	39	84.9	1.48 (13.10)	610 (1345)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8226- . . B . . .	0.86	61	87.5	1.93 (17.08)	740 (1632)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8228- . . B . . .	0.88	69	87.8	2.33 (20.62)	870 (1918)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8184- . . C . . .	0.90	27	85.2	0.489 (4.328)	350 (772)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8186- . . C . . .	0.89	41	88.5	0.652 (5.771)	422 (931)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8224- . . C . . .	0.88	63	90.4	1.48 (13.10)	610 (1345)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8226- . . C . . .	0.90	71	90.7	1.93 (17.08)	740 (1632)	1XB7322-P05	260	**6SL3320-1TE32-6AA3**
1PH8228- . . C . . .	0.91	75	91.1	2.33 (20.62)	870 (1918)	1XB7322-P05	260 [4]	**6SL3320-1TE32-6AA3**
1PH8284-1. C . . .	0.91	101	93	4.20 (37.17)	1200 (2646)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8286-1. C . . .	0.92	115	93.1	5.20 (46.03)	1400 (3087)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8288-1. C . . .	0.91	161	93.9	6.30 (55.76)	1650 (3638)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8184- . . D . . .	0.89	39	89.9	0.489 (4.328)	350 (772)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8186- . . D . . .	0.89	53	90.8	0.652 (5.771)	422 (931)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224- . . D . . .	0.88	73	92.6	1.48 (13.10)	610 (1345)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8226- . . D . . .	0.90	82	92.9	1.93 (17.08)	740 (1632)	1XB7322-P05	310	**6SL3320-1TE33-1AA3**
1PH8228- . . D . . .	0.91	93	93.3	2.33 (20.62)	870 (1918)	1XB7322-P05	380	**6SL3320-1TE33-8AA3**
1PH8284-1. D . . .	0.90	137	94.7	4.20 (37.17)	1200 (2646)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8286-1. D . . .	0.90	207	95.2	5.20 (46.03)	1400 (3087)	1XB7700-P02	840	**6SL3320-1TE38-4AA3**
1PH8288-1. D . . .	0.90	242	95.5	6.30 (55.76)	1650 (3638)	1XB7700-P02	985	**6SL3320-1TE41-0AA3**
1PH8184- . . F . . .	0.87	61	93.1	0.489 (4.328)	350 (772)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186- . . F . . .	0.89	79	93.6	0.652 (5.771)	422 (931)	1XB7322-P05	260	**6SL3320-1TE32-6AA3**
1PH8224- . . F . . .	0.89	84	94.2	1.48 (13.10)	610 (1345)	1XB7322-P05	310	**6SL3320-1TE33-1AA3**
1PH8226- . . F . . .	0.89	117	95	1.93 (17.08)	740 (1632)	1XB7422-P06	380	**6SL3320-1TE33-8AA3**
1PH8228- . . F . . .	0.88	166	95.3	2.33 (20.62)	870 (1918)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8284-1. F . . .	0.91	157	95.7	4.20 (37.17)	1200 (2646)	1XB7700-P02	745 [4]	**6SL3320-1TE37-5AA3**
1PH8286-1. F . . .	0.92	177	95.9	5.20 (46.03)	1400 (3087)	1XB7700-P02	840	**6SL3320-1TE38-4AA3**
1PH8288-1. F . . .	0.92	229	96.1	6.30 (55.76)	1650 (3638)	1XB7700-P02	985 [4]	**6SL3320-1TE41-0AA3**
1PH8184- . . L . . .	0.87	74	94.9	0.489 (4.328)	350 (772)	1XB7322-P05	210	**6SL3320-1TE32-1AA3**
1PH8186- . . L . . .	0.87	105	95.4	0.652 (5.771)	422 (931)	1XB7422-P06	310	**6SL3320-1TE33-1AA3**
1PH8224- . . L . . .	0.89	112	95.4	1.48 (13.10)	610 (1345)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8226- . . L . . .	0.89	149	95.7	1.93 (17.08)	740 (1632)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8228- . . L . . .	0.89	180	96	2.33 (20.62)	870 (1918)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. A to F); limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 2 kHz (SH 180 to 280).
[4] The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	SIMOTICS M-1PH8 asynchronous motors Forced ventilation
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC, Active Line Module									
500	180	30 (40.2)	573 (423)	65	370	17.6	2000	5000	**1PH8184-■■ B ■■-....**
		40 (53.6)	764 (564)	88	355	17.5	2200	5000	**1PH8186-■■ B ■■-....**
	225	55 (73.8)	1051 (775)	112	370	17.4	1800	4500	**1PH8224-■■ B ■■-....**
		72 (96.6)	1375 (1014)	144	375	17.3	2200	4500	**1PH8226-■■ B ■■-....**
		90 (121)	1719 (1268)	174	380	17.3	2200	4500	**1PH8228-■■ B ■■-....**
800	180	45 (60.3)	537 (396)	91	365	27.8	2300	5000	**1PH8184-■■ C ■■-....**
		60 (80.5)	716 (528)	120	360	27.7	2500	5000	**1PH8186-■■ C ■■-....**
	225	90 (121)	1074 (792)	184	350	27.4	2300	4500	**1PH8224-■■ C ■■-....**
		118 (158)	1409 (1039)	235	350	27.5	2300	4500	**1PH8226-■■ C ■■-....**
		135 (181)	1612 (1189)	260	360	27.4	2400	4500	**1PH8228-■■ C ■■-....**
	280	195 (261)	2328 (1717)	335	400	27.2	1350	3300	**1PH8284-1■ C 4■-....**
		250 (335)	2984 (2201)	435	385	27.2	1500	3300	**1PH8286-1■ C 4■-....**
		310 (416)	3701 (2730)	560	370	27.2	1550	3300	**1PH8288-1■ C 4■-....**
1150	180	65 (87.2)	540 (398)	120	390	39.4	3000	5000	**1PH8184-■■ D ■■-....**
		85 (114)	706 (521)	154	390	39.3	3200	5000	**1PH8186-■■ D ■■-....**
	225	120 (161)	997 (735)	220	385	39.1	2900	4500	**1PH8224-■■ D ■■-....**
		155 (208)	1287 (949)	270	390	39.1	2800	4500	**1PH8226-■■ D ■■-....**
		190 (255)	1578 (1164)	330	390	39.1	2800	4500	**1PH8228-■■ D ■■-....**
	280	280 (375)	2325 (1715)	475	400	38.9	2200	3300	**1PH8284-1■ D 4■-....**
		355 (476)	2944 (2171)	630	380	38.8	2200	3300	**1PH8286-1■ D 4■-....**
		435 (583)	3607 (2661)	760	385	38.8	2200	3300	**1PH8288-1■ D 4■-....**
1750	180	89 (119)	486 (358)	162	390	59.3	4300	5000	**1PH8184-■■ F ■■-....**
		125 (168)	682 (503)	225	385	59.2	4300	5000	**1PH8186-■■ F ■■-....**
	225	165 (221)	900 (664)	285	395	59.2	2900	4500	**1PH8224-■■ F ■■-....**
		200 (268)	1091 (805)	350	390	59.0	2900	4500	**1PH8226-■■ F ■■-....**
		265 (355)	1446 (1067)	460	390	59.0	2900	4500	**1PH8228-■■ F ■■-....**
	280	370 (496)	2019 (1489)	610	400	58.9	2200	3300	**1PH8284-1■ F 4■-....**
		445 (597)	2429 (1792)	730	400	58.9	2200	3300	**1PH8286-1■ F 4■-....**
		560 (751)	3055 (2253)	910	400	58.9	2200	3300	**1PH8288-1■ F 4■-....**
2900	180	113 (152)	372 (274)	200	395	97.5	5000	5000	**1PH8184-■■ L ■■-....**
		150 (201)	494 (364)	270	385	97.4	5000	5000	**1PH8186-■■ L ■■-....**
	225	205 (275)	675 (498)	355	395	97.4	3500	4500	**1PH8224-■■ L ■■-....**
		270 (362)	889 (656)	470	390	97.3	3500	4500	**1PH8226-■■ L ■■-....**
		300 (402)	988 (729)	510	395	97.3	3500	4500	**1PH8228-■■ L ■■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	$\cos \varphi$	I_μ	η	J			I_N	
		A	%	kgm^2 (lb$_f$-in-s^2)	kg (lb)	Type	A	Article No.
1PH8184- . . B . . .	0.86	27	84	0.489 (4.328)	350 (772)	1XB7322-P05	85	**6SL3120-1TE28-5AA3**
1PH8186- . . B . . .	0.87	38	85	0.652 (5.771)	422 (931)	1XB7322-P05	85 [4]	**6SL3120-1TE28-5AA3**
1PH8224- . . B . . .	0.88	41	87.8	1.48 (13.10)	610 (1345)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8226- . . B . . .	0.86	60	89.5	1.93 (17.08)	740 (1632)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8228- . . B . . .	0.87	73	89.9	2.33 (20.62)	870 (1918)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8184- . . C . . .	0.90	28	87.2	0.489 (4.328)	350 (772)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8186- . . C . . .	0.90	38	89.1	0.652 (5.771)	422 (931)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8224- . . C . . .	0.88	63	91.4	1.48 (13.10)	610 (1345)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8226- . . C . . .	0.90	71	91.8	1.93 (17.08)	740 (1632)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8228- . . C . . .	0.91	77	92.2	2.33 (20.62)	870 (1918)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8284-1. C . . .	0.89	117	94.2	4.20 (37.17)	1200 (2646)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8286-1. C . . .	0.91	126	94.2	5.20 (46.03)	1400 (3087)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8288-1. C . . .	0.91	164	94.5	6.30 (55.76)	1650 (3638)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8184- . . D . . .	0.88	39	91.1	0.489 (4.328)	350 (772)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8186- . . D . . .	0.89	54	91.8	0.652 (5.771)	422 (931)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224- . . D . . .	0.88	74	93.4	1.48 (13.10)	610 (1345)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8226- . . D . . .	0.90	83	93.6	1.93 (17.08)	740 (1632)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8228- . . D . . .	0.91	94	94	2.33 (20.62)	870 (1918)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8284-1. D . . .	0.89	150	95.3	4.20 (37.17)	1200 (2646)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8286-1. D . . .	0.89	209	95.6	5.20 (46.03)	1400 (3087)	1XB7700-P02	840	**6SL3320-1TE38-4AA3**
1PH8288-1. D . . .	0.90	244	95.8	6.30 (55.76)	1650 (3638)	1XB7712-P03	985	**6SL3320-1TE41-0AA3**
1PH8184- . . F . . .	0.87	61	93.7	0.489 (4.328)	350 (772)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186- . . F . . .	0.88	80	94.2	0.652 (5.771)	422 (931)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8224- . . F . . .	0.89	84	94.6	1.48 (13.10)	610 (1345)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8226- . . F . . .	0.89	114	95.4	1.93 (17.08)	740 (1632)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8228- . . F . . .	0.89	162	95.6	2.33 (20.62)	870 (1918)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8284-1. F . . .	0.91	158	960	4.20 (37.17)	1200 (2646)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8286-1. F . . .	0.92	178	96.2	5.20 (46.03)	1400 (3087)	1XB7712-P03	840	**6SL3320-1TE38-4AA3**
1PH8288-1. F . . .	0.92	228	96.3	6.30 (55.76)	1650 (3638)	1XB7712-P03	985 [4]	**6SL3320-1TE41-0AA3**
1PH8184- . . L . . .	0.87	75	95.2	0.489 (4.328)	350 (772)	1XB7322-P05	210	**6SL3320-1TE32-1AA3**
1PH8186- . . L . . .	0.87	105	95.5	0.652 (5.771)	422 (931)	1XB7422-P06	310	**6SL3320-1TE33-1AA3**
1PH8224- . . L . . .	0.89	113	95.5	1.48 (13.10)	610 (1345)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8226- . . L . . .	0.89	150	95.8	1.93 (17.08)	740 (1632)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8228- . . L . . .	0.89	182	96	2.33 (20.62)	870 (1918)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. A to F); limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 2 kHz (SH 180 to 280).
[4] The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	SIMOTICS M-1PH8 asynchronous motors Forced ventilation
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 480 V 3 AC, Smart/Basic Line Module									
600	180	36 (48.3)	573 (423)	64	440	20.9	2100	5000	**1PH8184-■■B■■-....**
		48 (64.4)	764 (564)	88	430	20.8	2300	5000	**1PH8186-■■B■■-....**
	225	67 (89.8)	1066 (786)	118	410	20.9	1800	4500	**1PH8224-■■B■■-....**
		87 (117)	1385 (1022)	152	410	20.8	2300	4500	**1PH8226-■■B■■-....**
		108 (145)	1719 (1268)	188	410	20.8	2200	4500	**1PH8228-■■B■■-....**
1000	180	57 (76.4)	544 (401)	90	460	34.4	2400	5000	**1PH8184-■■C■■-....**
		74 (99.2)	707 (521)	116	450	34.3	2600	5000	**1PH8186-■■C■■-....**
	225	105 (141)	1003 (740)	174	425	34.1	2300	4500	**1PH8224-■■C■■-....**
		146 (196)	1394 (1028)	230	440	34.1	2300	4500	**1PH8226-■■C■■-....**
		165 (221)	1576 (1162)	250	450	34.1	2400	4500	**1PH8228-■■C■■-....**
	280	235 (315)	2244 (1655)	345	455	33.9	1700	3300	**1PH8284-1■C4■-....**
		310 (416)	2961 (2184)	450	460	33.9	2000	3300	**1PH8286-1■C4■-....**
		385 (516)	3677 (2712)	560	460	33.9	2050	3300	**1PH8288-1■C4■-....**
1350	180	74 (99.2)	523 (386)	118	450	46.0	3100	5000	**1PH8184-■■D■■-....**
		98 (131)	693 (511)	152	450	45.9	3300	5000	**1PH8186-■■D■■-....**
	225	137 (184)	969 (715)	215	450	45.7	3000	4500	**1PH8224-■■D■■-....**
		172 (231)	1217 (898)	255	460	45.7	2900	4500	**1PH8226-■■D■■-....**
		218 (292)	1542 (1137)	320	460	45.7	2800	4500	**1PH8228-■■D■■-....**
	280	325 (436)	2299 (1696)	475	460	45.5	2200	3300	**1PH8284-1■D4■-....**
		410 (550)	2901 (2140)	620	445	45.5	2200	3300	**1PH8286-1■D4■-....**
		505 (677)	3573 (2635)	750	450	45.5	2200	3300	**1PH8288-1■D4■-....**
2000	180	98 (131)	468 (345)	156	450	67.5	4300	5000	**1PH8184-■■F■■-....**
		135 (181)	645 (476)	210	445	67.5	4300	5000	**1PH8186-■■F■■-....**
	225	178 (239)	850 (627)	265	460	67.4	2900	4500	**1PH8224-■■F■■-....**
		220 (295)	1051 (775)	335	450	67.3	2900	4500	**1PH8226-■■F■■-....**
		288 (386)	1375 (1014)	440	450	67.3	2900	4500	**1PH8228-■■F■■-....**
	280	415 (557)	1981 (1461)	600	455	67.3	2200	3300	**1PH8284-1■F4■-....**
		500 (671)	2387 (1761)	720	455	67.2	2200	3300	**1PH8286-1■F4■-....**
		630 (845)	3009 (2219)	900	455	67.2	2200	3300	**1PH8288-1■F4■-....**
3400	180	113 (152)	317 (234)	176	460	114.1	4500	5000	**1PH8184-■■L■■-....**
		130 (174)	365 (269)	210	455	113.9	4500	5000	**1PH8186-■■L■■-....**
	225	205 (275)	576 (425)	310	460	114.0	3500	4500	**1PH8224-■■L■■-....**
		270 (362)	758 (559)	405	460	113.9	3500	4500	**1PH8226-■■L■■-....**
		300 (402)	843 (622)	450	460	113.8	3500	4500	**1PH8228-■■L■■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	$\cos \varphi$	I_μ	η	J			I_N	
		A	%	kgm^2 (lb$_f$-in-s^2)	kg (lb)	Type	A	Article No.
1PH8184- . . B . . .	0.85	28	86.3	0.489 (4.328)	350 (772)	1XB7322-P05	85	**6SL3120-1TE28-5AA3**
1PH8186- . . B . . .	0.84	41	87.4	0.652 (5.771)	422 (931)	1XB7322-P05	85 [4]	**6SL3120-1TE28-5AA3**
1PH8224- . . B . . .	0.90	35	88.3	1.48 (13.10)	610 (1345)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8226- . . B . . .	0.90	49	89.9	1.93 (17.08)	740 (1632)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8228- . . B . . .	0.90	57	90.2	2.33 (20.62)	870 (1918)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8184- . . C . . .	0.89	30	89.6	0.489 (4.328)	350 (772)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8186- . . C . . .	0.89	39	91.2	0.652 (5.771)	422 (931)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8224- . . C . . .	0.88	61	92.9	1.48 (13.10)	610 (1345)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8226- . . C . . .	0.89	74	93.2	1.93 (17.08)	740 (1632)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8228- . . C . . .	0.90	79	93.6	2.33 (20.62)	870 (1918)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8284-1. C . . .	0.91	97	94.6	4.20 (37.17)	1200 (2646)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8286-1. C . . .	0.91	117	94.8	5.20 (46.03)	1400 (3087)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8288-1. C . . .	0.91	164	95.3	6.30 (55.76)	1650 (3638)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8184- . . D . . .	0.88	39	92.2	0.489 (4.328)	350 (772)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8186- . . D . . .	0.89	53	92.8	0.652 (5.771)	422 (931)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224- . . D . . .	0.87	75	94.1	1.48 (13.10)	610 (1345)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8226- . . D . . .	0.89	85	94.5	1.93 (17.08)	740 (1632)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8228- . . D . . .	0.90	96	94.7	2.33 (20.62)	870 (1918)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8284-1. D . . .	0.90	146	95.7	4.20 (37.17)	1200 (2646)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8286-1. D . . .	0.89	210	96	5.20 (46.03)	1400 (3087)	1XB7700-P02	840	**6SL3320-1TE38-4AA3**
1PH8288-1. D . . .	0.90	243	96.2	6.30 (55.76)	1650 (3638)	1XB7712-P03	985	**6SL3320-1TE41-0AA3**
1PH8184- . . F . . .	0.85	63	94.3	0.489 (4.328)	350 (772)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186- . . F . . .	0.87	83	94.8	0.652 (5.771)	422 (931)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8224- . . F . . .	0.88	88	95.2	1.48 (13.10)	610 (1345)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8226- . . F . . .	0.88	117	95.7	1.93 (17.08)	740 (1632)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8228- . . F . . .	0.88	166	95.9	2.33 (20.62)	870 (1918)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8284-1. F . . .	0.91	157	96.2	4.20 (37.17)	1200 (2646)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8286-1. F . . .	0.92	178	96.3	5.20 (46.03)	1400 (3087)	1XB7712-P03	840	**6SL3320-1TE38-4AA3**
1PH8288-1. F . . .	0.92	227	96.5	6.30 (55.76)	1650 (3638)	1XB7712-P03	985	**6SL3320-1TE41-0AA3**
1PH8184- . . L . . .	0.85	75	95.3	0.489 (4.328)	350 (772)	1XB7322-P05	210	**6SL3320-1TE32-1AA3**
1PH8186- . . L . . .	0.82	108	95.4	0.652 (5.771)	422 (931)	1XB7422-P06	310	**6SL3320-1TE33-1AA3**
1PH8224- . . L . . .	0.87	113	95.4	1.48 (13.10)	610 (1345)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8226- . . L . . .	0.87	153	95.7	1.93 (17.08)	740 (1632)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8228- . . L . . .	0.87	181	95.8	2.33 (20.62)	870 (1918)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. A to F); limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 2 kHz (SH 180 to 280).
[4] The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 480 V 3 AC, Active Line Module									
700	180	42 (56.3)	573 (423)	65	500	24.2	2200	5000	**1PH8184-■■B■■-....**
		56 (75.1)	764 (564)	88	500	24.1	2400	5000	**1PH8186-■■B■■-....**
	225	67 (89.8)	914 (674)	98	500	24.0	2300	4500	**1PH8224-■■B■■-....**
		87 (117)	1187 (876)	128	500	23.9	2400	4500	**1PH8226-■■B■■-....**
		108 (145)	1473 (1086)	156	500	23.9	2500	4500	**1PH8228-■■B■■-....**
1100	180	62 (83.1)	538 (397)	89	500	37.7	2500	5000	**1PH8184-■■C■■-....**
		80 (107)	695 (513)	114	500	37.6	2800	5000	**1PH8186-■■C■■-....**
	225	105 (141)	912 (673)	160	470	37.3	2500	4500	**1PH8224-■■C■■-....**
		146 (196)	1268 (935)	205	500	37.3	2500	4500	**1PH8226-■■C■■-....**
		165 (221)	1433 (1057)	225	500	37.3	2700	4500	**1PH8228-■■C■■-....**
	280	250 (335)	2170 (1601)	335	500	37.2	1700	3300	**1PH8284-1■C4■-....**
		330 (443)	2865 (2113)	440	500	37.2	2000	3300	**1PH8286-1■C4■-....**
		405 (543)	3516 (2593)	540	500	37.2	2050	3300	**1PH8288-1■C4■-....**
1500	180	76 (102)	484 (357)	108	500	50.9	3600	5000	**1PH8184-■■D■■-....**
		105 (141)	669 (493)	148	500	50.9	3800	5000	**1PH8186-■■D■■-....**
	225	137 (184)	872 (643)	194	500	50.6	3400	4500	**1PH8224-■■D■■-....**
		172 (231)	1095 (808)	240	500	50.7	3100	4500	**1PH8226-■■D■■-....**
		218 (292)	1388 (1024)	295	500	50.7	3000	4500	**1PH8228-■■D■■-....**
	280	325 (436)	2069 (1526)	440	500	50.5	2200	3300	**1PH8284-1■D4■-....**
		410 (550)	2610 (1925)	560	495	50.4	2200	3300	**1PH8286-1■D4■-....**
		505 (677)	3215 (2371)	680	500	50.4	2200	3300	**1PH8288-1■D4■-....**
2200	180	98 (131)	425 (313)	144	500	74.1	4300	5000	**1PH8184-■■F■■-....**
		135 (181)	586 (432)	196	490	74.1	4300	5000	**1PH8186-■■F■■-....**
	225	178 (239)	773 (570)	250	500	74.0	2900	4500	**1PH8224-■■F■■-....**
		220 (295)	955 (704)	305	500	73.9	2900	4500	**1PH8226-■■F■■-....**
		288 (386)	1250 (922)	405	500	73.9	2900	4500	**1PH8228-■■F■■-....**
	280	394 (528)	1710 (1261)	520	500	73.8	2400	3300	**1PH8284-1■F4■-....**
		475 (637)	2062 (1521)	620	500	73.8	2400	3300	**1PH8286-1■F4■-....**
		599 (803)	2600 (1918)	790	500	73.8	2400	3300	**1PH8288-1■F4■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	$\cos \varphi$	I_μ	η	J			I_N	
		A	%	kgm^2 (lb$_f$-in-s^2)	kg (lb)	Type	A	Article No.
1PH8184- . . B . . .	0.85	27	87.7	0.489 (4.328)	350 (772)	1XB7322-P05	85	**6SL3120-1TE28-5AA3**
1PH8186- . . B . . .	0.83	43	88.9	0.652 (5.771)	422 (931)	1XB7322-P05	85 [4]	**6SL3120-1TE28-5AA3**
1PH8224- . . B . . .	0.86	41	91.4	1.48 (13.10)	610 (1345)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8226- . . B . . .	0.85	58	92.4	1.93 (17.08)	740 (1632)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8228- . . B . . .	0.86	67	92.6	2.33 (20.62)	870 (1918)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8184- . . C . . .	0.88	30	92.1	0.489 (4.328)	350 (772)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8186- . . C . . .	0.88	41	92.1	0.652 (5.771)	422 (931)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8224- . . C . . .	0.86	63	93.8	1.48 (13.10)	610 (1345)	1XB7322-P05	200	**6SL3120-1TE32-0AA3**
1PH8226- . . C . . .	0.87	81	94.2	1.93 (17.08)	740 (1632)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8228- . . C . . .	0.89	82	94.4	2.33 (20.62)	870 (1918)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8284-1. C . . .	0.9	98	95.1	4.20 (37.17)	1200 (2646)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8286-1. C . . .	0.91	115	95.2	5.20 (46.03)	1400 (3087)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8288-1. C . . .	0.91	162	95.6	6.30 (55.76)	1650 (3638)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8184- . . D . . .	0.87	40	93.1	0.489 (4.328)	350 (772)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8186- . . D . . .	0.88	54	93.5	0.652 (5.771)	422 (931)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224- . . D . . .	0.86	77	94.7	1.48 (13.10)	610 (1345)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8226- . . D . . .	0.88	83	95	1.93 (17.08)	740 (1632)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8228- . . D . . .	0.9	94	95.2	2.33 (20.62)	870 (1918)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8284-1. D . . .	0.89	140	96	4.20 (37.17)	1200 (2646)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8286-1. D . . .	0.88	214	96.3	5.20 (46.03)	1400 (3087)	1XB7700-P02	840	**6SL3320-1TE38-4AA3**
1PH8288-1. D . . .	0.89	247	96.5	6.30 (55.76)	1650 (3638)	1XB7712-P03	985	**6SL3320-1TE41-0AA3**
1PH8184- . . F . . .	0.83	66	94.7	0.489 (4.328)	350 (772)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186- . . F . . .	0.85	85	95.2	0.652 (5.771)	422 (931)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8224- . . F . . .	0.87	88	95.4	1.48 (13.10)	610 (1345)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8226- . . F . . .	0.87	120	95.9	1.93 (17.08)	740 (1632)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8228- . . F . . .	0.86	171	96	2.33 (20.62)	870 (1918)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8284-1. F . . .	0.9	159	96.4	4.20 (37.17)	1200 (2646)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8286-1. F . . .	0.91	180	96.6	5.20 (46.03)	1400 (3087)	1XB7712-P03	840	**6SL3320-1TE38-4AA3**
1PH8288-1. F . . .	0.91	230	96.7	6.30 (55.76)	1650 (3638)	1XB7712-P03	985	**6SL3320-1TE41-0AA3**

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. A to F); limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 2 kHz (SH 180 to 280).
[4] The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 690 V 3 AC, Basic Line Module									
700	280	162 (217)	2210 (1630)	184	605	23.9	1200	3300	**1PH8284- 1■K 4■-....**
		210 (282)	2865 (2113)	235	605	23.8	1300	3300	**1PH8286- 1■K 4■-....**
		263 (353)	3588 (2647)	295	605	23.9	1400	3300	**1PH8288- 1■K 4■-....**
1000	280	236 (316)	2254 (1663)	265	600	33.9	1900	3300	**1PH8284- 1■U 4■-....**
		299 (401)	2855 (2106)	355	570	33.8	2000	3300	**1PH8286- 1■U 4■-....**
		367 (492)	3505 (2585)	425	580	33.8	2100	3300	**1PH8288- 1■U 4■-....**
1500	280	307 (412)	1955 (1442)	345	590	50.6	1900	3300	**1PH8284- 1■W 4■-....**
		370 (496)	2356 (1738)	410	590	50.6	2000	3300	**1PH8286- 1■W 4■-....**
		465 (624)	2961 (2184)	520	590	50.5	2100	3300	**1PH8288- 1■W 4■-....**
Line voltage 690 V 3 AC, Active Line Module									
800	280	185 (248)	2208 (1629)	182	690	27.2	1500	3300	**1PH8284- 1■K 4■-....**
		240 (322)	2865 (2113)	235	690	27.2	1600	3300	**1PH8286- 1■K 4■-....**
		300 (402)	3581 (2641)	290	690	27.3	1600	3300	**1PH8288- 1■K 4■-....**
1150	280	272 (365)	2255 (1663)	270	690	38.9	2200	3300	**1PH8284- 1■U 4■-....**
		344 (461)	2860 (2110)	355	655	38.8	2200	3300	**1PH8286- 1■U 4■-....**
		422 (566)	3504 (2585)	425	665	38.8	2200	3300	**1PH8288- 1■U 4■-....**
1750	280	359 (481)	1959 (1445)	345	690	58.9	2200	3300	**1PH8284- 1■W 4■-....**
		432 (579)	2356 (1738)	410	690	58.9	2200	3300	**1PH8286- 1■W 4■-....**
		543 (728)	2964 (2186)	510	690	58.9	2200	3300	**1PH8288- 1■W 4■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magne-tizing current	Efficiency	Moment of inertia	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb$_f$-in-s²)	kg (lb)	Type	A	Article No.
1PH8284-1.K...	0.91	50	92.7	4.20 (37.17)	1200 (2646)	1XB7700-P02	215	**6SL3320-1TG32-2AA3**
1PH8286-1.K...	0.90	79	93.8	5.20 (46.03)	1400 (3087)	1XB7700-P02	260	**6SL3320-1TG32-6AA3**
1PH8288-1.K...	0.92	71	92.9	6.30 (55.76)	1650 (3638)	1XB7700-P02	330 [4]	**6SL3320-1TG33-3AA3**
1PH8284-1.U...	0.90	85	94.7	4.20 (37.17)	1200 (2646)	1XB7700-P02	330	**6SL3320-1TG33-3AA3**
1PH8286-1.U...	0.89	119	95.2	5.20 (46.03)	1400 (3087)	1XB7700-P02	410	**6SL3320-1TG34-1AA3**
1PH8288-1.U...	0.90	140	95.4	6.30 (55.76)	1650 (3638)	1XB7700-P02	465	**6SL3320-1TG34-7AA3**
1PH8284-1.W...	0.91	89	95.6	4.20 (37.17)	1200 (2646)	1XB7700-P02	410	**6SL3320-1TG34-1AA3**
1PH8286-1.W...	0.92	101	95.8	5.20 (46.03)	1400 (3087)	1XB7700-P02	465	**6SL3320-1TG34-7AA3**
1PH8288-1.W...	0.92	130	960	6.30 (55.76)	1650 (3638)	1XB7700-P02	575	**6SL3320-1TG35-8AA3**
1PH8284-1.K...	0.91	51	93.4	4.20 (37.17)	1200 (2646)	1XB7700-P02	215	**6SL3320-1TG32-2AA3**
1PH8286-1.K...	0.90	79	94.4	5.20 (46.03)	1400 (3087)	1XB7700-P02	260	**6SL3320-1TG32-6AA3**
1PH8288-1.K...	0.92	72	93.6	6.30 (55.76)	1650 (3638)	1XB7700-P02	330	**6SL3320-1TG33-3AA3**
1PH8284-1.U...	0.89	86	95.1	4.20 (37.17)	1200 (2646)	1XB7700-P02	330	**6SL3320-1TG33-3AA3**
1PH8286-1.U...	0.89	119	95.6	5.20 (46.03)	1400 (3087)	1XB7700-P02	410	**6SL3320-1TG34-1AA3**
1PH8288-1.U...	0.90	140	95.8	6.30 (55.76)	1650 (3638)	1XB7700-P02	465	**6SL3320-1TG34-7AA3**
1PH8284-1.W...	0.91	91	95.9	4.20 (37.17)	1200 (2646)	1XB7700-P02	410	**6SL3320-1TG34-1AA3**
1PH8286-1.W...	0.92	102	96.1	5.20 (46.03)	1400 (3087)	1XB7700-P02	465	**6SL3320-1TG34-7AA3**
1PH8288-1.W...	0.92	131	96.3	6.30 (55.76)	1650 (3638)	1XB7700-P02	575	**6SL3320-1TG35-8AA3**

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded (applicable for standard; 14. position of the Article No.: A to F).
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 2 kHz (SH 180 to 280).
[4] The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Water cooling**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC, Smart/Basic Line Module									
1500	80	3.5 (4.7)	22 (16.2)	8.9	357	54.5	3550	10000	**1PH8083-■■F 2■-....**
		4.6 (6.2)	29 (21.4)	13.7	316	53.3	6000	10000	**1PH8087-■■F 2■-....**
	100	5 (6.71)	32 (23.6)	12.8	357	53.1	2500	9000	**1PH8101-■■F 2■-....**
		7.1 (9.5)	45 (33.2)	19.7	317	53.0	4000	9000	**1PH8103-■■F 2■-....**
		11 (14.8)	70 (51.6)	28.5	340	52.8	3500	9000	**1PH8105-■■F 2■-....**
		14 (18.8)	89 (65.6)	43.7	277	53.3	5600	9000	**1PH8107-■■F 2■-....**
	132	15 (20.1)	96 (70.8)	30	380	52.3	2500	8000	**1PH8131-■■F 2■-....**
		17 (22.8)	108 (79.7)	38	345	51.5	3500	8000	**1PH8133-■■F 2■-....**
		22 (29.5)	140 (103)	51	342	51.5	4000	8000	**1PH8135-■■F 2■-....**
		27 (36.2)	172 (127)	67	315	51.6	4000	8000	**1PH8137-■■F 2■-....**
		30 (40.2)	191 (141)	80	289	51.9	5000	8000	**1PH8138-■■F 2■-....**
	160	37 (49.6)	236 (174)	84	328	51.1	3000	6500	**1PH8163-■■F 2■-....**
		46 (61.7)	293 (216)	104	330	50.9	3050	6500	**1PH8165-■■F 2■-....**
		52 (69.7)	331 (244)	116	332	51.2	3050	6500	**1PH8166-■■F 2■-....**
2000	80	4.3 (5.8)	21 (15.5)	12	322	70.4	7200	10000	**1PH8083-■■G 2■-....**
		6.1 (8.2)	29 (21.4)	17.5	312	70.3	7950	10000	**1PH8087-■■G 2■-....**
	100	6.4 (8.6)	31 (22.9)	16.8	335	69.8	4000	9000	**1PH8101-■■G 2■-....**
		9.5 (12.7)	45 (33.2)	23.8	343	69.8	3000	9000	**1PH8103-■■G 2■-....**
		13.0 (17.4)	62 (45.7)	34.5	326	69.3	4000	9000	**1PH8105-■■G 2■-....**
	132	18 (24.1)	86 (63.4)	40	352	69.1	4000	8000	**1PH8131-■■G 2■-....**
		22 (29.5)	105 (77.4)	52	336	68.2	5000	8000	**1PH8133-■■G 2■-....**
		29 (38.9)	138 (102)	64	348	68.3	4500	8000	**1PH8135-■■G 2■-....**
	160	42 (56.3)	201 (148)	93	335	67.6	5000	6500	**1PH8163-■■G 2■-....**
		53 (71.1)	253 (187)	110	352	67.6	3500	6500	**1PH8165-■■G 2■-....**
		64 (85.8)	306 (226)	125	376	67.8	3000	6500	**1PH8166-■■G 2■-....**
3000	100	10.6 (14.2)	34 (25.1)	30	309	102.4	11900	9000	**1PH8103-■■M 2■-....**
		16.8 (22.5)	53 (39.1)	45	324	102.3	8050	9000	**1PH8105-■■M 2■-....**
		18 (24.1)	57 (42.0)	60	264	102.2	17000	9000	**1PH8107-■■M 2■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb$_f$-in-s²)	kg (lb)	Type	A	Article No.
1PH8083-..F...	0.84	3.6	78.4	0.0064 (0.0566)	36 (79.4)	gk803	9	6SL3120-■TE21-0AD0
1PH8087-..F...	0.78	7.2	81.4	0.0089 (0.0788)	44 (97.0)	gk803	18	6SL3120-■TE21-8A■0
1PH8101-..F...	0.81	6.0	81.3	0.0138 (0.1221)	51 (112)	gk823	18	6SL3120-■TE21-8A■0
1PH8103-..F...	0.82	8.6	82.7	0.0172 (0.1522)	60 (132)	gk823	30	6SL3120-1TE23-0A■0
1PH8105-..F...	0.81	13.3	84.3	0.0252 (0.2230)	74 (163)	gk823	30	6SL3120-1TE23-0A■0
1PH8107-..F...	0.83	17.8	82.9	0.0289 (0.2558)	83 (183)	gk823	45	6SL3120-1TE24-5AC0
1PH8131-..F...	0.89	9.2	88.3	0.0590 (0.5222)	105 (232)	gk843	30	6SL3120-1TE23-0A■0
1PH8133-..F...	0.86	14.2	89.7	0.0760 (0.6727)	123 (271)	gk843	45	6SL3120-1TE24-5AC0
1PH8135-..F...	0.85	20.3	90.1	0.0940 (0.8320)	141 (311)	gk843	60	6SL3120-1TE26-0AC0
1PH8137-..F...	0.86	25.3	90	0.1090 (0.9648)	157 (346)	gk843	85	6SL3120-1TE28-5AA3
1PH8138-..F...	0.88	27.1	88.2	0.1090 (0.9648)	157 (346)	gk843	85	6SL3120-1TE28-5AA3
1PH8163-..F...	0.88	27.4	91.6	0.2160 (1.9118)	229 (505)	gk873	85	6SL3120-1TE28-5AA3
1PH8165-..F...	0.87	37.2	93	0.2320 (2.0534)	264 (582)	gk873	132	6SL3120-1TE31-3AA3
1PH8166-..F...	0.88	36.7	93.6	0.2320 (2.0534)	269 (593)	gk873	132	6SL3120-1TE31-3AA3
1PH8083-..G...	0.80	5.9	83.3	0.0064 (0.0566)	36 (79.4)	gk803	18	6SL3120-■TE21-8A■0
1PH8087-..G...	0.80	8.4	84.3	0.0089 (0.0788)	44 (97.0)	gk803	18	6SL3120-■TE21-8A■0
1PH8101-..G...	0.81	7.6	85.7	0.0138 (0.1221)	51 (112)	gk823	18	6SL3120-■TE21-8A■0
1PH8103-..G...	0.82	10.3	85.7	0.0172 (0.1522)	60 (132)	gk823	30	6SL3120-1TE23-0A■0
1PH8105-..G...	0.81	15.6	87.9	0.0252 (0.2230)	74 (163)	gk823	45	6SL3120-1TE24-5AC0
1PH8131-..G...	0.85	15.5	90.8	0.0590 (0.5222)	105 (232)	gk843	45	6SL3120-1TE24-5AC0
1PH8133-..G...	0.84	22.2	90.9	0.0760 (0.6727)	123 (271)	gk843	60	6SL3120-1TE26-0AC0
1PH8135-..G...	0.86	23.9	92.4	0.0940 (0.8320)	141 (311)	gk843	85	6SL3120-1TE28-5AA3
1PH8163-..G...	0.88	30.8	93.7	0.2160 (1.9118)	229 (505)	gk873	132	6SL3120-1TE31-3AA3
1PH8165-..G...	0.89	32.1	93.8	0.2320 (2.0534)	264 (582)	gk873	132	6SL3120-1TE31-3AA3
1PH8166-..G...	0.88	39.3	93.7	0.2320 (2.0534)	269 (593)	gk873	132	6SL3120-1TE31-3AA3
1PH8103-..M...	0.80	13.0	90	0.0172 (0.1522)	60 (132)	gk823	30	6SL3120-1TE23-0A■0
1PH8105-..M...	0.80	20.3	90	0.0252 (0.2230)	74 (163)	gk823	45	6SL3120-1TE24-5AC0
1PH8107-..M...	0.80	26.0	90	0.0289 (0.2558)	83 (183)	gk823	60	6SL3120-1TE26-0AC0

Single Motor Module	1
Double Motor Module	2

Motor Module	
For continuous load with 200 % overload (C type)	C
For highly dynamic, intermittent load cycles with 300 % overload (D type)	D

1) n_2: Maximum permissible thermal speed at constant power.
2) n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. B to H); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
3) I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 4 kHz (SH 80 to 160).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Water cooling**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC, Active Line Module									
1750	80	4 (5.36)	22 (16.2)	8.7	416	62.4	4100	10000	**1PH8083-■■F 2■-....**
		5.4 (7.2)	29 (21.4)	13.7	358	61.8	6600	10000	**1PH8087-■■F 2■-....**
	100	5.8 (7.8)	32 (23.6)	12.8	400	61.7	2500	9000	**1PH8101-■■F 2■-....**
		8.2 (11.0)	45 (33.2)	19.7	364	61.4	5000	9000	**1PH8103-■■F 2■-....**
		12.5 (16.8)	68 (50.2)	28.5	380	61.2	3400	9000	**1PH8105-■■F 2■-....**
		15.5 (20.8)	85 (62.7)	42	314	61.4	4500	9000	**1PH8107-■■F 2■-....**
	132	17 (22.8)	93 (68.6)	30	425	60.7	2500	8000	**1PH8131-■■F 2■-....**
		19.5 (26.1)	106 (78.2)	38	403	59.8	3500	8000	**1PH8133-■■F 2■-....**
		25.5 (34.2)	139 (103)	51	395	59.8	4000	8000	**1PH8135-■■F 2■-....**
		31.5 (42.2)	172 (127)	67	365	59.9	4500	8000	**1PH8137-■■F 2■-....**
		33 (44.3)	180 (133)	77	332	60.0	5000	8000	**1PH8138-■■F 2■-....**
	160	43 (57.7)	235 (173)	84	380	59.4	3500	6500	**1PH8163-■■F 2■-....**
		53 (71.1)	289 (213)	104	374	59.3	3050	6500	**1PH8165-■■F 2■-....**
		61 (81.8)	333 (246)	116	381	59.5	3000	6500	**1PH8166-■■F 2■-....**
2300	80	4.9 (6.6)	20 (14.8)	12	362	80.5	8150	10000	**1PH8083-■■G 2■-....**
		7 (9.39)	29 (21.4)	17.7	355	80.3	8850	10000	**1PH8087-■■G 2■-....**
	100	7.3 (9.8)	30 (22.1)	16.8	382	79.7	5000	9000	**1PH8101-■■G 2■-....**
		10.9 (14.6)	45 (33.2)	23.8	390	79.8	3000	9000	**1PH8103-■■G 2■-....**
		15.0 (20.1)	62 (45.7)	34	370	79.3	3500	9000	**1PH8105-■■G 2■-....**
	132	20 (26.8)	83 (61.2)	39	400	78.5	4000	8000	**1PH8131-■■G 2■-....**
		25 (33.5)	104 (76.7)	52	373	78.3	6000	8000	**1PH8133-■■G 2■-....**
		31 (41.6)	129 (95.2)	61	397	78.1	4500	8000	**1PH8135-■■G 2■-....**
	160	48 (64.4)	199 (147)	93	382	77.6	4000	6500	**1PH8163-■■G 2■-....**
		60 (80.5)	249 (184)	107	410	77.6	3000	6500	**1PH8165-■■G 2■-....**
		72 (96.6)	299 (221)	124	420	77.8	3000	6500	**1PH8166-■■G 2■-....**
3300	100	11.7 (15.7)	34 (25.1)	30	340	112.4	13550	9000	**1PH8103-■■M 2■-....**
		18.5 (24.8)	54 (39.8)	45	355	112.4	9050	9000	**1PH8105-■■M 2■-....**
		20 (26.8)	58 (42.8)	60	290	112.6	18050	9000	**1PH8107-■■M 2■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb_f-in-s²)	kg (lb)	Type	A	Article No.
1PH8083-..F...	0.82	4.0	80.8	0.0064 (0.0566)	36 (79.4)	gk803	9	**6SL3120-■TE21-0AD0**
1PH8087-..F...	0.80	6.8	83.1	0.0089 (0.0788)	44 (97.0)	gk803	18	**6SL3120-■TE21-8A■0**
1PH8101-..F...	0.83	5.4	83.4	0.0138 (0.1221)	51 (112)	gk823	18	**6SL3120-■TE21-8A■0**
1PH8103-..F...	0.82	8.6	85.1	0.0172 (0.1522)	60 (132)	gk823	30	**6SL3120-1TE23-0A■0**
1PH8105-..F...	0.81	12.1	86.2	0.0252 (0.2230)	74 (163)	gk823	30	**6SL3120-1TE23-0A■0**
1PH8107-..F...	0.83	17.5	84.7	0.0289 (0.2558)	83 (183)	gk823	45	**6SL3120-1TE24-5AC0**
1PH8131-..F...	0.89	8.2	89.7	0.0590 (0.5222)	105 (232)	gk843	30	**6SL3120-1TE23-0A■0**
1PH8133-..F...	0.85	14.9	91.3	0.0760 (0.6727)	123 (271)	gk843	45	**6SL3120-1TE24-5AC0**
1PH8135-..F...	0.85	20.1	91.4	0.0940 (0.8320)	141 (311)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8137-..F...	0.86	24.8	91.1	0.1090 (0.9648)	157 (346)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8138-..F...	0.87	27.1	89.8	0.1090 (0.9648)	157 (346)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8163-..F...	0.88	27.3	92.4	0.2160 (1.9118)	229 (505)	gk873	85	**6SL3120-1TE28-5AA3**
1PH8165-..F...	0.88	33.8	93.5	0.2320 (2.0534)	264 (582)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8166-..F...	0.89	35.2	94	0.2320 (2.0534)	269 (593)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8083-..G...	0.80	5.8	84.6	0.0064 (0.0566)	36 (79.4)	gk803	18	**6SL3120-■TE21-8A■0**
1PH8087-..G...	0.79	8.6	86	0.0089 (0.0788)	44 (97.0)	gk803	18	**6SL3120-■TE21-8A■0**
1PH8101-..G...	0.80	7.8	87.4	0.0138 (0.1221)	51 (112)	gk823	18	**6SL3120-■TE21-8A■0**
1PH8103-..G...	0.82	10.3	88.3	0.0172 (0.1522)	60 (132)	gk823	30	**6SL3120-1TE23-0A■0**
1PH8105-..G...	0.81	15.1	89.1	0.0252 (0.2230)	74 (163)	gk823	45	**6SL3120-1TE24-5AC0**
1PH8131-..G...	0.85	15.4	92	0.0590 (0.5222)	105 (232)	gk843	45	**6SL3120-1TE24-5AC0**
1PH8133-..G...	0.86	19.4	92.3	0.0760 (0.6727)	123 (271)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8135-..G...	0.85	24.1	93.3	0.0940 (0.8320)	141 (311)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8163-..G...	0.88	30.2	93.9	0.2160 (1.9118)	229 (505)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8165-..G...	0.88	33.7	94.6	0.2320 (2.0534)	264 (582)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8166-..G...	0.89	35.5	94.6	0.2320 (2.0534)	269 (593)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8103-..M...	0.80	13.2	90	0.0172 (0.1522)	60 (132)	gk823	30	**6SL3120-1TE23-0A■0**
1PH8105-..M...	0.80	20.2	91	0.0252 (0.2230)	74 (163)	gk823	45	**6SL3120-1TE24-5AC0**
1PH8107-..M...	0.80	26.1	90	0.0289 (0.2558)	83 (183)	gk823	60	**6SL3120-1TE26-0AC0**

Single Motor Module	**1**
Double Motor Module	**2**
Motor Module	
For continuous load with 200 % overload (C type)	**C**
For highly dynamic, intermittent load cycles with 300 % overload (D type)	**D**

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. B to H); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 4 kHz (SH 80 to 160).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Water cooling**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 480 V 3 AC, Smart/Basic Line Module									
2000	80	4.6 (6.2)	22 (16.2)	8.7	457	71.0	4250	10000	**1PH8083-■■F 2■-....**
		6.1 (8.2)	29 (21.4)	13.7	402	70.0	6950	10000	**1PH8087-■■F 2■-....**
	100	6.6 (8.9)	32 (23.6)	12.5	450	69.9	2500	9000	**1PH8101-■■F 2■-....**
		9.4 (12.6)	45 (33.2)	19.7	411	69.7	5000	9000	**1PH8103-■■F 2■-....**
		14 (18.8)	67 (49.4)	27.5	426	69.5	3000	9000	**1PH8105-■■F 2■-....**
		18 (24.1)	86 (63.4)	42.6	363	69.7	3000	9000	**1PH8107-■■F 2■-....**
	132	18.5 (24.8)	88 (64.9)	30	460	68.7	2500	8000	**1PH8131-■■F 2■-....**
		22.5 (30.2)	107 (78.9)	38	452	68.2	4000	8000	**1PH8133-■■F 2■-....**
		29 (38.9)	138 (102)	52	448	68.2	4500	8000	**1PH8135-■■F 2■-....**
		36 (48.3)	172 (127)	67	415	68.3	4000	8000	**1PH8137-■■F 2■-....**
		37 (49.6)	177 (131)	76	380	68.4	4000	8000	**1PH8138-■■F 2■-....**
	160	49 (65.7)	234 (173)	84	430	67.7	3500	6500	**1PH8163-■■F 2■-....**
		60 (80.5)	287 (212)	103	426	67.6	3050	6500	**1PH8165-■■F 2■-....**
		68 (91.2)	325 (240)	116	426	67.9	3000	6500	**1PH8166-■■F 2■-....**
2650	80	5.6 (7.5)	20 (14.8)	12	425	91.8	8500	10000	**1PH8083-■■G 2■-....**
		8.1 (10.9)	29 (21.4)	17.8	415	91.8	9150	10000	**1PH8087-■■G 2■-....**
	100	8.4 (11.3)	30 (22.1)	16.8	435	91.4	4000	9000	**1PH8101-■■G 2■-....**
		12.5 (16.8)	45 (33.2)	23.5	454	91.2	4000	9000	**1PH8103-■■G 2■-....**
		17.0 (22.8)	61 (45.0)	33.5	424	90.9	4500	9000	**1PH8105-■■G 2■-....**
	132	23 (30.8)	83 (61.2)	39	458	90.1	4500	8000	**1PH8131-■■G 2■-....**
		28 (37.5)	101 (74.5)	50	427	89.9	6000	8000	**1PH8133-■■G 2■-....**
		32 (42.9)	115 (84.8)	58	448	89.6	5500	8000	**1PH8135-■■G 2■-....**
	160	55 (73.8)	198 (146)	90	450	89.2	5000	6500	**1PH8163-■■G 2■-....**
		65 (87.2)	234 (173)	100	460	89.2	3000	6500	**1PH8165-■■G 2■-....**
		83 (111)	299 (221)	125	460	89.6	3000	6500	**1PH8166-■■G 2■-....**
3600	100	12.7 (17.0)	34 (25.1)	29.7	368	122.5	14650	9000	**1PH8103-■■M 2■-....**
		20 (26.8)	53 (39.1)	45	375	122.5	10000	9000	**1PH8105-■■M 2■-....**
		21 (28.2)	56 (41.3)	59	315	122.1	17650	9000	**1PH8107-■■M 2■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb_f-in-s²)	kg (lb)	Type	A	Article No.
1PH8083-..F...	0.83	3.8	83.9	0.0064 (0.0566)	36 (79.4)	gk803	9	**6SL3120-■TE21-0AD0**
1PH8087-..F...	0.79	6.8	86.8	0.0089 (0.0788)	44 (97.0)	gk803	18	**6SL3120-■TE21-8A■0**
1PH8101-..F...	0.82	4.4	85.8	0.0138 (0.1221)	51 (112)	gk823	18	**6SL3120-■TE21-8A■0**
1PH8103-..F...	0.82	8.5	86.9	0.0172 (0.1522)	60 (132)	gk823	30	**6SL3120-1TE23-0A■0**
1PH8105-..F...	0.82	11.7	89.4	0.0252 (0.2230)	74 (163)	gk823	30	**6SL3120-1TE23-0A■0**
1PH8107-..F...	0.81	19.1	87.3	0.0289 (0.2558)	83 (183)	gk823	45	**6SL3120-1TE24-5AC0**
1PH8131-..F...	0.90	7.2	91.2	0.0590 (0.5222)	105 (232)	gk843	30	**6SL3120-1TE23-0A■0**
1PH8133-..F...	0.86	14.4	93.8	0.0760 (0.6727)	123 (271)	gk843	45	**6SL3120-1TE24-5AC0**
1PH8135-..F...	0.85	19.9	93.1	0.0940 (0.8320)	141 (311)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8137-..F...	0.86	25.4	92.8	0.1090 (0.9648)	157 (346)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8138-..F...	0.86	28.4	92	0.1090 (0.9648)	157 (346)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8163-..F...	0.88	26.9	92.5	0.2160 (1.9118)	229 (505)	gk873	85	**6SL3120-1TE28-5AA3**
1PH8165-..F...	0.88	34.0	94	0.2320 (2.0534)	264 (582)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8166-..F...	0.89	32.8	94.1	0.2320 (2.0534)	269 (593)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8083-..G...	0.76	6.5	86.2	0.0064 (0.0566)	36 (79.4)	gk803	18	**6SL3120-■TE21-8A■0**
1PH8087-..G...	0.77	9.3	87.1	0.0089 (0.0788)	44 (97.0)	gk803	18	**6SL3120-■TE21-8A■0**
1PH8101-..G...	0.80	7.7	88.8	0.0138 (0.1221)	51 (112)	gk823	18	**6SL3120-■TE21-8A■0**
1PH8103-..G...	0.79	11.3	90.4	0.0172 (0.1522)	60 (132)	gk823	30	**6SL3120-1TE23-0A■0**
1PH8105-..G...	0.81	15.3	91.1	0.0252 (0.2230)	74 (163)	gk823	45	**6SL3120-1TE24-5AC0**
1PH8131-..G...	0.85	15.4	93.8	0.0590 (0.5222)	105 (232)	gk843	45	**6SL3120-1TE24-5AC0**
1PH8133-..G...	0.85	19.5	93.3	0.0760 (0.6727)	123 (271)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8135-..G...	0.84	23.0	94.2	0.0940 (0.8320)	141 (311)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8163-..G...	0.86	33.6	94	0.2160 (1.9118)	229 (505)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8165-..G...	0.89	31.9	94.8	0.2320 (2.0534)	264 (582)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8166-..G...	0.90	35.7	94.8	0.2320 (2.0534)	269 (593)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8103-..M...	0.80	13.0	91	0.0172 (0.1522)	60 (132)	gk823	30	**6SL3120-1TE23-0A■0**
1PH8105-..M...	0.81	18.6	92	0.0252 (0.2230)	74 (163)	gk823	45	**6SL3120-1TE24-5AC0**
1PH8107-..M...	0.79	26.1	91	0.0289 (0.2558)	83 (183)	gk823	60	**6SL3120-1TE26-0AC0**

Single Motor Module	**1**
Double Motor Module	**2**
Motor Module	
For continuous load with 200 % overload (C type)	**C**
For highly dynamic, intermittent load cycles with 300 % overload (D type)	**D**

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. B to H); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 4 kHz (SH 80 to 160).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Water cooling**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 480 V 3 AC, Active Line Module									
2200	80	5 (6.71)	22 (16.2)	8.7	500	77.4	5050	10000	**1PH8083-■■F 2■-....**
		6.7 (9.0)	29 (21.4)	13.7	435	76.4	7100	10000	**1PH8087-■■F 2■-....**
	100	7.2 (9.7)	31 (22.9)	12.5	480	76.6	3000	9000	**1PH8101-■■F 2■-....**
		10.3 (13.8)	45 (33.2)	19.7	430	76.8	5000	9000	**1PH8103-■■F 2■-....**
		15.4 (20.7)	67 (49.4)	27.5	458	76.3	3500	9000	**1PH8105-■■F 2■-....**
		19.8 (26.6)	86 (63.4)	42.6	381	76.3	3500	9000	**1PH8107-■■F 2■-....**
	132	20.0 (26.8)	87 (64.2)	29	500	75.9	3000	8000	**1PH8131-■■F 2■-....**
		24.0 (32.2)	104 (76.7)	37	495	74.8	4500	8000	**1PH8133-■■F 2■-....**
		31 (41.6)	135 (99.6)	50	480	74.9	4500	8000	**1PH8135-■■F 2■-....**
		39 (52.3)	169 (125)	66	456	74.9	4500	8000	**1PH8137-■■F 2■-....**
		39 (52.3)	169 (125)	72	410	75.0	5000	8000	**1PH8138-■■F 2■-....**
	160	53 (71.1)	230 (170)	83	460	74.4	4500	6500	**1PH8163-■■F 2■-....**
		66 (88.5)	287 (212)	103	457	74.4	3500	6500	**1PH8165-■■F 2■-....**
		75 (101)	326 (240)	116	470	74.5	3500	6500	**1PH8166-■■F 2■-....**
2800	80	6 (8.05)	20 (14.8)	12	450	96.4	8900	10000	**1PH8083-■■G 2■-....**
		8.5 (11.4)	29 (21.4)	17.8	420	97	9700	10000	**1PH8087-■■G 2■-....**
	100	8.3 (11.1)	28 (20.7)	16.5	448	96.1	5000	9000	**1PH8101-■■G 2■-....**
		12.8 (17.2)	44 (32.5)	22.5	470	96.2	4500	9000	**1PH8103-■■G 2■-....**
		18 (24.1)	61 (45.0)	33.5	450	96	4500	9000	**1PH8105-■■G 2■-....**
	132	24.0 (32.2)	82 (60.5)	39	472	95.2	6000	8000	**1PH8131-■■G 2■-....**
		29.0 (38.9)	99 (73.0)	50	450	94.9	6000	8000	**1PH8133-■■G 2■-....**
		33 (44.3)	113 (83.3)	57	462	94.7	6000	8000	**1PH8135-■■G 2■-....**
	160	56 (75.1)	191 (141)	89	462	94.3	5500	6500	**1PH8163-■■G 2■-....**
		68 (91.2)	232 (171)	100	494	94.2	3500	6500	**1PH8165-■■G 2■-....**
		87 (117)	297 (219)	124	500	94.5	3500	6500	**1PH8166-■■G 2■-....**
3900	100	13 (17.4)	32 (23.6)	29	397	132.4	13000	9000	**1PH8103-■■M 2■-....**
		21 (28.2)	51 (37.6)	43.5	405	132.5	10000	9000	**1PH8105-■■M 2■-....**
		21.6 (29.0)	53 (39.1)	58	329	131.9	18000	9000	**1PH8107-■■M 2■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	$\cos \varphi$	I_μ	η	J			I_N	
		A	%	kgm^2 (lb$_f$-in-s^2)	kg (lb)	Type	A	Article No.
1PH8083-..F...	0.82	3.8	85	0.0064 (0.0566)	36 (79.4)	gk803	9	**6SL3120-■TE21-0AD0**
1PH8087-..F...	0.78	6.7	86	0.0089 (0.0788)	44 (97.0)	gk803	18	**6SL3120-■TE21-8A■0**
1PH8101-..F...	0.80	6.0	86	0.0138 (0.1221)	51 (112)	gk823	18	**6SL3120-■TE21-8A■0**
1PH8103-..F...	0.84	8.6	86	0.0172 (0.1522)	60 (132)	gk823	30	**6SL3120-1TE23-0A■0**
1PH8105-..F...	0.83	12.0	88	0.0252 (0.2230)	74 (163)	gk823	30	**6SL3120-1TE23-0A■0**
1PH8107-..F...	0.84	17.0	88	0.0289 (0.2558)	83 (183)	gk823	45	**6SL3120-1TE24-5AC0**
1PH8131-..F...	0.90	7.2	91	0.0590 (0.5222)	105 (232)	gk843	30	**6SL3120-1TE23-0A■0**
1PH8133-..F...	0.86	14.1	93	0.0760 (0.6727)	123 (271)	gk843	45	**6SL3120-1TE24-5AC0**
1PH8135-..F...	0.85	20.0	92	0.0940 (0.8320)	141 (311)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8137-..F...	0.85	25.5	92	0.1090 (0.9648)	157 (346)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8138-..F...	0.86	27.0	91	0.1090 (0.9648)	157 (346)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8163-..F...	0.88	26.5	92	0.2160 (1.9118)	229 (505)	gk873	85	**6SL3120-1TE28-5AA3**
1PH8165-..F...	0.89	33.0	94	0.2320 (2.0534)	264 (582)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8166-..F...	0.89	34.4	94	0.2320 (2.0534)	269 (593)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8083-..G...	0.75	6.6	87	0.0064 (0.0566)	36 (79.4)	gk803	18	**6SL3120-■TE21-8A■0**
1PH8087-..G...	0.80	8.5	87	0.0089 (0.0788)	44 (97.0)	gk803	18	**6SL3120-■TE21-8A■0**
1PH8101-..G...	0.76	7.8	89	0.0138 (0.1221)	51 (112)	gk823	18	**6SL3120-■TE21-8A■0**
1PH8103-..G...	0.80	10.7	89	0.0172 (0.1522)	60 (132)	gk823	30	**6SL3120-1TE23-0A■0**
1PH8105-..G...	0.80	15.6	89	0.0252 (0.2230)	74 (163)	gk823	45	**6SL3120-1TE24-5AC0**
1PH8131-..G...	0.86	15.0	92	0.0590 (0.5222)	105 (232)	gk843	45	**6SL3120-1TE24-5AC0**
1PH8133-..G...	0.85	19.5	92	0.0760 (0.6727)	123 (271)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8135-..G...	0.84	23.1	92	0.0940 (0.8320)	141 (311)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8163-..G...	0.88	30.2	94	0.2160 (1.9118)	229 (505)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8165-..G...	0.88	33.5	94	0.2320 (2.0534)	264 (582)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8166-..G...	0.9	35.5	95	0.2320 (2.0534)	269 (593)	gk873	132	**6SL3120-1TE31-3AA3**
1PH8103-..M...	0.79	13.0	90	0.0172 (0.1522)	60 (132)	gk823	30	**6SL3120-1TE23-0A■0**
1PH8105-..M...	0.81	18.6	91	0.0252 (0.2230)	74 (163)	gk823	45	**6SL3120-1TE24-5AC0**
1PH8107-..M...	0.80	24.5	90	0.0289 (0.2558)	83 (183)	gk823	60	**6SL3120-1TE26-0AC0**

Single Motor Module	**1**
Double Motor Module	**2**
Motor Module	
For continuous load with 200 % overload (C type)	**C**
For highly dynamic, intermittent load cycles with 300 % overload (D type)	**D**

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. B to H); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 4 kHz (SH 80 to 160).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Water cooling**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC, Smart/Basic Line Module									
400	180	17 (22.8)	406 (299)	50	271	14.0	1500	5000	**1PH8184-■■B 2■-....**
		23 (30.8)	549 (405)	68	268	13.9	1800	5000	**1PH8186-■■B 2■-....**
	225	36 (48.3)	859 (634)	100	268	14.0	1400	4500	**1PH8224-■■B 2■-....**
		47 (63.0)	1122 (828)	130	264	14.0	1600	4500	**1PH8226-■■B 2■-....**
		58 (77.8)	1385 (1022)	154	272	13.9	1700	4500	**1PH8228-■■B 2■-....**
	280	71 (95.2)	1695 (1250)	170	295	13.8	2200	3300	**1PH8284-1■B 2■-....**
		89 (119)	2125 (1567)	210	300	13.7	2200	3300	**1PH8286-1■B 2■-....**
		109 (146)	2602 (1919)	260	295	13.7	2200	3300	**1PH8288-1■B 2■-....**
700	180	33 (44.3)	450 (332)	77	320	24.2	2500	5000	**1PH8184-■■C 2■-....**
		43 (57.7)	587 (433)	97	330	23.9	3000	5000	**1PH8186-■■C 2■-....**
	225	61 (81.8)	832 (614)	128	340	24.0	2100	4500	**1PH8224-■■C 2■-....**
		81 (109)	1105 (815)	184	310	23.9	2300	4500	**1PH8226-■■C 2■-....**
		96 (129)	1310 (966)	210	315	23.9	2500	4500	**1PH8228-■■C 2■-....**
	280	123 (165)	1678 (1238)	260	330	23.7	2200	3300	**1PH8284-1■C 2■-....**
		153 (205)	2087 (1539)	320	325	23.7	2200	3300	**1PH8286-1■C 2■-....**
		188 (252)	2565 (1892)	400	324	23.6	2200	3300	**1PH8288-1■C 2■-....**
1000	180	47 (63.0)	449 (331)	114	300	34.2	5000	5000	**1PH8184-■■D 2■-....**
		64 (85.8)	611 (451)	148	320	34.0	5000	5000	**1PH8186-■■D 2■-....**
	225	89 (119)	850 (627)	188	335	33.9	2800	4500	**1PH8224-■■D 2■-....**
		115 (154)	1098 (810)	235	340	33.9	2400	4500	**1PH8226-■■D 2■-....**
		141 (189)	1346 (993)	280	340	33.9	2300	4500	**1PH8228-■■D 2■-....**
	280	172 (231)	1643 (1212)	350	335	33.7	2200	3300	**1PH8284-1■D 2■-....**
		214 (287)	2044 (1508)	460	330	33.6	2200	3300	**1PH8286-1■D 2■-....**
		264 (354)	2521 (1859)	550	335	33.6	2200	3300	**1PH8288-1■D 2■-....**
1500	180	70 (93.9)	446 (329)	150	335	51.0	5000	5000	**1PH8184-■■F 2■-....**
		93 (125)	592 (437)	198	330	51.0	5000	5000	**1PH8186-■■F 2■-....**
	225	119 (160)	758 (559)	240	340	50.6	3500	4500	**1PH8224-■■F 2■-....**
		145 (194)	923 (681)	295	340	50.5	3700	4500	**1PH8226-■■F 2■-....**
		192 (257)	1222 (901)	390	340	50.5	3700	4500	**1PH8228-■■F 2■-....**
	280	227 (304)	1445 (1066)	445	343	50.4	2200	3300	**1PH8284-1■F 2■-....**
		281 (377)	1789 (1320)	540	343	50.4	2200	3300	**1PH8286-1■F 2■-....**
		345 (463)	2197 (1621)	660	345	50.3	2200	3300	**1PH8288-1■F 2■-....**
2500	180	95 (127)	363 (268)	196	340	85.2	5000	5000	**1PH8184-■■L 2■-....**
		120 (161)	458 (338)	250	335	83.9	5000	5000	**1PH8186-■■L 2■-....**
	225	153 (205)	584 (431)	310	340	83.8	3200	4500	**1PH8224-■■L 2■-....**
		185 (248)	707 (521)	380	335	83.8	3200	4500	**1PH8226-■■L 2■-....**
		226 (303)	863 (637)	455	340	83.7	3200	4500	**1PH8228-■■L 2■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb$_f$-in-s²)	kg (lb)	Type	A	Article No.
1PH8184-..B...	0.87	28	83.1	0.489 (4.328)	340 (750)	1XB7322-P05	60	**6SL3120-1TE26-0AC0**
1PH8186-..B...	0.86	42	84.5	0.652 (5.771)	410 (904)	1XB7322-P05	85	**6SL3120-1TE28-5AA3**
1PH8224-..B...	0.91	37	85.8	1.452 (12.852)	610 (1345)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8226-..B...	0.90	49	87.5	1.895 (16.773)	740 (1632)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8228-..B...	0.90	62	88.6	2.354 (20.835)	870 (1918)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8284-1.B...	0.89	70	91.4	4.21 (37.26)	1280 (2822)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8286-1.B...	0.89	83	91.6	5.16 (45.67)	1490 (3285)	1XB7322-P05	210	**6SL3320-1TE32-1AA3**
1PH8288-1.B...	0.89	110	92.5	6.29 (55.67)	1750 (3859)	1XB7700-P02	260	**6SL3320-1TE32-6AA3**
1PH8184-..C...	0.89	33	87.2	0.489 (4.328)	340 (750)	1XB7322-P05	85	**6SL3120-1TE28-5AA3**
1PH8186-..C...	0.86	49	89.8	0.652 (5.771)	410 (904)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8224-..C...	0.89	48	91.4	1.452 (12.852)	610 (1345)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8226-..C...	0.88	79	92.8	1.895 (16.773)	740 (1632)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8228-..C...	0.90	82	93	2.354 (20.835)	870 (1918)	1XB7322-P05	210	**6SL3320-1TE32-1AA3**
1PH8284-1.C...	0.87	108	94.5	4.21 (37.26)	1280 (2822)	1XB7700-P02	260	**6SL3320-1TE32-6AA3**
1PH8286-1.C...	0.89	123	94.8	5.16 (45.67)	1490 (3285)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8288-1.C...	0.88	172	95.2	6.29 (55.67)	1750 (3859)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8184-..D...	0.88	45	90.4	0.489 (4.328)	340 (750)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8186-..D...	0.85	78	92	0.652 (5.771)	410 (904)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224-..D...	0.87	79	93.7	1.452 (12.852)	610 (1345)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8226-..D...	0.89	87	93.8	1.895 (16.773)	745 (1643)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8228-..D...	0.91	98	94.3	2.354 (20.835)	875 (1929)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8284-1.D...	0.88	144	95.7	4.21 (37.26)	1280 (2822)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8286-1.D...	0.85	215	96	5.16 (45.67)	1490 (3285)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8288-1.D...	0.86	251	96.2	6.29 (55.67)	1750 (3859)	1XB7712-P03	745	**6SL3320-1TE37-5AA3**
1PH8184-..F...	0.87	66	92.8	0.489 (4.328)	340 (750)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186-..F...	0.87	85	93.5	0.652 (5.771)	410 (904)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224-..F...	0.89	87	95.1	1.452 (12.852)	615 (1356)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8226-..F...	0.87	119	95.7	1.895 (16.773)	745 (1643)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8228-..F...	0.87	169	95.9	2.354 (20.835)	875 (1929)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8284-1.F...	0.89	161	96.4	4.21 (37.26)	1280 (2822)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8286-1.F...	0.90	181	96.6	5.16 (45.67)	1490 (3285)	1XB7712-P03	745	**6SL3320-1TE37-5AA3**
1PH8288-1.F...	0.90	234	96.7	6.29 (55.67)	1750 (3859)	1XB7712-P03	840	**6SL3320-1TE38-4AA3**
1PH8184-..L...	0.87	75	94.5	0.489 (4.328)	340 (750)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186-..L...	0.88	109	94.8	0.652 (5.771)	415 (915)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8224-..L...	0.87	113	96.1	1.452 (12.852)	615 (1356)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8226-..L...	0.87	151	96.3	1.895 (16.773)	745 (1643)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8228-..L...	0.87	181	96.4	2.354 (20.835)	875 (1929)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**

Single Motor Module	**1**
Motor Module	
For continuous load with 200 % overload (C type)	**C**
For highly dynamic, intermittent load cycles with 300 % overload (D type)	**D**

1) n_2: Maximum permissible thermal speed at constant power.
2) n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article A to F); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
3) I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system). The rated motor data are valid for 2 kHz (SH 180 to 280).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Water cooling**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC, Active Line Module									
500	180	23 (30.8)	439 (324)	54	335	17.4	1800	5000	**1PH8184-■■B 2■-....**
		30 (40.2)	573 (423)	70	335	17.3	2200	5000	**1PH8186-■■B 2■-....**
	225	46 (61.7)	879 (648)	100	335	17.3	1500	4500	**1PH8224-■■B 2■-....**
		59 (79.1)	1127 (831)	128	330	17.3	1700	4500	**1PH8226-■■B 2■-....**
		72 (96.6)	1375 (1014)	150	340	17.2	1800	4500	**1PH8228-■■B 2■-....**
	280	89 (119)	1700 (1254)	172	365	17.1	2200	3300	**1PH8284-1■B 2■-....**
		111 (149)	2120 (1564)	205	375	17.0	2200	3300	**1PH8286-1■B 2■-....**
		136 (182)	2598 (1916)	260	365	17.0	2200	3300	**1PH8288-1■B 2■-....**
800	180	38 (51.0)	454 (335)	77	365	27.5	2900	5000	**1PH8184-■■C 2■-....**
		49 (65.7)	585 (431)	99	360	27.4	3500	5000	**1PH8186-■■C 2■-....**
	225	70 (93.9)	836 (617)	130	380	27.3	2300	4500	**1PH8224-■■C 2■-....**
		93 (125)	1110 (819)	186	350	27.2	2500	4500	**1PH8226-■■C 2■-....**
		110 (148)	1313 (968)	210	360	27.2	2700	4500	**1PH8228-■■C 2■-....**
	280	141 (189)	1683 (1241)	260	375	27.0	2200	3300	**1PH8284-1■C 2■-....**
		175 (235)	2089 (1541)	320	375	27.0	2200	3300	**1PH8286-1■C 2■-....**
		215 (288)	2567 (1893)	405	370	27.0	2200	3300	**1PH8288-1■C 2■-....**
1150	180	54 (72.4)	448 (330)	112	350	39.2	5000	5000	**1PH8184-■■D 2■-....**
		74 (99.2)	615 (454)	148	370	38.9	5000	5000	**1PH8186-■■D 2■-....**
	225	101 (135)	839 (619)	186	385	38.9	3000	4500	**1PH8224-■■D 2■-....**
		131 (176)	1088 (803)	230	390	38.9	2700	4500	**1PH8226-■■D 2■-....**
		161 (216)	1337 (986)	280	390	38.9	2500	4500	**1PH8228-■■D 2■-....**
	280	198 (266)	1644 (1213)	355	385	38.7	2200	3300	**1PH8284-1■D 2■-....**
		246 (330)	2043 (1507)	455	380	38.6	2200	3300	**1PH8286-1■D 2■-....**
		304 (408)	2525 (1862)	550	385	38.6	2300	3300	**1PH8288-1■D 2■-....**
1750	180	82 (110)	447 (330)	150	390	59.3	5000	5000	**1PH8184-■■F 2■-....**
		111 (149)	606 (447)	200	385	59.3	5000	5000	**1PH8186-■■F 2■-....**
	225	138 (185)	753 (555)	240	395	58.9	3800	4500	**1PH8224-■■F 2■-....**
		169 (227)	922 (680)	295	390	58.8	3900	4500	**1PH8226-■■F 2■-....**
		221 (296)	1206 (890)	390	390	58.8	3900	4500	**1PH8228-■■F 2■-....**
	280	265 (355)	1446 (1067)	445	400	58.7	2200	3300	**1PH8284-1■F 2■-....**
		328 (440)	1790 (1320)	540	400	58.7	2300	3300	**1PH8286-1■F 2■-....**
		403 (540)	2199 (1622)	670	400	58.7	2400	3300	**1PH8288-1■F 2■-....**
2900	180	102 (137)	336 (248)	182	395	97.5	5000	5000	**1PH8184-■■L 2■-....**
		135 (181)	445 (328)	245	385	97.3	5000	5000	**1PH8186-■■L 2■-....**
	225	164 (220)	540 (398)	285	395	97.1	3600	4500	**1PH8224-■■L 2■-....**
		204 (274)	672 (496)	360	390	97.1	3600	4500	**1PH8226-■■L 2■-....**
		237 (318)	780 (575)	415	395	97.0	3600	4500	**1PH8228-■■L 2■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb$_f$-in-s²)	kg (lb)	Type	A	Article No.
1PH8184-. .B...	0.86	27	85	0.489 (4.328)	340 (750)	1XB7322-P05	60	**6SL3120-1TE26-0AC0**
1PH8186-. .B...	0.85	43	86.8	0.652 (5.771)	410 (904)	1XB7322-P05	85	**6SL3120-1TE28-5AA3**
1PH8224-. .B...	0.90	38	88.3	1.452 (12.852)	610 (1345)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8226-. .B...	0.90	50	89.9	1.895 (16.773)	740 (1632)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8228-. .B...	0.90	63	90.8	2.354 (20.835)	870 (1918)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8284-1.B...	0.88	69	92.9	4.21 (37.26)	1280 (2822)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8286-1.B...	0.89	84	93.1	5.16 (45.67)	1490 (3285)	1XB7322-P05	210	**6SL3320-1TE32-1AA3**
1PH8288-1.B...	0.88	109	93.8	6.29 (55.67)	1750 (3859)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8184-. .C...	0.88	33	88.5	0.489 (4.328)	340 (750)	1XB7322-P05	85	**6SL3120-1TE28-5AA3**
1PH8186-. .C...	0.88	44	90.4	0.652 (5.771)	410 (904)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8224-. .C...	0.89	46	92	1.452 (12.852)	610 (1345)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8226-. .C...	0.88	77	93.4	1.895 (16.773)	740 (1632)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8228-. .C...	0.90	82	93.7	2.354 (20.835)	870 (1918)	1XB7322-P05	210	**6SL3320-1TE32-1AA3**
1PH8284-1.C...	0.88	108	95	4.21 (37.26)	1280 (2822)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8286-1.C...	0.88	126	95.3	5.16 (45.67)	1490 (3285)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8288-1.C...	0.87	172	95.6	6.29 (55.67)	1750 (3859)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8184-. .D...	0.87	46	91.5	0.489 (4.328)	340 (750)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8186-. .D...	0.84	80	92.7	0.652 (5.771)	410 (904)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224-. .D...	0.86	79	94.4	1.452 (12.852)	610 (1345)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8226-. .D...	0.89	87	94.5	1.895 (16.773)	745 (1643)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8228-. .D...	0.90	98	94.8	2.354 (20.835)	875 (1929)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8284-1.D...	0.87	144	96	4.21 (37.26)	1280 (2822)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8286-1.D...	0.85	216	96.2	5.16 (45.67)	1490 (3285)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8288-1.D...	0.86	251	96.4	6.29 (55.67)	1750 (3859)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8184-. .F...	0.87	65	93.3	0.489 (4.328)	340 (750)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186-. .F...	0.89	85	93.9	0.652 (5.771)	410 (904)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224-. .F...	0.88	87	95.4	1.452 (12.852)	615 (1356)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8226-. .F...	0.88	116	95.9	1.895 (16.773)	745 (1643)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8228-. .F...	0.87	165	96.1	2.354 (20.835)	875 (1929)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8284-1.F...	0.89	161	96.6	4.21 (37.26)	1280 (2822)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8286-1.F...	0.90	182	96.7	5.16 (45.67)	1490 (3285)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8288-1.F...	0.90	232	96.8	6.29 (55.67)	1750 (3859)	1XB7700-P02	840	**6SL3320-1TE38-4AA3**
1PH8184-. .L...	0.87	77	94.5	0.489 (4.328)	340 (750)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186-. .L...	0.87	108	94.8	0.652 (5.771)	415 (915)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8224-. .L...	0.88	114	96.1	1.452 (12.852)	615 (1356)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8226-. .L...	0.87	152	96.2	1.895 (16.773)	745 (1643)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8228-. .L...	0.87	182	96.3	2.354 (20.835)	875 (1929)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**

Single Motor Module	**1**	
Motor Module For continuous load with 200 % overload (C type) For highly dynamic, intermittent load cycles with 300 % overload (D type)		**C** **D**

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article A to F); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 2 kHz (SH 180 to 280).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	SIMOTICS M-1PH8 asynchronous motors Water cooling
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 480 V 3 AC, Smart/Basic/Active Line Module									
600	180	29 (38.9)	462 (341)	55	405	20.8	1800	5000	**1PH8184-■■B 2■-....**
		38 (51.0)	605 (446)	73	405	20.6	2500	5000	**1PH8186-■■B 2■-....**
	225	53 (71.1)	844 (623)	94	410	20.6	1900	4500	**1PH8224-■■B 2■-....**
		70 (93.9)	1114 (822)	122	410	20.5	2000	4500	**1PH8226-■■B 2■-....**
		85 (114)	1353 (998)	148	410	20.5	2100	4500	**1PH8228-■■B 2■-....**
	280	107 (143)	1703 (1256)	170	440	20.4	2200	3300	**1PH8284-1■B 2■-....**
		133 (178)	2117 (1561)	205	445	20.4	2200	3300	**1PH8286-1■B 2■-....**
		164 (220)	2610 (1925)	260	440	20.3	2200	3300	**1PH8288-1■B 2■-....**
1000	180	48 (64.4)	458 (338)	77	460	34.1	3100	5000	**1PH8184-■■C 2■-....**
		61 (81.8)	583 (430)	98	450	34.0	3700	5000	**1PH8186-■■C 2■-....**
	225	87 (117)	831 (613)	132	460	34.0	2500	4500	**1PH8224-■■C 2■-....**
		116 (156)	1108 (817)	184	440	33.9	2700	4500	**1PH8226-■■C 2■-....**
		138 (185)	1318 (972)	210	450	33.9	2900	4500	**1PH8228-■■C 2■-....**
	280	176 (236)	1681 (1240)	265	455	33.7	2200	3300	**1PH8284-1■C 2■-....**
		219 (294)	2091 (1542)	325	455	33.7	2200	3300	**1PH8286-1■C 2■-....**
		269 (361)	2569 (1895)	405	460	33.6	2200	3300	**1PH8288-1■C 2■-....**
1350	180	64 (85.8)	453 (334)	112	410	45.8	5000	5000	**1PH8184-■■D 2■-....**
		86 (115)	608 (448)	148	420	45.7	5000	5000	**1PH8186-■■D 2■-....**
	225	115 (154)	813 (600)	180	450	45.5	3400	4500	**1PH8224-■■D 2■-....**
		150 (201)	1061 (783)	225	460	45.5	3200	4500	**1PH8226-■■D 2■-....**
		184 (247)	1302 (960)	270	460	45.5	3000	4500	**1PH8228-■■D 2■-....**
	280	232 (311)	1641 (1210)	355	450	45.4	2200	3300	**1PH8284-1■D 2■-....**
		289 (388)	2044 (1508)	460	445	45.3	2300	3300	**1PH8286-1■D 2■-....**
		357 (479)	2525 (1862)	550	450	45.3	2400	3300	**1PH8288-1■D 2■-....**
2000	180	95 (127)	454 (335)	152	450	67.3	5000	5000	**1PH8184-■■F 2■-....**
		126 (169)	602 (444)	200	445	67.3	5000	5000	**1PH8186-■■F 2■-....**
	225	155 (208)	740 (546)	235	460	67.2	4200	4500	**1PH8224-■■F 2■-....**
		191 (256)	912 (673)	290	450	67.1	4100	4500	**1PH8226-■■F 2■-....**
		245 (329)	1170 (863)	380	450	67.1	4100	4500	**1PH8228-■■F 2■-....**
	280	303 (406)	1447 (1067)	445	455	67.0	2300	3300	**1PH8284-1■F 2■-....**
		375 (503)	1791 (1321)	550	455	67.0	2400	3300	**1PH8286-1■F 2■-....**
		460 (617)	2197 (1621)	670	455	67.0	2500	3300	**1PH8288-1■F 2■-....**
3400	180	100 (134)	281 (207)	158	460	114.0	5000	5000	**1PH8184-■■L 2■-....**
		121 (162)	340 (251)	200	455	114.0	5000	5000	**1PH8186-■■L 2■-....**
	225	164 (220)	461 (340)	255	460	114.0	4100	4500	**1PH8224-■■L 2■-....**
		199 (267)	559 (412)	310	460	114.0	4100	4500	**1PH8226-■■L 2■-....**
		237 (318)	666 (491)	370	460	114.0	4100	4500	**1PH8228-■■L 2■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia without holding brake	Weight without holding brake, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb$_f$-in-s²)	kg (lb)	Type	A	Article No.
1PH8184-. .B...	0.86	28	86.9	0.489 (4.328)	340 (750)	1XB7322-P05	60	**6SL3120-1TE26-0AC0**
1PH8186-. .B...	0.84	44	88.3	0.652 (5.771)	410 (904)	1XB7322-P05	85	**6SL3120-1TE28-5AA3**
1PH8224-. .B...	0.87	40	90.8	1.452 (12.852)	610 (1345)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8226-. .B...	0.88	55	91.9	1.895 (16.773)	740 (1632)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8228-. .B...	0.88	64	92.3	2.354 (20.835)	870 (1918)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8284-1.B...	0.88	71	93.9	4.21 (37.26)	1280 (2822)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8286-1.B...	0.89	83	94	5.16 (45.67)	1490 (3285)	1XB7322-P05	210	**6SL3320-1TE32-1AA3**
1PH8288-1.B...	0.88	111	94.6	6.29 (55.67)	1750 (3859)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8184-. .C...	0.86	34	90.5	0.489 (4.328)	340 (750)	1XB7322-P05	85	**6SL3120-1TE28-5AA3**
1PH8186-. .C...	0.87	44	92	0.652 (5.771)	410 (904)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8224-. .C...	0.89	44	93.1	1.452 (12.852)	610 (1345)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8226-. .C...	0.88	79	94.4	1.895 (16.773)	740 (1632)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8228-. .C...	0.89	83	94.6	2.354 (20.835)	870 (1918)	1XB7322-P05	210	**6SL3320-1TE32-1AA3**
1PH8284-1.C...	0.88	102	95.6	4.21 (37.26)	1280 (2822)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8286-1.C...	0.89	120	95.8	5.16 (45.67)	1490 (3285)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8288-1.C...	0.87	171	96.1	6.29 (55.67)	1750 (3859)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8184-. .D...	0.87	46	92.4	0.489 (4.328)	340 (750)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8186-. .D...	0.86	73	93.3	0.652 (5.771)	410 (904)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224-. .D...	0.86	79	950	1.452 (12.852)	610 (1345)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8226-. .D...	0.88	88	95.1	1.895 (16.773)	745 (1643)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8228-. .D...	0.90	99	95.4	2.354 (20.835)	875 (1929)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8284-1.D...	0.87	143	96.3	4.21 (37.26)	1280 (2822)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8286-1.D...	0.85	216	96.4	5.16 (45.67)	1490 (3285)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8288-1.D...	0.86	249	96.6	6.29 (55.67)	1750 (3859)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8184-. .F...	0.85	68	93.8	0.489 (4.328)	340 (750)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186-. .F...	0.87	89	93.8	0.652 (5.771)	410 (904)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224-. .F...	0.86	90	95.8	1.452 (12.852)	615 (1356)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8226-. .F...	0.88	118	96.1	1.895 (16.773)	745 (1643)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8228-. .F...	0.86	169	96.3	2.354 (20.835)	875 (1929)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8284-1.F...	0.89	160	96.7	4.21 (37.26)	1280 (2822)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8286-1.F...	0.90	180	96.8	5.16 (45.67)	1490 (3285)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8288-1.F...	0.90	230	96.9	6.29 (55.67)	1750 (3859)	1XB7700-P02	840	**6SL3320-1TE38-4AA3**
1PH8184-. .L...	0.84	76	94.4	0.489 (4.328)	340 (750)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186-. .L...	0.81	110	94.2	0.652 (5.771)	415 (915)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8224-. .L...	0.84	113	95.9	1.452 (12.852)	615 (1356)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8226-. .L...	0.84	153	95.8	1.895 (16.773)	745 (1643)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8228-. .L...	0.84	180	95.9	2.354 (20.835)	875 (1929)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**

Single Motor Module	**1**
Motor Module For continuous load with 200 % overload (C type) For highly dynamic, intermittent load cycles with 300 % overload (D type)	**C** **D**

1) n_2: Maximum permissible thermal speed at constant power.
2) n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article A to F); for performance bearings (14th position = "L"), increased maximum speeds apply; limitations must be taken into consideration where necessary (e.g. with holding brake), see Article No. supplements.
3) I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 2 kHz (SH 180 to 280).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed for field weakening, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 asynchronous motors Water cooling**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 690 V 3 AC, Basic Line Module									
400	280	68 (91.2)	1624 (1198)	89	555	13.7	2000	3300	**1PH8284-1■H2■-....**
		85 (114)	2029 (1497)	108	555	13.7	2000	3300	**1PH8286-1■H2■-....**
		105 (141)	2507 (1849)	134	555	13.7	2000	3300	**1PH8288-1■H2■-....**
700	280	119 (160)	1624 (1198)	136	605	23.7	2200	3300	**1PH8284-1■K2■-....**
		148 (198)	2019 (1489)	174	605	23.6	2200	3300	**1PH8286-1■K2■-....**
		182 (244)	2483 (1831)	205	605	23.7	2200	3300	**1PH8288-1■K2■-....**
1000	280	167 (224)	1595 (1176)	196	600	33.6	2200	3300	**1PH8284-1■U2■-....**
		208 (279)	1986 (1465)	260	570	33.6	2200	3300	**1PH8286-1■U2■-....**
		256 (343)	2445 (1803)	310	580	33.6	2200	3300	**1PH8288-1■U2■-....**
1500	280	220 (295)	1401 (1033)	250	590	50.4	2200	3300	**1PH8284-1■W2■-....**
		273 (366)	1738 (1282)	310	590	50.4	2200	3300	**1PH8286-1■W2■-....**
		335 (449)	2133 (1573)	375	590	50.3	2200	3300	**1PH8288-1■W2■-....**
Line voltage 690 V 3 AC, Active Line Module									
500	280	85 (114)	1624 (1198)	89	690	17.0	2000	3300	**1PH8284-1■H2■-....**
		106 (142)	2025 (1494)	108	690	17.0	2000	3300	**1PH8286-1■H2■-....**
		131 (176)	2502 (1845)	134	690	17.0	2000	3300	**1PH8288-1■H2■-....**
800	280	137 (184)	1635 (1206)	138	690	27.0	2200	3300	**1PH8284-1■K2■-....**
		170 (228)	2029 (1497)	176	690	27.0	2200	3300	**1PH8286-1■K2■-....**
		209 (280)	2495 (1840)	205	690	27.0	2200	3300	**1PH8288-1■K2■-....**
1150	280	192 (257)	1594 (1176)	198	690	38.6	2200	3300	**1PH8284-1■U2■-....**
		239 (320)	1985 (1464)	260	655	38.6	2200	3300	**1PH8286-1■U2■-....**
		295 (396)	2450 (1807)	310	665	38.6	2300	3300	**1PH8288-1■U2■-....**
1750	280	257 (345)	1401 (1033)	250	690	58.7	2200	3300	**1PH8284-1■W2■-....**
		318 (426)	1735 (1280)	305	690	58.7	2300	3300	**1PH8286-1■W2■-....**
		391 (524)	2134 (1574)	375	690	58.7	2400	3300	**1PH8288-1■W2■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Power factor	Magnetizing current	Efficiency	Moment of inertia	Weight, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	cos φ	I_μ	η	J			I_N	
		A	%	kgm² (lb_f-in-s²)	kg (lb)	Type	A	Article No.
1PH8284-1.H...	0.87	41	91.7	4.21 (37.26)	1280 (2822)	1XB7322-P05	100	**6SL3320-1TG31-0AA3**
1PH8286-1.H...	0.89	45	91.7	5.16 (45.67)	1490 (3285)	1XB7322-P05	120	**6SL3320-1TG31-2AA3**
1PH8288-1.H...	0.88	58	92.3	6.29 (55.67)	1750 (3859)	1XB7322-P05	150	**6SL3320-1TG31-5AA3**
1PH8284-1.K...	0.88	54	94.2	4.21 (37.26)	1280 (2822)	1XB7322-P05	150	**6SL3320-1TG31-5AA3**
1PH8286-1.K...	0.85	84	0.95	5.16 (45.67)	1490 (3285)	1XB7322-P05	215	**6SL3320-1TG32-2AA3**
1PH8288-1.K...	0.90	77	94.6	6.29 (55.67)	1750 (3859)	1XB7322-P05	260	**6SL3320-1TG32-6AA3**
1PH8284-1.U...	0.86	89	95.6	4.21 (37.26)	1280 (2822)	1XB7322-P05	215	**6SL3320-1TG32-2AA3**
1PH8286-1.U...	0.85	123	95.9	5.16 (45.67)	1490 (3285)	1XB7700-P02	330	**6SL3320-1TG33-3AA3**
1PH8288-1.U...	0.86	145	96.1	6.29 (55.67)	1750 (3859)	1XB7700-P02	410	**6SL3320-1TG34-1AA3**
1PH8284-1.W...	0.89	92	96.3	4.21 (37.26)	1280 (2822)	1XB7422-P06	330	**6SL3320-1TG33-3AA3**
1PH8286-1.W...	0.90	104	96.5	5.16 (45.67)	1490 (3285)	1XB7700-P02	410	**6SL3320-1TG34-1AA3**
1PH8288-1.W...	0.90	132	96.6	6.29 (55.67)	1750 (3859)	1XB7700-P02	465	**6SL3320-1TG34-7AA3**
1PH8284-1.H...	0.86	41	93.1	4.21 (37.26)	1280 (2822)	1XB7322-P05	100	**6SL3320-1TG31-0AA3**
1PH8286-1.H...	0.88	45	93.1	5.16 (45.67)	1490 (3285)	1XB7322-P05	120	**6SL3320-1TG31-2AA3**
1PH8288-1.H...	0.88	58	93.6	6.29 (55.67)	1750 (3859)	1XB7322-P05	150	**6SL3320-1TG31-5AA3**
1PH8284-1.K...	0.88	54	94.7	4.21 (37.26)	1280 (2822)	1XB7322-P05	150	**6SL3320-1TG31-5AA3**
1PH8286-1.K...	0.85	84	95.4	5.16 (45.67)	1490 (3285)	1XB7322-P05	215	**6SL3320-1TG32-2AA3**
1PH8288-1.K...	0.90	77	95.1	5.29 (46.82)	1750 (3859)	1XB7322-P05	260	**6SL3320-1TG32-6AA3**
1PH8284-1.U...	0.85	90	95.9	4.21 (37.26)	1280 (2822)	1XB7322-P05	215	**6SL3320-1TG32-2AA3**
1PH8286-1.U...	0.85	123	96.2	5.16 (45.67)	1490 (3285)	1XB7422-P06	330	**6SL3320-1TG33-3AA3**
1PH8288-1.U...	0.86	144	96.3	6.29 (55.67)	1750 (3859)	1XB7700-P02	410	**6SL3320-1TG34-1AA3**
1PH8284-1.W...	0.89	92	96.5	4.21 (37.26)	1280 (2822)	1XB7422-P06	330	**6SL3320-1TG33-3AA3**
1PH8286-1.W...	0.90	104	96.7	5.16 (45.67)	1490 (3285)	1XB7700-P02	410	**6SL3320-1TG34-1AA3**
1PH8288-1.W...	0.90	133	96.8	6.29 (55.67)	1750 (3859)	1XB7700-P02	465	**6SL3320-1TG34-7AA3**

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded (applicable for standard: 14th position of the Article No. A to D, E and F).
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 2 kHz (SH 180 to 280).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 reluctance motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC, Smart/Basic Line Module									
1000	132	21 (28.2)	200 (148)	62	283	33.3	3000	6500	**1PH8138-5■D■■-....**
		25 (33.5)	240 (177)	72	292	33.3	2600	6500	**1PH8138-7■D■■-....**
	160	35 (46.9)	335 (247)	97	298	33.3	2650	5000	**1PH8165-5■D■■-....**
		39 (52.3)	370 (273)	106	304	33.3	2350	5000	**1PH8165-7■D■■-....**
		39 (52.3)	370 (273)	96	335	33.3	2100	5000	**1PH8167-5■D■■-....**
		44 (59.0)	420 (310)	106	342	33.3	1800	5000	**1PH8167-7■D■■-....**
1500	132	32 (42.9)	205 (151)	75	350	50.0	2800	6500	**1PH8138-5■F■■-....**
		38 (51.0)	240 (177)	87	361	50.0	2250	6500	**1PH8138-7■F■■-....**
	160	45 (60.3)	285 (210)	107	344	50.0	3100	5000	**1PH8165-5■F■■-....**
		56 (75.1)	355 (262)	128	359	50.0	2300	5000	**1PH8165-7■F■■-....**
		56 (75.1)	355 (262)	132	345	50.0	2950	5000	**1PH8167-5■F■■-....**
		63 (84.5)	400 (295)	146	352	50.0	2400	5000	**1PH8167-7■F■■-....**
2000	132	43 (57.7)	205 (151)	95	370	66.7	3150	6500	**1PH8138-5■G■■-....**
		48 (64.4)	230 (170)	104	370	66.7	2500	6500	**1PH8138-7■G■■-....**
	160	51 (68.4)	245 (181)	110	370	66.7	3050	5000	**1PH8165-5■G■■-....**
		68 (91.2)	325 (240)	143	370	66.7	2100	5000	**1PH8165-7■G■■-....**
		68 (91.2)	325 (240)	145	370	66.7	2850	5000	**1PH8167-5■G■■-....**
		81 (109)	390 (288)	170	370	66.7	2200	5000	**1PH8167-7■G■■-....**
Line voltage 400 V 3 AC, Active Line Module									
1150	132	24 (32.2)	200 (148)	62	324	38.3	3300	6500	**1PH8138-5■D■■-....**
		28.5 (38.2)	240 (177)	71	334	38.3	2850	6500	**1PH8138-7■D■■-....**
	160	40 (53.6)	335 (247)	97	342	38.3	2850	5000	**1PH8165-5■D■■-....**
		43.5 (58.3)	365 (269)	104	347	38.3	2550	5000	**1PH8165-7■D■■-....**
		45 (60.3)	370 (273)	96	383	38.3	2300	5000	**1PH8167-5■D■■-....**
		49 (65.7)	410 (302)	104	390	38.3	1950	5000	**1PH8167-7■D■■-....**
1750	132	37 (49.6)	205 (151)	75	406	58.3	3000	6500	**1PH8138-5■F■■-....**
		43.5 (58.3)	235 (173)	85	415	58.3	2300	6500	**1PH8138-7■F■■-....**
	160	52 (69.7)	285 (210)	107	401	58.3	3150	5000	**1PH8165-5■F■■-....**
		63 (84.5)	345 (254)	124	415	58.3	2400	5000	**1PH8165-7■F■■-....**
		65 (87.2)	355 (262)	132	402	58.3	2950	5000	**1PH8167-5■F■■-....**
		71 (95.2)	385 (284)	141	408	58.3	2500	5000	**1PH8167-7■F■■-....**
2300	132	49.5 (66.4)	205 (151)	95	415	76.7	3250	6500	**1PH8138-5■G■■-....**
		54 (72.4)	220 (162)	102	415	76.7	2600	6500	**1PH8138-7■G■■-....**
	160	58 (77.8)	245 (181)	110	415	76.7	3250	5000	**1PH8165-5■G■■-....**
		74 (99.2)	310 (229)	138	415	76.7	2350	5000	**1PH8165-7■G■■-....**
		78 (105)	320 (236)	145	415	76.7	3050	5000	**1PH8167-5■G■■-....**
		89 (119)	370 (273)	165	415	76.7	2400	5000	**1PH8167-7■G■■-....**

Reluctance version Efficiency: without holding brake **5** / with holding brake **6** — **5**
Reluctance version Performance: without holding brake **7** / with holding brake **8** — **7**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Efficiency (acc. to IEC 60034-30-2)	IE efficiency class	Moment of inertia	Weight, approx.	Terminal box	SINAMICS S120 Motor Module	
								Rated output current [3]	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system
	M_0	I_0	η		J			I_N	
	Nm (lb_f-ft)	A	%		kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
Line voltage 400 V 3 AC, Smart/Basic Line Module									
1PH8138-5.D...	200 (148)	62	91	IE 3	0.0930 (0.8231)	145 (320)	gk843	60 [4]	**6SL3120-1TE26-0AC0**
1PH8138-7.D...	260 (192)	77	90.1	IE 2	0.0930 (0.8231)	145 (320)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8165-5.D...	335 (247)	97	92.3	IE 3	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8165-7.D...	400 (295)	115	91.4	IE 2	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-5.D...	375 (277)	96	92.5	IE 3	0.2140 (1.8941)	244 (538)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-7.D...	450 (332)	115	91.7	IE 2	0.2140 (1.8941)	244 (538)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8138-5.F...	205 (151)	75	92.8	IE 3	0.0930 (0.8231)	145 (320)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8138-7.F...	260 (192)	92	91.8	IE 2	0.0930 (0.8231)	145 (320)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8165-5.F...	290 (214)	107	94.8	IE 4	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8165-7.F...	400 (295)	144	93.8	IE 3	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-5.F...	360 (266)	132	95.1	IE 4	0.2140 (1.8941)	244 (538)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-7.F...	450 (332)	163	94	IE 3	0.2140 (1.8941)	244 (538)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8138-5.G...	210 (155)	95	94.3	IE 4	0.0930 (0.8231)	145 (320)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8138-7.G...	260 (192)	115	93.3	IE 3	0.0930 (0.8231)	145 (320)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8165-5.G...	255 (188)	110	95.6	IE 5	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8165-7.G...	400 (295)	165	94.9	IE 4	0.1830 (1.6197)	221 (487)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-5.G...	335 (247)	145	95.9	IE 5	0.2140 (1.8941)	244 (538)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-7.G...	450 (332)	191	95.1	IE 4	0.2140 (1.8941)	244 (538)	gk874	200	**6SL3120-1TE32-0AA4**
Line voltage 400 V 3 AC, Active Line Module									
1PH8138-5.D...	200 (148)	62	91.3	IE 3	0.0930 (0.8231)	145 (320)	gk843	60 [4]	**6SL3120-1TE26-0AC0**
1PH8138-7.D...	260 (192)	77	90.5	IE 2	0.0930 (0.8231)	145 (320)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8165-5.D...	335 (247)	97	92.6	IE 3	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8165-7.D...	400 (295)	115	91.7	IE 2	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-5.D...	375 (277)	96	92.9	IE 3	0.2140 (1.8941)	244 (538)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-7.D...	450 (332)	115	92	IE 2	0.2140 (1.8941)	244 (538)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8138-5.F...	205 (151)	75	93.1	IE 3	0.0930 (0.8231)	145 (320)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8138-7.F...	260 (192)	92	92.1	IE 2	0.0930 (0.8231)	145 (320)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8165-5.F...	290 (214)	107	95	IE 4	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8165-7.F...	400 (295)	144	94	IE 3	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-5.F...	360 (266)	132	95.2	IE 4	0.2140 (1.8941)	244 (538)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-7.F...	450 (332)	163	94.2	IE 3	0.2140 (1.8941)	244 (538)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8138-5.G...	210 (155)	95	94.5	IE 4	0.0930 (0.8231)	145 (320)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8138-7.G...	260 (192)	115	93.5	IE 3	0.0930 (0.8231)	145 (320)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8165-5.G...	255 (188)	110	95.7	IE 5	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8165-7.G...	400 (295)	165	95	IE 4	0.1830 (1.6197)	221 (487)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-5.G...	335 (247)	145	96	IE 5	0.2140 (1.8941)	244 (538)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-7.G...	450 (332)	191	95.2	IE 4	0.2140 (1.8941)	244 (538)	gk874	200	**6SL3120-1TE32-0AA4**

Motor Module: Single Motor Module	**1**
Motor Module For continuous load with 200 % overload (C type)	**C**

1) n_2: Maximum permissible thermal speed at constant power.
2) n_{max}: Maximum speed that must not be exceeded. Limitations must be taken into consideration where necessary (e.g. with holding brake).
3) I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
4) The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 reluctance motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 480 V 3 AC, Smart/Basic Line Module									
1350	132	28.5 (38.2)	200 (148)	62	378	45.0	3300	6500	**1PH8138-5■D■■-....**
		33 (44.3)	235 (173)	70	389	45.0	2750	6500	**1PH8138-7■D■■-....**
	160	47 (63.0)	335 (247)	97	400	45.0	2700	5000	**1PH8165-5■D■■-....**
		49.5 (66.4)	350 (258)	101	404	45.0	2500	5000	**1PH8165-7■D■■-....**
		52 (69.7)	370 (273)	96	448	45.0	2100	5000	**1PH8167-5■D■■-....**
		56 (75.1)	395 (291)	101	448	45.0	1800	5000	**1PH8167-7■D■■-....**
2000	132	42 (56.3)	200 (148)	75	448	66.7	2800	6500	**1PH8138-5■F■■-....**
		47 (63.0)	225 (166)	83	448	66.7	2200	6500	**1PH8138-7■F■■-....**
	160	60 (80.5)	285 (210)	107	448	66.7	2950	5000	**1PH8165-5■F■■-....**
		68 (91.2)	325 (240)	120	448	66.7	2250	5000	**1PH8165-7■F■■-....**
		74 (99.2)	355 (262)	132	448	66.7	2750	5000	**1PH8167-5■F■■-....**
		78 (105)	370 (273)	137	448	66.7	2400	5000	**1PH8167-7■F■■-....**
2650	132	55 (73.8)	198 (146)	95	448	88.3	3100	6500	**1PH8138-5■G■■-....**
		57 (76.4)	205 (151)	99	448	88.3	2700	6500	**1PH8138-7■G■■-....**
	160	64 (85.8)	230 (170)	110	448	88.3	3100	5000	**1PH8165-5■G■■-....**
		77 (103)	275 (203)	132	448	88.3	2650	5000	**1PH8165-7■G■■-....**
		85 (114)	305 (225)	145	448	88.3	3000	5000	**1PH8167-5■G■■-....**
		94 (126)	335 (247)	159	448	88.3	2650	5000	**1PH8167-7■G■■-....**

Reluctance version Efficiency: without holding brake **5** / with holding brake **6**
Reluctance version Performance: without holding brake **7** / with holding brake **8**

5
7

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Efficiency (acc. to IEC 60034-30-2)	IE efficiency class	Moment of inertia	Weight, approx.	Terminal box	SINAMICS S120 Motor Module	
								Rated output current [3]	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system
	M_0	I_0	η		J			I_N	
	Nm (lb_f-ft)	A	%		kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
Line voltage 480 V 3 AC, Smart/Basic Line Module									
1PH8138-5.D...	200 (148)	62	92.6	IE 3	0.0930 (0.8231)	145 (320)	gk843	60 [4]	**6SL3120-1TE26-0AC0**
1PH8138-7.D...	260 (192)	77	91.5	IE 2	0.0930 (0.8231)	145 (320)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8165-5.D...	335 (247)	97	93.5	IE 3	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8165-7.D...	400 (295)	115	92.3	IE 2	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-5.D...	375 (277)	96	93.7	IE 3	0.2140 (1.8941)	244 (538)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-7.D...	450 (332)	115	92.6	IE 2	0.2140 (1.8941)	244 (538)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8138-5.F...	205 (151)	75	93.1	IE 3	0.0930 (0.8231)	145 (320)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8138-7.F...	260 (192)	92	92	IE 2	0.0930 (0.8231)	145 (320)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8165-5.F...	290 (214)	111	94.7	IE 4	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8165-7.F...	400 (295)	144	93.9	IE 3	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-5.F...	360 (266)	132	95	IE 4	0.2140 (1.8941)	244 (538)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-7.F...	450 (332)	163	94.1	IE 3	0.2140 (1.8941)	244 (538)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8138-5.G...	210 (155)	95	94.6	IE 4	0.0930 (0.8231)	145 (320)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8138-7.G...	260 (192)	115	93.6	IE 3	0.0930 (0.8231)	145 (320)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8165-5.G...	255 (188)	110	95.8	IE 5	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8165-7.G...	400 (295)	165	95.1	IE 4	0.1830 (1.6197)	221 (487)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-5.G...	335 (247)	145	96.1	IE 5	0.2140 (1.8941)	244 (538)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-7.G...	450 (332)	191	94.9	IE 4	0.2140 (1.8941)	244 (538)	gk874	200	**6SL3120-1TE32-0AA4**

Motor Module: Single Motor Module	**1**
Motor Module For continuous load with 200 % overload (C type)	**C**

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded. Limitations must be taken into consideration where necessary (e.g. with holding brake).
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
[4] The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 reluctance motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 480 V 3 AC, Active Line Module									
1500	132	31.5 (42.2)	200 (148)	62	419	50.0	3600	6500	**1PH8138-5■D■■-....**
		36 (48.3)	230 (170)	70	429	50.0	3000	6500	**1PH8138-7■D■■-....**
	160	52 (69.7)	335 (247)	97	443	50.0	2850	5000	**1PH8165-5■D■■-....**
		53.5 (71.7)	340 (251)	99	445	50.0	2700	5000	**1PH8165-7■D■■-....**
		58 (77.8)	370 (273)	96	498	50.0	2200	5000	**1PH8167-5■D■■-....**
		60 (80.5)	385 (284)	99	498	50.0	2000	5000	**1PH8167-7■D■■-....**
2200	132	46.5 (62.4)	200 (148)	75	498	73.3	3200	6500	**1PH8138-5■F■■-....**
		51 (68.4)	220 (162)	81	498	73.3	2450	6500	**1PH8138-7■F■■-....**
	160	66 (88.5)	285 (210)	107	498	73.3	3000	5000	**1PH8165-5■F■■-....**
		73 (97.9)	315 (232)	117	498	73.3	2550	5000	**1PH8165-7■F■■-....**
		82 (110)	355 (262)	132	498	73.3	2750	5000	**1PH8167-5■F■■-....**
		82 (110)	355 (262)	132	498	73.3	2700	5000	**1PH8167-7■F■■-....**
2800	132	60 (80.5)	205 (151)	95	498	93.3	3250	6500	**1PH8138-5■G■■-....**
		61 (81.8)	210 (155)	97	498	93.3	3000	6500	**1PH8138-7■G■■-....**
	160	70 (93.9)	240 (177)	110	498	93.3	3700	5000	**1PH8165-5■G■■-....**
		82 (110)	280 (207)	128	498	93.3	2900	5000	**1PH8165-7■G■■-....**
		94 (126)	320 (236)	145	498	93.3	3100	5000	**1PH8167-5■G■■-....**
		101 (135)	345 (254)	155	498	93.3	2800	5000	**1PH8167-7■G■■-....**

Reluctance version Efficiency: without holding brake **5** / with holding brake **6** — **5**
Reluctance version Performance: without holding brake **7** / with holding brake **8** — **7**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Efficiency (acc. to IEC 60034-30-2)	IE efficiency class	Moment of inertia	Weight, approx.	Terminal box	SINAMICS S120 Motor Module	
								Rated output current [3]	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system
	M_0	I_0	η		J			I_N	
	Nm (lb_f-ft)	A	%		kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
Line voltage 480 V 3 AC, Active Line Module									
1PH8138-5.D...	200 (148)	62	92.8	IE 3	0.0930 (0.8231)	145 (320)	gk843	60[4]	**6SL3120-1TE26-0AC0**
1PH8138-7.D...	260 (192)	77	91.7	IE 2	0.0930 (0.8231)	145 (320)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8165-5.D...	335 (247)	97	93.7	IE 3	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8165-7.D...	400 (295)	115	92.5	IE 2	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-5.D...	375 (277)	96	93.9	IE 3	0.2140 (1.8941)	244 (538)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-7.D...	450 (332)	115	92.7	IE 2	0.2140 (1.8941)	244 (538)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8138-5.F...	205 (151)	75	93.2	IE 3	0.0930 (0.8231)	145 (320)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8138-7.F...	260 (192)	92	92.2	IE 2	0.0930 (0.8231)	145 (320)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8165-5.F...	290 (214)	107	94.9	IE 4	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8165-7.F...	400 (295)	144	94	IE 3	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-5.F...	360 (266)	132	95.1	IE 4	0.2140 (1.8941)	244 (538)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8167-7.F...	450 (332)	163	94.1	IE 3	0.2140 (1.8941)	244 (538)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8138-5.G...	210 (155)	95	94.7	IE 4	0.0930 (0.8231)	145 (320)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8138-7.G...	260 (192)	115	93.7	IE 3	0.0930 (0.8231)	145 (320)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8165-5.G...	255 (188)	110	95.9	IE 5	0.1830 (1.6197)	221 (487)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8165-7.G...	400 (295)	165	95.1	IE 4	0.1830 (1.6197)	221 (487)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-5.G...	335 (247)	145	95.9	IE 5	0.2140 (1.8941)	244 (538)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-7.G...	450 (332)	191	95	IE 4	0.2140 (1.8941)	244 (538)	gk874	200	**6SL3120-1TE32-0AA4**

Motor Module: Single Motor Module	**1**
Motor Module For continuous load with 200 % overload (C type)	**C**

[1] n_2: Maximum permissible thermal speed at constant power.
[2] n_{max}: Maximum speed that must not be exceeded. Limitations must be taken into consideration where necessary (e.g. with holding brake).
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
[4] The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 reluctance motors Water cooling**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC, Smart/Basic Line Module									
1500	132	32 (42.9)	205 (151)	84	315	50.0	3600	6500	**1PH8138-5■F2■-....**
		40 (53.6)	255 (188)	102	330	50.0	2850	6500	**1PH8138-7■F2■-....**
	160	55 (73.8)	350 (258)	146	310	50.0	3600	5000	**1PH8165-5■F2■-....**
		70 (93.9)	445 (328)	179	325	50.0	2800	5000	**1PH8165-7■F2■-....**
		62 (83.1)	395 (291)	145	348	50.0	2800	5000	**1PH8167-5■F2■-....**
		78 (105)	500 (369)	178	365	50.0	2150	5000	**1PH8167-7■F2■-....**
2000	132	50 (67.0)	240 (177)	125	333	66.7	4000	6500	**1PH8138-5■G2■-....**
		63 (84.5)	300 (221)	153	350	66.7	3100	6500	**1PH8138-7■G2■-....**
	160	77 (103)	370 (273)	178	357	66.7	3400	5000	**1PH8165-5■G2■-....**
		91 (122)	435 (321)	205	369	66.7	2700	5000	**1PH8165-7■G2■-....**
		84 (113)	400 (295)	177	370	66.7	2450	5000	**1PH8167-5■G2■-....**
		96 (129)	460 (339)	202	370	66.7	2100	5000	**1PH8167-7■G2■-....**
Line voltage 400 V 3 AC, Active Line Module									
1750	132	37 (49.6)	205 (151)	84	366	58.3	3750	6500	**1PH8138-5■F2■-....**
		43.5 (58.3)	250 (184)	100	381	58.3	2950	6500	**1PH8138-7■F2■-....**
	160	64 (85.8)	350 (258)	146	361	58.3	3900	5000	**1PH8165-5■F2■-....**
		80 (107)	435 (321)	176	377	58.3	3000	5000	**1PH8165-7■F2■-....**
		72 (96.6)	395 (291)	145	405	58.3	2950	5000	**1PH8167-5■F2■-....**
		89 (119)	490 (361)	176	415	58.3	2200	5000	**1PH8167-7■F2■-....**
2300	132	57 (76.4)	240 (177)	125	382	76.7	4400	6500	**1PH8138-5■G2■-....**
		71 (95.2)	295 (218)	151	399	76.7	3350	6500	**1PH8138-7■G2■-....**
	160	89 (119)	370 (273)	178	410	76.7	3650	5000	**1PH8165-5■G2■-....**
		102 (137)	425 (313)	200	415	76.7	2850	5000	**1PH8165-7■G2■-....**
		95 (127)	395 (291)	177	415	76.7	2600	5000	**1PH8167-5■G2■-....**
		106 (142)	440 (325)	197	415	76.7	2300	5000	**1PH8167-7■G2■-....**

Reluctance version Efficiency: without holding brake **5** / with holding brake **6** — **5**
Reluctance version Performance: without holding brake **7** / with holding brake **8** — **7**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Efficiency (acc. to IEC 60034-30-2)	IE efficiency class	Moment of inertia	Weight, approx.	Terminal box	SINAMICS S120 Motor Module	
								Rated output current [3]	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system
	M_0	I_0	η		J			I_N	
	Nm (lb_f-ft)	A	%		kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
Line voltage 400 V 3 AC, Smart/Basic Line Module									
1PH8138-5. F2...	205 (151)	85	92.8	IE 3	0.0930 (0.8231)	163 (359)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8138-7. F2...	285 (210)	111	91.9	IE 2	0.0930 (0.8231)	163 (359)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8165-5. F2...	355 (262)	146	93.8	IE 3	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8165-7. F2...	500 (369)	191	93	IE 2	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-5. F2...	400 (295)	146	0.94	IE 3	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-7. F2...	550 (406)	192	93.2	IE 2	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8138-5. G2...	245 (181)	125	93.4	IE 3	0.0930 (0.8231)	163 (359)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8138-7. G2...	330 (243)	164	92.6	IE 2	0.0930 (0.8231)	163 (359)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8165-5. G2...	375 (277)	178	95.1	IE 4	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8165-7. G2...	500 (369)	225	93.8	IE 3	0.1830 (1.6197)	260 (573)	gk874	200 [4]	**6SL3120-1TE32-0AA4**
1PH8167-5. G2...	415 (306)	177	95.2	IE 4	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-7. G2...	550 (406)	225	93.9	IE 3	0.2140 (1.8941)	283 (624)	gk874	200 [4]	**6SL3120-1TE32-0AA4**
Line voltage 400 V 3 AC, Active Line Module									
1PH8138-5. F2...	205 (151)	85	93.1	IE 3	0.0930 (0.8231)	163 (359)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8138-7. F2...	285 (210)	111	92.2	IE 2	0.0930 (0.8231)	163 (359)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8165-5. F2...	355 (262)	146	94	IE 3	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8165-7. F2...	500 (369)	191	93.2	IE 2	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-5. F2...	400 (295)	146	94.2	IE 3	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-7. F2...	550 (406)	192	93.4	IE 2	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8138-5. G2...	245 (181)	125	93.6	IE 3	0.0930 (0.8231)	163 (359)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8138-7. G2...	330 (243)	164	92.8	IE 2	0.0930 (0.8231)	163 (359)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8165-5. G2...	375 (277)	178	95.2	IE 4	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8165-7. G2...	500 (369)	225	94	IE 3	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-5. G2...	415 (306)	177	94.9	IE 4	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-7. G2...	550 (406)	225	94	IE 3	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**

Motor Module:
Single Motor Module **1**

Motor Module
For continuous load with 200 % overload (C type) **C**

1) n_2: Maximum permissible thermal speed at constant power.
2) n_{max}: Maximum speed that must not be exceeded. Limitations must be taken into consideration where necessary (e.g. with holding brake).
3) I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
4) The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 reluctance motors Water cooling**
n_N	SH	P_N	M_N	I_N	U_N	f_N	n_2	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 480 V 3 AC, Smart/Basic Line Module									
2000	132	42.5 (57.0)	205 (151)	84	417	66.7	3600	6500	**1PH8138- 5■F 2■-....**
		51 (68.4)	240 (177)	98	432	66.7	2900	6500	**1PH8138- 7■F 2■-....**
	160	73 (97.9)	350 (258)	146	412	66.7	3900	5000	**1PH8165- 5■F 2■-....**
		89 (119)	425 (313)	174	428	66.7	3000	5000	**1PH8165- 7■F 2■-....**
		82 (110)	390 (288)	145	448	66.7	2750	5000	**1PH8167- 5■F 2■-....**
		98 (131)	470 (347)	173	448	66.7	2150	5000	**1PH8167- 7■F 2■-....**
2650	132	66 (88.5)	240 (177)	125	439	88.3	4300	6500	**1PH8138- 5■G 2■-....**
		80 (107)	290 (214)	148	448	88.3	3200	6500	**1PH8138- 7■G 2■-....**
	160	101 (135)	365 (269)	178	448	88.3	3350	5000	**1PH8165- 5■G 2■-....**
		112 (150)	405 (299)	196	448	88.3	2750	5000	**1PH8165- 7■G 2■-....**
		103 (138)	370 (273)	177	448	88.3	2750	5000	**1PH8167- 5■G 2■-....**
		110 (148)	400 (295)	191	448	88.3	2650	5000	**1PH8167- 7■G 2■-....**
Line voltage 480 V 3 AC, Active Line Module									
2200	132	46.5 (62.4)	200 (148)	84	458	73.3	3750	6500	**1PH8138- 5■F 2■-....**
		54 (72.4)	235 (173)	96	472	73.3	3150	6500	**1PH8138- 7■F 2■-....**
	160	81 (109)	350 (258)	145	452	73.3	4300	5000	**1PH8165- 5■F 2■-....**
		96 (129)	415 (306)	171	468	73.3	3300	5000	**1PH8165- 7■F 2■-....**
		91 (122)	395 (291)	145	498	73.3	3150	5000	**1PH8167- 5■F 2■-....**
		106 (142)	460 (339)	170	498	73.3	2450	5000	**1PH8167- 7■F 2■-....**
2800	132	70 (93.9)	240 (177)	125	463	93.3	5000	6500	**1PH8138- 5■G 2■-....**
		83 (111)	285 (210)	146	481	93.3	3850	6500	**1PH8138- 7■G 2■-....**
	160	108 (145)	370 (273)	178	498	93.3	3950	5000	**1PH8165- 5■G 2■-....**
		118 (158)	405 (299)	193	498	93.3	3300	5000	**1PH8165- 7■G 2■-....**
		114 (153)	390 (288)	177	498	93.3	3050	5000	**1PH8167- 5■G 2■-....**
		121 (162)	415 (306)	188	498	93.3	2800	5000	**1PH8167- 7■G 2■-....**

Reluctance version Efficiency: without holding brake **5** / with holding brake **6**
Reluctance version Performance: without holding brake **7** / with holding brake **8**

5
7

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Efficiency (acc. to IEC 60034-30-2)	IE efficiency class	Moment of inertia	Weight, approx.	Terminal box	SINAMICS S120 Motor Module	
								Rated output current [3]	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system
	M_0	I_0	η		J			I_N	
	Nm (lb_f-ft)	A	%		kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
Line voltage 480 V 3 AC, Smart/Basic Line Module									
1PH8138-5. F2…	205 (151)	85	93.1	IE 3	0.0930 (0.8231)	163 (359)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8138-7. F2…	285 (210)	111	92.2	IE 2	0.0930 (0.8231)	163 (359)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8165-5. F2…	355 (262)	146	94	IE 3	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8165-7. F2…	500 (369)	191	93.2	IE 2	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-5. F2…	400 (295)	146	94.1	IE 3	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-7. F2…	550 (406)	192	92.8	IE 2	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8138-5. G2…	245 (181)	125	93.8	IE 3	0.0930 (0.8231)	163 (359)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8138-7. G2…	330 (243)	164	93	IE 2	0.0930 (0.8231)	163 (359)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8165-5. G2…	375 (277)	178	95	IE 4	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8165-7. G2…	500 (369)	225	94.1	IE 3	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-5. G2…	415 (306)	177	95	IE 4	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-7. G2…	550 (406)	225	94.1	IE 3	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**
Line voltage 480 V 3 AC, Active Line Module									
1PH8138-5. F2…	205 (151)	85	93.2	IE 3	0.0930 (0.8231)	163 (359)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8138-7. F2…	285 (210)	111	92.3	IE 2	0.0930 (0.8231)	163 (359)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8165-5. F2…	355 (262)	146	94.1	IE 3	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8165-7. F2…	500 (369)	191	92.8	IE 2	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-5. F2…	400 (295)	146	93.8	IE 3	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-7. F2…	550 (406)	192	93	IE 2	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8138-5. G2…	245 (181)	125	93.9	IE 3	0.0930 (0.8231)	163 (359)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8138-7. G2…	330 (243)	164	93.1	IE 2	0.0930 (0.8231)	163 (359)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8165-5. G2…	375 (277)	178	95.1	IE 4	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8165-7. G2…	500 (369)	225	94.2	IE 3	0.1830 (1.6197)	260 (573)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-5. G2…	415 (306)	177	95.1	IE 4	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8167-7. G2…	550 (406)	225	94.2	IE 3	0.2140 (1.8941)	283 (624)	gk874	200	**6SL3120-1TE32-0AA4**

Motor Module:
Single Motor Module **1**

Motor Module
For continuous load with 200 % overload (C type) **C**

1) n_2: Maximum permissible thermal speed at constant power.
2) n_{max}: Maximum speed that must not be exceeded. Limitations must be taken into consideration where necessary (e.g. with holding brake).
3) I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
4) The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 synchronous motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	$n_{max, Inv}$	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC, Smart/Basic Line Module									
700	180	33 (44.3)	450 (332)	80	278	47.0	1450	3800	**1PH8184-■■C■■-....**
		44 (59.0)	600 (443)	108	269	47.0	1450	3800	**1PH8186-■■C■■-....**
	225	48 (64.4)	655 (483)	120	256	47.0	1450	3500	**1PH8224-■■C■■-....**
		64 (85.8)	873 (644)	170	238	47.0	1550	3500	**1PH8226-■■C■■-....**
		80 (107)	1091 (805)	200	254	47.0	1450	3500	**1PH8228-■■C■■-....**
1000	180	46 (61.7)	439 (324)	106	285	67.0	1950	3800	**1PH8184-■■D■■-....**
		62 (83.1)	592 (437)	148	275	67.0	2050	3800	**1PH8186-■■D■■-....**
	225	68 (91.2)	649 (479)	170	254	67.0	2050	3500	**1PH8224-■■D■■-....**
		91 (122)	869 (641)	215	265	67.0	1950	3500	**1PH8226-■■D■■-....**
		113 (152)	1079 (796)	265	271	67.0	1950	3500	**1PH8228-■■D■■-....**
1500	132	15.7 (21.1)	100 (73.8)	29	388	50.0	2550	4500	**1PH8131-■■F■■-....**
		19.9 (26.7)	127 (93.7)	44	316	50.0	3050	4500	**1PH8133-■■F■■-....**
		23.7 (31.8)	151 (111)	43	383	50.0	2450	4500	**1PH8135-■■F■■-....**
		30.6 (41.0)	195 (144)	60	356	50.0	2700	4500	**1PH8137-■■F■■-....**
	160	61 (81.8)	390 (288)	119	340	100	2600	4000	**1PH8165-■■F■■-....**
		69 (92.5)	435 (321)	133	345	100	2600	4000	**1PH8167-■■F■■-....**
	180	70 (93.9)	446 (329)	148	308	100	2700	3800	**1PH8184-■■F■■-....**
		93 (125)	592 (437)	215	282	100	2950	3800	**1PH8186-■■F■■-....**
	225	101 (135)	643 (474)	235	271	100	2900	3500	**1PH8224-■■F■■-....**
		134 (180)	853 (629)	295	288	100	2700	3500	**1PH8226-■■F■■-....**
		168 (225)	1070 (789)	395	270	100	2900	3500	**1PH8228-■■F■■-....**
2000	132	31.4 (42.1)	150 (111)	59	356	66.7	3500	4500	**1PH8135-■■G■■-....**
2500	132	25 (33.5)	96 (70.8)	44	371	83.3	4050	4500	**1PH8131-■■L■■-....**
		31.7 (42.5)	121 (89.2)	55	371	83.3	3950	4500	**1PH8133-■■L■■-....**
		48.4 (64.9)	185 (136)	83	371	83.3	3900	4500	**1PH8137-■■L■■-....**
	160	84 (113)	320 (236)	148	370	167	3900	4000	**1PH8165-■■L■■-....**
		95 (127)	360 (266)	177	350	167	4000	4000	**1PH8167-■■L■■-....**
3000	132	57.5 (77.1)	183 (135)	104	370	100	4500	4500	**1PH8137-■■M■■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Efficiency	Moment of inertia without holding brake	Weight, approx. without holding brake	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	M_0	I_0	η	J			I_N	
	Nm (lb_f-ft)	A	%	kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
1PH8184-..C...	480 (354)	84	93.2	0.46 (4.07)	330 (728)	1XB7322-P05	85	**6SL3120-1TE28-5A A 3**
1PH8186-..C...	640 (472)	115	92.4	0.60 (5.31)	400 (882)	1XB7322-P05	132	**6SL3120-1TE31-3A A 3**
1PH8224-..C...	708 (522)	128	96.1	1.28 (11.33)	580 (1279)	1XB7322-P05	132	**6SL3120-1TE31-3A A 3**
1PH8226-..C...	944 (696)	183	96.3	1.66 (14.69)	700 (1544)	1XB7322-P05	200	**6SL3120-1TE32-0A A 4**
1PH8228-..C...	1180 (870)	213	96.5	2.02 (17.88)	810 (1786)	1XB7322-P05	200 [4]	**6SL3120-1TE32-0A A 4**
1PH8184-..D...	480 (354)	115	93.7	0.46 (4.07)	330 (728)	1XB7322-P05	132	**6SL3120-1TE31-3A A 3**
1PH8186-..D...	640 (472)	157	94.3	0.60 (5.31)	400 (882)	1XB7322-P05	200	**6SL3120-1TE32-0A A 4**
1PH8224-..D...	708 (522)	183	96.4	1.28 (11.33)	580 (1279)	1XB7322-P05	200	**6SL3120-1TE32-0A A 4**
1PH8226-..D...	944 (696)	233	96.7	1.66 (14.69)	700 (1544)	1XB7422-P06	260	**6SL3320-1TE32-6A A 3**
1PH8228-..D...	1180 (870)	284	96.8	2.02 (17.88)	810 (1786)	1XB7422-P06	310	**6SL3320-1TE33-1A A 3**
1PH8131-..F...	105 (77.4)	30	94.4	0.0446 (0.3948)	85 (187)	gk833	30	**6SL3120-1TE23-0A ■ 0**
1PH8133-..F...	131 (96.6)	45	94.8	0.0600 (0.5311)	103 (227)	gk833	45	**6SL3120-1TE24-5A C 0**
1PH8135-..F...	158 (117)	44	95.2	0.0750 (0.6638)	120 (265)	gk833	45	**6SL3120-1TE24-5A C 0**
1PH8137-..F...	203 (150)	62	95.2	0.0885 (0.7833)	136 (300)	gk833	60	**6SL3120-1TE26-0A C 0**
1PH8165-..F...	440 (325)	126	94	0.2160 (1.9118)	218 (481)	gk874	132	**6SL3120-1TE31-3A A 3**
1PH8167-..F...	500 (369)	143	94	0.2440 (2.1596)	240 (529)	gk874	132 [4]	**6SL3120-1TE31-3A A 3**
1PH8184-..F...	480 (354)	157	95.1	0.46 (4.07)	330 (728)	1XB7322-P05	200	**6SL3120-1TE32-0A A 4**
1PH8186-..F...	640 (472)	229	95.2	0.60 (5.31)	405 (893)	1XB7422-P06	260	**6SL3320-1TE32-6A A 3**
1PH8224-..F...	708 (522)	256	96.5	1.28 (11.33)	580 (1279)	1XB7422-P06	260	**6SL3320-1TE32-6A A 3**
1PH8226-..F...	944 (696)	320	96.7	1.66 (14.69)	700 (1544)	1XB7700-P02	310 [4]	**6SL3320-1TE33-1A A 3**
1PH8228-..F...	1180 (870)	427	96.7	2.02 (17.88)	810 (1786)	1XB7700-P02	490	**6SL3320-1TE35-0A A 3**
1PH8135-..G...	158 (117)	63	95.3	0.0750 (0.6638)	120 (265)	gk833	60	**6SL3120-1TE26-0A C 0**
1PH8131-..L...	105 (77.4)	48	94.8	0.0446 (0.3948)	85 (187)	gk833	45	**6SL3120-1TE24-5A C 0**
1PH8133-..L...	131 (96.6)	59	95.1	0.0600 (0.5311)	103 (227)	gk833	60	**6SL3120-1TE26-0A C 0**
1PH8137-..L...	203 (150)	89 [5]	95.4	0.0885 (0.7833)	136 (300)	gk833	85	**6SL3120-1TE28-5A A 3**
1PH8165-..L...	440 (325)	188	95.5	0.2160 (1.9118)	218 (481)	gk874	200	**6SL3120-1TE32-0A A 4**
1PH8167-..L...	500 (369)	230	95.5	0.2440 (2.1596)	240 (529)	gk874	200	**6SL3120-1TE32-0A A 4**
1PH8137-..M...	203 (150)	115 [5]	95.3	0.0885 (0.7833)	136 (300)	gk833	132	**6SL3120-1TE31-3A A 3**

Single Motor Module	**1**
Motor Module	
For continuous load with 200 % overload (C type)	**C**
For highly dynamic, intermittent load cycles with 300 % overload (D type)	**D**

[1] $n_{max, Inv}$: Maximum permissible operating speed based on the voltage induced in the motor and the voltage strength of the Motor Module (without protective circuit).
[2] n_{max}: Maximum speed that must not be exceeded.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 4 kHz (SH 80 to 160) or 2 kHz (SH 180 to 280).
[4] The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.
[5] From approximately 85 A, the top power connector connection type is not possible (15th data position E to H).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max.[1]	Speed, max.[2]	**SIMOTICS M-1PH8 synchronous motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	$n_{max, Inv}$	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC, Active Line Module									
800	180	38 (51.0)	454 (335)	80	316	53.0	1450	3800	**1PH8184-■■C■■-....**
		50 (67.0)	597 (440)	108	306	53.0	1450	3800	**1PH8186-■■C■■-....**
	225	55 (73.8)	657 (485)	120	292	53.0	1450	3500	**1PH8224-■■C■■-....**
		73 (97.9)	871 (642)	170	271	53.0	1550	3500	**1PH8226-■■C■■-....**
		91 (122)	1086 (801)	198	290	53.0	1450	3500	**1PH8228-■■C■■-....**
1150	180	53 (71.1)	440 (325)	106	327	77.0	1950	3800	**1PH8184-■■D■■-....**
		71 (95.2)	590 (435)	148	315	77.0	2050	3800	**1PH8186-■■D■■-....**
	225	78 (105)	648 (478)	170	292	77.0	2050	3500	**1PH8224-■■D■■-....**
		104 (139)	864 (637)	215	304	77.0	1950	3500	**1PH8226-■■D■■-....**
		129 (173)	1071 (790)	260	311	77.0	1950	3500	**1PH8228-■■D■■-....**
1750	132	18 (24.1)	98 (72.3)	29	415	58.3	2550	4500	**1PH8131-■■F■■-....**
		23.1 (31.0)	126 (92.9)	43	366	58.3	3050	4500	**1PH8133-■■F■■-....**
		27.2 (36.5)	149 (110)	42	415	58.3	2450	4500	**1PH8135-■■F■■-....**
		35.6 (47.7)	194 (143)	59	412	58.3	2700	4500	**1PH8137-■■F■■-....**
	160	69 (92.5)	375 (277)	115	395	117	2600	4000	**1PH8165-■■F■■-....**
		77 (103)	420 (310)	128	400	117	2600	4000	**1PH8167-■■F■■-....**
	180	82 (110)	447 (330)	150	359	117	2700	3800	**1PH8184-■■F■■-....**
		109 (146)	595 (439)	215	328	117	2950	3800	**1PH8186-■■F■■-....**
	225	117 (157)	638 (471)	235	315	117	2900	3500	**1PH8224-■■F■■-....**
		156 (209)	851 (628)	295	335	117	2700	3500	**1PH8226-■■F■■-....**
		195 (261)	1064 (785)	390	314	117	2900	3500	**1PH8228-■■F■■-....**
2300	132	35.6 (47.7)	148 (109)	59	407	76.7	3500	4500	**1PH8135-■■G■■-....**
2800	132	27.7 (37.1)	95 (70.1)	44	415	93.3	4050	4500	**1PH8131-■■L■■-....**
		35.2 (47.2)	120 (88.5)	54	415	93.3	3950	4500	**1PH8133-■■L■■-....**
		53.4 (71.6)	182 (134)	82	415	93.3	3900	4500	**1PH8137-■■L■■-....**
	160	87 (117)	300 (221)	138	410	187	3900	4000	**1PH8165-■■L■■-....**
		98 (131)	335 (247)	164	385	187	4000	4000	**1PH8167-■■L■■-....**
3300	132	62.2 (83.4)	180 (133)	102	405	110	4500	4500	**1PH8137-■■M■■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Efficiency	Moment of inertia without holding brake	Weight, approx. without holding brake	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	M_0	I_0	η	J			I_N	
	Nm (lb_f-ft)	A	%	kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
1PH8184-..C...	480 (354)	84	92.6	0.46 (4.07)	330 (728)	1XB7322-P05	85	**6SL3120-1TE28-5A A 3**
1PH8186-..C...	640 (472)	115	93.1	0.60 (5.31)	400 (882)	1XB7322-P05	132	**6SL3120-1TE31-3A A 3**
1PH8224-..C...	708 (522)	128	96.2	1.28 (11.33)	580 (1279)	1XB7322-P05	132	**6SL3120-1TE31-3A A 3**
1PH8226-..C...	944 (696)	183	96.5	1.66 (14.69)	700 (1544)	1XB7322-P05	200	**6SL3120-1TE32-0A A 4**
1PH8228-..C...	1180 (870)	213	96.7	2.02 (17.88)	810 (1786)	1XB7322-P05	200 [4]	**6SL3120-1TE32-0A A 4**
1PH8184-..D...	480 (354)	115	94.2	0.46 (4.07)	330 (728)	1XB7322-P05	132	**6SL3120-1TE31-3A A 3**
1PH8186-..D...	640 (472)	157	94.8	0.60 (5.31)	400 (882)	1XB7322-P05	200	**6SL3120-1TE32-0A A 4**
1PH8224-..D...	708 (522)	183	96.5	1.28 (11.33)	580 (1279)	1XB7322-P05	200	**6SL3120-1TE32-0A A 4**
1PH8226-..D...	944 (696)	233	96.7	1.66 (14.69)	700 (1544)	1XB7422-P06	260	**6SL3320-1TE32-6A A 3**
1PH8228-..D...	1180 (870)	284	96.9	2.02 (17.88)	810 (1786)	1XB7422-P06	310	**6SL3320-1TE33-1A A 3**
1PH8131-..F...	105 (77.4)	30	94.7	0.0446 (0.3948)	85 (187)	gk833	30	**6SL3120-1TE23-0A ■ 0**
1PH8133-..F...	131 (96.6)	45	95	0.0600 (0.5311)	103 (227)	gk833	45	**6SL3120-1TE24-5A C 0**
1PH8135-..F...	158 (117)	44	95.2	0.0750 (0.6638)	120 (265)	gk833	45	**6SL3120-1TE24-5A C 0**
1PH8137-..F...	203 (150)	62	95.3	0.0885 (0.7833)	136 (300)	gk833	60	**6SL3120-1TE26-0A C 0**
1PH8165-..F...	440 (325)	126	94.3	0.2160 (1.9118)	218 (481)	gk874	132	**6SL3120-1TE31-3A A 3**
1PH8167-..F...	500 (369)	143	94.3	0.2440 (2.1596)	240 (529)	gk874	132	**6SL3120-1TE31-3A A 3**
1PH8184-..F...	480 (354)	157	95.4	0.46 (4.07)	330 (728)	1XB7322-P05	200	**6SL3120-1TE32-0A A 4**
1PH8186-..F...	640 (472)	229	95.5	0.60 (5.31)	405 (893)	1XB7422-P06	260	**6SL3320-1TE32-6A A 3**
1PH8224-..F...	708 (522)	256	96.5	1.28 (11.33)	580 (1279)	1XB7422-P06	260	**6SL3320-1TE32-6A A 3**
1PH8226-..F...	944 (696)	320	96.6	1.66 (14.69)	700 (1544)	1XB7700-P02	310 [4]	**6SL3320-1TE33-1A A 3**
1PH8228-..F...	1180 (870)	427	96.6	2.02 (17.88)	810 (1786)	1XB7700-P02	490	**6SL3320-1TE35-0A A 3**
1PH8135-..G...	158 (117)	63	95.3	0.0750 (0.6638)	120 (265)	gk833	60	**6SL3120-1TE26-0A C 0**
1PH8131-..L...	105 (77.4)	48	94.9	0.0446 (0.3948)	85 (187)	gk833	45	**6SL3120-1TE24-5A C 0**
1PH8133-..L...	131 (96.6)	59	95.2	0.0600 (0.5311)	103 (227)	gk833	60	**6SL3120-1TE26-0A C 0**
1PH8137-..L...	203 (150)	89 [5]	95.3	0.0885 (0.7833)	136 (300)	gk833	85	**6SL3120-1TE28-5A A 3**
1PH8165-..L...	440 (325)	188	95.9	0.2160 (1.9118)	218 (481)	gk874	200	**6SL3120-1TE32-0A A 4**
1PH8167-..L...	500 (369)	230	95.9	0.2440 (2.1596)	240 (529)	gk874	200	**6SL3120-1TE32-0A A 4**
1PH8137-..M...	203 (150)	115 [5]	95.2	0.0885 (0.7833)	136 (300)	gk833	132	**6SL3120-1TE31-3A A 3**

Single Motor Module	**1**
Motor Module For continuous load with 200 % overload (C type) For highly dynamic, intermittent load cycles with 300 % overload (D type)	**C** **D**

1) $n_{max,\ Inv}$: Maximum permissible operating speed based on the voltage induced in the motor and the voltage strength of the Motor Module (without protective circuit).
2) n_{max}: Maximum speed that must not be exceeded.
3) I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 4 kHz (SH 80 to 160) or 2 kHz (SH 180 to 280).
4) The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.
5) From approximately 85 A, the top power connector connection type is not possible (15th data position E to H).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max.[1]	Speed, max.[2]	**SIMOTICS M-1PH8 synchronous motors Forced ventilation**
n_N	SH	P_N	M_N	I_N	U_N	f_N	$n_{max, Inv}$	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 480 V 3 AC, Smart/Basic/Active Line Module									
1000	180	46 (61.7)	439 (324)	78	390	67.0	1450	3800	**1PH8184-■■C■■-....**
		62 (83.1)	592 (437)	108	379	67.0	1450	3800	**1PH8186-■■C■■-....**
	225	68 (91.2)	649 (479)	118	363	67.0	1450	3500	**1PH8224-■■C■■-....**
		91 (122)	869 (641)	170	338	67.0	1550	3500	**1PH8226-■■C■■-....**
		113 (152)	1079 (796)	198	361	67.0	1450	3500	**1PH8228-■■C■■-....**
1350	180	62 (83.1)	439 (324)	106	382	90.0	1950	3800	**1PH8184-■■D■■-....**
		83 (111)	587 (433)	146	368	90.0	2050	3800	**1PH8186-■■D■■-....**
	225	91 (122)	644 (475)	168	342	90.0	2050	3500	**1PH8224-■■D■■-....**
		121 (162)	856 (631)	215	356	90.0	1950	3500	**1PH8226-■■D■■-....**
		151 (202)	1068 (788)	260	364	90.0	1950	3500	**1PH8228-■■D■■-....**
2000	132	19.9 (26.7)	95 (70.1)	29	449	66.7	2550	4500	**1PH8131-■■F■■-....**
		26.2 (35.1)	125 (92.2)	43	415	66.7	3050	4500	**1PH8133-■■F■■-....**
		30.2 (40.5)	144 (106)	42	449	66.7	2450	4500	**1PH8135-■■F■■-....**
		40 (53.6)	191 (141)	59	449	66.7	2700	4500	**1PH8137-■■F■■-....**
	160	74 (99.2)	355 (262)	110	445	133	2600	4000	**1PH8165-■■F■■-....**
		82 (110)	395 (291)	123	450	133	2600	4000	**1PH8167-■■F■■-....**
	180	86 (115)	411 (303)	138	404	133	2700	3800	**1PH8184-■■F■■-....**
		115 (154)	549 (405)	200	370	133	2950	3800	**1PH8186-■■F■■-....**
	225	118 (158)	563 (415)	210	355	133	2900	3500	**1PH8224-■■F■■-....**
		157 (211)	750 (553)	260	378	133	2700	3500	**1PH8226-■■F■■-....**
		196 (263)	936 (690)	345	355	133	2900	3500	**1PH8228-■■F■■-....**
2650	132	40.2 (53.9)	145 (107)	58	449	88.3	3500	4500	**1PH8135-■■G■■-....**
3000	132	29.5 (39.6)	94 (69.3)	43	449	100	4050	4500	**1PH8131-■■L■■-....**
		37.4 (50.2)	119 (87.8)	54	449	100	3950	4500	**1PH8133-■■L■■-....**
		56.9 (76.3)	181 (134)	81	449	100	3900	4500	**1PH8137-■■L■■-....**
	160	89 (119)	285 (210)	131	440	200	3900	4000	**1PH8165-■■L■■-....**
		99 (133)	315 (232)	155	410	200	4000	4000	**1PH8167-■■L■■-....**
3600	132	66.7 (89.4)	177 (131)	100	440	120	4500	4500	**1PH8137-■■M■■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Efficiency	Moment of inertia without holding brake	Weight, approx. without holding brake	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	M_0	I_0	η	J			I_N	
	Nm (lb_f-ft)	A	%	kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
1PH8184-..C...	480 (354)	84	93.7	0.46 (4.07)	330 (728)	1XB7322-P05	85	**6SL3120-1TE28-5A A 3**
1PH8186-..C...	640 (472)	115	94.1	0.60 (5.31)	400 (882)	1XB7322-P05	132	**6SL3120-1TE31-3A A 3**
1PH8224-..C...	708 (522)	128	96.5	1.28 (11.33)	580 (1279)	1XB7322-P05	132	**6SL3120-1TE31-3A A 3**
1PH8226-..C...	944 (696)	183	96.7	1.66 (14.69)	700 (1544)	1XB7322-P05	200	**6SL3120-1TE32-0A A 4**
1PH8228-..C...	1180 (870)	213	96.8	2.02 (17.88)	810 (1786)	1XB7322-P05	200 [4]	**6SL3120-1TE32-0A A 4**
1PH8184-..D...	480 (354)	115	94.6	0.46 (4.07)	330 (728)	1XB7322-P05	132	**6SL3120-1TE31-3A A 3**
1PH8186-..D...	640 (472)	157	95.2	0.60 (5.31)	400 (882)	1XB7322-P05	200	**6SL3120-1TE32-0A A 4**
1PH8224-..D...	708 (522)	183	96.5	1.28 (11.33)	580 (1279)	1XB7322-P05	200	**6SL3120-1TE32-0A A 4**
1PH8226-..D...	944 (696)	233	96.8	1.66 (14.69)	700 (1544)	1XB7422-P06	260	**6SL3320-1TE32-6A A 3**
1PH8228-..D...	1180 (870)	284	96.8	2.02 (17.88)	810 (1786)	1XB7422-P06	310	**6SL3320-1TE33-1A A 3**
1PH8131-..F...	105 (77.4)	30	94.8	0.0446 (0.3948)	85 (187)	gk833	30	**6SL3120-1TE23-0A ■ 3**
1PH8133-..F...	131 (96.6)	45	95.1	0.0600 (0.5311)	103 (227)	gk833	45	**6SL3120-1TE24-5A C 0**
1PH8135-..F...	158 (117)	44	95.3	0.0750 (0.6638)	120 (265)	gk833	45	**6SL3120-1TE24-5A C 0**
1PH8137-..F...	203 (150)	62	95.4	0.0885 (0.7833)	136 (300)	gk833	60	**6SL3120-1TE26-0A C 0**
1PH8165-..F...	440 (325)	126	94.6	0.2160 (1.9118)	218 (481)	gk874	132	**6SL3120-1TE31-3A A 3**
1PH8167-..F...	500 (369)	143	94.6	0.2440 (2.1596)	240 (529)	gk874	132	**6SL3120-1TE31-3A A 3**
1PH8184-..F...	480 (354)	157	95.7	0.46 (4.07)	330 (728)	1XB7322-P05	200	**6SL3120-1TE32-0A A 4**
1PH8186-..F...	640 (472)	229	95.6	0.60 (5.31)	405 (893)	1XB7422-P06	260	**6SL3320-1TE32-6A A 3**
1PH8224-..F...	708 (522)	256	96.3	1.28 (11.33)	580 (1279)	1XB7422-P06	260	**6SL3320-1TE32-6A A 3**
1PH8226-..F...	944 (696)	320	96.4	1.66 (14.69)	700 (1544)	1XB7700-P02	310 [4]	**6SL3320-1TE33-1A A 3**
1PH8228-..F...	1180 (870)	427	96.4	2.02 (17.88)	810 (1786)	1XB7700-P02	490	**6SL3320-1TE35-0A A 3**
1PH8135-..G...	158 (117)	63	95.2	0.0750 (0.6638)	120 (265)	gk833	60	**6SL3120-1TE26-0A C 0**
1PH8131-..L...	105 (77.4)	48	95.1	0.0446 (0.3948)	85 (187)	gk833	45	**6SL3120-1TE24-5A C 0**
1PH8133-..L...	131 (96.6)	59	95.2	0.0600 (0.5311)	103 (227)	gk833	60	**6SL3120-1TE26-0A C 0**
1PH8137-..L...	203 (150)	89 [5]	95.3	0.0885 (0.7833)	136 (300)	gk833	85	**6SL3120-1TE28-5A A 3**
1PH8165-..L...	440 (325)	188	96	0.2160 (1.9118)	218 (481)	gk874	200	**6SL3120-1TE32-0A A 4**
1PH8167-..L...	500 (369)	230	96	0.2440 (2.1596)	240 (529)	gk874	200	**6SL3120-1TE32-0A A 4**
1PH8137-..M...	203 (150)	115 [5]	95	0.0885 (0.7833)	136 (300)	gk833	132	**6SL3120-1TE31-3A A 3**

Single Motor Module	**1**
Motor Module For continuous load with 200 % overload (C type) For highly dynamic, intermittent load cycles with 300 % overload (D type)	**C** **D**

[1] $n_{max, Inv}$: Maximum permissible operating speed based on the voltage induced in the motor and the voltage strength of the Motor Module (without protective circuit).
[2] n_{max}: Maximum speed that must not be exceeded.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 4 kHz (SH 80 to 160) or 2 kHz (SH 180 to 280).
[4] The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.
[5] From approximately 85 A, the top power connector connection type is not possible (15th data position E to H).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 synchronous motors Water cooling**
n_N	SH	P_N	M_N	I_N	U_N	f_N	$n_{max, Inv}$	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC, Smart/Basic Line Module									
1500	132	17.6 (23.6)	112 (82.6)	40	326	50.0	3150	4500	**1PH8131-■■F2■-....**
		23.1 (31.0)	147 (108)	42	371	50.0	2450	4500	**1PH8133-■■F2■-....**
		29.7 (39.8)	189 (139)	57	384	50.0	2650	4500	**1PH8135-■■F2■-....**
		32.7 (43.9)	208 (153)	58	371	50.0	2350	4500	**1PH8137-■■F2■-....**
		44.9 (60.2)	286 (211)	118	316	50.0	3500	4500	**1PH8138-■■F2■-....**
	160	59 (79.1)	375 (277)	111	380	100	2400	4000	**1PH8164-■■F2■-....**
		74 (99.2)	475 (350)	148	355	100	2600	4000	**1PH8166-■■F2■-....**
		84 (113)	530 (391)	169	355	100	2600	4000	**1PH8168-■■F2■-....**
2000	132	30.6 (41.0)	146 (108)	57	383	66.7	3450	4500	**1PH8133-■■G2■-....**
		39 (52.3)	186 (137)	81	346	66.7	3800	4500	**1PH8135-■■G2■-....**
		44.4 (59.5)	212 (156)	85	371	66.7	3500	4500	**1PH8137-■■G2■-....**
		59.3 (79.5)	283 (209)	131	374	66.7	3900	4500	**1PH8138-■■G2■-....**
2500	132	28.5 (38.2)	109 (80.4)	57	359	83.3	4500	4500	**1PH8131-■■L2■-....**
	160	88 (118)	335 (247)	165	355	167	4000	4000	**1PH8164-■■L2■-....**
		102 (137)	390 (288)	188	380	167	3900	4000	**1PH8166-■■L2■-....**
		119 (160)	455 (336)	225	355	167	4000	4000	**1PH8168-■■L2■-....**
Line voltage 400 V 3 AC, Active Line Module									
1750	132	20.4 (27.4)	112 (82.6)	40	377	58.3	3150	4500	**1PH8131-■■F2■-....**
		26.4 (35.4)	144 (106)	42	415	58.3	2450	4500	**1PH8133-■■F2■-....**
		34.1 (45.7)	186 (137)	56	395	58.3	2650	4500	**1PH8135-■■F2■-....**
		37 (49.6)	202 (149)	57	415	58.3	2350	4500	**1PH8137-■■F2■-....**
		52.4 (70.3)	286 (211)	118	366	58.3	3500	4500	**1PH8138-■■F2■-....**
	160	67 (89.8)	365 (269)	108	440	117	2400	4000	**1PH8164-■■F2■-....**
		85 (114)	460 (339)	143	410	117	2600	4000	**1PH8166-■■F2■-....**
		94 (126)	510 (376)	164	410	117	2600	4000	**1PH8168-■■F2■-....**
2300	132	34.9 (46.8)	145 (107)	57	415	76.7	3450	4500	**1PH8133-■■G2■-....**
		44.3 (59.4)	184 (136)	80	395	76.7	3800	4500	**1PH8135-■■G2■-....**
		50.5 (67.7)	210 (155)	84	424	76.7	3500	4500	**1PH8137-■■G2■-....**
		67.7 (90.8)	281 (207)	130	415	76.7	3900	4500	**1PH8138-■■G2■-....**
2800	132	31.7 (42.5)	108 (79.7)	56	400	93.3	4500	4500	**1PH8131-■■L2■-....**
	160	93 (125)	315 (232)	156	395	187	4000	4000	**1PH8164-■■L2■-....**
		109 (146)	375 (277)	177	420	187	3900	4000	**1PH8166-■■L2■-....**
		123 (165)	420 (310)	210	395	187	4000	4000	**1PH8168-■■L2■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Efficiency	Moment of inertia without holding brake	Weight, approx. without holding brake	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	M_0	I_0	η	J			I_N	
	Nm (lb_f-ft)	A	%	kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
1PH8131-..F...	115 (84.8)	41	94.6	0.0446 (0.3948)	102 (225)	gk843	45	**6SL3120-1TE24-5AC0**
1PH8133-..F...	155 (114)	43	94.7	0.0600 (0.5311)	120 (265)	gk843	45	**6SL3120-1TE24-5AC0**
1PH8135-..F...	196 (145)	59	95	0.0750 (0.6638)	138 (304)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8137-..F...	226 (167)	60	95.1	0.0885 (0.7833)	153 (337)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8138-..F...	290 (214)	120 [4]	95.8	0.0885 (0.7833)	156 (344)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8164-..F...	440 (325)	118	94	0.1750 (1.5489)	224 (494)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8166-..F...	550 (406)	159	94	0.2160 (1.9118)	257 (567)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8168-..F...	620 (457)	179	94	0.2440 (2.1596)	279 (615)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8133-..G...	155 (114)	61	95	0.0600 (0.5311)	120 (265)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8135-..G...	196 (145)	85 [4]	95.2	0.0750 (0.6638)	138 (304)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8137-..G...	226 (167)	90 [4]	95.4	0.0885 (0.7833)	153 (337)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8138-..G...	290 (214)	133 [4]	96	0.0885 (0.7833)	156 (344)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8131-..L...	115 (84.8)	60	94.8	0.0446 (0.3948)	102 (225)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8164-..L...	440 (325)	205	95.5	0.1750 (1.5489)	224 (494)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8166-..L...	550 (406)	240	95.5	0.2160 (1.9118)	257 (567)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8168-..L...	520 (384)	240	95.5	0.2440 (2.1596)	279 (615)	gk874	260	**6SL3320-1TE32-6AA3**
1PH8131-..F...	115 (84.8)	41	94.7	0.0446 (0.3948)	102 (225)	gk843	45	**6SL3120-1TE24-5AC0**
1PH8133-..F...	155 (114)	43	94.8	0.0600 (0.5311)	120 (265)	gk843	45	**6SL3120-1TE24-5AC0**
1PH8135-..F...	196 (145)	59	95.1	0.0750 (0.6638)	138 (304)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8137-..F...	226 (167)	60	95.2	0.0885 (0.7833)	153 (337)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8138-..F...	290 (214)	120 [4]	95.9	0.0885 (0.7833)	156 (344)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8164-..F...	440 (325)	118	94.3	0.1750 (1.5489)	224 (494)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8166-..F...	550 (406)	159	94.3	0.2160 (1.9118)	257 (567)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8168-..F...	620 (457)	179	94.3	0.2440 (2.1596)	279 (615)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8133-..G...	155 (114)	61	95.1	0.0600 (0.5311)	120 (265)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8135-..G...	196 (145)	85 [4]	95.3	0.0750 (0.6638)	138 (304)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8137-..G...	226 (167)	90 [4]	95.6	0.0885 (0.7833)	153 (337)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8138-..G...	290 (214)	133 [4]	96.1	0.0885 (0.7833)	156 (344)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8131-..L...	115 (84.8)	60	94.9	0.0446 (0.3948)	102 (225)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8164-..L...	440 (325)	205	95.9	0.1750 (1.5489)	224 (494)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8166-..L...	550 (406)	240	95.9	0.2160 (1.9118)	257 (567)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8168-..L...	520 (384)	240	95.9	0.2440 (2.1596)	279 (615)	gk874	260	**6SL3320-1TE32-6AA3**

[1] $n_{max, Inv}$: Maximum permissible operating speed based on the voltage induced in the motor and the voltage strength of the Motor Module (without protective circuit).
[2] n_{max}: Maximum speed that must not be exceeded.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 4 kHz (SH 80 to 160).
[4] From approximately 85 A, the top power connector connection type is not possible (15th data position E to H).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 synchronous motors Water cooling**
n_N r/min	SH	P_N kW (hp)	M_N Nm (lb_f-ft)	I_N A	U_N V	f_N Hz	$n_{max, Inv}$ r/min	n_{max} r/min	Article No.
Line voltage 480 V 3 AC, Smart/Basic Line Module									
2000	132	23.2 (31.1)	111 (81.9)	39	427	66.7	3150	4500	**1PH8131-■■F2■-....**
		29 (38.9)	139 (103)	41	449	66.7	2450	4500	**1PH8133-■■F2■-....**
		37.9 (50.8)	181 (134)	56	449	66.7	2650	4500	**1PH8135-■■F2■-....**
		40.6 (54.4)	194 (143)	57	449	66.7	2350	4500	**1PH8137-■■F2■-....**
		59.7 (80.1)	285 (210)	118	416	66.7	3500	4500	**1PH8138-■■F2■-....**
	160	70 (93.9)	330 (243)	105	500	133	2400	4000	**1PH8164-■■F2■-....**
		89 (119)	425 (313)	138	465	133	2600	4000	**1PH8166-■■F2■-....**
		100 (134)	480 (354)	157	465	133	2600	4000	**1PH8168-■■F2■-....**
2650	132	39.1 (52.4)	141 (104)	57	449	88.3	3450	4500	**1PH8133-■■G2■-....**
		50.5 (67.7)	182 (134)	79	452	88.3	3800	4500	**1PH8135-■■G2■-....**
		56.8 (76.2)	205 (151)	83	449	88.3	3500	4500	**1PH8137-■■G2■-....**
		76.3 (102.3)	275 (203)	130	449	88.3	3900	4500	**1PH8138-■■G2■-....**
3000	132	33.6 (45.1)	107 (78.9)	56	427	100.0	4500	4500	**1PH8131-■■L2■-....**
	160	96 (129)	305 (225)	150	420	200	4000	4000	**1PH8164-■■L2■-....**
		110 (148)	350 (258)	169	450	200	3900	4000	**1PH8166-■■L2■-....**
		125 (168)	395 (291)	197	420	200	4000	4000	**1PH8168-■■L2■-....**

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For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Efficiency	Moment of inertia without holding brake	Weight, approx. without holding brake	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	M_0	I_0	η	J			I_N	
	Nm (lb_f-ft)	A	%	kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
1PH8131-..F...	115 (84.8)	41	94.8	0.0446 (0.3948)	102 (225)	gk843	45	**6SL3120-1TE24-5AC0**
1PH8133-..F...	155 (114)	43	94.9	0.0600 (0.5311)	120 (265)	gk843	45	**6SL3120-1TE24-5AC0**
1PH8135-..F...	196 (145)	59	95.2	0.0750 (0.6638)	138 (304)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8137-..F...	226 (167)	60	95.3	0.0885 (0.7833)	153 (337)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8138-..F...	290 (214)	120 [4]	96	0.0885 (0.7833)	156 (344)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8164-..F...	440 (325)	118	94.6	0.1750 (1.5489)	224 (494)	gk874	132	**6SL3120-1TE31-3AA3**
1PH8166-..F...	550 (406)	159	94.6	0.2160 (1.9118)	257 (567)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8168-..F...	620 (457)	179	94.6	0.2440 (2.1596)	279 (615)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8133-..G...	155 (114)	61	95.2	0.0600 (0.5311)	120 (265)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8135-..G...	196 (145)	85 [4]	95.4	0.0750 (0.6638)	138 (304)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8137-..G...	226 (167)	90 [4]	95.8	0.0885 (0.7833)	153 (337)	gk843	85	**6SL3120-1TE28-5AA3**
1PH8138-..G...	290 (214)	133 [4]	96.2	0.0885 (0.7833)	156 (344)	gk843	132	**6SL3120-1TE31-3AA3**
1PH8131-..L...	115 (84.8)	60	95	0.0446 (0.3948)	102 (225)	gk843	60	**6SL3120-1TE26-0AC0**
1PH8164-..L...	440 (325)	205	96	0.1750 (1.5489)	224 (494)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8166-..L...	550 (406)	240	96	0.2160 (1.9118)	257 (567)	gk874	200	**6SL3120-1TE32-0AA4**
1PH8168-..L...	520 (384)	240	96	0.2440 (2.1596)	279 (615)	gk874	260	**6SL3320-1TE32-6AA3**

[1] $n_{max, Inv}$: Maximum permissible operating speed based on the voltage induced in the motor and the voltage strength of the Motor Module (without protective circuit).
[2] n_{max}: Maximum speed that must not be exceeded.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 4 kHz (SH 80 to 160).
[4] From approximately 85 A, the top power connector connection type is not possible (15th data position E to H).

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	SIMOTICS M-1PH8 synchronous motors Water cooling
n_N r/min	SH	P_N kW (hp)	M_N Nm (lb_f-ft)	I_N A	U_N V	f_N Hz	$n_{max, Inv}$ r/min	n_{max} r/min	Article No.
Line voltage 400 V 3 AC, Smart/Basic Line Module									
700	180	42 (56.3)	573 (423)	100	303	47	1450	3800	**1PH8184-■■C2■-....**
		58 (77.8)	791 (583)	142	295	47	1450	3800	**1PH8186-■■C2■-....**
	225	72 (96.6)	982 (724)	180	275	47	1450	3500	**1PH8224-■■C2■-....**
		95 (127)	1296 (956)	255	255	47	1550	3500	**1PH8226-■■C2■-....**
		121 (162)	1651 (1218)	305	270	47	1450	3500	**1PH8228-■■C2■-....**
1000	180	61 (81.8)	583 (430)	140	313	67	1950	3800	**1PH8184-■■D2■-....**
		80 (107)	764 (564)	190	300	67	2050	3800	**1PH8186-■■D2■-....**
	225	101 (135)	964 (711)	255	275	67	2050	3500	**1PH8224-■■D2■-....**
		135 (181)	1289 (951)	325	285	67	1950	3500	**1PH8226-■■D2■-....**
		169 (227)	1614 (1190)	395	290	67	1950	3500	**1PH8228-■■D2■-....**
1500	180	90 (121)	573 (423)	190	334	100	2700	3800	**1PH8184-■■F2■-....**
		119 (160)	758 (559)	275	305	100	2950	3800	**1PH8186-■■F2■-....**
	225	151 (202)	961 (709)	355	290	100	2900	3500	**1PH8224-■■F2■-....**
		201 (270)	1280 (944)	445	305	100	2700	3500	**1PH8226-■■F2■-....**
		251 (337)	1598 (1179)	590	285	100	2900	3500	**1PH8228-■■F2■-....**
2500	180	127 (170)	485 (358)	260	328	167	3800	3800	**1PH8184-■■L2■-....**
		168 (225)	642 (474)	370	305	167	3800	3800	**1PH8186-■■L2■-....**
	225	182 (244)	695 (513)	365	320	167	3500	3500	**1PH8224-■■L2■-....**
		228 (306)	871 (642)	400	360	167	3500	3500	**1PH8226-■■L2■-....**
		270 (362)	1031 (760)	570	300	167	3500	3500	**1PH8228-■■L2■-....**
Line voltage 400 V 3 AC, Active Line Module									
800	180	48 (64.4)	573 (423)	102	342	53	1450	3800	**1PH8184-■■C2■-....**
		66 (88.5)	788 (581)	142	335	53	1450	3800	**1PH8186-■■C2■-....**
	225	81 (109)	967 (713)	178	310	53	1450	3500	**1PH8224-■■C2■-....**
		108 (145)	1289 (951)	255	287	53	1550	3500	**1PH8226-■■C2■-....**
		138 (185)	1647 (1215)	305	315	53	1450	3500	**1PH8228-■■C2■-....**
1150	180	70 (93.9)	581 (429)	140	386	77	1950	3800	**1PH8184-■■D2■-....**
		92 (123)	764 (564)	190	345	77	2050	3800	**1PH8186-■■D2■-....**
	225	115 (154)	955 (704)	250	310	77	2050	3500	**1PH8224-■■D2■-....**
		155 (208)	1287 (949)	325	325	77	1950	3500	**1PH8226-■■D2■-....**
		194 (260)	1611 (1188)	395	330	77	1950	3500	**1PH8228-■■D2■-....**
1750	180	103 (138)	562 (415)	186	386	117	2700	3800	**1PH8184-■■F2■-....**
		138 (185)	753 (555)	275	355	117	2950	3800	**1PH8186-■■F2■-....**
	225	175 (235)	955 (704)	355	335	117	2900	3500	**1PH8224-■■F2■-....**
		233 (312)	1271 (937)	440	355	117	2700	3500	**1PH8226-■■F2■-....**
		289 (388)	1577 (1163)	580	335	117	2900	3500	**1PH8228-■■F2■-....**
2900	180	140 (188)	461 (340)	250	375	193	3800	3800	**1PH8184-■■L2■-....**
		178 (239)	586 (432)	340	345	193	3800	3800	**1PH8186-■■L2■-....**
	225	191 (256)	629 (464)	335	370	193	3500	3500	**1PH8224-■■L2■-....**
		238 (319)	784 (578)	365	413	193	3500	3500	**1PH8226-■■L2■-....**
		283 (380)	932 (687)	520	345	193	3500	3500	**1PH8228-■■L2■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Efficiency	Moment of inertia without holding brake	Weight, approx. without holding brake	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	M_0	I_0	η	J			I_N	
	Nm (lb_f-ft)	A	%	kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
1PH8184-..C...	590 (435)	103	91.9	0.457 (4.045)	330 (728)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8186-..C...	800 (590)	143	92.4	0.599 (5.302)	400 (882)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224-..C...	1007 (743)	183	94.7	1.28 (11.33)	580 (1279)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8226-..C...	1330 (981)	260	95.2	1.66 (14.69)	700 (1544)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8228-..C...	1680 (1239)	306	95.5	2.02 (17.88)	810 (1786)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8184-..D...	600 (443)	143	93.7	0.457 (4.045)	330 (728)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186-..D...	800 (590)	196	94.3	0.599 (5.302)	400 (882)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224-..D...	1007 (743)	262	95.6	1.28 (11.33)	580 (1279)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8226-..D...	1330 (981)	330	96	1.66 (14.69)	700 (1544)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8228-..D...	1680 (1239)	408	96.2	2.02 (17.88)	810 (1786)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8184-..F...	600 (443)	196	95.1	0.457 (4.045)	330 (728)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186-..F...	800 (590)	285	95.2	0.599 (5.302)	405 (893)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8224-..F...	1007 (743)	367	96.2	1.28 (11.33)	580 (1279)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8226-..F...	1330 (981)	454	96.5	1.66 (14.69)	700 (1544)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8228-..F...	1680 (1239)	612	96.4	2.02 (17.88)	810 (1786)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8184-..L...	530 (391)	278	95.7	0.457 (4.045)	332 (732)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8186-..L...	720 (531)	405	95.7	0.599 (5.302)	405 (893)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8224-..L...	885 (653)	460	96.1	1.28 (11.33)	580 (1279)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8226-..L...	1170 (863)	532	96.2	1.66 (14.69)	700 (1544)	1XB7712-P03	380 [4]	**6SL3320-1TE33-8AA3**
1PH8228-..L...	1400 (1033)	762	96.3	2.02 (17.88)	810 (1786)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8184-..C...	590 (435)	103	92.6	0.457 (4.045)	330 (728)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8186-..C...	800 (590)	143	93.1	0.599 (5.302)	400 (882)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224-..C...	1007 (743)	183	95.2	1.28 (11.33)	580 (1279)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8226-..C...	1330 (981)	260	95.6	1.66 (14.69)	700 (1544)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8228-..C...	1680 (1239)	306	95.8	2.02 (17.88)	810 (1786)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8184-..D...	600 (443)	143	94.2	0.457 (4.045)	330 (728)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186-..D...	800 (590)	196	94.8	0.599 (5.302)	400 (882)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224-..D...	1007 (743)	262	95.9	1.28 (11.33)	580 (1279)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8226-..D...	1330 (981)	330	96.2	1.66 (14.69)	700 (1544)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8228-..D...	1680 (1239)	408	96.4	2.02 (17.88)	810 (1786)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8184-..F...	600 (443)	196	95.4	0.457 (4.045)	330 (728)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186-..F...	800 (590)	285	95.5	0.599 (5.302)	405 (893)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8224-..F...	1007 (743)	367	96.3	1.28 (11.33)	580 (1279)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8226-..F...	1330 (981)	454	96.5	1.66 (14.69)	700 (1544)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8228-..F...	1680 (1239)	612	96.5	2.02 (17.88)	810 (1786)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8184-..L...	530 (391)	278	95.6	0.457 (4.045)	332 (732)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8186-..L...	720 (531)	405	95.5	0.599 (5.302)	405 (893)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8224-..L...	885 (653)	460	95.8	1.28 (11.33)	580 (1279)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8226-..L...	1170 (863)	532	95.8	1.66 (14.69)	700 (1544)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8228-..L...	1400 (1033)	762	95.8	2.02 (17.88)	810 (1786)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**

[1] $n_{max,\ Inv}$: Maximum permissible operating speed based on the voltage induced in the motor and the voltage strength of the Motor Module (without protective circuit).
[2] n_{max}: Maximum speed that must not be exceeded.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 2 kHz (SH 180 to 280).
[4] The output current of the Motor Module is lower than the rated motor current for the pulse frequency on which it is based.

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Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	**SIMOTICS M-1PH8 synchronous motors Water cooling**
n_N r/min	SH	P_N kW (hp)	M_N Nm (lb_f-ft)	I_N A	U_N V	f_N Hz	$n_{max, Inv}$ r/min	n_{max} r/min	Article No.
Line voltage 480 V 3 AC, Smart/Basic/Active Line Module									
1000	180	60 (80.5)	573 (423)	102	423	67	1450	3800	**1PH8184-■■C2■-....**
		82 (110)	783 (578)	140	415	67	1450	3800	**1PH8186-■■C2■-....**
	225	101 (135)	964 (711)	178	385	67	1450	3500	**1PH8224-■■C2■-....**
		134 (180)	1280 (944)	255	357	67	1550	3500	**1PH8226-■■C2■-....**
		172 (231)	1642 (1211)	300	390	67	1450	3500	**1PH8228-■■C2■-....**
1350	180	82 (110)	580 (428)	140	417	90	1950	3800	**1PH8184-■■D2■-....**
		107 (143)	757 (558)	190	400	90	2050	3800	**1PH8186-■■D2■-....**
	225	135 (181)	955 (704)	250	365	90	2050	3500	**1PH8224-■■D2■-....**
		180 (241)	1273 (939)	320	380	90	1950	3500	**1PH8226-■■D2■-....**
		226 (303)	1599 (1179)	395	395	90	1950	3500	**1PH8228-■■D2■-....**
2000	180	110 (148)	525 (387)	176	434	133	2700	3800	**1PH8184-■■F2■-....**
		154 (207)	735 (542)	265	400	133	2950	3800	**1PH8186-■■F2■-....**
	225	186 (249)	888 (655)	330	380	133	2900	3500	**1PH8224-■■F2■-....**
		248 (333)	1184 (873)	410	390	133	2700	3500	**1PH8226-■■F2■-....**
		310 (416)	1480 (1092)	550	380	133	2900	3500	**1PH8228-■■F2■-....**
3200	180	142 (190)	424 (313)	230	405	213	3800	3800	**1PH8184-■■L2■-....**
		183 (245)	546 (403)	315	375	213	3800	3800	**1PH8186-■■L2■-....**
	225	196 (263)	585 (431)	310	400	213	3500	3500	**1PH8224-■■L2■-....**
		245 (329)	731 (539)	340	460	213	3500	3500	**1PH8226-■■L2■-....**
		291 (390)	868 (640)	485	380	213	3500	3500	**1PH8228-■■L2■-....**

For versions, see Article No. supplements and options.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Efficiency	Moment of inertia without holding brake	Weight, approx. without holding brake	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [3]	Internal air cooling For further components, see SINAMICS S120 drive system
	M_0	I_0	η	J			I_N	
	Nm (lb_f-ft)	A	%	kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
1PH8184-..C...	590 (435)	103	93.7	0.457 (4.045)	330 (728)	1XB7322-P05	132	**6SL3120-1TE31-3AA3**
1PH8186-..C...	800 (590)	143	94.1	0.599 (5.302)	400 (882)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224-..C...	1007 (743)	183	95.7	1.28 (11.33)	580 (1279)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8226-..C...	1330 (981)	260	96	1.66 (14.69)	700 (1544)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8228-..C...	1680 (1239)	306	96.1	2.02 (17.88)	810 (1786)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8184-..D...	600 (443)	143	94.6	0.457 (4.045)	330 (728)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186-..D...	800 (590)	196	95.2	0.599 (5.302)	400 (882)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8224-..D...	1007 (743)	262	96.1	1.28 (11.33)	580 (1279)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8226-..D...	1330 (981)	330	96.4	1.66 (14.69)	700 (1544)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8228-..D...	1680 (1239)	408	96.5	2.02 (17.88)	810 (1786)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8184-..F...	600 (443)	196	95.7	0.457 (4.045)	330 (728)	1XB7322-P05	200	**6SL3120-1TE32-0AA4**
1PH8186-..F...	800 (590)	285	95.6	0.599 (5.302)	405 (893)	1XB7700-P02	310	**6SL3320-1TE33-1AA3**
1PH8224-..F...	1007 (743)	367	96.4	1.28 (11.33)	580 (1279)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8226-..F...	1330 (981)	454	96.5	1.66 (14.69)	700 (1544)	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8228-..F...	1680 (1239)	612	96.4	2.02 (17.88)	810 (1786)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**
1PH8184-..L...	530 (391)	278	95.4	0.457 (4.045)	332 (732)	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8186-..L...	720 (531)	405	95.3	0.599 (5.302)	405 (893)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8224-..L...	885 (653)	460	95.4	1.28 (11.33)	580 (1279)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8226-..L...	1170 (863)	532	95.4	1.66 (14.69)	700 (1544)	1XB7700-P02	380	**6SL3320-1TE33-8AA3**
1PH8228-..L...	1400 (1033)	762	95.4	2.02 (17.88)	810 (1786)	1XB7700-P02	745	**6SL3320-1TE37-5AA3**

[1] $n_{max, Inv}$: Maximum permissible operating speed based on the voltage induced in the motor and the voltage strength of the Motor Module (without protective circuit).
[2] n_{max}: Maximum speed that must not be exceeded.
[3] I_N: Output current of the Motor Module at rated pulse frequency (see SINAMICS S120 drive system).
The rated motor data are valid for 2 kHz (SH 180 to 280).

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Article No. supplements for SIMOTICS M-1PH8 without holding brake > SH 80 to SH 160

Selection and ordering data

Data position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 80	**1**	**P**	**H**	**8**	**0**	**8**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Shaft height 100	**1**	**P**	**H**	**8**	**1**	**0**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Shaft height 132	**1**	**P**	**H**	**8**	**1**	**3**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Shaft height 160	**1**	**P**	**H**	**8**	**1**	**6**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Overall length (cannot be selected, determined by the choice of rated power)							**.**													
Asynchronous version									**1**											
Synchronous version (only shaft height 132 and 160)									**2**											
Encoder systems for motors without DRIVE-CLiQ interface																				
Without encoder [1]										**A**								**2**		
Absolute encoder EnDat 2048 S/R (encoder AM2048S/R) [2]										**E**								**2**		
Incremental encoder HTL 1024 S/R (encoder HTL1024S/R) [1] [3]										**H**								**2**		
Incremental encoder HTL 2048 S/R (encoder HTL2048S/R) [1] [4]										**J**								**2**		
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks (encoder IC2048S/R) [2]										**M**								**2**		
Incremental encoder sin/cos 1 V_{pp} 512 S/R without C and D tracks (encoder IN512S/R) [1] [5]										**T**								**2**		
Encoder systems for motors with DRIVE-CLiQ interface																				
Absolute encoder 22-bit single-turn + 12-bit multi-turn (encoder AM22DQ) [2]										**F**								**1**		
Incremental encoder 22-bit with commutation position (encoder IC22DQ) [2]										**D**								**1**		
Incremental encoder 20-bit without commutation position (encoder IN20DQ) [1] [5]										**U**								**1**		
Rated speeds (380 V to 480 V 3 AC) (winding design)																				
400 r/min, 500 r/min, 600 r/min, 700 r/min											**B**									
1000 r/min, 1150 r/min, 1350 r/min, 1500 r/min											**D**									
1500 r/min, 1750 r/min, 2000 r/min, 2200 r/min											**F**									
2000 r/min, 2300 r/min, 2650 r/min, 2800 r/min											**G**									
2500 r/min, 2800 r/min, 3000 r/min											**L**									
3000 r/min, 3300 r/min, 3600 r/min, 3900 r/min											**M**									
Cooling / **Degree of protection**																				
Forced ventilation DE → NDE / IP55												**0**								
Forced ventilation NDE → DE / IP55												**1**								
Water cooling / IP65												**2**								
Type of construction																				
IM B3 (IM V5, IM V6, IM B6, IM B7, IM B8)													**0**							
IM B5 (IM V1, IM V3) [12]													**2**							
IM B35 (IM V15, IM V35) [6]													**3**							
Version status [11]																				
Special version (order codes required for options)																				**Z**

13th to 16th position of the Article No. see next page

For footnotes, see next page.

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Article No. supplements for SIMOTICS M-1PH8 without holding brake > SH 80 to SH 160

Selection and ordering data

Data position of the Article No.			1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
			1	P	H	8	.	.	.	–	■	■	■	■	■	–	■	■	■	.	–	Z
Shaft end (DE)	**Balancing**																					
Plain shaft	–																**0**					
Feather key	Full-key																**1**					
Feather key	Half-key																**2**					
Bearing	**Vibration severity acc. to Siemens/EN 60034-14**	**Shaft and flange accuracy**																				
Standard with location bearing [13]	R/A	R																**B**				
Standard with location bearing [13]	S/A	R																**C**				
Standard with location bearing [1] [13]	SR/A	R																**D**				
Standard [13]	R/A	R																**G**				
Standard [13]	S/A	R																**H**				
Increased radial forces [13] [15]	R/A	R																**F**				
Performance [7]	SPECIAL/B	SPECIAL																**L**				
Advanced Lifetime [8] [13]	S/A	R																**Q**				
Power connection (when viewing DE)																						
Terminal box	Cable entry	Signal port																				
Top	Right	DE																	**A**			
Top	Left	DE																	**B**			
Top	NDE	Left																	**C**			
Top [14]	DE	Left																	**D**			
Power connector																						
Top [9]	Right	DE																	**E**			
Top [9]	Left	DE																	**F**			
Top [9]	NDE	Left																	**G**			
Top [9]	DE	Left																	**H**			
Version status [11]																						
Special version (order codes required for options)																						**Z**

1) Only possible when 8th data position is "1" (asynchronous version).
2) Limited to n_{max} = 12000 r/min.
3) Limited to n_{max} = 9000 r/min.
4) Limited to n_{max} = 4600 r/min.
5) Limited to n_{max} = 15000 r/min.
6) Only possible for shaft height 100, 132, and 160.
7) Only possible when 8th data position is "1" (asynchronous version).
Shaft height 80: limited to n_{max} = 15000 r/min
shaft height 100: limited to n_{max} = 12000 r/min
shaft height 132: limited to n_{max} = 10000 r/min
shaft height 160: limited to n_{max} = 9000 r/min, not possible if 12th data position is "2" (IM B5).
8) Limited to n_{max} = 5000 r/min, shaft height 132: n_{max} = 4500 r/min, shaft height 160: n_{max} = 4000 r/min .
9) Power connector for shaft height 100 only possible up to a maximum stall current of I_0 = 36 A,
Power connector for shaft height 132 only possible up to a maximum stall current of I_0 = 85 A.
Power connector not possible for shaft height 160.
10) Only possible when 14th data position is: B, C, D, G, H, Q, F; and 15th data position is: A and B.
11) Directly coupled to the 9th data position.
12) Not possible with shaft height 160 and 14th data position: L.
13) Not possible when 9th data position is: T, U.
14) Not possible with shaft height 160 and when 8th data position is "2" or "4" (synchronous version).
15) Limited to shaft height 100: n_{max} = 7000 r/min, shaft height 132: n_{max} = 6500 r/min, shaft height 160: n_{max} = 5300 r/min .

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Article No. supplements for SIMOTICS M-1PH8 without holding brake > SH 180 to SH 280

Selection and ordering data

Data position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 180	**1**	**P**	**H**	**8**	**1**	**8**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Shaft height 225	**1**	**P**	**H**	**8**	**2**	**2**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Shaft height 280 (only asynchronous version with water cooling)	**1**	**P**	**H**	**8**	**2**	**8**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Overall length (cannot be selected, determined by the choice of rated power)							**.**													
Asynchronous version									**1**											
Synchronous version									**2**											
Encoder systems for motors without DRIVE-CLiQ interface																				
Without encoder [1]										**A**								**2**		
Absolute encoder EnDat 2048 S/R (encoder AM2048S/R)										**E**								**2**		
Incremental encoder HTL 1024 S/R (encoder HTL1024S/R) [1]										**H**								**2**		
Incremental encoder HTL 2048 S/R (encoder HTL2048S/R) [1] [2]										**J**								**2**		
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D track (encoder IC2048S/R)										**M**								**2**		
Encoder systems for motors with DRIVE-CLiQ interface																				
Absolute encoder 22-bit single-turn + 12-bit multi-turn (encoder AM22DQ)										**F**								**1**		
Incremental encoder 22-bit with commutation position (encoder IC22DQ)										**D**								**1**		
Rated speeds (380 V to 480 V 3 AC) (winding design)																				
400 r/min, 500 r/min, 600 r/min, 700 r/min											**B**									
700 r/min, 800 r/min, 1000 r/min, 1100 r/min											**C**									
1000 r/min, 1150 r/min, 1350 r/min, 1500 r/min											**D**									
1500 r/min, 1750 r/min, 2000 r/min, 2200 r/min											**F**									
2500 r/min, 2900 r/min, 3400 r/min											**L**									
Rated speeds (690 V 3 AC) only with shaft height 280 (winding design)																				
400 r/min, 500 r/min											**H**									
700 r/min, 800 r/min											**K**									
1000 r/min, 1150 r/min											**U**									
1500 r/min, 1750 r/min											**W**									

Cooling	Degree of protection		
Forced ventilation, DE → NDE	IP55	**0**	
Forced ventilation, NDE → DE	IP55	**1**	
Water cooling	IP55	**2**	
Forced ventilation, DE → NDE (only asynchronous version)	IP23	**3**	
Forced ventilation, NDE → DE (only asynchronous version)	IP23	**4**	

Type of construction

Shaft height 180	Shaft height 225	Shaft height 280	
IM B3 (IM B6, IM B7, IM B8, IM V6)	IM B3 (IM B6, IM B7, IM B8, IM V6)	IM B3 (IM V6)	**0**
IM V5	IM V5	IM V5 [7]	**1**
IM B5 with A450 flange (IM V3) [3]	IM B5 with A550 flange (IM V3) [3]	IM B5 with A660 flange (IM V3) [5] [7]	**2**
IM B35 with A450 flange (IM V35)	IM B35 with A550 flange (IM V35)	IM B35 with A660 flange (IM V35)	**3**
IM V15 with A450 flange	IM V15 with A550 flange	IM V15 with A660 flange	**5**

Version status [8]

Special version (order codes required for options)	**Z**

13th to 16th position of the Article No. see next page

For footnotes, see next page.

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Article No. supplements for SIMOTICS M-1PH8 without holding brake > SH 180 to SH 280

Selection and ordering data

Data position of the Article No.			1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
			1	P	H	8	.	.	.	–	■	■	■	■	■	–	■	■	■	.	–	Z
Shaft end (DE)	**Balancing**																					
Plain shaft	–																**0**					
Feather key	Full-key																**1**					
Feather key	Half-key																**2**					
Bearing	**Vibration severity acc. to Siemens/EN 60034-14**	**Shaft and flange accuracy**																				
Standard	A	N																**A**				
Standard	R/A	R																**B**				
Increased radial forces	A	N																**E**				
Increased radial forces	R/A	R																**F**				
Also possible with shaft heights 180 and 225:																						
Standard	S/A	R																**C**				
Standard [1]	SR/A	R																**D**				
Performance [6]	SR/A	R																**L**				
Power connection (when viewing DE)																						
Terminal box	Cable entry	Signal port																				
Top	Right	DE																	**A**			
Top	Left	DE																	**B**			
Top	NDE	Right																	**C**			
Top	DE	Right																	**D**			
Version status [8]																						
Special version (order codes required for options)																						**Z**

[1] Only possible when 8th data position is "1" (asynchronous version).
[2] Limited to n_{max} = 4600 r/min.
[3] Limited to n_{max} = 3000 r/min, not possible if 14th data position is "L" (Performance).
[4] Limited to n_{max} = 2500 r/min, not possible if 14th data position is "L" (Performance).
[5] Limited to n_{max} = 2000 r/min.
[6] Only possible when 8th data position is "1" (asynchronous version); not possible when 12th data position is "2" (IM B5) and 11th data position is "3" and "4" (forced ventilation, IP23).
Shaft height 180: limited to n_{max} = 7500 r/min;
shaft height 225: limited to n_{max} = 6000 r/min.
[7] Only possible when 14th data position is "A" or "B" (standard bearing).
[8] Directly coupled to the 9th data position.

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Article No. supplements for SIMOTICS M-1PH8 without holding brake > SH 280

Selection and ordering data

Data position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 280 (forced ventilation)	**1**	**P**	**H**	**8**	**2**	**8**	**.**	**–**	**1**	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Overall length (cannot be selected, determined by the choice of rated power)							**.**													
Asynchronous version									**1**											
Encoder systems for motors without DRIVE-CLiQ interface																				
Without encoder										**A**								**2**		
Absolute encoder EnDat 2048 S/R (encoder AM2048S/R)										**E**								**2**		
Incremental encoder HTL 1024 S/R (encoder HTL1024S/R)										**H**								**2**		
Incremental encoder HTL 2048 S/R (encoder HTL2048S/R)										**J**								**2**		
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D track (encoder IC2048S/R)										**M**								**2**		
Encoder systems for motors with DRIVE-CLiQ interface																				
Absolute encoder 22-bit single-turn + 12-bit multi-turn (encoder AM22DQ)										**F**								**1**		
Incremental encoder 22-bit with commutation position (encoder IC22DQ)										**D**								**1**		
External encoder systems																				
Incremental encoder HTL 1024 S/R WITH HOLLOW SHAFT HOG 22 (Baumer-Hübner), prepared for mounting [1]										**G**								**2**		
Incremental encoder HTL 1024 S/R POG 10 (Baumer-Hübner), prepared for mounting [2]										**K**								**2**		
Rated speeds (380 V to 480 V 3 AC) (winding design)																				
400 r/min, 500 r/min, 600 r/min, 700 r/min											**B**									
700 r/min, 800 r/min, 1000 r/min, 1100 r/min											**C**									
1000 r/min, 1150 r/min, 1350 r/min, 1500 r/min											**D**									
1500 r/min, 1750 r/min, 2000 r/min, 2200 r/min											**F**									
Rated speeds (690 V 3 AC) (winding design)																				
400 r/min, 500 r/min											**H**									
700 r/min, 800 r/min											**K**									
1000 r/min, 1150 r/min											**U**									
1500 r/min, 1750 r/min											**W**									
Cooling **Degree of protection**																				
Forced ventilation IP55												**1**								
Forced ventilation IP23												**4**								
Type of construction																				
IM B3 (IM V6)													**0**							
IM V5 [3) 6)]													**1**							
IM B5 with A660 flange (IM V3) [3) 6)]													**2**							
IM B35 with A660 flange (IM V35)													**3**							
IM V15 with A660 flange (IM V35) [3)]													**5**							
Version status [8)]																				
Special version (order codes required for options)																				**Z**

13th to 16th position of the Article No. see next page

For footnotes, see next page.

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Article No. supplements for SIMOTICS M-1PH8 without holding brake > SH 280

Selection and ordering data

Data position of the Article No.			1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
			1	P	H	8	.	.	.	–	1	■	■	■	■	–	■	■	■	.	–	Z
Shaft end (DE)	**Balancing**																					
Plain shaft	–																**0**					
Feather key	Full-key																**1**					
Feather key	Half-key																**2**					
Bearing	**Vibration severity acc. to Siemens/EN 60034-1**	**Shaft and flange accuracy**																				
Standard	A	N																**A**				
Standard	R/A	R																**B**				
Increased radial forces	A	N																**E**				
Increased radial forces	R/A	R																**F**				
Power connection (when viewing DE)																						
Terminal box	Cable entry	Signal port	Separately driven fan																			
NDE right	Bottom	DE																	**U**			
			NDE top, air inlet from NDE, air-flow direction NDE → DE																			**–**
			NDE left, air inlet from NDE, air-flow direction NDE → DE																			**G00**
NDE left	Bottom	DE																	**V**			
			NDE top, air inlet from NDE, air-flow direction NDE → DE																			**–**
			NDE right, air inlet from NDE, air-flow direction NDE → DE																			**G02**
NDE top	Right	DE																	**W**			
			NDE left, air inlet from NDE, air-flow direction NDE → DE																			**G00**
			NDE right, air inlet from NDE, air-flow direction NDE → DE																			**G02**
DE top [4]	Right	NDE																	**X**			
			NDE top, air inlet from NDE, air-flow direction NDE → DE [4] [5]																			**–**
			NDE left, air inlet from NDE, air-flow direction NDE → DE [4]																			**G00**
			NDE right, air inlet from NDE, air-flow direction NDE → DE [4]																			**G02**
Version status [8]																						
Special version (order codes required for options)																						**Z**

1) When ordering, also select option H75 (= encoder provided).
2) When ordering, also select options H56 (= procured by factory) or G80 (provided).
3) n_{max}. Limited to 2000 r/min.
4) Only possible when 12th data position is "0" (IM B3) and "1" (IM V5).
5) Only possible for assignments with terminal box 1XB7712-P..
6) Only possible when 14th data position is "A" and "B" (standard bearing).
7) Possible for the following combinations:
12th data position is "0" or "1" with 16th data position "W" or "X"
12th data position is "2", "3", or "5" with 16th data position "W".
8) Directly coupled to the 9th data position.

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Article No. supplements for SIMOTICS M-1PH8 with holding brake > SH 80 to SH 160

Selection and ordering data

Data position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 80	**1**	**P**	**H**	**8**	**0**	**8**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Shaft height 100	**1**	**P**	**H**	**8**	**1**	**0**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Shaft height 132	**1**	**P**	**H**	**8**	**1**	**3**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Shaft height 160	**1**	**P**	**H**	**8**	**1**	**6**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Overall length (cannot be selected, determined by the choice of rated power)							**.**													
Asynchronous version with holding brake [1]									**3**											
Synchronous version with holding brake (only shaft heights 132 and 160) [1]									**4**											
Encoder systems for motors without DRIVE-CLiQ interface																				
Without encoder [2]										**A**								**2**		
Absolute encoder EnDat 2048 S/R (encoder AM2048S/R)										**E**								**2**		
Incremental encoder HTL 1024 S/R (encoder HTL1024S/R) [2]										**H**								**2**		
Incremental encoder HTL 2048 S/R (encoder HTL2048S/R) [2]										**J**								**2**		
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D track (encoder IC2048S/R)										**M**								**2**		
Encoder systems for motors with DRIVE-CLiQ interface																				
Absolute encoder 22-bit single-turn + 12-bit multi-turn (encoder AM22DQ)										**F**								**1**		
Incremental encoder 22-bit with commutation position (encoder IC22DQ)										**D**								**1**		
Rated speeds (380 V to 480 V 3 AC) (winding design)																				
400 r/min, 500 r/min, 600 r/min, 700 r/min											**B**									
1000 r/min, 1150 r/min, 1350 r/min, 1500 r/min											**D**									
1500 r/min, 1750 r/min, 2000 r/min, 2200 r/min											**F**									
2000 r/min, 2300 r/min, 2650 r/min, 2800 r/min											**G**									
2500 r/min, 2800 r/min, 3000 r/min											**L**									
3000 r/min, 3300 r/min, 3600 r/min, 3900 r/min											**M**									
Cooling / **Degree of protection**																				
Forced ventilation, DE → NDE / IP55												**0**								
Forced ventilation, NDE → DE / IP55												**1**								
Water cooling / IP55 [3]												**2**								
Type of construction																				
IM B5 (IM V1, IM V3) [4]													**2**							
IM B35 (IM V15, IM V35) [7]													**3**							
Version status [8]																				
Special version (order codes required for options)																				**Z**

13th to 16th position of the Article No. see next page

For footnotes, see next page.

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Article No. supplements for SIMOTICS M-1PH8 with holding brake > SH 80 to SH 160

Selection and ordering data

Data position of the Article No.			1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
			1	**P**	**H**	**8**	**.**	**.**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Shaft end (DE)	**Balancing**																					
Plain shaft	–																**0**					
Feather key	Half-key																**2**					
Bearing	**Vibration severity acc. to Siemens/EN 60034-14**	**Shaft and flange accuracy**																				
Standard	A	N																**A**				
Advanced Lifetime	A	N																**P**				
Power connection [5] (when viewing DE)																						
Terminal box	Cable entry	Signal port																				
Top	Right	DE																	**A**			
Top	Left	DE																	**B**			
Top	NDE	Left																	**C**			
Top [9]	DE	Left																	**D**			
Top [6]	Right	DE																	**E**			
Top [6]	Left	DE																	**F**			
Top [6]	NDE	Left																	**G**			
Top [6]	DE	Left																	**H**			
Version status [8]																						
Brake versions:																						
Brake supply voltage 230 V 1 AC, 50/60 Hz																						
Holding brake DE																						**U60**
Holding brake DE with microswitch																						**U61**
Holding brake DE with manual brake release lever																						**U62**
Holding brake DE with microswitch and manual brake release lever																						**U63**
Brake supply voltage 24 V DC																						
Holding brake DE																						**U65**
Holding brake DE with microswitch																						**U66**
Holding brake DE with manual brake release lever																						**U67**
Holding brake DE with microswitch and manual brake release lever																						**U68**
Z options that cannot be combined with DE holding brake DE: K18, V91, M03, M39																						

[1] A U option must also be stated in the order to specify the holding brake version.
Shaft height 80: limited to n_{max} = 5000 r/min
shaft height 100: limited to n_{max} = 5000 r/min
shaft height 132: limited to n_{max} = 4500 r/min
shaft height 160: limited to n_{max} = 4000 r/min

[2] Only possible when 8th data position is "3" (asynchronous version).

[3] With holding brake, degree of protection is limited to IP55.

[4] Not possible with shaft height 160.

[5] Connection for holding brake is only possible via terminal box (top).

[6] Power connector for motor only (not with holding brake):
Power connector for shaft height 100 only possible up to a maximum stall current of I_0 = 36 A.
Power connector for shaft height 132 only possible up to a maximum stall current of I_0 = 85 A.
Power connector not possible for shaft height 160.

[7] Not possible for shaft height 80.

[8] Directly coupled to the 9th data position.

[9] Not possible with shaft height 160 and when 8th data position is "2" or "4" (synchronous version).

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Article No. supplements for SIMOTICS M-1PH8 with holding brake > SH 180 and SH 225

Selection and ordering data

Data position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 180	**1**	**P**	**H**	**8**	**1**	**8**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Shaft height 225	**1**	**P**	**H**	**8**	**2**	**2**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Overall length							**.**													
Asynchronous version with holding brake [1]									**3**											
Synchronous version with holding brake [1]									**4**											
Encoder systems for motors without DRIVE-CLiQ interface																				
Without encoder [2]										**A**								**2**		
Absolute encoder EnDat 2048 S/R (encoder AM2048S/R)										**E**								**2**		
Incremental encoder HTL 1024 S/R (encoder HTL1024S/R) [2]										**H**								**2**		
Incremental encoder HTL 2048 S/R (encoder HTL2048S/R) [2]										**J**								**2**		
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D track (encoder IC2048S/R)										**M**								**2**		
Encoder systems for motors with DRIVE-CLiQ interface																				
Absolute encoder 22-bit single-turn + 12-bit multi-turn (encoder AM22DQ)										**F**								**1**		
Incremental encoder 22-bit with commutation position (encoder IC22DQ)										**D**								**1**		
Rated speeds (380 V to 480 V 3 AC) (winding design)																				
400 r/min, 500 r/min, 600 r/min, 700 r/min											**B**									
700 r/min, 800 r/min, 1000 r/min, 1100 r/min											**C**									
1000 r/min, 1150 r/min, 1350 r/min, 1500 r/min											**D**									
1500 r/min, 1750 r/min, 2000 r/min, 2200 r/min											**F**									
2500 r/min, 2900 r/min, 3400 r/min											**L**									
Cooling	**Degree of protection**																			
Forced ventilation, DE → NDE	IP55											**0**								
Forced ventilation, NDE → DE	IP55											**1**								
Water cooling	IP55											**2**								
Forced ventilation, NDE → DE (only asynchronous)	IP23											**4**								
Type of construction																				
IM B3 (IM B6, IM B7, IM B8)													**0**							
Shaft end (DE)	**Balancing**																			
Feather key	Half-key														**2**					
Bearing	**Vibration severity acc. to Siemens/EN 60034-14**	**Shaft and flange accuracy**																		
Standard	A	N														**A**				
Power connection [3] (when viewing DE)																				
Terminal box	Cable entry	Signal port																		
Top	Right	DE															**A**			
Top	Left	DE															**B**			
Top	NDE	Right															**C**			
Top	DE	Right															**D**			
Version status [4]																				
With DRIVE-CLiQ interface																		**1**		
Without DRIVE-CLiQ interface, Pt1000 temperature sensor in the stator winding																		**2**		
Brake versions:																				
Brake supply voltage 230 V 1 AC, 50/60 Hz																				
Holding brake DE standard with microswitch and manual brake release lever																				**U64**
Holding brake DE performance with microswitch and manual brake release lever																				**U70**
Z options that cannot be combined with DE holding brake DE: K18, K90, L03, V92, M39																				

1) A U option must also be stated in the order to specify the holding brake version.
Shaft height 180: limited to n_{max} = 3500 r/min
shaft height 225: limited to n_{max} = 3100 r/min.
2) Only possible when 8th data position is "3" (asynchronous version).
3) Connection for holding brake is only possible via brake terminal box (top).
4) Directly coupled to the 9th data position.

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Article No. supplements for SIMOTICS M-1PH8 without holding brake > SH 132 and 160

Selection and ordering data

Data position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 132	**1**	**P**	**H**	**8**	**1**	**3**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Shaft height 160	**1**	**P**	**H**	**8**	**1**	**6**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Overall length (cannot be selected, determined by the choice of rated power)							**.**													
Reluctance version Efficiency									**5**											
Reluctance version Performance									**7**											
Encoder systems for motors without DRIVE-CLiQ interface																				
Without encoder										**A**								**2**		
Absolute encoder EnDat 2048 S/R (encoder AM2048S/R)										**E**								**2**		
Incremental encoder HTL 1024 S/R (encoder HTL1024S/R)										**H**								**2**		
Incremental encoder HTL 2048 S/R (encoder HTL2048S/R)										**J**								**2**		
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D track (encoder IC2048S/R)										**M**								**2**		
Encoder systems for motors with DRIVE-CLiQ interface																				
Absolute encoder 22-bit single-turn + 12-bit multi-turn (encoder AM22DQ)										**F**								**1**		
Incremental encoder 22-bit with commutation position (encoder IC22DQ)										**D**								**1**		
Rated speeds (380 V to 480 V 3 AC) (winding design)																				
1000 r/min, 1150 r/min, 1350 r/min, 1500 r/min (only for forced ventilation)											**D**									
1500 r/min, 1750 r/min, 2000 r/min, 2200 r/min											**F**									
2000 r/min, 2300 r/min, 2650 r/min, 2800 r/min											**G**									

Cooling	**Degree of protection**	
Forced ventilation DE → NDE	IP55	**0**
Forced ventilation NDE → DE	IP55	**1**
Water cooling	IP65	**2**

Type of construction	
IM B3 (IM V5, IM V6, IM B6, IM B7, IM B8)	**0**
IM B5 (IM V1, IM V3)	**2**
IM B35 (IM V15, IM V35)	**3**

Shaft end (DE)	**Balancing**	
Plain shaft	–	**0**
Feather key	Full-key	**1**
Feather key	Half-key	**2**

Bearing	**Vibration severity acc. to Siemens/EN 60034-14**	**Shaft and flange accuracy**	
Standard with fixed bearing	R/A	R	**B**
Standard with fixed bearing	S/A	R	**C**
Standard with fixed bearing	SR/A	R	**D**
Increased radial forces	R/A	R	**F**

Power connection (when viewing DE)

Terminal box	Cable entry	Signal port	
Top	Right	DE	**A**
Top	Left	DE	**B**
Top	NDE	Left	**C**
Top [1]	DE	Left	**D**

Version status [2]	
With DRIVE-CLiQ interface	**1**
Without DRIVE-CLiQ interface, Pt1000 temperature sensor in the stator winding	**2**

Special version (order codes required for options)	**Z**

[1] Not possible with shaft height 160 and when 8th data position is "2" or "4" (synchronous version).
[2] Directly coupled to the 9th data position.

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Article No. supplements for SIMOTICS M-1PH8 with holding brake > SH 132 and SH 160

Selection and ordering data

Data position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 132	**1**	**P**	**H**	**8**	**1**	**3**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Shaft height 160	**1**	**P**	**H**	**8**	**1**	**6**	**.**	**–**	■	■	■	■	■	**–**	■	■	■	**.**	**–**	**Z**
Overall length (cannot be selected, determined by the choice of rated power)							**.**													
Reluctance version Efficiency with holding brake [1]									**6**											
Reluctance version Performance with holding brake [1]									**8**											
Encoder systems for motors without DRIVE-CLiQ interface																				
Without encoder										**A**								**2**		
Absolute encoder EnDat 2048 S/R (encoder AM2048S/R)										**E**								**2**		
Incremental encoder HTL 1024 S/R (encoder HTL1024S/R)										**H**								**2**		
Incremental encoder HTL 2048 S/R (encoder HTL2048S/R)										**J**								**2**		
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D track (encoder IC2048S/R)										**M**								**2**		
Encoder systems for motors with DRIVE-CLiQ interface																				
Absolute encoder 22-bit single-turn + 12-bit multi-turn (encoder AM22DQ)										**F**								**1**		
Incremental encoder 22-bit with commutation position (encoder IC22DQ) [2]										**D**								**1**		
Rated speeds (380 V to 480 V 3 AC) (winding design)																				
1000 r/min, 1150 r/min, 1350 r/min, 1500 r/min (only for forced ventilation)											**D**									
1500 r/min, 1750 r/min, 2000 r/min, 2200 r/min											**F**									
2000 r/min, 2300 r/min, 2650 r/min, 2800 r/min											**G**									
Cooling / **Degree of protection**																				
Forced ventilation DE → NDE / IP55												**0**								
Forced ventilation NDE → DE / IP55												**1**								
Water cooling / IP55												**2**								
Type of construction																				
IM B5 (IM V1, IM V3) [2]													**2**							
IM B35 (IM V15, IM V35)													**3**							
Shaft end (DE) / **Balancing**																				
Plain shaft / –															**0**					
Feather key / Half-key															**2**					
Bearing / **Vibration severity acc. to Siemens/EN 60034-14** / **Shaft and flange accuracy**																				
Standard / A / N																**A**				
Power connection (when viewing DE)																				
Terminal box / Cable entry / Signal port																				
Top / Right / DE																	**A**			
Top / Left / DE																	**B**			
Top / NDE / Left																	**C**			
Top [3] / DE / Left																	**D**			
Version status [4]																				
With DRIVE-CLiQ interface																		**1**		
Without DRIVE-CLiQ interface, Pt1000 temperature sensor in the stator winding																		**2**		
Special version (order codes required for options)																				**Z**

[1] A U option must also be provided in the order to specify the holding brake version.

Shaft height 132: limited to n_{max} = 4500 r/min
shaft height 160: limited to n_{max} = 4000 r/min

[2] Not possible for shaft height 160; the vibration load must be taken into consideration for shaft height 132, see Configuration Manual.

[3] Not possible for terminal box gk874 (1PH816 and 1PH8138-xxG2x).

[4] Directly coupled to the 9th data position.

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Options

Order code	Option description **-Z** must be attached to the Article No. to order a motor with options. The order code must also be specified for each additional required option (Order codes must not be repeated in plain text in the order)	For use with motors Shaft height 80 to 160	Shaft height 180 to 280	Shaft height 280 only for forced ventilation (11th data position "1" or "4")
A12	Additional PTC thermistor chain for alarm and tripping (Only possible for version with terminal box)	✔	✔	✔
A25	Additional temperature sensor as reserve connected to signal terminal strip (Only possible for version with terminal box)	✔	Standard	Standard
A72	2 Pt1000 temperature sensors for roller bearing temperature monitoring (DE and NDE)	–	✔	✔
B02	Factory test certificate in accordance with EN 10204 2.3 (for motor ordered)	✔	Standard	Standard
B35	Factory test certificate for vibration report	✔	✔ 1)	✔ 1)
B36	Factory test certificate for run-out log	✔	Only for SH 180 and SH 225	–
G00	Separately driven fan NDE left, air inlet at NDE (possible if 15th data position is U, W or X)	–	–	✔
G02	Separately driven fan NDE right, air inlet at NDE (possible if 15th data position is V, W or X)	–	–	✔
G06	Separately driven fan DE left, air inlet NDE (possible at 11th position = 1 and 15th position = U, V or W; possible if 11th position = 4 and 15th position = W)	–	–	✔
G07	Separately driven fan DE left, air inlet DE (possible if 11th position = 1 and 15th position = U, V or W; possible if 11th position = 4 and 15th position = W)	–	–	✔
G08	Separately driven fan DE right, air inlet NDE (possible if 11th position = 1 and 15th position = U, V or W; possible if 11th position = 4 and 15th position = W)	–	–	✔
G09	Separately driven fan DE right, air inlet DE (possible if 11th position = 1 and 15th position = U, V or W; possible if 11th position = 4 and 15th position = W)	–	–	✔
G11	Separately driven fan DE top, air inlet DE (possible if 11th position = 1 and 15th position = U, V or W; possible if 11th position = 4 and 15th position = W)	–	–	✔
G14	With air filter (only possible when 11th data position "1" or "4")	Only for SH 132 and SH 160	✔	✔
G50	Nipple for SPM, with M8 adapter	–	✔	✔
G80	Mounting a POG 10 incremental encoder supplied by the customer (Possible if 9th data position is "K")	–	–	✔
H56	Mounting a POG 10 D 1024 incremental encoder (encoder HTL1024 S/R) (Possible if 9th data position is "K")	–	–	✔
H75	Mounting a HOG 22 hollow shaft encoder supplied by the customer (Possible if 9th data position is "G")	–	–	✔
K08	Encoder connector or DRIVE-CLiQ mounted opposite (Not possible if 15th data position is "X")	–	✔	✔
K09	Terminal box or power connector NDE right	Only for SH 100 2) up to SH 160	–	–
	Terminal box NDE right, cable entry DE, signal port top (Possible if 15th data position is "A")	–	✔	–
K10	Terminal box or power connector NDE left	Only for SH 100 2) up to SH 160	–	–
	Terminal box NDE left, cable entry DE, signal port top (Possible if 15th data position is "A")	–	✔	–
K16	Second shaft end (d × l: 95 mm × 170 mm) (Possible if 9th data position is "A" or "G" and 12th data position is "0" or "3")	–	–	✔
K17	Labyrinth seal DE for Performance version (possible if 12th data position is "5" and 14th data position is "L")	–	Only for SH 180	–
K18	Radial shaft sealing ring DE 3)	✔	✔	–
K40	Regreasing system, DE and NDE	–	Only for SH 180 and SH 225	Standard

–	Not possible
✔	Option available

1) Not possible with shaft height 280 and when 14th data position is "E" or "F" (increased radial forces).
2) Not possible when 12th data position is "2" (type of construction IM B5).
3) Only appropriate if oil spray or oil vapor is occasionally deposited on the sealing ring.
Radial shaft sealing ring not possible when: 14th data position is "E", "F" or "L".

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Options for SIMOTICS M-1PH8 asynchronous and synchronous motors

Options

Order code	Option description **-Z** must be attached to the Article No. to order a motor with options. The order code must also be specified for each additional required option (Order codes must not be repeated in plain text in the order)	For use with motors Shaft height 80 to 160	Shaft height 180 to 280	Shaft height 280 only for forced ventilation (11th data position "1" or "4")
K45	Anti-condensation heating 230 V AC	–	✔	✔
K69	Pipe connection prepared NDE right (Only possible with forced ventilation, not for G00 or G11)	–	–	✔
K70	Pipe connection prepared NDE left (Only possible with forced ventilation, not for G00 or G11)	–	–	✔
K71	Pipe connection prepared NDE top (Only possible with forced ventilation, not for G00 or G11)	–	–	✔
K80	Axial pipe connection NDE (Only possible with forced ventilation)	–	Only for SH 180 and SH 225	Options **K69**, **K70**, **K71**
K83	Rotation of terminal box through +90 degrees (Possible in combination with Options K09 or K10 or if 15th data position is "U", "V" or "W")	–	✔ 1)	✔
K84	Rotation of terminal box through -90 degrees (Possible in combination with Options K09 or K10 or if 15th data position is "U", "V", "W", or "X")	–	✔ 1)	✔
K85	Rotation of terminal box through +180 degrees (Possible in combination with Options K09 or K10 or if 15th data position is "U", "V", "W", or "X")	–	✔	✔
K90	Version with flange size A400 (Possible if 12th data position is "2", "3" and "5")	–	Only for SH 180	–
L00	Terminal box (standard) replaced by the next larger terminal box (note the impact on the dimensions in the Siemens Product Configurator!)	–	✔	✔
L03	Increased vibration stress (For SH 180 and SH 225 only for type of construction IM B3; 12th data position is "2")	–	Only for SH 180 and SH 225	–
L12	Condensation drain hole	–	Standard for water cooling	Only if 11th data position is "1"
L27	NDE bearing in insulated version	–	Only for SH 180	Standard
L29	Enhanced corrosion protection for installation in industrial/marine climates	–	–	✔
L72	Shaft manufactured out of special steel (Note: Option results in longer delivery times)	–	–	✔
L74	Fan version with IP65 degree of protection 2)	✔	–	–
L76	Connection 3-phase separately driven fan 400 V 3 AC 50/60 Hz	–	Only for SH180 and SH225	–
L77	2-phase version for connecting separately driven fans to the 400 V line supply	Only for SH 80	–	–
M03	Version for potentially explosive atmospheres Zone 2	Only for SH 100 to SH 160	–	
M39	Version for potentially explosive atmospheres Zone 22	Only for SH 100 to SH 160	Only for SH 180 and SH 225	–
M83	Additional forcing-off thread on motor feet (Possible, if 12th data position is "0" or "3")	–	–	✔
P00	Undrilled cable entry plate	–	✔	Not for 1XB7820-P00
P01	Cable entry plate 3 × M63 × 1.5	–	Only for 1XB7700-P02 1XB7712-P03	Only for 1XB7712-P03
P02	Cable entry plate 3 × M75 × 1.5	–	Only for 1XB7712-P03	Only for 1XB7712-P01 1XB7712-P03
P03	Cable entry plate 4 × M75 × 1.5	–	–	Only for 1XB7712-P01
P04	Cable entry plate 4 × M63 × 1.5	–	Only for 1XB7712-P03	Only for 1XB7712-P01 1XB7712-P03

–	Not possible
✔	Option available

1) Not possible for 1PH822 and terminal box 1XB7712-P03.
2) Regardless of the degree of protection, for high levels of atmospheric pollution, the fan must be cleaned.

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Options

Order code	Option description **-Z** must be attached to the Article No. to order a motor with options. The order code must also be specified for each additional required option (Order codes must not be repeated in plain text in the order)	For use with motors Shaft height 80 to 160	Shaft height 180 to 280	Shaft height 280 only for forced ventilation (11th data position "1" or "4")
Q00	Higher number of ground terminals in the terminal box	–	–	✔
Q12	Sealing air connection	✔	–	–
Q21	Screw locked with Loctite	–	✔	✔
Q25	Q25 fan connection NDE or at the top with M16 ×1.5	Only for SH 100 to SH 160	–	–
Q31	Metal rating plate instead of adhesive label	✔	–	–
Q81	Higher preloading of bearing (only possible when 14th data position is "B", "C" or "D")	✔		
U60	Holding brake 230 V	✔	–	–
U61	Holding brake 230 V with microswitch	✔	–	–
U62	Holding brake 230 V with manual brake release lever	✔	–	–
U63	Holding brake 230 V with microswitch and manual brake release lever	✔	–	–
U64	Holding brake Standard 230 V with microswitch and manual brake release lever	–	Only for SH 180 and SH 225[1)]	–
U65	Holding brake 24 V DC	✔	–	–
U66	Holding brake 24 V DC with microswitch	✔	–	–
U67	Holding brake 24 V DC with manual brake release lever	✔	–	–
U68	Holding brake 24 V DC with microswitch and manual brake release lever	✔	–	–
U70	Holding brake Performance 230 V with microswitch and manual brake release lever	–	Only for SH 180 and SH 225[1)]	–
U81	Holding brake with reduced braking torque	Only for SH 100 to SH 160	–	–
U82	Holding brake with reduced braking torque	Only for SH 100 to SH 160	–	–
U83	Holding brake with reduced braking torque	Only for SH 100 to SH 160	–	–
U84	Holding brake with reduced braking torque	Only for SH 100 to SH 160	–	–
U85	Holding brake with reduced braking torque	Only for SH 100 to SH 160	–	–
U86	Holding brake with reduced braking torque	Only for SH 100 to SH 160	–	–
V90	1PH7-compatible shaft end (d × l: 42 mm × 110 mm) (Reduced radial forces must be taken into consideration!)	Only for SH 132	–	–
V91	1FT6-compatible shaft end (d × l: 48 mm × 82 mm) (Only possible when 8th data position is "2")	Only for SH 132	–	–
V92	1PH7184-/1PL6184-compatible shaft end (d × l: 60 mm × 140 mm)	–	Only for 1PH8184	–
Y82	Additional plate with customer specifications (plain text required)	–	✔	✔
Y84	Customer specifications on rating plate (max. 30 characters)	✔	✔	✔

–	Not possible
✔	Option available

[1)] Performance brake 4HPB-30V and 4HPB-40S only for:

Shaft height 180

Synchronous

1PH8184-4*C2*
1PH8184-4*D2*
1PH8184-4*F2*
1PH8186-4*C0*
1PH8186-4*D0*
1PH8186-4*F0*
1PH8186-4*C1*
1PH8186-4*D1*
1PH8186-4*F1*
1PH8186-4*C2*
1PH8186-4*D2*
1PH8186-4*F2*
1PH8186-4*L2*

Asynchronous

1PH8184-3*B4*
1PH8184-3*C4*
1PH8184-3*D4*
1PH8186-3*B0*
1PH8186-3*C0*
1PH8186-3*D0*
1PH8186-3*F0*
1PH8186-3*B1*
1PH8186-3*C1*
1PH8186-3*D1*
1PH8186-3*F1*
1PH8186-3*B4*
1PH8186-3*C4*
1PH8186-3*D4*
1PH8186-3*F4*
1PH8186-3*B2*
1PH8186-3*C2*
1PH8186-3*D2*
1PH8186-3*F2*

Shaft height 225

Synchronous

1PH8226-4*C2*
1PH8226-4*D2*
1PH8226-4*F2*
1PH8228-4*C2*
1PH8228-4*D2*
1PH8228-4*F2*

Asynchronous

1PH8226-3*B4*
1PH8226-3*C4*
1PH8226-3*D4*
1PH8228-3*B4*
1PH8228-3*C4*
1PH8228-3*D4*
1PH8228-3*F4*
1PH8228-3*B2*
1PH8228-3*C2*
1PH8228-3*D2*
1PH8228-3*F2*

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Options for SIMOTICS M-1PH8 asynchronous and synchronous motors

Options

Order code	Option description **-Z** must be attached to the Article No. to order a motor with options. The order code must also be specified for each additional required option (Order codes must not be repeated in plain text in the order)	For use with motors Shaft height 80 to 160	Shaft height 180 to 280	Shaft height 280 only for forced ventilation (11th data position "1" or "4")
–	Standard: Paint finish anthracite gray RAL 7016	Standard	Standard	Standard
X01	Paint finish in RAL 9005 (jet black)	✔	✔	✔
X02	Paint finish in RAL 9001 (cream)	✔	✔	✔
X03	Paint finish in RAL 6011 (reseda green)	✔	✔	✔
X04	Paint finish in RAL 7032 (pebble gray)	✔	✔	✔
X05	Paint finish in RAL 5015 (sky blue).	✔	✔	✔
X06	Paint finish in RAL 1015 (light ivory).	✔	✔	✔
X08	Paint finish in RAL 9006 (white aluminum)	✔	✔	✔
X12	Paint finish in RAL 5010 (gentian blue)	✔	✔	✔
X14	Paint finish in RAL 5017 (traffic blue)	✔	✔	✔
X15	Paint finish in RAL 9010 (pure white)	✔	✔	✔
X16	Paint finish in RAL 6018 (yellow green)	✔	✔	✔
X21	Paint finish in RAL 9003 (signal white)	✔	✔	✔
X22	Paint finish in RAL 9002 (gray white)	✔	✔	✔
X23	Paint finish in RAL 5005 (signal blue)	✔	✔	✔
X27	Paint finish in RAL 9023 (pearl dark gray)	✔	✔	✔
X52	Paint finish in RAL 3000 (flame red)	✔	✔	✔
X53	Paint finish in RAL 7035 (light gray)	✔	✔	✔
X57	Paint finish in RAL 5012 (light blue)	✔	✔	✔
X59	Paint finish in RAL 7030 (stone gray)	✔	✔	✔
X91	Paint finish in RAL 7011 (iron gray)	✔	✔	✔
K24	Primer	Pale green	Light gray	Light gray
K23	Special paint finish "Worldwide" (anthracite RAL 7016)	✔	✔	✔
K23 + X..	Special paint finish Worldwide in another color (X01 to X08)	✔	✔	✔

–	Not possible
✔	Option available

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Options

Terminal box type (See selection and ordering data for assignment)	Cable entry Power	External signals	Outer cable diameter, max.[1] mm (in)	Number of main terminals		Cross-section per terminal, max. mm²	Rated current, max.[2] A
gk803	1 × M25 × 1.5	1 × M16 × 1.5[3]	20 (0.79)	Phases:	3 × M5	1 × 10	52
				Grounding:	2 × M5		
gk806	1 × M25 × 1.5	1 × M16 × 1.5[3]	20 (0.79)	Phases:	6 × M5	1 × 10	52
				Grounding:	2 × M5		
gk813	1 × M32 × 1.5	1 × M16 × 1.5[3]	24.2 (0.95)	Phases:	3 × M5	1 × 16	70
				Grounding:	2 × M5		
gk823	1 × M32 × 1.5	1 × M16 × 1.5[3]	24.2 (0.95)	Phases:	3 × M5	1 × 16	70
				Grounding:	2 × M5		
gk826	1 × M32 × 1.5	1 × M16 × 1.5[3]	24.2 (0.95)	Phases:	6 × M5	1 × 10	52
				Grounding:	2 × M5		
gk833	1 × M40 × 1.5	1 × M16 × 1.5[3]	32 (1.26)	Phases:	3 × M6	1 × 35	110
				Grounding:	2 × M6		
gk843	1 × M50 × 1.5	1 × M16 × 1.5[3]	38 (1.50)	Phases:	3 × M6	1 × 50	133
				Grounding:	2 × M6		
gk846	1 × M50 × 1.5	1 × M16 × 1.5[3]	38 (1.50)	Phases:	6 × M6	1 × 25	88
				Grounding:	2 × M6		
gk863	1 × M50 × 1.5	1 × M16 × 1.5[3]	38 (1.50)	Phases:	3 × M6	1 × 50	133
				Grounding:	2 × M6		
gk873	1 × M63 × 1.5	1 × M16 × 1.5[3]	42.6 (1.68)	Phases:	3 × M6	1 × 50	133
				Grounding:	2 × M6		
gk874	1 × M63 × 1.5	1 × M16 × 1.5[3]	42.6 (1.68)	Phases:	3 × M10	2 × 70	240
				Grounding:	2 × M6		
1XB7322-P05	2 × M50 × 1.5	1 × M16 × 1.5[4]	38 (1.50)	Phases:	3 × M12	2 × 50	210
				Grounding:	2 × M6		
1XB7422-P06	2 × M63 × 1.5	1 × M16 × 1.5[4]	53 (2.09)	Phases:	3 × M12	2 × 70	270
				Grounding:	4 × M8		
1XB7700-P02	3 × M75 × 1.5	1 × M16 × 1.5[4]	68 (2.68)	Phases:	3 × 2 × M12	3 × 150	700
				Grounding:	3 × fixing eyelet		
1XB7712-P03	4 × M75 × 1.5	1 × M16 × 1.5[4]	68 (2.68)	Phases:	3 × 4 × M16	4 × 185	1150
				Grounding:	4 × M16		

For terminal box **1XB7712-P03**, other cable entries (power) can be ordered via P options, depending on the standard:

P00	Undrilled cable entry plate
P01	Cable entry plate 3 × M63 × 1.5 (not for 1XB7712-P01)
P02	Cable entry plate 3 × M75 × 1.5
P04	Cable entry plate 4 × M63 × 1.5

For terminal box **1XB7700-P02** other cable entries (power) can be ordered via P options, depending on the standard:

P00	Undrilled cable entry plate
P01	Cable entry plate 3 × M63 × 1.5

For terminal boxes **1XB7322-P05** and **1XB7422-P06**, another cable entry (power) can be ordered via the P option, depending on the standard:

P00	Undrilled cable entry plate

For options **K09** or **K10**, instead of terminal box **gk863**, terminal box **gk873** is used mounted on the side.

For options **K09** or **K10**, instead of terminal box **gk833**, terminal box **gk843** is used mounted on the side.

For options **K09** or **K10**, instead of terminal box **gk813**, terminal box **gk823** is used mounted on the side.

1) Depending on the version of metric cable gland (based on the MOTION-CONNECT cable type and cable glands from HUGRO or from AGRO)
2) Current-carrying capacity based on EN 60204-1/IEC 60364-5-52 with installation type E.
3) Thread M16 × 1.5 arranged at 90° to signal port; thread only with options A12, A25 and when 9th data position is A (without encoder).
4) Thread M16 × 1.5 arranged opposite the signal port (lateral to the cable entry plate); thread only with option A12 and encoder version A (without encoder).

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Technical specifications

Motor type	Fan motor current consumption, max.			Air flow direction	Volume of air, min.	Sound pressure level L_{pA} (1 m) Motor + separately driven fan operation 50 Hz, tolerance + 3 dB
	A	A	A		m^3/s (ft^3/s)	dB
Forced ventilation	**230 V 1 AC/50 Hz (± 10 %)**	**230 V 1 AC/60 Hz (± 10 %)**	**265 V 1 AC/60 Hz (± 10 %)**			
1PH808	0.33 0.20	0.25 0.16	0.32 0.19	NDE → DE DE → NDE	0.02 (0.71)	70 [1]
Forced ventilation	**400 V 3 AC/50 Hz (± 10 %)**	**400 V 3 AC/60 Hz (± 10 %)**	**480 V 3 AC/60 Hz (± 10 %)**			
1PH810	0.08 0.10	0.07 0.08	0.11 0.11	NDE → DE DE → NDE	0.04 (1.41)	70 [1]
1PH813	0.11 0.10	0.13 0.12	0.13 0.12	NDE → DE DE → NDE	0.09 (3.18)	70 [1]
1PH816	0.16 0.16	0.21 0.21	0.21 0.21	NDE → DE DE → NDE	0.16 (5.65)	73 [1]
Forced ventilation (EC fan)	**380 V ... 480 V 3 AC/ 50 Hz, 60 Hz (± 10 %)**					
1PH818	1.1 ... 1.3	–	–	NDE → DE DE → NDE	0.17 (6.00)	73 [2]
1PH822	0.75 ... 0.9	–	–	NDE → DE DE → NDE	0.31 (10.95)	73 [2]
Forced ventilation	**380 V ... 480 V 3 AC/ 50 Hz, 60 Hz (± 10 %)**					
1PH828	0.75 ... 0.9	–	–	NDE → DE DE → NDE	0.31 (10.95)	74 [2]

Note: For separately driven fans, e.g. explosion protection (options **M03** and **M39**), the technical specifications may differ. Additional information on separately driven fans is provided in the current Configuration Manual.

You can find the Configuration Manual for SIMOTICS M-1PH8 for SINAMICS S120 at:

https://support.industry.siemens.com/cs/ww/en/view/109744012

[1] At rated pulse frequencies 2 kHz and speed ranges:
Forced ventilation (IP55 degree of protection):
1PH818 up to 5000 r/min
1PH822 up to 3500 r/min
1PH828 up to 3300 r/min
Forced ventilation (IP23 degree of protection):
1PH818 up to 3000 r/min
1PH822 up to 2000 r/min
1PH828 up to 2800 r/min

[2] At a rated pulse frequency of 4 kHz and a speed range up to 5000 r/min.

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Technical specifications

Cooling data and sound pressure level

Motor type	Flow volume, min.	Pressure drop	Water connection at the NDE Thread	Sound pressure level L_{pA} (1 m) Motor Tolerance + 3 dB
	l/min (US gal./min.)	bar	Inches	dB
Water cooling				
1PH808	6 (1.59)	0.6	G 1/8	68[1)]
1PH810	8 (2.11)	0.4	G 1/4	68[1)]
1PH813	12 (3.17)	0.9	G 3/8	68[1)]
1PH816	15 (3.96)	0.2	G 1/2	69[1)]
1PH8184	15 (3.96)	0.6	G 3/8	70[2)]
1PH8186	15 (3.96)	0.7	G 3/8	70[2)]
1PH822.-1 (asynchronous version)	20 (5.28)	0.6	G 3/8	70[2)]
1PH822.-2 (synchronous version)	25 (6.60)	0.9	G 3/8	70[3)]
1PH828	35 (9.25)	0.6	G 1/2	72[3)]

Water specification

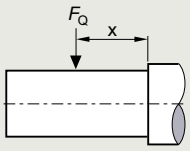
Cooling water quality	The values specified for the cooling water correspond to the requirements for a closed cooling circuit. Not all of the specified concentrations will occur in the cooling water at the same time. A filter can be installed to ensure fault-free operation. The filter fineness should be no less than 100 µm.	
Cooling water specifications	Quality of the water used as coolant for motors with stainless steel tubes + cast iron or steel jacket 1PH808 ... 1PH816	Quality of the water used as coolant for motors with stainless steel tubes 1PH818 ... 1PH828
pH value	6.0 ... 9.0	
Total hardness	< 170 ppm	
Conductivity	< 500 µS/cm	< 2000 µS/cm
Operating pressure, max.	< 6 bar	
Pressure drop at V(N)	< 1 bar	
Cooling water inlet temperature, max.	< 30 °C (86 °F)	
Frost protection / corrosion protection	20 ... 30 %	
NALCO 00GE056 inhibitor	0.2 ... 0.25 %	
Constituent elements		
Dissolved substances	< 340 ppm	
Particle size, max.	< 100 µm	
Chloride ions	< 40 ppm	< 250 ppm
Sulfate ions	< 50 ppm	< 240 ppm
Nitrate ions	< 50 ppm	

1) At a rated pulse frequency of 4 kHz and a speed range up to 5000 r/min.
2) At rated pulse frequencies 2 kHz or 4 kHz and speed ranges:
1PH818 up to 5000 r/min,
1PH822 up to 4500 r/min.
3) At rated pulse frequency 2 kHz and speed ranges:
1PH822 up to 4500 r/min,
1PH828 up to 3300 r/min.

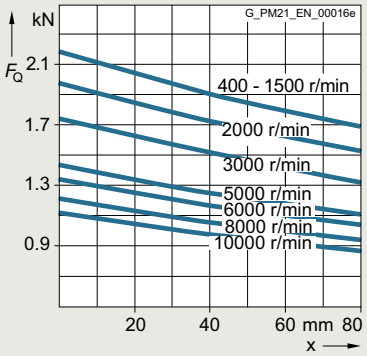
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Characteristic curves

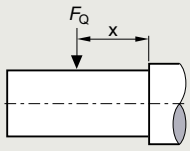
Permissible radial forces 1PH808 motors Standard and Standard with location bearing



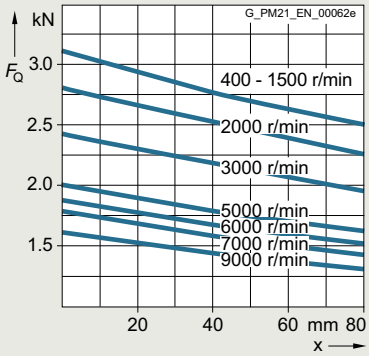
L_{10h} = 20000 h



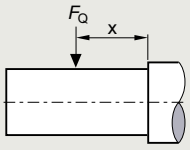
Permissible radial forces 1PH810 motors Standard and Standard with location bearing



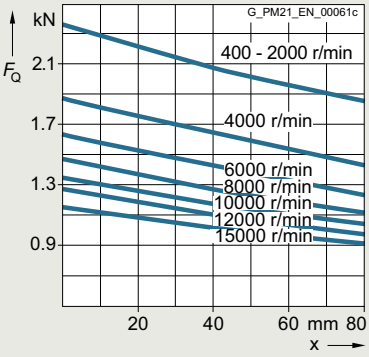
L_{10h} = 20000 h



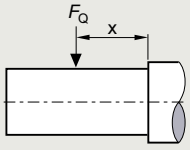
Permissible radial forces 1PH808 motors Performance



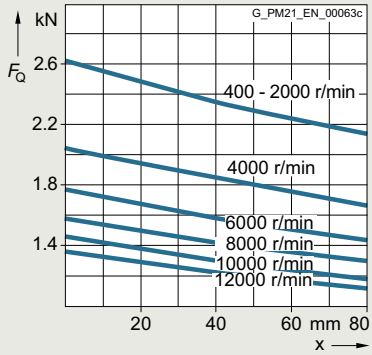
L_{10h} = 12000 h



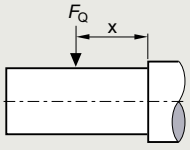
Permissible radial forces 1PH810 motors Performance



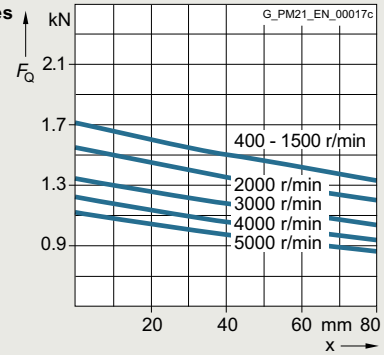
L_{10h} = 12000 h



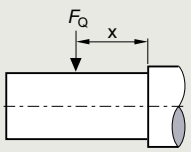
Permissible radial forces 1PH808 motors Advanced lifetime



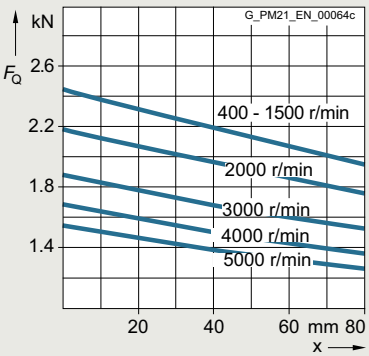
L_{10h} = 40000 h



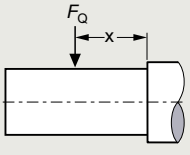
Permissible radial forces 1PH810 motors Advanced lifetime



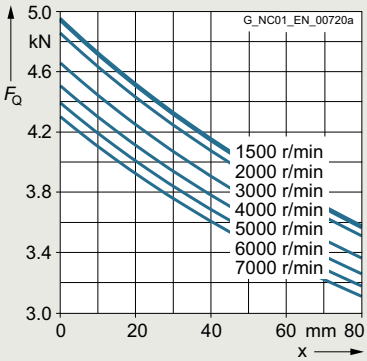
L_{10h} = 40000 h



Permissible radial forces 1PH810 motors with increased radial force. Minimal radial force: 0.5 kN (112 lb_f)



L_{10h} = 20000 h

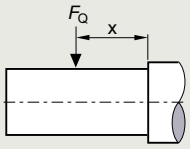


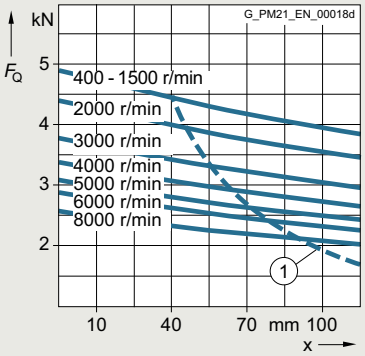
The roller bearings used here (bearings with increased radial force) could sustain damage if they are operated under no load. Observe the specified minimum radial forces. The permissible radial/axial forces can be found in the Configuration Manual.

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Characteristic curves

Permissible radial forces 1PH813 motors Standard and Standard with location bearing

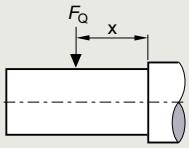


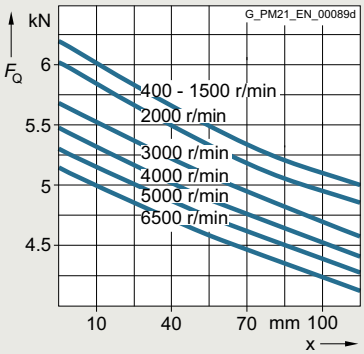


(1) Maximum load for 1PH7-compatible shaft end (42 x 110 mm (1.65 x 4.33 in)) (option V90)

L_{10h} = 20000 h

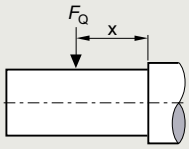
Permissible radial forces 1PH816 motors Standard and Standard with location bearing

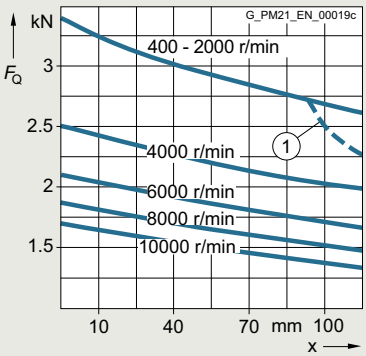




L_{10h} = 20000 h

Permissible radial forces 1PH813 motors Performance

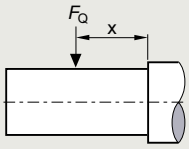


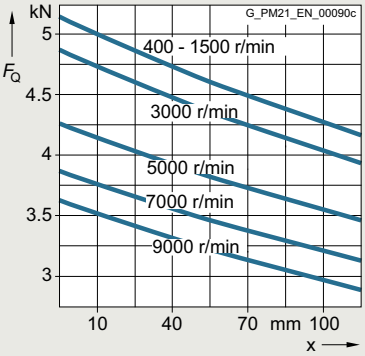


(1) Maximum load for 1PH7-compatible shaft end (42 x 110 mm (1.65 x 4.33 in)) (option V90)

L_{10h} = 12000 h

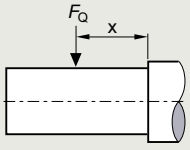
Permissible radial forces 1PH816 motors Performance

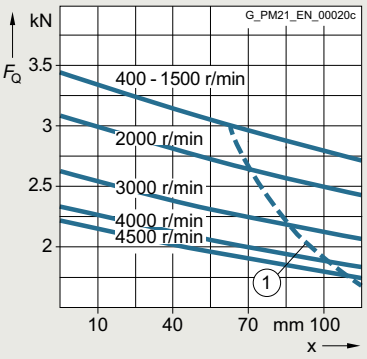




L_{10h} = 12000 h

Permissible radial forces 1PH813 motors Advanced lifetime

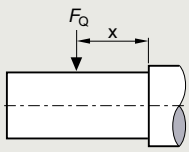


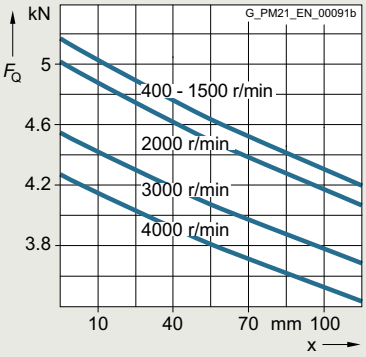


(1) Maximum load for 1PH7-compatible shaft end (42 x 110 mm (1.65 x 4.33 in)) (option V90)

L_{10h} = 40000 h

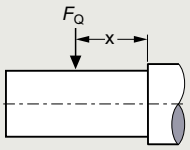
Permissible radial forces 1PH816 motors Advanced Lifetime



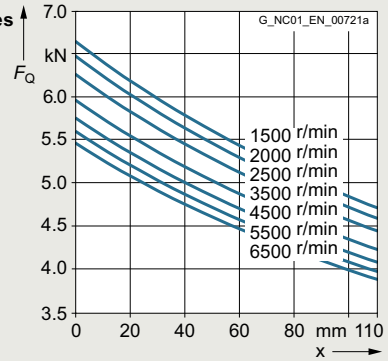


L_{10h} = 40000 h

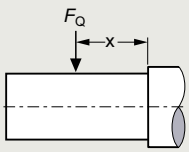
Permissible radial forces 1PH813 motors with increased radial force. Minimal radial force: 0.7 kN (157 lb_f)



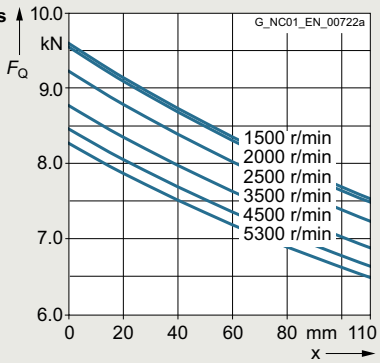
L_{10h} = 20000 h



Permissible radial forces 1PH816 motors with increased radial force. Minimal radial force: 1 kN (225 lb_f)



L_{10h} = 20000 h

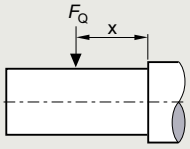


The roller bearings used here (bearings with increased radial force) could sustain damage if they are operated under no load. Observe the specified minimum radial forces. The permissible radial/axial forces can be found in the Configuration Manual.

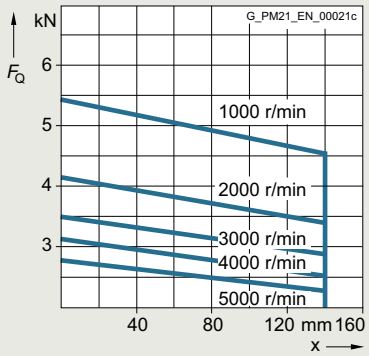
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Characteristic curves

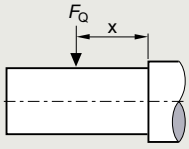
Permissible radial forces 1PH818 motors Standard with location bearing



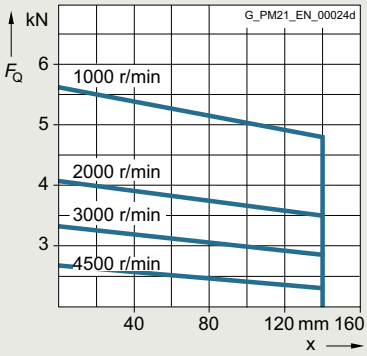
L_{10h} = 20000 h



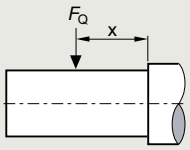
Permissible radial forces 1PH822 motors Standard with location bearing



L_{10h} = 20000 h

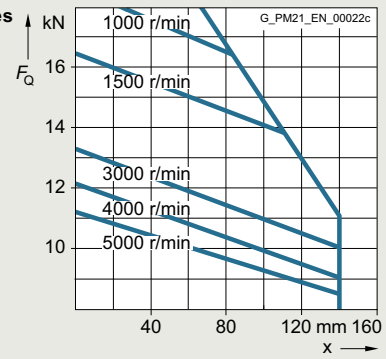


Permissible radial forces 1PH818 motors with increased radial force

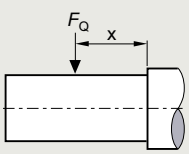


Minimum radial force 4 kN (899 lb_f)

L_{10h} = 12000 h

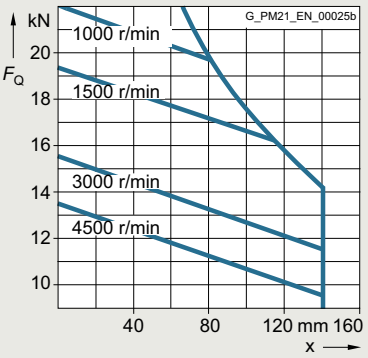


Permissible radial forces 1PH822 motors with increased radial force

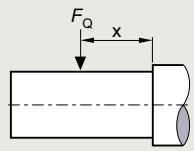


Minimum radial force 5 kN (1124 lb_f)

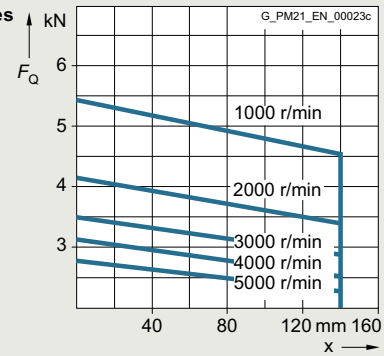
L_{10h} = 12000 h



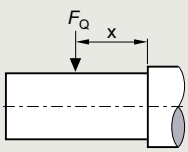
Permissible radial forces 1PH818 motors Performance



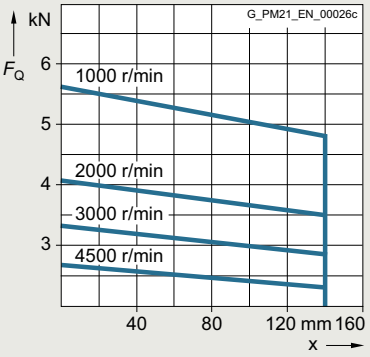
L_{10h} = 12000 h



Permissible radial forces 1PH822 motors Performance



L_{10h} = 12000 h

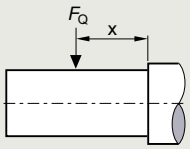


The roller bearings used here (bearings with increased radial force) could sustain damage if they are operated under no load. Observe the specified minimum radial forces. The permissible radial/axial forces can be found in the Configuration Manual.

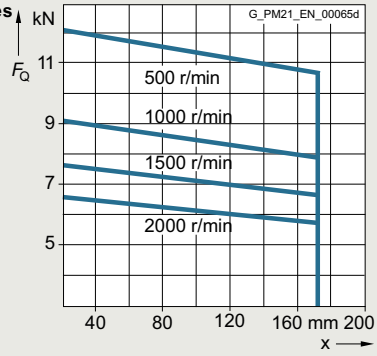
© Siemens 2026

Characteristic curves

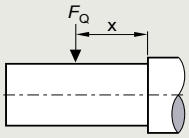
Permissible radial forces 1PH828 motors Standard with location bearing



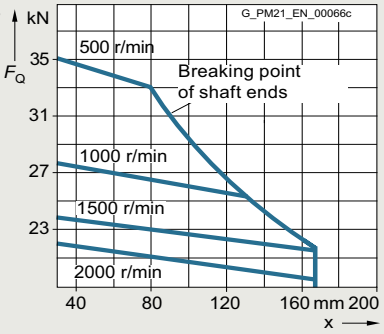
L_{10h} = 20000 h



Permissible radial forces 1PH828 motors with increased radial force



Minimum radial force 9 kN (2023 lb_f)



L_{10h} = 12000 h

The roller bearings used here (bearings with increased radial force) could sustain damage if they are operated under no load. Observe the specified minimum radial forces. The permissible radial/axial forces can be found in the Configuration Manual.

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Overview

Mounted holding brake for SIMOTICS M-1PH8 motors

A brake can be mounted on the DE of 1PH808 to 1PH822 motors.

These brakes are electromagnetic units for dry-running operation. An electromagnetic field is used to release the brake which is applied using spring force. They operate in accordance with the quiescent current principle, i.e. when no current is flowing, the spring-operated brake brakes and holds the drive. When current flows, the brake is released and the drive is free to rotate.

In the event of a voltage failure or an EMERGENCY STOP, the drive is braked from its current speed down to standstill.

Connection of the brakes (must be provided on the system side)

- Alternating voltage 230 V 1 AC, 50/60 Hz
- Direct voltage 24 V DC up to 1PH816

The brake control module is designed for an ambient temperature of -5 °C to +40 °C (23 °F to 104 °F).

The maximum speed of a motor with brake is limited to the maximum speed of the brake (refer to the table).

The holding brakes for 1PH818 and 1PH822 are not UL-approved. As a consequence, these motors do not have the cUR marking when mounted on brakes.

Brake selection for SIMOTICS M-1PH8 motors SH 180 and SH 225

For motors with holding brakes, two brake types are available, depending on the shaft height (SH 180 or SH 225):

Standard holding brake:

- 2HPB-30V
- 2HPB-40V

Performance holding brake:

- 4HPB-30V
- 4HPB-40S

As standard, the holding brake that ensures the braking power required for the respective motor is selected. This selection is made using the U64 option, which ensures that the appropriate standard holding brake type is installed.

If higher braking power is required for specific applications, the more powerful performance holding brake (U70) can be selected instead of the standard holding brake (U64).

Motor type	Brake type	Holding torque	Maximum speed	Moment of inertia	Weight	Coil current		Single operating energy, perm.	Total moment of inertia (EMERGENCY STOP)	Speed (EMERGENCY STOP)	Number of EMERGENCY STOPS[1]	Opening time	Closing time
		n_{max}	J_{Br}	m_{Br}	230 V AC ± 10 %	24 V DC ± 10 %	W_E	J_{tot}	n	z			
		Nm (lb_f-ft)	r/min	kgm^2 (lb_f-in-s^2)	kg (lb)	A	A	kJ	kgm^2 (lb_f-in-s^2)	r/min		ms	ms
1PH808	Size 13	29 (21.4)	5000	0.00093 (0.00823)	10 (22.1)	0.8	4.1	2.2	0.0174 (0.1540)	4800	2000	150	300
1PH810	Size 19	60 … 150 (44.3 … 111)	5000	0.0048 (0.0425)	21 (46.3)	1.0	4.7	7	0.063 (0.558)	4500	2000	500	500
1PH813	Size 24	140 … 310 (103 … 229)	4500	0.0141 (0.1248)	46 (101)	1.7	6.9	16	0.218 (1.930)	3600	2000	650	1000
1PH816	Size 29	280 … 500 (207 … 369)	4000	0.0266 (0.2354)	66 (146)	1.9	6.7	24	0.456 (4.036)	3100	2000	750	1100
1PH818	2HPB-30V	500 (369)	3500	0.01451 (0.1284)	62.3 (137)	1.37	–	79	1.3 (11.5)	3000	41	450	300[2]
1PH818	4HPB-30V	1000 (738)	3500	0.024667 (0.2183)	68.1 (150)	1.37	–	158	1.3 (11.5)	3000	20	450	250[2]
1PH822	2HPB-40V	1300 (959)	3100	0.0581 (0.5143)	125.7 (277)	1.93	–	187	3.9 (34.5)	2800	11	550	250[2]
1PH822	4HPB-40S	1600 (1180)	3100	0.0988 (0.8746)	141.2 (311)	1.93	–	275	3.9 (34.5)	2800	20	550	300[2]

Explanation of terms

Holding torque	For 1PH810 to 1PH816 motors, the holding torque can be continuously set in the specified value range using an adjustment ring. The dynamic braking torque is approximately 70 % of the set holding torque.
Single switching energy, perm. W_E	Permissible switching energy in the event of an EMERGENCY STOP, $W_E = J_{tot} \times n^2/182.4 \times 10^{-3}$ (J in kgm^2, n in r/min)
Service life switching energy W_{max}	Maximum possible brake switching energy (for EMERGENCY STOP) until the brake linings must be replaced, $W_{max} = W_E \times z$.
Number of EMERGENCY STOPS z	The specified number of EMERGENCY STOPS refers to the specified conditions. A conversion can be made for operation under different conditions: Number of EMERGENCY STOPS z = $W_{max}/W_{E\ factually}$
Coil current	Current to release the brake.
Opening time	Separating time until the brake releases (the specified values refer to the maximum braking torque and rated voltage).
Closing time	Application time until the brake closes (Values refer to the maximum braking torque and at rated voltage).

Note: You will find additional information on mounted holding brakes in the Configuration Manual.

1) Max. of 3 switching operations per hour

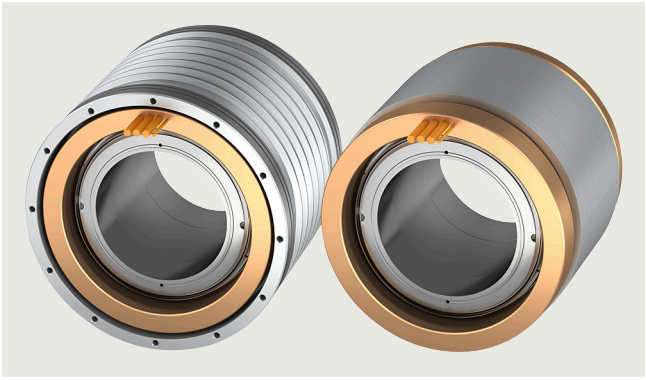
2) Closing times are only valid for 230 V AC power supply and with switching-off the DC-circuit. Important note: For powering off the AC-circuit, the closing times are considerably longer! Therefore, a DC-switching-off is recommended.

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Overview



SIMOTICS M-1FE1 synchronous built-in motors



SIMOTICS M-1FE2 built-in motors

The SIMOTICS M-1FE built-in motors are water-cooled synchronous motors that are supplied as stator and rotor components. When the stator and rotor have been mounted to the spindle in the spindle box, a complete spindle unit is created.

Benefits

- Compact and rigid spindle design
- Optimum heat dissipation through water cooling for optimum power density and precision
- Broad portfolio for almost all spindle sizes and machining tasks: Maximum speeds up to 40000 r/min, torques up to 1530 Nm in S1 operation
- High dynamic response for maximum productivity due to permanent-magnet rotors with low inertia
- Low rotor temperatures, especially in the low speed range, and low power loss in the rotor, resulting in reduced bearing temperature rise/spindle expansion
- The stator and rotor are machined **ready for installation** to facilitate quick and simple installation
- Highest accuracy and surface quality on the workpiece due to smooth, accurate spindle motion over the entire speed range
- Large rotor inner bore – advantage for spindle stiffness and ejector rod guide for automatic turning machines
- Compatible system of SINUMERIK, SINAMICS S120/S220 and motor, therefore fast commissioning is ensured

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SIMOTICS M-1FE synchronous built-in motors

Application

Water-cooled SIMOTICS M-1FE built-in motors are used in combination with the SINAMICS S120/S220 drive system for applications that require the highest quality of machining, accuracy and running smoothness, as well as very short acceleration times.

There are two main versions of SIMOTICS M-1FE built-in motor available:

- High Torque series
  6-pole/8-pole and 16-pole synchronous motors are available that have been developed for turning and grinding machines with moderate maximum speeds.
  These motors are characterized by a very high torque utilization. The speed control range (n_n : n_{max}) here is approximately 1:2 to 1:4.
- High Speed series
  This series has 4-pole synchronous motors for milling applications. These motors are optimized for high maximum speeds and a speed control range of up to 1:6.

Design

The SIMOTICS M-1FE built-in motor comprises:

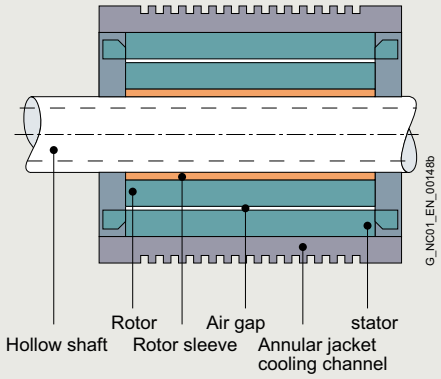
- A laminated, permanent-magnet rotor, which, as an option, can be designed with a sleeve for simple mounting and removal.
- A wound stator core with cooling jacket and encapsulated winding overhang
  - Free cable ends, length 0.5 m, 1.5 m and 3.5 m
  - Two integrated Pt1000 temperature sensors (of which 1 is reserve), optionally with full or universal protection
  - A cooling jacket into which the stator has been inserted

Rotor with sleeve

Torque is transmitted to the spindle mechanically with zero-backlash using a cylindrical stepped press fit. The rotor is mounted on the spindle by thermal shrinking.
The rotor with sleeve is pre-balanced and can be removed and subsequently remounted. The bond can be released by pressure-oil injection without affecting the joint surfaces.

Rotor without sleeve

Torque is transmitted to the spindle mechanically with zero-backlash using a cylindrical stepped press fit. The rotor is mounted on the spindle by thermal shrinking.
Removal of the rotor is not possible with this type of mounting. Rotors without sleeves are not pre-balanced.



Technical specifications

Product name	SIMOTICS M-1FE synchronous built-in motors
Machine type	Synchronous spindle with permanent-magnet rotor
Constant power range	1:2 ... 1:4 (6-/8-/16-pole)/ 1:4 ... 1:6 (4-pole)
Recommended coolant inlet temperature, approx.	25 °C (77 °F)
Standard protection temperature monitoring	2 × Pt1000 PTC thermistor in the stator winding, 1 of which is reserve
Full protection optional Application example: Machining at motor standstill	In addition to standard protection 3 × PTC thermistor triplet Can be evaluated, e.g. using a thermal motor protection unit: Article No.: 3RN2013-1GW30
Universal protection optional	Full protection + NTC PT3-51F + NTC K227
Stator winding insulation according to EN 60034-1 (IEC 60034-1)	Temperature class 155 (F) for a coolant inlet temperature of 25 °C (77 °F)
Type of construction (similar to ISO)	Individual components: Stator, rotor
Degree of protection according to IEC 60034-5	IP00
Balance quality of rotor according to ISO 1940-1	
• Rotor with sleeve	Version-specific - Pre-balanced, balancing quality G 2.5 reference speed 3600 r/min - Unbalanced for full balancing after assembly
• Rotor without sleeve	Non-balanced
Encoder system	(not included in scope of supply)
Motor connection	Free cable ends with length of 0.5/1.5/3.5 m (1.64/4.92/11.48 ft)
Rating plate	2 units, enclosed separately

A Voltage Protection Module VPM is required for certain motor types if they are operated at max. speed > $n_{max\ Inv}$.

Configuration

You can find the Configuration Manual for SIMOTICS M-1FE1 for SINAMICS S120 at:
https://support.industry.siemens.com/cs/ww/en/ps/21744/man

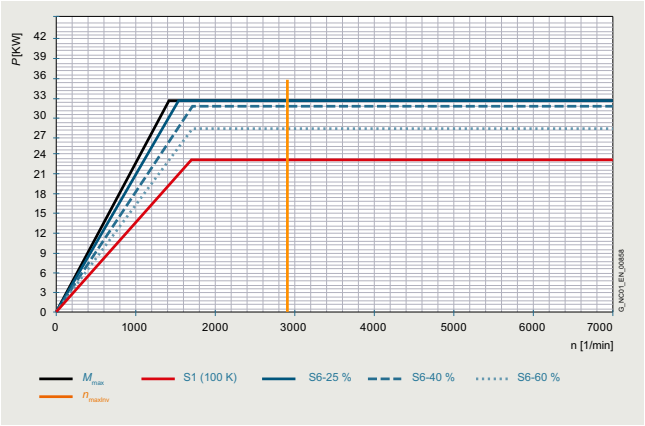
The compatibility list for SINAMICS S120/S220 Booksize Modules can be found at:
https://support.industry.siemens.com/cs/ww/en/view/109806050

The SINAMICS S220 Booksize power units along with the Motor Modules are available at:
https://support.industry.siemens.com/cs/ww/en/view/109803552

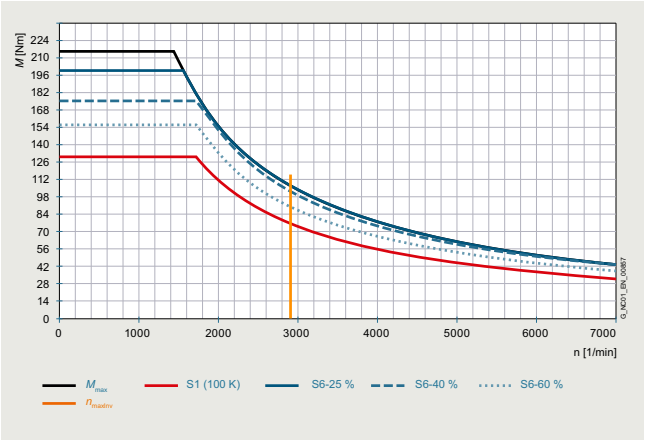
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Characteristic curves

Examples for power/torque characteristics for SIMOTICS M-1FE1084-6WU11 synchronous built-in motor



Power characteristic 1FE1084-6WU11



Torque characteristic 1FE1084-6WU11

Characteristics for the SIMOTICS motors are available via selectors through to the exact article number with the Siemens Product Configurator.

Access to the Siemens Product Configurator

The Siemens Product Configurator can be accessed without having to register or log in:

www.siemens.com/spc

→ SIMOTICS M-1FE1 in the SPC

→ SIMOTICS M-1FE2 in the SPC

More information

Liquid cooling

These are third-party products that are fundamentally suitable. It goes without saying that equivalent products from other manufacturers may be used. These recommendations are to be seen as helpful information, not as requirements or regulations. Siemens cannot accept any liability for the quality and properties/features of third-party products.

Please get in touch with the cooler manufacturers listed below for technical information.

ait-deutschland GmbH
www.kkt-chillers.com

BKW Kälte-Wärme-Versorgungstechnik GmbH
www.bkw-kuema.de

DELTATHERM Hirmer GmbH
www.deltatherm.com

Glen Dimplex Deutschland GmbH
Business unit RIEDEL cooling technology
www.riedel-kooling.com

Helmut Schimpke und Team Industriekühlanlagen GmbH + Co. KG
www.schimpke.de

Hydac System GmbH
www.hydac.com

Hyfra Industriekühlanlagen GmbH
www.hyfra.com

Lahntechnik GmbH
www.lahntechnik.com

Pfannenberg GmbH
www.pfannenberg.com

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SIMOTICS M-1FE1 synchronous built-in motors

Selection and ordering data

Rated power for duty type		Rated torque		Rated speed	Speed without VPM, max.	Speed, max.	SIMOTICS M-1FE1 synchronous built-in motors	Moment of inertia rotor without sleeve [8]	Weight, approx. stator + rotor without sleeve
P_N S1	S6-40 %	M_N S1	S6-40 %	n_N	$n_{max\ Inv}$	n_{max}		J	m
kW (hp)	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	r/min	r/min	r/min	Article No.	kgm^2 (lb_f-in-s^2)	kg (lb)
SIMOTICS M-1FE1 High Torque series – water cooling – ΔT = 105 K - line voltage 400 V 3 AC, operation with Active Line Module									
7.4 (9.9)	9.9 (13.3)	4.5 (3.3)	6 (4.43)	15800	18000	18000	**1FE1041-6WM ■ 0 - 6 B A ■**	0.00019 (0.002)	2.8 (6.2)
4 (5.36)	5.3 (7.1)	4.5 (3.3)	6 (4.43)	8500	13100	18000	**1FE1041-6WU ■ ■ - 6 B A ■**	0.00019 (0.002)	2.8 (6.2)
14.4 (19.3)	18.3 (24.5)	11 (8.11)	14 (10.3)	12500	18000	18000	**1FE1042-6WN ■ 0 - 6 B A ■**	0.00033 (0.003)	6.5 (14.3)
11.5 (15.4)	14.7 (19.7)	11 (8.11)	14 (10.3)	10000	15000	18000	**1FE1042-6WR ■ ■ - 6 B A ■**	0.00033 (0.003)	6.5 (14.3)
9.2 (12.3)	11.7 (15.7)	11 (8.11)	14 (10.3)	8000	12000	18000	**1FE1042-6WT ■ ■ - 6 B A ■**	0.00033 (0.003)	6.5 (14.3)
8.3 (11.1)	10.4 (13.9)	10 (7.38)	12.4 (9.1)	8000	15000	15000	**1FE1051-6WK ■ 0 - 6 B ■ ■**	0.00106 (0.009)	5.5 (12.1)
6.3 (8.4)	7.9 (10.6)	10 (7.38)	12.6 (9.3)	6000	12300	15000	**1FE1051-6WN ■ ■ - 6 B ■ ■**	0.00106 (0.009)	5.5 (12.1)
14 (18.8)	18 (24.1)	18 (13.3)	23 (17.0)	7500	15000	15000	**1FE1052-6WK ■ 0 - 6 B ■ ■**	0.00195 (0.017)	8.2 (18.1)
11.5 (15.4)	14.5 (19.4)	20 (14.8)	25.2 (18.6)	5500	12300	15000	**1FE1052-6WN ■ ■ - 6 B ■ ■**	0.00195 (0.017)	8.2 (18.1)
5.7 (7.6)	7.2 (9.7)	18 (13.3)	23 (17.0)	3000	6000	14200	**1FE1052-6WY ■ ■ - 6 B ■ ■**	0.00195 (0.017)	8.2 (18.1)
23 (30.8)	29 (38.9)	37 (27.3)	46 (33.9)	6000	12000	12000	**1FE1054-6WN ■ 0 - 6 B A ■**	0.0038 (0.034)	14.3 (31.5)
20.2 (27.1)	28.9 (38.8)	42 (31.0)	60 (44.3)	4600	8500	12000	**1FE1054-6WR ■ ■ - 6 B A ■**	0.0038 (0.034)	14.3 (31.5)
11.6 (15.6)	15 (20.1)	13 (9.59)	17 (12.5)	8500	12000	12000	**1FE1061-6WH ■ 0 - 6 B ■ ■**	0.00141 (0.012)	5.5 (12.1)
4.8 (6.4)	6.2 (8.3)	13 (9.59)	17 (12.5)	3500	6300	12000	**1FE1061-6WV ■ ■ - 6 B ■ ■**	0.00141 (0.012)	5.5 (12.1)
4 (5.36)	5.3 (7.1)	13 (9.59)	17 (12.5)	3000	5300	10500	**1FE1061-6WY ■ ■ - 6 B ■ ■**	0.00141 (0.012)	5.5 (12.1)
14 (18.8)	17 (22.8)	23 (17.0)	28 (20.7)	5800	9700	12000	**1FE1062-6WQ ■ 1 - 6 B A ■**	0.0028 (0.025)	7.7 (17.0)
25 (33.5)	36.5 (48.9)	56 (41.3)	81 (59.7)	4300	8000	12000	**1FE1064-6WN ■ 1 - 6 B A ■**	0.00553 (0.049)	14.5 (32.0)
20 (26.8)	29 (38.9)	56 (41.3)	81 (59.7)	3400	6300	10000	**1FE1064-6WQ ■ 1 - 6 B A ■**	0.00553 (0.049)	14.5 (32.0)
34 (45.6)	42.5 (57.0)	65 (47.9)	81 (59.7)	5000	8500	9000	**1FE1082-6WP ■ ■ - 6 B ■ ■**	0.01048 (0.093)	14 (30.9)
29.3 (39.3)	36.5 (48.9)	65 (47.9)	81 (59.7)	4300	7700	9000	**1FE1082-6WQ ■ 1 - 6 B ■ ■**	0.01048 (0.093)	14 (30.9)
24.5 (32.9)	30 (40.2)	65 (47.9)	81 (59.7)	3600	6000	9000	**1FE1082-6WS ■ ■ - 6 B ■ ■**	0.01048 (0.093)	14 (30.9)
15 (20.1)	18.7 (25.1)	65 (47.9)	81 (59.7)	2200	3800	9000	**1FE1082-6WW ■ 1 - 6 B ■ ■**	0.01048 (0.093)	14 (30.9)
11.6 (15.6)	14.4 (19.3)	65 (47.9)	81 (59.7)	1700	3100	8000	**1FE1082-6WE ■ 1 - 6 B ■ ■**	0.01048 (0.093)	14 (30.9)
35.5 (47.6)	46.5 (62.4)	97 (71.5)	127 (93.7)	3500	5600	9000	**1FE1083-6WP ■ ■ - 6 B ■ ■**	0.016 (0.142)	24 (52.9)
31 (41.6)	42 (56.3)	130 (95.9)	175 (129)	2300	3800	9000	**1FE1084-6WR ■ 1 - 6 B ■ ■**	0.02067 (0.183)	30 (66.2)
23.1 (31.0)	31.1 (41.7)	130 (95.9)	175 (129)	1700	2900	7000	**1FE1084-6WU ■ 1 - 6 B ■ ■**	0.02067 (0.183)	30 (66.2)
15 (20.1)	19 (25.5)	130 (95.9)	174 (128)	1100	1900	4500	**1FE1084-6WX ■ 1 - 6 B ■ ■**	0.02067 (0.183)	30 (66.2)
10 (13.4)	13.2 (17.7)	28 (20.7)	36 (26.6)	3500	7000	7000	**1FE1091-6WN ■ 0 - 6 B ■ ■**	0.00814 (0.072)	17 (37.5)
6.3 (8.4)	7.5 (10.1)	30 (22.1)	36 (26.6)	2000	4100	7000	**1FE1091-6WS ■ ■ - 6 B ■ ■**	0.00814 (0.072)	17 (37.5)
24.2 (32.5)	31 (41.6)	66 (48.7)	85 (62.7)	3500	7000	7000	**1FE1092-6WN ■ 0 - 6 B ■ ■**	0.01566 (0.139)	26 (57.3)
22 (29.5)	28.5 (38.2)	66 (48.7)	85 (62.7)	3200	5100	7000	**1FE1092-6WR ■ 1 - 6 B ■ ■**	0.01566 (0.139)	26 (57.3)
36.6 (49.1)	47 (63.0)	100 (73.8)	128 (94.4)	3500	7000	7000	**1FE1093-6WN ■ 0 - 6 B ■ ■**	0.02317 (0.205)	36 (79.4)
27.2 (36.5)	34 (45.6)	100 (73.8)	130 (95.9)	2600	4300	7000	**1FE1093-6WS ■ ■ - 6 B ■ ■**	0.02317 (0.205)	36 (79.4)
16.8 (22.5)	21.5 (28.8)	100 (73.8)	128 (94.4)	1600	3400	7000	**1FE1093-6WV ■ 1 - 6 B ■ ■**	0.02317 (0.205)	36 (79.4)
15 (20.1)	18 (24.1)	98 (72.3)	130 (95.9)	1460	2500	6300	**1FE1093-6WX ■ 1 - 6 B ■ ■**	0.02317 (0.205)	36 (79.4)

Article No. supplements

• Standard protection: 2 × Pt1000 [1] • Full protection: 2 × Pt1000 + 3 × PTC thermistor triplet [2] • Universal protection [3]	**1** **3** **5**					
• Operation without VPM module • Operation with VPM module		**0** **1**				
• Delivery of stator + rotor [1] [4] [5]			**6**			
• Stator with cooling jacket [1] [7]				**B**		
• Without rotor sleeve, d_i see dimensions table • With rotor sleeve, d^* see dimensions table (only for 1FE1061/1FE108/1FE109) • With rotor sleeve, d^{**} see dimensions table (only for 1FE1051/1FE1052/1FE108/1FE109) • With rotor sleeve, d^{**} see dimensions table (only for 1FE1082)					**A** **B** **C** **D**	
• Free cable ends, length 1.5 m (4.92 ft) [6] Cable outlet at larger outer diameter of cooling jacket Cable outlet at smaller outer diameter of cooling jacket						**0** **1**
• Free cable ends, length 0.5 m (1.64 ft) [6] Cable outlet at larger outer diameter of cooling jacket Cable outlet at smaller outer diameter of cooling jacket						**2** **3**

S1 = Continuous duty
S6 = Intermittent duty:
Type 1FE104/1FE105/1FE106/1FE1082: Duty cycle time 1 min
Type 1FE1084/1FE109: Duty cycle time 2 min

For footnotes, see next page.

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Motor type (repeated)	Rated current for duty type		Voltage Protection Module (VPM)	SINAMICS S120 Motor Module	
				Required rated current	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system
	I_N S1 A	S6-40 % A		I_N S1 to n_{max} A	Article No.
SIMOTICS M-1FE1 High Torque series – water cooling					
1FE1041-6WM...	13	17.5	–	24 [10]	**6SL3120-1TE22-4AD0**
1FE1041-6WU...	8	11	VPM 120	18 [10]	**6SL3120-■TE21-8AD0**
1FE1042-6WN...	24	32	–	45 [10]	**6SL3120-1TE24-5AC0**
1FE1042-6WR...	19	26	VPM 120	30 [10]	**6SL3120-1TE23-0AD0**
1FE1042-6WT...	16	22	VPM 120	24 [9) 10)]	**6SL3120-1TE22-0AD0**
1FE1051-6WK...	20	29	–	24 [10]	**6SL3120-1TE22-4AD0**
1FE1051-6WN...	15	22	VPM 120	18 [10]	**6SL3120-■TE21-8AD0**
1FE1052-6WK...	37	54	–	45 [10]	**6SL3120-1TE24-5AC0**
1FE1052-6WN...	30	44	VPM 120	30 [10]	**6SL3120-1TE23-0AD0**
1FE1052-6WY...	13.5	20	VPM 120	18	**6SL3120-■TE21-8AD0**
1FE1054-6WN...	60	88	–	60	**6SL3120-1TE26-0AC0**
1FE1054-6WR...	40	58	VPM 120	45 [9)]	**6SL3120-1TE24-5AC0**
1FE1061-6WH...	21	30	–	24	**6SL3120-1TE22-4AD0**
1FE1061-6WV...	9	13	VPM 120	9 [9)]	**6SL3120-1TE21-0AD0**
1FE1061-6WY...	8	11.5	VPM 120	9 [9)]	**6SL3120-1TE21-0AD0**
1FE1062-6WQ...	28.5	36	VPM 120	30 [9)]	**6SL3120-1TE23-0AD0**
1FE1064-6WN...	56	80	VPM 120	60 [9)]	**6SL3120-1TE26-0AC0**
1FE1064-6WQ...	43	61	VPM 120	45 [9)]	**6SL3120-1TE24-5AC0**
1FE1082-6WP...	65	91	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1082-6WQ...	60	84	VPM 120	60 [9)]	**6SL3120-1TE26-0AC0**
1FE1082-6WS...	45	62	VPM 120	45 [9)]	**6SL3120-1TE24-5AC0**
1FE1082-6WW...	30	42	VPM 120	30 [9)]	**6SL3120-1TE23-0AD0**
1FE1082-6WE...	24	33	VPM 120	24 [9)]	**6SL3120-1TE22-4AD0**
1FE1083-6WP...	66	92	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1084-6WR...	60	84	VPM 120	60 [9)]	**6SL3120-1TE26-0AC0**
1FE1084-6WU...	45	64	VPM 120	45 [9)]	**6SL3120-1TE24-5AC0**
1FE1084-6WX...	30	42	VPM 120	30 [9)]	**6SL3120-1TE23-0AD0**
1FE1091-6WN...	24	35	–	24	**6SL3120-1TE22-4AD0**
1FE1091-6WS...	15	19	VPM 120	18	**6SL3120-■TE21-8AD0**
1FE1092-6WN...	58	84	–	60	**6SL3120-1TE26-0AC0**
1FE1092-6WR...	41	58	VPM 120	45	**6SL3120-1TE24-5AC0**
1FE1093-6WN...	83	120	–	85	**6SL3120-1TE28-5AA3**
1FE1093-6WS...	53	76	VPM 120	60	**6SL3120-1TE26-0AC0**
1FE1093-6WV...	43	60	VPM 120	45	**6SL3120-1TE24-5AC0**
1FE1093-6WX...	30	45	VPM 120	30 [9)]	**6SL3120-1TE23-0AD0**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

1) Standard scope of supply: Encapsulated winding with 2 × Pt1000 (1 × reserve).
2) Full protection option, application example: Load at motor standstill, external tripping device required; Article No.: 3RN2013-1GW30.
3) Universal protection option: Full protection + NTC PT3-51F + NTC K227.
4) Ordering a spare stator: 1FE1…-…..-7.W.
5) Ordering a spare rotor: 1FE1…-…..-3W..
6) For cable design, see Configuration Manual.
7) Stator without cooling jacket on request.
8) For moment of inertia with sleeve, see Configuration Manual.
9) For operation without external VPM but with converter function IVP (Internal Voltage Protection), a larger Motor Module is required.
10) PWM clock cycle must be increased.

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SIMOTICS M-1FE1 synchronous built-in motors

Selection and ordering data

Rated power for duty type		Rated torque		Rated speed	Speed without VPM, max.	Speed, max.	SIMOTICS M-1FE1 synchronous built-in motors	Moment of inertia rotor without sleeve [8]	Weight, approx. stator + rotor without sleeve
P_N S1	S6-40 %	M_N S1	S6-40 %	n_N	$n_{max\ Inv}$	n_{max}		J	m
kW (hp)	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	r/min	r/min	r/min	Article No.	kgm^2 (lb_f-in-s^2)	kg (lb)
SIMOTICS M-1FE1 High Torque series – water cooling – ΔT = 105 K – line voltage 400 V 3 AC, operation with Active Line Module									
33 (44.3)	35 (46.9)	150 (111)	190 (140)	2100	3300	6500	**1FE1113-6WU ■ 1 - 6 B ■ ■**	0.047 (0.416)	53 (117)
22 (29.5)	24 (32.2)	150 (111)	190 (140)	1400	2300	5700	**1FE1113-6WX ■ 1 - 6 B ■ ■**	0.047 (0.416)	53 (117)
41.9 (56.2)	53.6 (71.9)	200 (148)	256 (189)	2000	4300	6500	**1FE1114-6WR ■ 1 - 6 B ■ ■**	0.06239 (0.552)	67 (148)
29.3 (39.3)	37.5 (50.3)	200 (148)	256 (189)	1400	3400	6500	**1FE1114-6WT ■ 1 - 6 B ■ ■**	0.06239 (0.552)	67 (148)
20.9 (28.0)	26.8 (35.9)	200 (148)	256 (189)	1000	2300	6000	**1FE1114-6WW ■ 1 - 6 B ■ ■**	0.06239 (0.552)	67 (148)
41.6 (55.8)	45 (60.3)	265 (195)	340 (251)	1500	2600	6500	**1FE1115-6WT ■ 1 - 6 B ■ ■**	0.078 (0.690)	81 (179)
29.1 (39.0)	30 (40.2)	265 (195)	340 (251)	1050	1800	4500	**1FE1115-6WW ■ 1 - 6 B ■ ■**	0.078 (0.690)	81 (179)
37.7 (50.6)	48.3 (64.8)	300 (221)	384 (283)	1200	2800	6500	**1FE1116-6WR ■ 1 - 6 B ■ ■**	0.09285 (0.822)	92 (203)
28.3 (38.0)	36.2 (48.5)	300 (221)	384 (283)	900	2200	5500	**1FE1116-6WT ■ 1 - 6 B ■ ■**	0.09285 (0.822)	92 (203)
22 (29.5)	28 (37.5)	300 (221)	384 (283)	700	1500	4000	**1FE1116-6WW ■ 1 - 6 B ■ ■**	0.09285 (0.822)	92 (203)
24 (32.2)	24 (32.2)	310 (229)	410 (302)	740	1100	3000	**1FE1116-6WY ■ 1 - 6 B ■ ■**	0.09285 (0.822)	92 (203)
61.3 (82.2)	78 (105)	325 (240)	440 (325)	1800	3200	8000	**1FE1143-8WM ■ 1 - 6 B A ■**	0.0859 (0.760)	74.4 (164.1)
38.5 (51.6)	47 (63.0)	320 (236)	440 (325)	1150	1900	5000	**1FE1143-8WQ ■ 1 - 6 B A ■**	0.0859 (0.760)	74.4 (164.1)
63 (84.5)	80 (107)	430 (317)	610 (450)	1400	2600	6500	**1FE1144-8WL ■ 1 - 6 B ■ ■**	0.1145 (1.013)	84.5 (186.3)
49.5 (66.4)	60 (80.5)	430 (317)	610 (450)	1100	2000	4900	**1FE1144-8WQ ■ 1 - 6 B ■ ■**	0.1145 (1.013)	84.5 (186.3)
40.5 (54.3)	51 (68.4)	430 (317)	610 (450)	900	1700	3800	**1FE1144-8WT ■ 1 - 6 B ■ ■**	0.1145 (1.013)	84.5 (186.3)
35.1 (47.1)	40 (53.6)	430 (317)	610 (450)	780	1400	3500	**1FE1144-8WV ■ 1 - 6 B ■ ■**	0.1145 (1.013)	84.5 (186.3)
104 (139)	124 (166) [10]	585 (431)	795 (586) [10]	1700	3100	8000	**1FE1145-8WN ■ 1 - 6 B ■ ■**	0.21636 (1.915) [9]	117 (258)
79.6 (106.7)	97 (130)	585 (431)	795 (586)	1300	2400	6000	**1FE1145-8WQ ■ 1 - 6 B ■ ■**	0.21636 (1.915) [9]	117 (258)
67.4 (90.4)	80 (107)	585 (431)	795 (586)	1100	1900	5000	**1FE1145-8WS ■ 1 - 6 B ■ ■**	0.21636 (1.915) [9]	117 (258)
48 (64.4)	52 (69.7)	585 (431)	795 (586)	780	1300	3500	**1FE1145-8WE ■ 1 - 6 B ■ ■**	0.21636 (1.915) [9]	117 (258)
103 (138)	124 (166) [10]	820 (605)	1110 (819) [10]	1200	2200	5500	**1FE1147-8WN ■ 1 - 6 B ■ ■**	0.28823 (2.551) [9]	155 (342)
81.6 (109.4)	97 (130)	820 (605)	1110 (819)	950	1700	4200	**1FE1147-8WQ ■ 1 - 6 B ■ ■**	0.28823 (2.551) [9]	155 (342)
64.4 (86.4)	80 (107)	820 (605)	1110 (819)	750	1400	3500	**1FE1147-8WS ■ 1 - 6 B ■ ■**	0.28823 (2.551) [9]	155 (342)

Article No. supplements

• Standard protection: 2 × Pt1000 [1]	1
• Full protection: 2 × Pt1000 + 3 × PTC thermistor triplet [2]	3
• Universal protection [3]	5
• Delivery of stator + rotor [1] [4] [5]	6
• Stator with cooling jacket [1] [7]	B
• Without rotor sleeve (only for 1FE111./1FE1143/1FE1144)	A
• With rotor sleeve, *d** see dimensions table (only for 1FE1114/1FE1116)	B
• With rotor sleeve, *d*** see dimensions table	C
• With rotor sleeve, *d*** see dimensions table (only for 1FE1113/1FE1145/1FE1147)	D
• With rotor sleeve, *d*** see dimensions table (only for 1FE1113/1FE1145)	E
• Free cable ends, length 1.5 m (4.92 ft) [6] Cable outlet at larger outer diameter of cooling jacket	0
Cable outlet at smaller outer diameter of cooling jacket	1
• Free cable ends, length 0.5 m (1.64 ft) [6] Cable outlet at larger outer diameter of cooling jacket	2
Cable outlet at smaller outer diameter of cooling jacket	3

S1 = Continuous duty
S6 = Intermittent duty:
Type 1FE111/1FE114: Duty cycle time 2 min

For footnotes, see next page.

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Motor type (repeated)	Rated current for duty type		Voltage Protection Module (VPM)	SINAMICS S120 Motor Module	
				Required rated current	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system
	I_N S1 A	S6-40 % A		I_N S1 to n_{max} A	Article No.
SIMOTICS M-1FE1 High Torque series – water cooling					
1FE1113-6WU...	60	91	VPM 120	60	**6SL3120-1TE26-0AC0**
1FE1113-6WX...	43	62	VPM 120	45	**6SL3120-1TE24-5AC0**
1FE1114-6WR...	108	159	VPM 120	132	**6SL3120-1TE31-3AA3**
1FE1114-6WT...	84	123	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1114-6WW...	58	85	VPM 120	60	**6SL3120-1TE26-0AC0**
1FE1115-6WT...	85	123	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1115-6WW...	60	87	VPM 120	60	**6SL3120-1TE26-0AC0**
1FE1116-6WR...	109	160	VPM 120	132	**6SL3120-1TE31-3AA3**
1FE1116-6WT...	84	123	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1116-6WW...	60	87	VPM 120	60	**6SL3120-1TE26-0AC0**
1FE1116-6WY...	45	65	VPM 120	45	**6SL3120-1TE24-5AC0**
1FE1143-8WM...	120	180	VPM 200	132	**6SL3120-1TE31-3AA3**
1FE1143-8WQ...	77	113	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1144-8WL...	133	193	VPM 200	200	**6SL3120-1TE32-0AA4**
1FE1144-8WQ...	100	146	VPM 200	132	**6SL3120-1TE31-3AA3**
1FE1144-8WT...	85	124	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1144-8WV...	71	103	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1145-8WN...	200	290 [10]	VPM 200	200	**6SL3120-1TE32-0AA4**
1FE1145-8WQ...	158	230	VPM 200	200	**6SL3120-1TE32-0AA4**
1FE1145-8WS...	130	188	VPM 200	132	**6SL3120-1TE31-3AA3**
1FE1145-8WE...	85	128	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1147-8WN...	200	290 [10]	VPM 200	200	**6SL3120-1TE32-0AA4**
1FE1147-8WQ...	158	230	VPM 200	200	**6SL3120-1TE32-0AA4**
1FE1147-8WS...	130	190	VPM 200	132	**6SL3120-1TE31-3AA3**

Motor Module: Single Motor Module	**1**

1) Standard scope of supply: Encapsulated winding with 2 × Pt1000 (1 × reserve).
2) Full protection option, application example: Load at motor standstill, external tripping device required; Article No.: 3RN2013-1GW30.
3) Universal protection option: Full protection + NTC PT3-51F + NTC K227.
4) Ordering a spare stator: 1FE1…-…..-7.W.
5) Ordering a spare rotor: 1FE1…-…..-3W..
6) For cable design, see Configuration Manual.
7) Stator without cooling jacket on request.
8) For moment of inertia with sleeve, see Configuration Manual.
9) Moment of inertia rotor with rotor sleeve, "C" in 15th data position of Article No.
10) Observe the Motor Module limit value.

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SIMOTICS M-1FE1 synchronous built-in motors

Selection and ordering data

Rated power for duty type		Rated torque		Rated speed	Speed without VPM, max.	Speed, max.	SIMOTICS M-1FE1 synchronous built-in motors	Moment of inertia rotor	Weight, approx. stator + rotor without sleeve
P_N		M_N		n_N	$n_{max\ Inv}$	n_{max}		J	m
S1	S6-40 %	S1	S6-40 %						
kW (hp)	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	r/min	r/min	r/min	Article No.	kgm^2 (lb_f-in-s^2)	kg (lb)
SIMOTICS M-1FE1 High Speed series – water cooling – ΔT = 105 K – line voltage 400 V 3 AC, operation with Active Line Module									
12.6 (16.9)	17.6 (23.6)	5 (3.69)	7 (5.16)	24000	40000	40000	**1FE1051-4HC ■ 0 - 6 B A ■**	0.00045 (0.004)	4.1 (9.0)
10 (13.4)	14 (18.8)	5 (3.69)	7 (5.16)	19000	34100	40000	**1FE1051-4HF ■ 1 - 6 B A ■**	0.00045 (0.004)	4.1 (9.0)
6.5 (8.7)	8 (10.7)	6.5 (4.8)	9 (6.64)	9500	17000	30000	**1FE1051-4WN ■ 1 - 6 B A ■**	0.00057 (0.005)	4.2 (9.3)
31.4 (42.1)	35 (46.9)	12 (8.85)	15 (11.1)	25000	40000	40000 [9]	**1FE1052-4HD ■ 0 - 6 B A ■**	0.00087 (0.008)	7.15 (15.77)
23.9 (32.0)	29.8 (40.0)	12 (8.85)	15 (11.1)	19000	32200	40000 [9]	**1FE1052-4HG ■ 1 - 6 B A ■**	0.00087 (0.008)	7.15 (15.77)
17.5 (23.5)	19 (25.5)	13 (9.59)	17 (12.5)	12500	20700	30000	**1FE1052-4WK ■ 1 - 6 B A ■**	0.00110 (0.010)	7.35 (16.21)
11 (14.8)	12 (16.1)	13 (9.59)	18 (13.3)	8000	13100	30000	**1FE1052-4WN ■ 1 - 6 B A ■**	0.00110 (0.010)	7.35 (16.21)
25.5 (34.2)	32.5 (43.6)	18 (13.3)	23 (17.0)	13500	23100	40000 [9]	**1FE1053-4HH ■ 1 - 6 B A ■**	0.00128 (0.011)	10.2 (22.5)
23 (30.8)	25 (33.5)	20 (14.8)	27 (19.9)	11000	14800	30000	**1FE1053-4WJ ■ 1 - 6 B A ■**	0.00163 (0.014)	10.5 (23.2)
16.5 (22.1)	18 (24.1)	20 (14.8)	27 (19.9)	7900	12800	30000	**1FE1053-4WN ■ 1 - 6 B A ■**	0.00163 (0.014)	10.5 (23.2)
28.5 (38.2)	28.5 (38.2)	28 (20.7)	40 (29.5)	9700	17500	24000	**1FE1072-4WH ■ 1 - 6 B A ■**	0.00287 (0.025)	11.2 (24.7)
20 (26.8)	20 (26.8)	28 (20.7)	40 (29.5)	6800	12600	24000	**1FE1072-4WL ■ 1 - 6 B A ■**	0.00287 (0.025)	11.2 (24.7)
16 (21.5)	16 (21.5)	28 (20.7)	40 (29.5)	5500	9900	24000	**1FE1072-4WN ■ 1 - 6 B A ■**	0.00287 (0.025)	11.2 (24.7)
7.3 (9.8)	8.5 (11.4)	28 (20.7)	40 (29.5)	2500	5100	12600	**1FE1072-4WV ■ 1 - 6 B A ■**	0.00287 (0.025)	11.2 (24.7)
45 (60.3)	45 (60.3)	44 (32.5)	67 (49.4)	9700	14800	24000	**1FE1073-4WL ■ 1 - 6 B A ■**	0.0043 (0.038)	16 (35.3)
30 (40.2)	30 (40.2)	42 (31.0)	59 (43.5)	6800	11800	24000	**1FE1073-4WN ■ 1 - 6 B A ■**	0.0043 (0.038)	16 (35.3)
15 (20.1)	15 (20.1)	45 (33.2)	64 (47.2)	3200	5500	14000	**1FE1073-4WT ■ 1 - 6 B A ■**	0.0043 (0.038)	16 (35.3)
48 (64.4)	51 (68.4)	60 (44.3)	86 (63.4)	7700	13400	20000	**1FE1074-4WM ■ 1 - 6 B A ■**	0.00573 (0.051)	21 (46.3)
41 (55.0)	41 (55.0)	56 (41.3)	79 (58.3)	7000	12300	20000	**1FE1074-4WN ■ 1 - 6 B A ■**	0.00573 (0.051)	21 (46.3)
30 (40.2)	33 (44.3)	60 (44.3)	85 (62.7)	4800	8200	20000	**1FE1074-4WR ■ 1 - 6 B A ■**	0.00573 (0.051)	21 (46.3)
25.8 (34.6)	28 (37.5)	60 (44.3)	85 (62.7)	4100	7200	18000	**1FE1074-4WT ■ 1 - 6 B A ■**	0.00573 (0.051)	21 (46.3)
23.9 (32.0)	25 (33.5)	60 (44.3)	80 (59.0)	3800	6300	15500	**1FE1074-4WV ■ 1 - 6 B A ■**	0.00573 (0.051)	21 (46.3)
23.6 (31.6)	27 (36.2)	75 (55.3)	100 (73.8)	3000	5700	14000	**1FE1075-4WQ ■ 1 - 6 B A ■**	0.00741 (0.066)	25.5 (56.2)
33 (44.3)	37 (49.6)	42 (31.0)	55 (40.6)	7500	16500	20000	**1FE1082-4WF ■ 1 - 6 B A ■**	0.00559 (0.049)	15.1 (33.3)
24.5 (32.9)	24.5 (32.9)	42 (31.0)	55 (40.6)	5600	10700	20000	**1FE1082-4WK ■ 1 - 6 B A ■**	0.00559 (0.049)	15.1 (33.3)
15.5 (20.8)	15.5 (20.8)	42 (31.0)	55 (40.6)	3500	7800	20000	**1FE1082-4WN ■ 1 - 6 B A ■**	0.00559 (0.049)	15.1 (33.3)
12 (16.1)	12 (16.1)	42 (31.0)	55 (40.6)	2700	5900	15000	**1FE1082-4WP ■ 1 - 6 B A ■**	0.00559 (0.049)	15.1 (33.3)
8.8 (11.8)	8.8 (11.8)	42 (31.0)	55 (40.6)	2000	4500	11000	**1FE1082-4WR ■ 1 - 6 B A ■**	0.00559 (0.049)	15.1 (33.3)
28 (37.5)	28 (37.5)	63 (46.5)	83 (61.2)	4200	9600	20000	**1FE1083-4WN ■ 1 - 6 B A ■**	0.00847 (0.075)	22 (48.5)
38 (51.0)	38 (51.0)	84 (62.0)	110 (81.1)	4300	9800	20000	**1FE1084-4WN ■ 1 - 6 B A ■**	0.01118 (0.099)	28.5 (62.8)
35 (46.9)	35 (46.9)	78 (57.5)	110 (81.1)	4300	8200	20000	**1FE1084-4WP ■ 1 - 6 B A ■**	0.01118 (0.099)	28.5 (62.8)
30 (40.2)	30 (40.2)	84 (62.0)	110 (81.1)	3400	7600	18000	**1FE1084-4WQ ■ 1 - 6 B A ■**	0.01118 (0.099)	28.5 (62.8)
26.4 (35.4)	26.4 (35.4)	84 (62.0)	110 (81.1)	3000	5900	15000	**1FE1084-4WT ■ 1 - 6 B A ■**	0.01118 (0.099)	28.5 (62.8)
22.9 (30.7)	23 (30.8)	84 (62.0)	110 (81.1)	2600	4900	12000	**1FE1084-4WV ■ 1 - 6 B A ■**	0.01118 (0.099)	28.5 (62.8)
38 (51.0)	38 (51.0)	105 (77.4)	138 (102)	3500	7700	18000	**1FE1085-4WN ■ 1 - 6 B A ■**	0.01388 (0.123)	35 (77.2)
33 (44.3)	33 (44.3)	105 (77.4)	140 (103)	3000	6500	16000	**1FE1085-4WQ ■ 1 - 6 B A ■**	0.01388 (0.123)	35 (77.2)
24 (32.2)	24 (32.2)	105 (77.4)	140 (103)	2200	4700	12000	**1FE1085-4WT ■ 1 - 6 B A ■**	0.01388 (0.123)	35 (77.2)

Article No. supplements

• Standard protection: 2 × Pt1000 [1]	1
• Full protection: 2 × Pt1000 + 3 × PTC thermistor triplet [2]	3
• Universal protection [3]	5
• Operation without VPM module	0
• Operation with VPM module	1
• Delivery of stator + rotor [1] [4] [5]	6
• Stator with cooling jacket [1] [7]	B
• Without rotor sleeve	A
• Free cable ends, length 1.5 m (4.92 ft) [6] Cable outlet at larger outer diameter of cooling jacket	0
Cable outlet at smaller outer diameter of cooling jacket	1
• Free cable ends, length 0.5 m (1.64 ft) [6] Cable outlet at larger outer diameter of cooling jacket	2
Cable outlet at smaller outer diameter of cooling jacket	3

S1 = Continuous duty
S6 = Intermittent duty:
Type 1FE105/1FE107: Duty cycle time 1 min
Type 1FE108: Duty cycle time 2 min

For footnotes, see next page.

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Motor type (repeated)	Rated current for duty type		Voltage Protection Module (VPM)	SINAMICS S120 Motor Module	
				Required rated current	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system
	I_N			I_N	
	S1	S6-40 %		S1 to n_{max}	
	A	A		A	Article No.
SIMOTICS M-1FE1 High Speed series – water cooling					
1FE1051-4HC...	25	34.5	–	45 [8]	**6SL3120-1TE24-5AC0**
1FE1051-4HF...	21	29	VPM 120	45 [8]	**6SL3120-1TE24-5AC0**
1FE1051-4WN...	12	17	VPM 120	18 [8]	**6SL3120-1TE21-8AD0**
1FE1052-4HD...	57	75	–	132 [8]	**6SL3120-1TE31-3AA3**
1FE1052-4HG...	44	59	VPM 120	85 [8]	**6SL3120-1TE28-5AA3**
1FE1052-4WK...	30	39	VPM 120	45 [8]	**6SL3120-1TE24-5AC0**
1FE1052-4WN...	20	26	VPM 120	30 [8]	**6SL3120-1TE23-0AD0**
1FE1053-4HH...	46	63	VPM 120	85 [8]	**6SL3120-1TE28-5AA3**
1FE1053-4WJ...	36	49	VPM 120	45 [8]	**6SL3120-1TE24-5AC0**
1FE1053-4WN...	29	38	VPM 120	45 [8]	**6SL3120-1TE24-5AC0**
1FE1072-4WH...	64	96	VPM 120	85 [8]	**6SL3120-1TE28-5AA3**
1FE1072-4WL...	45	68	VPM 120	45	**6SL3120-1TE24-5AC0**
1FE1072-4WN...	36	54	VPM 120	45	**6SL3120-1TE24-5AC0**
1FE1072-4WV...	18	26.5	VPM 120	18	**6SL3120-1TE21-8AD0**
1FE1073-4WL...	83	124	VPM 120	132 [8]	**6SL3120-1TE31-3AA3**
1FE1073-4WN...	65	97	VPM 120	85 [8]	**6SL3120-1TE28-5AA3**
1FE1073-4WT...	30	44	VPM 120	30	**6SL3120-1TE23-0AD0**
1FE1074-4WM...	97	144	VPM 120	132	**6SL3120-1TE31-3AA3**
1FE1074-4WN...	91	136	VPM 120	132	**6SL3120-1TE31-3AA3**
1FE1074-4WR...	58	85	VPM 120	60	**6SL3120-1TE26-0AC0**
1FE1074-4WT...	53	77	VPM 120	60	**6SL3120-1TE26-0AC0**
1FE1074-4WV...	45	66	VPM 120	45	**6SL3120-1TE24-5AC0**
1FE1075-4WQ...	51	75	VPM 120	60	**6SL3120-1TE26-0AC0**
1FE1082-4WF...	81	115	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1082-4WK...	55	78	VPM 120	60	**6SL3120-1TE26-0AC0**
1FE1082-4WN...	42	60	VPM 120	45	**6SL3120-1TE24-5AC0**
1FE1082-4WP...	30	43	VPM 120	30	**6SL3120-1TE23-0AD0**
1FE1082-4WR...	24	34	VPM 120	24	**6SL3120-1TE22-4AD0**
1FE1083-4WN...	77	110	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1084-4WN...	105	150	VPM 120	132	**6SL3120-1TE31-3AA3**
1FE1084-4WP...	79	120	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1084-4WQ...	83	119	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1084-4WT...	60	85	VPM 120	60	**6SL3120-1TE26-0AC0**
1FE1084-4WV...	50	71	VPM 120	60	**6SL3120-1TE26-0AC0**
1FE1085-4WN...	105	150	VPM 120	132	**6SL3120-1TE31-3AA3**
1FE1085-4WQ...	85	120	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1085-4WT...	60	85	VPM 120	60	**6SL3120-1TE26-0AC0**

Motor Module: Single Motor Module	**1**

1) Standard scope of supply: Encapsulated winding with 2 × Pt1000 (1 × reserve).
2) Full protection option, application example: Load at motor standstill, external tripping device required; Article No.: 3RN2013-1GW30.
3) Universal protection option: Full protection + NTC PT3-51F + NTC K227.
4) Ordering a spare stator: 1FE1…-…..-7.W.
5) Ordering a spare rotor: 1FE1…-…..-3W..
6) For cable design, see Configuration Manual.
7) Stator without cooling jacket on request.
8) PWM clock cycle must be increased.
9) Series reactor required, see Configuration Manual.

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SIMOTICS M-1FE1 synchronous built-in motors

Selection and ordering data

Rated power for duty type		Rated torque		Rated speed	Speed without VPM, max.	Speed, max.	SIMOTICS M-1FE1 synchronous built-in motors	Moment of inertia rotor	Weight, approx. stator + rotor without sleeve
P_N		M_N		n_N	$n_{max\ Inv}$	n_{max}		J	m
S1	S6-40 %	S1	S6-40 %						
kW (hp)	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	r/min	r/min	r/min	Article No.	kgm^2 (lb_f-in-s^2)	kg (lb)
SIMOTICS M-1FE1 High Speed series – water cooling – ΔT = 105 K – line voltage 400 V 3 AC, operation with Active Line Module									
16 (21.5)	16 (21.5)	45 (33.2)	60 (44.3)	3400	7300	18000	**1FE1092-4WP ■ 1 - 6 B R ■**	0.00916 (0.081) [8]	30 (66.2)
10.5 (14.1)	10.5 (14.1)	50 (36.9)	64 (47.2)	2000	4100	10000	**1FE1092-4WV ■ 1 - 6 B R ■**	0.00916 (0.081) [8]	30 (66.2)
35.3 (47.3)	35 (46.9)	75 (55.3)	103 (76.0)	4500	9500	18000	**1FE1093-4WH ■ 1 - 6 B ■ ■**	0.01350 (0.119) [8]	41.6 (91.7)
27.5 (36.9)	27.5 (36.9)	75 (55.3)	103 (76.0)	3500	7200	18000	**1FE1093-4WM ■ 1 - 6 B ■ ■**	0.01350 (0.119) [8]	41.6 (91.7)
26 (34.9)	26 (34.9)	75 (55.3)	103 (76.0)	3300	6800	16000	**1FE1093-4WN ■ 1 - 6 B ■ ■**	0.01350 (0.119) [8]	41.6 (91.7)
46 (61.7)	46 (61.7)	100 (73.8)	137 (101)	4400	9200	18000	**1FE1094-4WK ■ 1 - 6 B ■ ■**	0.01808 (0.160) [8]	48.5 (106.9)
40 (53.6)	40 (53.6)	100 (73.8)	137 (101)	3800	7600	18000	**1FE1094-4WL ■ 1 - 6 B ■ ■**	0.01808 (0.160) [8]	48.5 (106.9)
26 (34.9)	26 (34.9)	100 (73.8)	125 (92.2)	2500	5100	13000	**1FE1094-4WS ■ 1 - 6 B ■ ■**	0.01808 (0.160) [8]	48.5 (106.9)
18 (24.1)	18 (24.1)	95 (70.1)	119 (87.8)	1800	3900	10000	**1FE1094-4WU ■ 1 - 6 B ■ ■**	0.01808 (0.160) [8]	48.5 (106.9)
46 (61.7)	46 (61.7)	125 (92.2)	171 (126)	3500	7300	18000	**1FE1095-4WN ■ 1 - 6 B ■ ■**	0.02242 (0.198) [8]	56.8 (125.2)
52 (69.7)	52 (69.7)	150 (111)	206 (152)	3300	6800	16000	**1FE1096-4WN ■ 1 - 6 B ■ ■**	0.02700 (0.239) [8]	64.2 (141.6)
38.5 (51.6)	45 (60.3)	102 (75.2)	142 (105)	3600	7200	16000	**1FE1103-4WN ■ 1 - 6 B A ■**	0.01589 (0.141)	34 (75.0)
35 (46.9)	38 (51.0)	100 (73.8)	130 (95.9)	3300	6200	15000	**1FE1103-4WQ ■ 1 - 6 B A ■**	0.01589 (0.141)	34 (75.0)
26 (34.9)	29 (38.9)	100 (73.8)	130 (95.9)	2500	4700	12000	**1FE1103-4WT ■ 1 - 6 B A ■**	0.01589 (0.141)	34 (75.0)
75 (101)	75 (101)	136 (100)	175 (129)	5300	9300	16000	**1FE1104-4WL ■ 1 - 6 B A ■**	0.02098 (0.186)	42.5 (93.7)
54 (72.4)	64 (85.8)	136 (100)	189 (139)	3800	7700	16000	**1FE1104-4WN ■ 1 - 6 B A ■**	0.02098 (0.186)	42.5 (93.7)
53.4 (71.6)	64 (85.8)	170 (125)	236 (174)	3000	6100	16000	**1FE1105-4WN ■ 1 - 6 B A ■**	0.02608 (0.231)	52 (115)
46.3 (62.1)	55 (73.8)	170 (125)	230 (170)	2600	4900	12200	**1FE1105-4WQ ■ 1 - 6 B A ■**	0.02608 (0.231)	52 (115)
41 (55.0)	44 (59.0)	170 (125)	230 (170)	2300	4300	10500	**1FE1105-4WS ■ 1 - 6 B A ■**	0.02608 (0.231)	52 (115)
72.6 (97.4)	85 (114)	204 (150)	283 (209)	3400	6900	16000	**1FE1106-4WN ■ 1 - 6 B A ■**	0.03147 (0.279)	61.5 (135.6)
62 (83.1)	66 (88.5)	204 (150)	270 (199)	2900	5400	14000	**1FE1106-4WR ■ 1 - 6 B A ■**	0.03147 (0.279)	61.5 (135.6)
56.5 (75.8)	60 (80.5)	200 (148)	270 (199)	2700	5100	12500	**1FE1106-4WS ■ 1 - 6 B A ■**	0.03147 (0.279)	61.5 (135.6)
25 (33.5)	30 (40.2)	200 (148)	270 (199)	1200	2500	6000	**1FE1106-4WY ■ 1 - 6 B A ■**	0.03147 (0.279)	61.5 (135.6)
63 (84.5)	75 (101)	200 (148)	275 (203)	3000	6100	14000	**1FE1124-4WN ■ 1 - 6 B A ■**	0.05112 (0.452)	62.6 (138.0)
52.4 (70.3)	55.9 (75.0)	200 (148)	275 (203)	2500	4900	12000	**1FE1124-4WQ ■ 1 - 6 B A ■**	0.05112 (0.452)	62.6 (138.0)
78.5 (105.3)	90 (121)	250 (184)	345 (254)	3000	5800	14000	**1FE1125-4WN ■ 1 - 6 B A ■**	0.06337 (0.561)	76 (168)
65.5 (87.8)	82 (110)	250 (184)	345 (254)	2500	5300	12500	**1FE1125-4WP ■ 1 - 6 B A ■**	0.06337 (0.561)	76 (168)
57.6 (77.2)	65 (87.2)	250 (184)	345 (254)	2200	4200	10000	**1FE1125-4WQ ■ 1 - 6 B A ■**	0.06337 (0.561)	76 (168)
94 (126)	112 (150) [9]	300 (221)	410 (302) [9]	3000	6100	14000	**1FE1126-4WN ■ 1 - 6 B A ■**	0.07604 (0.673)	90 (198)
78.5 (105.3)	100 (134) [9]	300 (221)	410 (302) [9]	2500	5400	12500	**1FE1126-4WP ■ 1 - 6 B A ■**	0.07604 (0.673)	90 (198)
63 (84.5)	82 (110)	300 (221)	410 (302)	2000	4400	10000	**1FE1126-4WQ ■ 1 - 6 B A ■**	0.07604 (0.673)	90 (198)

Article No. supplements

• Standard protection: 2 × Pt1000 [1]	1
• Full protection: 2 × Pt1000 + 3 × PTC thermistor triplet [2]	3
• Universal protection [3]	5
• Delivery of stator + rotor [1] [4] [5]	6
• Stator with cooling jacket [1] [7]	B
• Without rotor sleeve	A
• Without rotor sleeve, d_i = 80 mm (3.15 in) only for 1FE109.-4W...	R
• Free cable ends, length 1.5 m (4.92 ft) [6]	
Cable outlet at larger outer diameter of cooling jacket	0
Cable outlet at smaller outer diameter of cooling jacket	1
• Free cable ends, flexible, length 0.5 m (1.64 ft) [6]	
Cable outlet at larger outer diameter of cooling jacket	2
Cable outlet at smaller outer diameter of cooling jacket	3

S1 = Continuous duty
S6 = Intermittent duty:
Type 1FE109/1FE110/1FE112: Duty cycle time 2 min

For footnotes, see next page.

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Motor type (repeated)	Rated current for duty type		Voltage Protection Module (VPM)	SINAMICS S120 Motor Module	
				Required rated current	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system
	I_N S1 A	S6-40 % A		I_N S1 to n_{max} A	Article No.
SIMOTICS M-1FE1 High Speed series – water cooling					
1FE1092-4WP...	41	58	VPM 120	45	**6SL3120-1TE24-5AC0**
1FE1092-4WV...	24	35	VPM 120	24	**6SL3120-1TE22-4AD0**
1FE1093-4WH...	83	120	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1093-4WM...	64	92	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1093-4WN...	60	86	VPM 120	60	**6SL3120-1TE26-0AC0**
1FE1094-4WK...	108	156	VPM 120	132	**6SL3120-1TE31-3AA3**
1FE1094-4WL...	90	130	VPM 120	132	**6SL3120-1TE31-3AA3**
1FE1094-4WS...	60	85	VPM 120	60	**6SL3120-1TE26-0AC0**
1FE1094-4WU...	45	64	VPM 120	45	**6SL3120-1TE24-5AC0**
1FE1095-4WN...	108	156	VPM 120	132	**6SL3120-1TE31-3AA3**
1FE1096-4WN...	120	173	VPM 120	132	**6SL3120-1TE31-3AA3**
1FE1103-4WN...	84	127	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1103-4WQ...	68	98	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1103-4WT...	53	75	VPM 120	60	**6SL3120-1TE26-0AC0**
1FE1104-4WL...	140	200	VPM 200	200	**6SL3120-1TE32-0AA4**
1FE1104-4WN...	120	181	VPM 200	132	**6SL3120-1TE31-3AA3**
1FE1105-4WN...	120	180	VPM 200	132	**6SL3120-1TE31-3AA3**
1FE1105-4WQ...	95	135	VPM 120	132	**6SL3120-1TE31-3AA3**
1FE1105-4WS...	84	120	VPM 120	85	**6SL3120-1TE28-5AA3**
1FE1106-4WN...	159	240	VPM 200	200	**6SL3120-1TE32-0AA4**
1FE1106-4WR...	128	184	VPM 200	132	**6SL3120-1TE31-3AA3**
1FE1106-4WS...	120	170	VPM 200	132	**6SL3120-1TE31-3AA3**
1FE1106-4WY...	60	85	VPM 200	60	**6SL3120-1TE26-0AC0**
1FE1124-4WN...	135	198	VPM 200	200	**6SL3120-1TE32-0AA4**
1FE1124-4WQ...	110	162	VPM 200	132	**6SL3120-1TE31-3AA3**
1FE1125-4WN...	162	240	VPM 200	200	**6SL3120-1TE32-0AA4**
1FE1125-4WP...	147	215	VPM 200	200	**6SL3120-1TE32-0AA4**
1FE1125-4WQ...	116	169	VPM 200	132	**6SL3120-1TE31-3AA3**
1FE1126-4WN...	200	295 [9]	VPM 200	200	**6SL3120-1TE32-0AA4**
1FE1126-4WP...	180	265 [9]	VPM 200	200	**6SL3120-1TE32-0AA4**
1FE1126-4WQ...	147	215	VPM 200	200	**6SL3120-1TE32-0AA4**

Motor Module: Single Motor Module	**1**

[1] Standard scope of supply: Encapsulated winding with 2 × Pt1000 (1 × reserve).
[2] Full protection option, application example: Load at motor standstill, external tripping device required; Article No.: 3RN2013-1GW30.
[3] Universal protection option: Full protection + NTC PT3-51F + NTC K227.
[4] Ordering a spare stator: 1FE1…-…..-7.W.
[5] Ordering a spare rotor: 1FE1…-…..-3W..
[6] For cable design, see Configuration Manual.
[7] Stator without cooling jacket on request.
[8] For moment of inertia for version R without rotor sleeve d_i = 80 mm (3.15 in), see Configuration Manual.
[9] Observe the Motor Module limit value.

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SIMOTICS M-1FE2 synchronous built-in motors

Selection and ordering data

Rated power for duty type		Rated torque	Torque at low speeds for duty type	Rated speed	Speed without VPM, max.	Speed, max.	**SIMOTICS M-1FE2 synchronous built-in motors**	Moment of inertia rotor with C sleeve	Weight, stator with cooling jacket
P_N		M_N		n_N	$n_{max\ Inv}$	n_{max}		J	m
S1	S6-40 %	S1	S6-40 %						
kW (hp)	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	r/min	r/min	r/min	Article No.	kgm^2 (lb_f-in-s^2)	kg (lb)
SIMOTICS M-1FE2 High Torque series – water cooling – ΔT = 100 K – line voltage 400 V 3 AC, operation with Active Line Module									
68 (91.2)	85.9 (115.2)	640 (472)	916 (676)	1000	2000	4200	**1FE2182-8LH ■■-■■ C 1**	0.75 (6.64)	110 (243)
34 (45.6)	40.8 (54.7)	650 (479)	925 (682)	500	1000	2400	**1FE2182-8LN ■■-■■ C 1**	0.75 (6.64)	110 (243)
88 (118)	110 (148)	840 (620)	1190 (878)	1000	2000	4200	**1FE2183-8LH ■■-■■ C 1**	0.9 (8.0)	130 (287)
44.5 (59.7)	52.4 (70.3)	840 (620)	1197 (883)	500	1000	2400	**1FE2183-8LN ■■-■■ C 1**	0.9 (8.0)	130 (287)
105 (141)	130.9 (175.5)	1000 (738)	1425 (1051)	1000	2000	4200	**1FE2184-8LH ■■-■■ C 1**	1.05 (9.29)	150 (331)
85 (114)	106.4 (142.7)	1010 (745)	1437 (1060)	800	1600	4010	**1FE2184-8LK ■■-■■ C 1**	1.05 (9.29)	150 (331)
53 (71.1)	62.8 (84.2)	1010 (745)	1437 (1060)	500	1000	2400	**1FE2184-8LN ■■-■■ C 1**	1.05 (9.29)	150 (331)
122 (164)	149.7 (200.7)	1160 (856)	1653 (1219)	1000	1900	4200	**1FE2185-8LH ■■-■■ C 1**	1.2 (10.6)	170 (375)
87 (117)	106.3 (142.5)	1180 (870)	1665 (1228)	700	1400	3440	**1FE2185-8LL ■■-■■ C 1**	1.2 (10.6)	170 (375)
62 (83.1)	73.8 (99.0)	1180 (870)	1646 (1214)	500	1000	2420	**1FE2185-8LN ■■-■■ C 1**	1.2 (10.6)	170 (375)
142 (190)	171.7 (230.2)	1350 (996)	1932 (1425)	1000	1900	4200	**1FE2186-8LH ■■-■■ C 1**	1.35 (11.95)	190 (419)
86 (115)	104.9 (140.7)	1370 (1011)	1936 (1428)	600	1200	3000	**1FE2186-8LM ■■-■■ C 1**	1.35 (11.95)	190 (419)
72 (96.6)	84.8 (113.7)	1370 (1011)	1941 (1432)	500	1000	2400	**1FE2186-8LN ■■-■■ C 1**	1.35 (11.95)	190 (419)
159 (213)	193.7 (259.8)	1510 (1114)	2151 (1587)	1000	1900	4200	**1FE2187-8LH ■■-■■ C 1**	1.49 (13.19)	210 (463)
80 (107)	100 (134)	1530 (1129)	2156 (1590)	500	1100	2670	**1FE2187-8LN ■■-■■ C 1**	1.49 (13.19)	210 (463)

Article No. supplements

Winding protection					
• Standard protection 2 × Pt1000 [1]	**1**				
• Full protection: 2 × Pt1000 + 3 × PTC thermistor triplet [2]	**3**				
• Universal protection [3]	**5**				
Cable outlet [6]					
• Free cable ends, length 0.5 m (1.64 ft), cable outlet large outer diameter or stator without cooling jacket		**0**			
• Free cable ends, length 0.5 m (1.64 ft), cable outlet small outer diameter		**1**			
• Free cable ends, length 1.5 m (4.92 ft), cable outlet large outer diameter or stator without cooling jacket		**2**			
• Free cable ends, length 1.5 m (4.92 ft), cable outlet small outer diameter		**3**			
Delivery					
• Delivery of stator + rotor [1] [4] [5] [7]			**1**		
Stator					
• Stator without cooling jacket				**A**	
• Stator with cooling jacket				**C**	
Rotor					
• Standard rotor sleeve					**C**
Version status					**1**

S1 = Continuous duty
S6 = Intermittent duty:

Additional options
Z = T00 ... Rotor prebalanced

For footnotes, see next page.

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Motor type (repeated)	Rated current for duty type		Voltage Protection Module (VPM)	SINAMICS S120 Motor Module		
				Quantity Motor Modules	Required rated current	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system
	I_N S1 A	S6-40 % A			I_N S1 to n_{max} A	Article No.
SIMOTICS M-1FE2 High Torque series – water cooling						
1FE2182-8LH...	145	214	VPM 200	1	200	**6SL3120-1TE32-0AA4**
1FE2182-8LN...	73	108	VPM 120	1	85	**6SL3120-1TE28-5AA3**
1FE2183-8LH...	189	278	VPM 200	1	200	**6SL3120-1TE32-0AA4**
1FE2183-8LN...	95	140	VPM 200	1	132	**6SL3120-1TE31-3AA3**
1FE2184-8LH...	225	333	2 × VPM 200	2	2 × 132	**6SL3120-1TE31-3AA3**
1FE2184-8LK...	190	280	VPM 200	1	200	**6SL3120-1TE32-0AA4**
1FE2184-8LN...	114	168	VPM 200	1	132	**6SL3120-1TE31-3AA3**
1FE2185-8LH...	250	368	2 × VPM 200	2	2 × 132	**6SL3120-1TE31-3AA3**
1FE2185-8LL...	189	278	VPM 200	1	200	**6SL3120-1TE32-0AA4**
1FE2185-8LN...	132	194	VPM 200	1	132	**6SL3120-1TE31-3AA3**
1FE2186-8LH...	290	424	2 × VPM 200	2	2 × 200	**6SL3120-1TE32-0AA4**
1FE2186-8LM...	192	283	VPM 200	1	200	**6SL3120-1TE32-0AA4**
1FE2186-8LN...	154	227	VPM 200	1	200	**6SL3120-1TE32-0AA4**
1FE2187-8LH...	325	479	2 × VPM 200	2	2 × 200	**6SL3120-1TE32-0AA4**
1FE2187-8LN...	190	280	VPM 200	1	200	**6SL3120-1TE32-0AA4**

Motor Module:	
Single Motor Module	**1**

8
2

1) Standard scope of supply: Impregnated winding with 2 × Pt1000 (1 × reserve).
2) Full protection option, application example: Load at motor standstill, external tripping device required; Article No.: 3RN2013-1GW30.
3) Universal protection option: Full protection + NTC PT3-51F + NTC K227.
4) Ordering a spare stator: 1FE2…-…..-2...
5) Ordering a spare rotor: 1FE2…-…..-3...
6) For cable design, see Configuration Manual.
7) Standard rotor is not pre-balanced.

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SIMOTICS M-1FE2 asynchronous built-in motors

Overview

The SIMOTICS M-1FE2 product series is the new generation of built-in asynchronous motors for directly driven motor spindles in turning, milling, grinding and multitasking machines.



SIMOTICS M-1FE2 asynchronous built-in motor, AL rotor, with cooling jacket, with rotor sleeve



SIMOTICS M-1FE2 asynchronous built-in motor, CU rotor, without cooling jacket, without rotor sleeve

They are characterized by significantly improved torque density, higher maximum speeds, a wider constant power range and higher overload.

As a consequence, SIMOTICS M-1FE1/M-1FE2 built-in synchronous motors, this means that applications for machines in job shops and mold making, as well as turning, milling and grinding machines can be addressed more intensively.

Benefits

- Wide range of applications and high surface quality
- Optimum heat dissipation for maximum precision (encapsulated winding)
- Wide continuous power range and high overload:
  - for constant cutting performance when turning
  - short acceleration times for milling
- Safe temperature monitoring with Pt1000 (Option: PTC or NTC)
- Compact motor length compared with previous 1PH2 series and large internal rotor bore
  - advantage for the ejector rod guide of automatic turning machines and for higher spindle stiffnesses
- Harmonized system comprising SINUMERIK, SINAMICS S120/S220 and motor
  - therefore ensuring fast commissioning.

Application

The water-cooled SIMOTICS M-1FE2 asynchronous built-in motors are used in combination with the SINAMICS S120/S220 drive system for applications that require the highest quality of machining, accuracy and running smoothness, as well as very short acceleration times.

Mainly used for:

- Flexible combination for applications with high speeds or high torques
- Job shops and mold making
  - (high accuracy and high surface quality)
- Turning, milling and grinding applications

Design

All frame sizes are available in both winding versions, star connection and star-delta connection:

The following variants are possible:

- Stator version without/with cooling jacket
- Rotor version without/with rotor sleeve
- Rotor version for asynchronous motor in copper or in aluminum
  - in copper for the highest torque version
  - in aluminum for the highest speeds
- Flexible connection cables 0.5 m/1.5 m (1.64 ft/4.92 ft)

Additional lengths available on request.

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Technical specifications

Product name	SIMOTICS M-1FE2 asynchronous built-in motor
Machine type	Asynchronous spindle with squirrel-cage rotor, aluminum or copper
Constant power range	Up to 1:8 (star connection) or 1:10 for star-delta connection (8-pole)
Recommended coolant inlet temperature, approx.	20 °C (68 °F) (max. 40 °C (104 °F) with derating)
Standard protection temperature monitoring	2 × Pt1000 PTC thermistors in the stator winding, 1 × spare
Full protection optional Application example: Machining when the motor is at a zero speed	In addition to standard protection 3 × PTC thermistor triplet Can be evaluated, e.g. using a thermal motor protection unit: Article No.: 3RN2013-1GW30
Universal protection optional	Full protection + NTC PT3-51F + NTC K227
Stator winding insulation according to EN 60034-1 (IEC 60034-1)	Temperature class 155 (F) for a coolant intake temperature of 20 °C (68 °F) (max. 40 °C (104 °F) with derating)
Type of construction (similar to ISO)	Individual components: Stator, rotor
Degree of protection according to IEC 60034-5	IP00
Balance quality of rotor according to ISO 1940-1	Not pre-balanced, balancing using external balancing planes
Encoder system	Typical: Hollow shaft incremental encoder sin/cos 1 V_{pp} (Not included in the scope of delivery)
Motor connection	Free cable ends with length of 0.5/1.5 m (1.64/4.92 ft)
Rating plate	2 units, enclosed separately

Configuration

You can find the Configuration Manual for SIMOTICS M-1FE2 for SINAMICS S120 at:
https://support.industry.siemens.com/cs/ww/en/view/109474362

The compatibility list for SINAMICS S120/S220 Booksize Modules can be found at:
https://support.industry.siemens.com/cs/ww/en/view/109806050

The SINAMICS S220 Booksize power units along with the Motor Modules are available at:
https://support.industry.siemens.com/cs/ww/en/view/109803552

Dimensional drawings

Dimensional drawings for the SIMOTICS motors are available via selectors through to the exact article number with the Siemens Product Configurator.

Access to the Siemens Product Configurator

The Siemens Product Configurator can be accessed having to register or log in:
www.siemens.com/spc
→ SIMOTICS M-1FE2 in the SPC

Characteristic curves

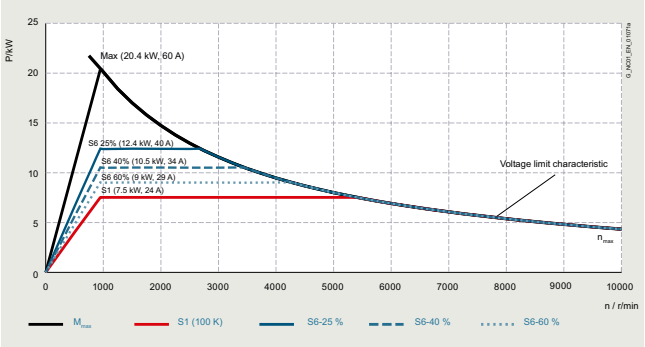
Characteristics for the SIMOTICS motors are available via selectors through to the exact article number with the Siemens Product Configurator.

Access to the Siemens Product Configurator

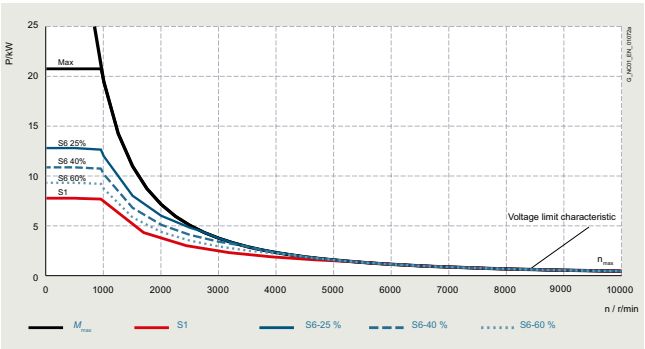
The Siemens Product Configurator can be accessed having to register or log in:
www.siemens.com/spc
→ SIMOTICS M-1FE2 in the SPC

Characteristic curves

Examples for power/torque characteristics for SIMOTICS M-1FE2093-8AG..-...1 asynchronous built-in motor



Power characteristic SIMOTICS M-1FE2093-8AG.. - ...1



Torque characteristic SIMOTICS M-1FE2093-8AG.. - ...1

More information

You can find more information on the internet at:

https://siemens.com/online-support

Technical specifications and characteristic curves of SIMOTICS M-1FE2 can be found at:

https://support.industry.siemens.com/cs/ww/en/view/109783767

You can find the Hardware Installation Manual for SIMOTICS S-1FE2 for SINAMICS S120 at:

https://support.industry.siemens.com/cs/document/109475767

Cooling unit manufacturers, see
Liquid cooling for SIMOTICS M-1FE

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SIMOTICS M-1FE2 asynchronous built-in motors

Selection and ordering data

Rated power for Y or Y/Δ operation for duty type		Rated torque for Y or Y/Δ operation for operating mode		Rated speed for Y or Y/Δ operation	Speed range for constant power for Y or Y/Δ operation, max.	Speed, max. for Y or Y/Δ operation	**SIMOTICS M-1FE2 asynchronous built-in motors**	Moment of inertia rotor without sleeve	Weight, stator + rotor
P_N		M_N		n_N	N2 (S1)	n_{max}		J	m
S1	S6-40 %	S1	S6-40 %						
kW (hp)	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	r/min	r/min	r/min	Article No.	kgm^2 (lb_f-in-s^2)	kg (lb)
SIMOTICS M-1FE2 High Torque series AL rotor – water cooling – ΔT = 105 K – line voltage 400 V 3 AC, operation with Active Line Module									
16 (21.5)	22.4 (30.0)	21 (15.5)	29 (21.4)	7360	25000	25000	**1FE2073-4AW ■ ■ - 1 ■ ■ 1**	0.00426 (0.03771)	13 (28.7)
4.6/8 (6.2/10.7)	6.5/11.2 (8.7/15.0)	22/17 (16.2/12.5)	31/24 (22.9/17.7)	2000/4400	5500/25000	5500/25000	**1FE2073-4AN ■ ■ - 1 ■ ■ 2**	0.00426 (0.03771)	13 (28.7)
8/14.5 (10.7/19.4)	11.2/20.3 (15.0/27.2)	22/17 (16.2/12.5)	31/24 (22.9/17.7)	3500/8200	7500/25000	7500/25000	**1FE2073-4AS ■ ■ - 1 ■ ■ 2**	0.00426 (0.03771)	13 (28.7)
11.6 (15.6)	16.2 (21.7)	30 (22.1)	41 (30.2)	3760	25000	25000	**1FE2074-4AT ■ ■ - 1 ■ ■ 1**	0.00564 (0.04992)	17 (37.5)
5.4/10 (7.2/13.4)	7.6/14 (10.2/18.8)	30/23 (22.1/17.0)	41/32 (30.2/23.6)	1750/4200	5000/24500	5000/25000	**1FE2074-4AN ■ ■ - 1 ■ ■ 2**	0.00564 (0.04992)	17 (37.5)
8.5/13 (11.4/17.4)	11.8/18.3 (15.8/24.5)	30/23 (22.1/17.0)	41/32 (30.2/23.6)	2760/5500	650025000	6500/25000	**1FE2074-4AQ ■ ■ - 1 ■ ■ 2**	0.00564 (0.04992)	17 (37.5)
7.5 (10.1)	10.5 (14.1)	75 (55.3)	106 (78.2)	950	5400	10000	**1FE2093-8AG ■ ■ - 1 ■ ■ 1**	0.02028 (0.17950)	22.4 (49.4)
11/11.5 (14.8/15.4)	15.5/16.1 (20.8/21.6)	65/23 (47.9/17.0)	92/32 (67.9/23.6)	1600/4750	7400/13300	10000/19000	**1FE2093-8AM ■ ■ - 1 ■ ■ 2**	0.02028 (0.17950)	22.4 (49.4)
11 (14.8)	15.4 (20.7)	95 (70.1)	134 (98.8)	1100	8300	10000	**1FE2094-8AJ ■ ■ - 1 ■ ■ 1**	0.02662 (0.23561)	28.5 (62.8)
15/17 (20.1/22.8)	21.1/23.8 (28.3/31.9)	90/34 (66.4/25.1)	126/48 (92.9/35.4)	1600/4750	9700/14300	10000/19000	**1FE2094-8AM ■ ■ - 1 ■ ■ 2**	0.02662 (0.23561)	28.5 (62.8)
24.1 (32.3)	33.7 (45.2)	144 (106)	201 (148)	1600	6300	15000	**1FE2114-8AM ■ ■ - 1 ■ ■ 1**	0.07169 (0.63453)	42.0 (92.6)
15/18.6 (20.1/24.9)	21.1/26 (28.3/34.9)	160/84 (118/62.0)	224/118 (165/87.0)	900/1200	3300/8700	6000/15000	**1FE2114-8AG ■ ■ - 1 ■ ■ 2**	0.07169 (0.63453)	42.0 (92.6)
33.1 (44.4)	46.3 (62.1)	197 (145)	276 (204)	1600	7100	15000	**1FE2116-8AM ■ ■ - 1 ■ ■ 1**	0.10605 (0.93865)	59.0 (130.1)
18.5/25.1 (24.8/33.7)	25.9/35.1 (34.7/47.1)	235/120 (173/88.5)	330/168 (243/124)	750/2000	3480/8400	6000/15000	**1FE2116-8AE ■ ■ - 1 ■ ■ 2**	0.10605 (0.93865)	59.0 (130.1)

Article No. supplements

Winding protection • Standard protection: Stator winding with 2 × Pt1000 (1 × reserve) • Full protection: 2 × Pt1000 + 3 × PTC thermistor triplets [1] • Universal protection full protection + NTC PT3-51F + NTC K227	**1** **3** **5**				
Connection type • Free cable ends: length 0.5 m (1.64 ft) • Free cable ends: length 0.5 m (1.64 ft) or stator without cooling jacket • Free cable ends: length 1.5 m (4.92 ft) • Free cable ends: length 1.5 m (4.92 ft) or stator without cooling jacket		**0** **1** **2** **3**			
Delivery • Delivery of stator + rotor			**1**		
Stator version • Encapsulated winding without cooling jacket • Encapsulated winding with cooling jacket				**E** **D**	
Rotor version • Rotor core without sleeve, inner diameter unmachined, unbalanced [2] • Rotor core with standard sleeve, balanced					**A** **D**
Connection/winding • Y connection • Can be switched between Y and Δ					**1** **2**

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Motor type (repeated)	Rated current for Y or Y/Δ operation for duty type		SINAMICS S120 Motor Module	
			Required rated current	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system
	I_N	I_N	I_N	
	S1	S6-40 %	S1	
	A	A	A	Article No.
SIMOTICS M-1FE2 High Torque series AL rotor – water cooling				
1FE2073-4AW...	40	56	45	**6SL3120-1TE24-5AC0**
1FE2073-4AN...	15.5/21	22/29.5	24 [3]	**6SL3120-1TE22-4AC0**
1FE2073-4AS...	24/30	33.5/42	30 [3]	**6SL3120-1TE23-0AC0**
1FE2074-4AT...	39	54.5	45	**6SL3120-1TE24-5AC0**
1FE2074-4AN...	19.5/24	27.5/33.5	24 [3]	**6SL3120-1TE22-4AC0**
1FE2074-4AQ...	30/40	42/56	45 [3]	**6SL3120-1TE24-5AC0**
1FE2093-8AG...	24	34	24	**6SL3120-1TE22-4AC0**
1FE2093-8AM...	30/28.5	42/40	30 [3]	**6SL3120-1TE23-0AC0**
1FE2094-8AJ...	39	55	45	**6SL3120-1TE24-5AC0**
1FE2094-8AM...	45/45	65/63	45 [3]	**6SL3120-1TE24-5AC0**
1FE2114-8AM…	60	84	60	**6SL3120-1TE26-0AC0**
1FE2114-8AG…	40/45	56/60	45 [3]	**6SL3120-1TE24-5AC0**
1FE2116-8AM…	85	102	85	**6SL3120-1TE28-5AA3**
1FE2116-8AE…	55/60	76/84	60 [3]	**6SL3120-1TE26-0AC0**

Motor Module:	
Single Motor Module	**1**

[1] Application example: Load at motor standstill, external tripping device required; Article No.: 3RN2013-1GW30.
[2] Rotor core without sleeve, inner diameter machined ready for installation, unbalanced, (on request).
[3] Star/delta changeover required, incl. data set switchover with PWM 4 > 8 kHz with 62.5 µs.

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SIMOTICS M-1FE2 asynchronous built-in motors

Selection and ordering data

Rated power for Y or Y/Δ operation for duty type		Rated torque for Y or Y/Δ operation for operating mode		Rated speed for Y or Y/Δ operation	Speed range for constant power for Y or Y/Δ operation, max.	Speed, max. for Y or Y/Δ operation	**SIMOTICS M-1FE2 asynchronous built-in motors**	Moment of inertia rotor without sleeve	Weight, stator + rotor
P_N		M_N		n_N	N2 (S1)	n_{max}		J	m
S1	S6-40 %	S1	S6-40 %						
kW (hp)	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	r/min	r/min	r/min	Article No.	kgm^2 (lb_f-in-s^2)	kg (lb)
SIMOTICS M-1FE2 High Torque series CU rotor – water cooling – ΔT = 105 K – line voltage 400 V 3 AC, operation with Active Line Module									
5.5 (7.4)	7.7 (10.3)	37 (27.3)	51 (37.6)	1450	11500	20000	**1FE2073-4CL ■ ■ - 1 ■ ■ 1**	0.00529 (0.04682)	14.0 (30.9)
4.0/7.5 (5.4/10.1)	5.6/10.5 (7.5/14.1)	37/24 (27.3/17.7)	51/33 (37.6/24.3)	1050/3000	8400/16500	20000/20000	**1FE2073-4CG ■ ■ - 1 ■ ■ 2**	0.00529 (0.04682)	14.0 (30.9)
11 (14.8)	15.5 (20.8)	35 (25.8)	49 (36.1)	3000	19000	20000	**1FE2073-4CQ ■ ■ - 1 ■ ■ 1**	0.00529 (0.04682)	14.0 (30.9)
5.5/7.5 (7.4/10.1)	7.7/10.5 (10.3/14.1)	36/22 (26.6/16.2)	51/31 (37.6/22.9)	1450/3250	11500/20000	20000/20000	**1FE2073-4CL ■ ■ - 1 ■ ■ 2**	0.00529 (0.04682)	14.0 (30.9)
7.5 (10.1)	10.5 (14.1)	49 (36.1)	68 (50.2)	1480	11700	20000	**1FE2074-4CL ■ ■ - 1 ■ ■ 1**	0.00689 (0.06098)	18.0 (39.7)
5.5/8 (7.4/10.7)	7.7/11.2 (10.3/15.0)	48/24 (35.4/17.7)	67/33 (49.4/24.3)	1100/3200	8000/20000	20000/20000	**1FE2074-4CJ ■ ■ - 1 ■ ■ 2**	0.00689 (0.06098)	18.0 (39.7)
18.5 (24.8)	25.9 (34.7)	49 (36.1)	68 (50.2)	3650	20000	20000	**1FE2074-4CR ■ ■ - 1 ■ ■ 1**	0.00689 (0.06098)	18.0 (39.7)
7.5/11 (10.1/14.8)	10.5/15.4 (14.1/20.7)	48/27 (35.4/19.9)	67/37 (49.4/27.3)	1500/4000	10000/20000	20000/20000	**1FE2074-4CL ■ ■ - 1 ■ ■ 2**	0.00689 (0.06098)	18.0 (39.7)

Article No. supplements

Winding protection • Standard protection: Stator winding with 2 × Pt1000 (1 × reserve) • Full protection: 2 × Pt1000 + 3 × PTC thermistor triplets [1] • Universal protection full protection + NTC PT3-51F + NTC K227	**1** **3** **5**
Connection type • Free cable ends: length 0.5 m (1.64 ft) • Free cable ends: length 0.5 m (1.64 ft) or stator without cooling jacket • Free cable ends: length 1.5 m (4.92 ft) • Free cable ends: length 1.5 m (4.92 ft) or stator without cooling jacket	**0** **1** **2** **3**
Delivery • Delivery of stator + rotor	**1**
Stator version • Encapsulated winding without cooling jacket • Encapsulated winding with cooling jacket	**E** **D**
Rotor version • Rotor core without sleeve, inner diameter unmachined, unbalanced [2] • Rotor core with standard sleeve, balanced	**A** **D**
Connection/winding • Y connection • Can be switched between Y and Δ	**1** **2**

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Motor type (repeated)	Rated current for Y or Y/Δ operation for duty type		SINAMICS S120 Motor Module	
			Required rated current	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system
	I_N	I_N	I_N	
	S1	S6-40 %	S1	
	A	A	A	Article No.
SIMOTICS M-1FE2 High Torque series CU rotor – water cooling				
1FE2073-4CL…	17.5	24.5	18	**6SL3120-1TE21-8AC0**
1FE2073-4CG…	13.5/16.5	19/23	18 [3]	**6SL3120-1TE21-8AC0**
1FE2073-4CQ…	29	41	30	**6SL3120-1TE23-0AC0**
1FE2073-4CL…	17.5/20.5	24.5/29	18 [3]	**6SL3120-1TE21-8AC0**
1FE2074-4CL…	23.5	33	24	**6SL3120-1TE22-4AC0**
1FE2074-4CJ…	17.5/17.5	24.5/24.5	18 [3]	**6SL3120-1TE21-8AC0**
1FE2074-4CR…	42.5	60	45	**6SL3120-1TE24-5AC0**
1FE2074-4CL…	21.5/23.5	30/33	24 [3]	**6SL3120-1TE22-4AC0**

Motor Module: Single Motor Module	**1**

8
2

[1] Application example: Load at motor standstill, external tripping device required; Article No.: 3RN2013-1GW30.
[2] Rotor core without sleeve, inner diameter machined ready for installation, unbalanced, (on request).
[3] Star/delta changeover required, incl. data set switchover with PWM 4 > 8 kHz with 62.5 µs.

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SIMOTICS M-1FE2 asynchronous built-in motors

Selection and ordering data

Rated power for Y or Y/Δ operation for duty type		Rated torque for Y or Y/Δ operation for operating mode		Rated speed for Y or Y/Δ operation	Speed range for constant power for Y or Y/Δ operation, max.	Speed, max. for Y or Y/Δ operation	**SIMOTICS M-1FE2 asynchronous built-in motors**	Moment of inertia rotor without sleeve	Weight, stator + rotor
P_N		M_N		n_N	N2 (S1)	n_{max}		J	m
S1	S6-40 %	S1	S6-40 %						
kW (hp)	kW (hp)	Nm (lb_f-ft)	Nm (lb_f-ft)	r/min	r/min	r/min	Article No.	kgm^2 (lb_f-in-s^2)	kg (lb)
SIMOTICS M-1FE2 High Torque series CU rotor – water cooling – ΔT = 105 K – line voltage 400 V 3 AC, operation with Active Line Module									
18.5 (24.8)	26 (34.9)	136 (100)	191 (141)	1300	5700	10000	**1FE2094-8CJ ■ ■ - 1 ■ ■ 1**	0.03765 (0.33324)	32.2 (71.0)
15/18.5 (20.1/24.8)	21.1/26 (28.3/34.9)	136/55 (100/40.6)	192/78 (142/57.5)	1050/3200	5100/13700	10000/16000	**1FE2094-8CG ■ ■ - 1 ■ ■ 2**	0.03765 (0.33324)	32.2 (71.0)
22.5 (30.2)	31.6 (42.4)	172 (127)	241 (178)	1250	4500	10000	**1FE2095-8CJ ■ ■ - 1 ■ ■ 1**	0.04437 (0.39272)	38.3 (84.5)
18.5/22 (24.8/29.5)	26/30.8 (34.9/41.3)	177/70 (131/51.6)	248/98 (183/72.3)	1000/3000	5400/16000	10000/16000	**1FE2095-8CG ■ ■ - 1 ■ ■ 2**	0.04437 (0.39272)	38.3 (84.5)
25 (33.5)	35 (46.9)	215 (159)	304 (224)	1100	3000	13000	**1FE2114-8CJ ■ ■ - 1 ■ ■ 1**	0.10211 (0.90378)	48.0 (105.8)
18.5/22.1 (24.8/29.6)	25.9/30.9 (34.7/41.4)	230/141 (170/104)	321/197 (237/145)	770/1500	2300/6500	6000/13000	**1FE2114-8CE ■ ■ - 1 ■ ■ 2**	0.10211 (0.90378)	48.0 (105.8)
37.1 (49.8)	51.9 (69.6)	320 (236)	451 (333)	1100	2700	13000	**1FE2116-8CJ ■ ■ - 1 ■ ■ 1**	0.14744 (1.30499)	67.0 (147.7)
25.1/30 (33.7/40.2)	35.1/42 (47.1/56.3)	320/191 (236/141)	447/267 (330/197)	750/1500	2600/7400	6000/13000	**1FE2116-8CE ■ ■ - 1 ■ ■ 2**	0.14744 (1.30499)	67.0 (147.7)
25 (33.5)	35.1 (47.1)	250 (184)	353 (260)	950	3900	12000	**1FE2124-8CG ■ ■ - 1 ■ ■ 1**	0.14523 (1.28543)	55.0 (121.3)
18.5/25.1 (24.8/33.7)	26/35.1 (34.9/47.1)	255/133 (188/98.1)	355/186 (262/137)	700/1800	2700/5400	6000/12000	**1FE2124-8CE ■ ■ - 1 ■ ■ 2**	0.14523 (1.28543)	55.0 (121.3)
52.1 (69.9)	73 (97.9)	475 (350)	734 (541)	1050	3000	12000	**1FE2127-8CJ ■ ■ - 1 ■ ■ 1**	0.24237 (2.14522)	91.0 (200.7)
32.1/37 (43.0/49.6)	44.9/51.8 (60.2/69.5)	470/235 (347/173)	660/330 (487/243)	650/1500	2000/4700	6000/12000	**1FE2127-8CE ■ ■ - 1 ■ ■ 2**	0.24237 (2.14522)	91.0 (200.7)
33 (44.3)	46.3 (62.1)	420 (310)	590 (435)	750	2600	6000	**1FE2145-8CE ■ ■ - 1 ■ ■ 1**	0.26674 (2.36092)	99.0 (218.3)
22/25 (29.5/33.5)	30.8/35.3 (41.3/47.3)	420/159 (310/117)	589/225 (434/166)	500/1500	1800/4500	6000/10000	**1FE2145-8CC ■ ■ - 1 ■ ■ 2**	0.26674 (2.36092)	99.0 (218.3)
48 (64.4)	67.4 (90.4)	611 (451)	859 (634)	750	2800	6000	**1FE2147-8CE ■ ■ - 1 ■ ■ 1**	0.35886 (3.17627)	130.0 (286.7)
32/35 (42.9/46.9)	44.8/49.4 (60.1/66.2)	611/257 (451/190)	856/363 (631/268)	500/1300	1500/4300	6000/10000	**1FE2147-8CC ■ ■ - 1 ■ ■ 2**	0.35886 (3.17627)	130.0 (286.7)

Article No. supplements

Winding protection • Standard protection: Stator winding with 2 × Pt1000 (1 × reserve) • Full protection: 2 × Pt1000 + 3 × PTC thermistor triplets [1] • Universal protection full protection + NTC PT3-51F + NTC K227	**1** **3** **5**				
Connection type • Free cable ends: length 0.5 m (1.64 ft) • Free cable ends: length 0.5 m (1.64 ft) or stator without cooling jacket • Free cable ends: length 1.5 m (4.92 ft) • Free cable ends: length 1.5 m (4.92 ft) or stator without cooling jacket		**0** **1** **2** **3**			
Delivery • Delivery of stator + rotor			**1**		
Stator version • Encapsulated winding without cooling jacket • Encapsulated winding with cooling jacket				**E** **D**	
Rotor version • Rotor core without sleeve, inner diameter unmachined, unbalanced [2] • Rotor core with standard sleeve, balanced					**A** **D**
Connection/winding • Y connection • Can be switched between Y and Δ					**1** **2**

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Motor type (repeated)	Rated current for Y or Y/Δ operation for duty type		**SINAMICS S120 Motor Module**	
			Required rated current	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system
	I_N	I_N	I_N	
	S1	S6-40 %	S1	
	A	A	A	Article No.
SIMOTICS M-1FE2 High Torque series CU rotor – water cooling				
1FE2094-8CJ...	53	74	60	**6SL3120-1TE26-0AC0**
1FE2094-8CG...	45/45	63/63	45 3)	**6SL3120-1TE24-5AC0**
1FE2095-8CJ...	59	83	60	**6SL3120-1TE26-0AC0**
1FE2095-8CG...	60/56	84/78	60 3)	**6SL3120-1TE26-0AC0**
1FE2114-8CJ…	59	83	60	**6SL3120-1TE26-0AC0**
1FE2114-8CE…	49/57	69/83	60 3)	**6SL3120-1TE26-0AC0**
1FE2116-8CJ…	83	116	85	**6SL3120-1TE28-5AA3**
1FE2116-8CE…	68/83	95/116	85 3)	**6SL31201TE28-5AA3**
1FE2124-8CG…	72	98	85	**6SL3120-1TE28-5AA3**
1FE2124-8CE…	53.5/57.5	73/78	60 3)	**6SL3120-1TE26-0AC0**
1FE2127-8CJ…	128	173	132	**6SL3120-1TE31-3AA3**
1FE2127-8CE…	85/85	116/116	85 3)	**6SL3120-1TE28-5AA3**
1FE2145-8CE...	85	119	85	**6SL3120-1TE28-5AA3**
1FE2145-8CC...	60/58	84/81	60	**6SL3120-1TE26-0AC0**
1FE2147-8CE...	130	180	132	**6SL3120-1TE31-3AA3**
1FE2147-8CC...	85/81	119/113	85	**6SL3120-1TE28-5AA3**

Motor Module: Single Motor Module	**1**

1) Application example: Load at motor standstill, external tripping device required; Article No.: 3RN2013-1GW30.
2) Rotor core without sleeve, inner diameter machined ready for installation, unbalanced, (on request).
3) Star/delta changeover required, incl. data set switchover with PWM 4 > 8 kHz with 62.5 µs.

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VPM Voltage Protection Module

Overview



The voltage protection function is used for SIMOTICS M-1FE motors and on the synchronous version of 2SP1 motor spindles with an EMF of $\hat{U}$ > 820 V to 2000 V (U_{rms} 570 V to 1400 V) in order to limit the DC link voltage in the drive system in the event of a fault.

If the line voltage fails with the motor operating at maximum speed, or if the drive system pulses are suppressed as a result of a line voltage failure, the synchronous motor feeds energy at high voltage back into the DC link.

The VPM detects that the DC link voltage is too high (DC > 820 V) and short-circuits the three motor supply cables to brake the motor. The power remaining in the motor is converted to heat via the short-circuit in the VPM and motor.

Integration

The VPM can be operated in conjunction with SINAMICS S120, and with SIMOTICS M-1FE motors and with 2SP1 motor spindles.

The VPM must be installed between the motor and drive system (maximum distance from drive system 1.5 m). 6FX8 shielded motor supply cables must be used in combination with the VPM.

The VPM can always be used with:

- SINAMICS S120
- SINUMERIK 840D sl
- SINUMERIK ONE
- SINUMERIK MC

Technical specifications

Article No.	6SN1113-1AA00-1JA1	6SN1113-1AA00-1KA1	6SN1113-1AA00-1KC1
Product short term	VPM 120	VPM 200	VPM 200 DYNAMIC
Product designation	Voltage Protection Module	Voltage Protection Module	Voltage Protection Module
Rated current, permissible	120 A	200 A	200 A
Short-circuit current, perm.	90 A	200 A	200 A
Degree of protection	IP20	IP20	IP20
Environmental category according to IEC 60721-3-3	Class 3K5, condensation and icing excluded. Low air temperature 0 °C (32 °F).		
Ambient temperature during			
• Storage	-25 ... +55 °C (-13 ... +131 °F)	-25 ... +55 °C (-13 ... +131 °F)	-25 ... +55 °C (-13 ... +131 °F)
• Transport	-25 ... +55 °C (-13 ... +131 °F)	-25 ... +55 °C (-13 ... +131 °F)	-25 ... +55 °C (-13 ... +131 °F)
• Operation	0 ... 55 °C (32 ... 131 °F)	0 ... 55 °C (32 ... 131 °F)	0 ... 55 °C (32 ... 131 °F)
Height	300 mm (11.81 in)	300 mm (11.81 in)	300 mm (11.81 in)
Width	150 mm (5.91 in)	250 mm (9.84 in)	250 mm (9.84 in)
Depth	180 mm (7.09 in)	190 mm (7.48 in)	260 mm (10.24 in)
Net weight	6 kg (13.2 lb)	11 kg (24.3 lb)	12 kg (26.5 lb)
Certificate of suitability	cULus	cULus	cULus

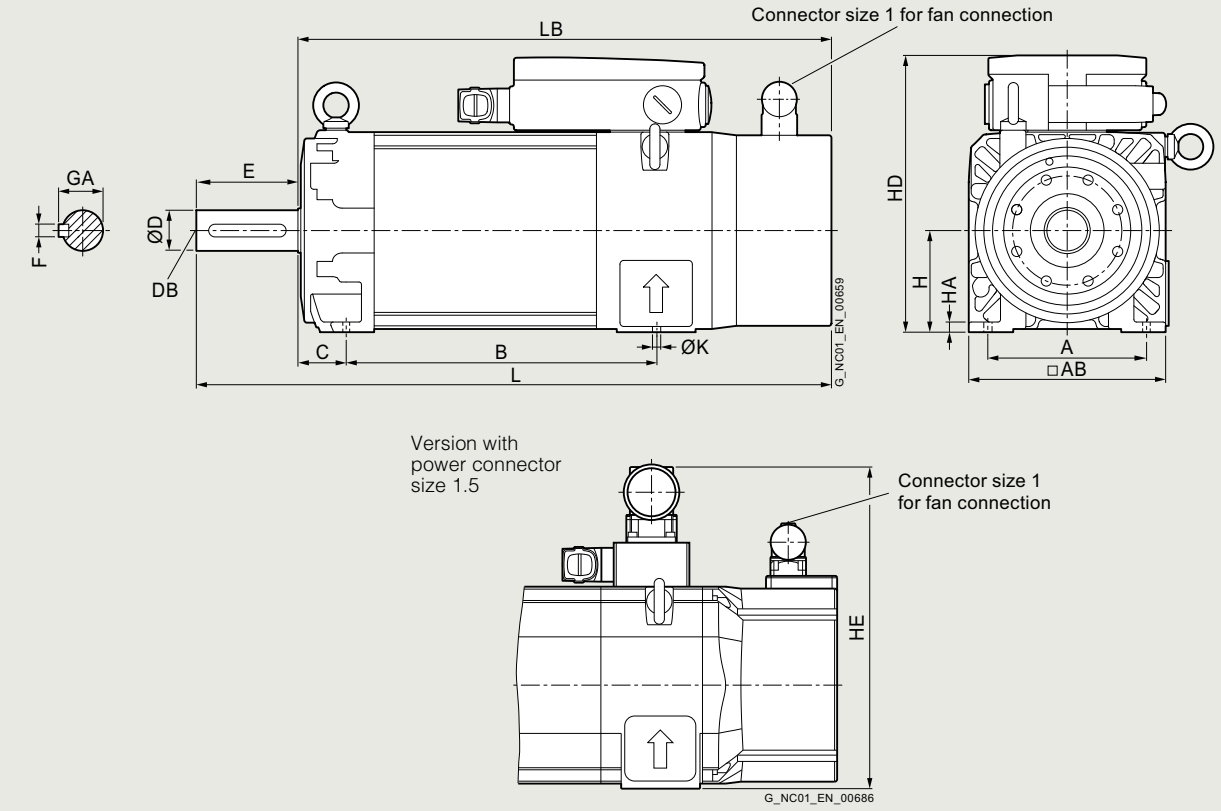
Selection and ordering data

Description	Article No.
Voltage Protection Module	
• VPM 120	**6SN1113-1AA00-1JA1**
• VPM 200	**6SN1113-1AA00-1KA1**
• VPM 200 DYNAMIC For large cable cross-sections up to 50 mm^2	**6SN1113-1AA00-1KC1**

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Dimensional drawings

1PH808



For motor		Dimensions in mm (inches)								
Shaft height	Type	IEC	A	AB	B	C	H	HA	HD	HE
SIMOTICS M-1PH8, type of construction IM B3, forced ventilation										
80	1PH8083		125 (4.92	155 (6.10)	194 (7.64)	38 (1.50)	80 (3.15)	8 (0.31)	216 (6.50)	253.5 (9.98)
	1PH8087				244 (9.61)					

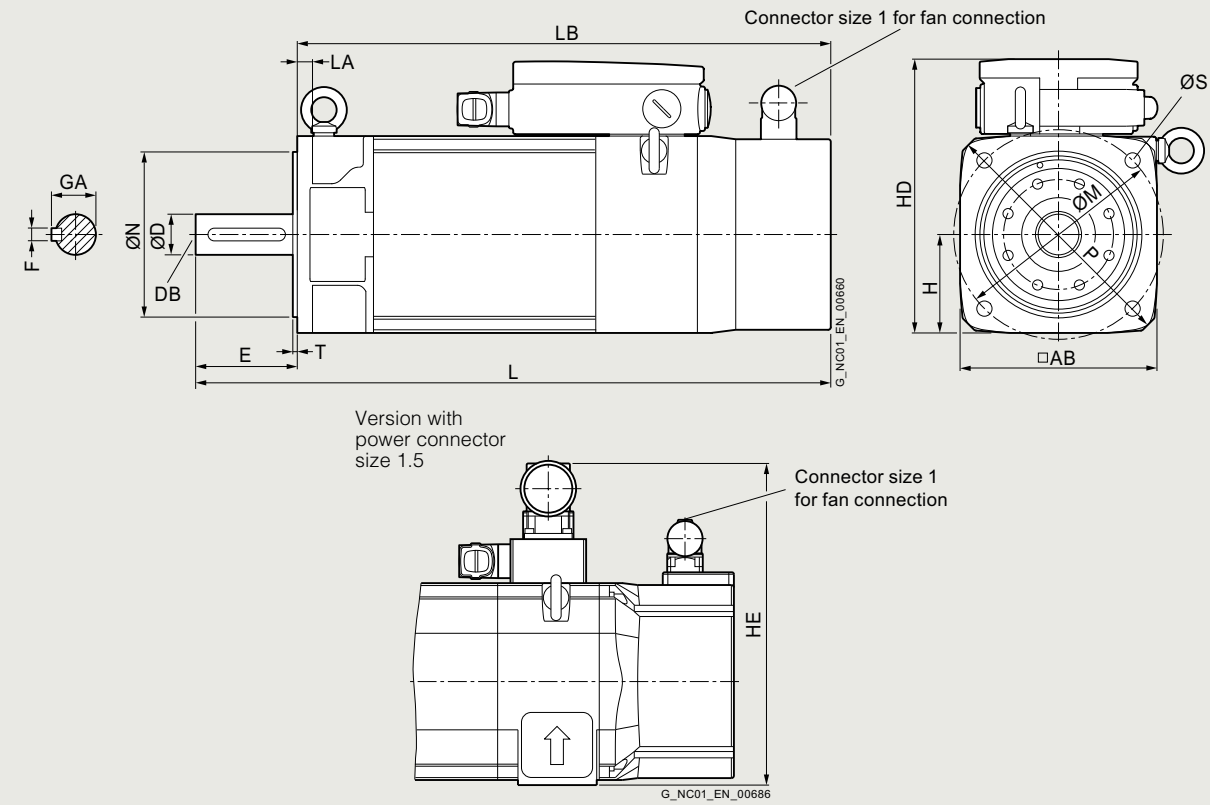
						Shaft end DE				
Shaft height	Type	IEC	L	LB	K	**D**	DB	E	F	GA
80	1PH8083		455 (17.91)	375 (14.76)	10 (0.39)	**32 (1.26)**	M12	80 (3.15)	10 (0.39)	35 (1.38)
	1PH8087		505 (19.88)	425 (16.73)						

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SIMOTICS M-1PH8 asynchronous motors – SH 80 – forced ventilation

Dimensional drawings

1PH808

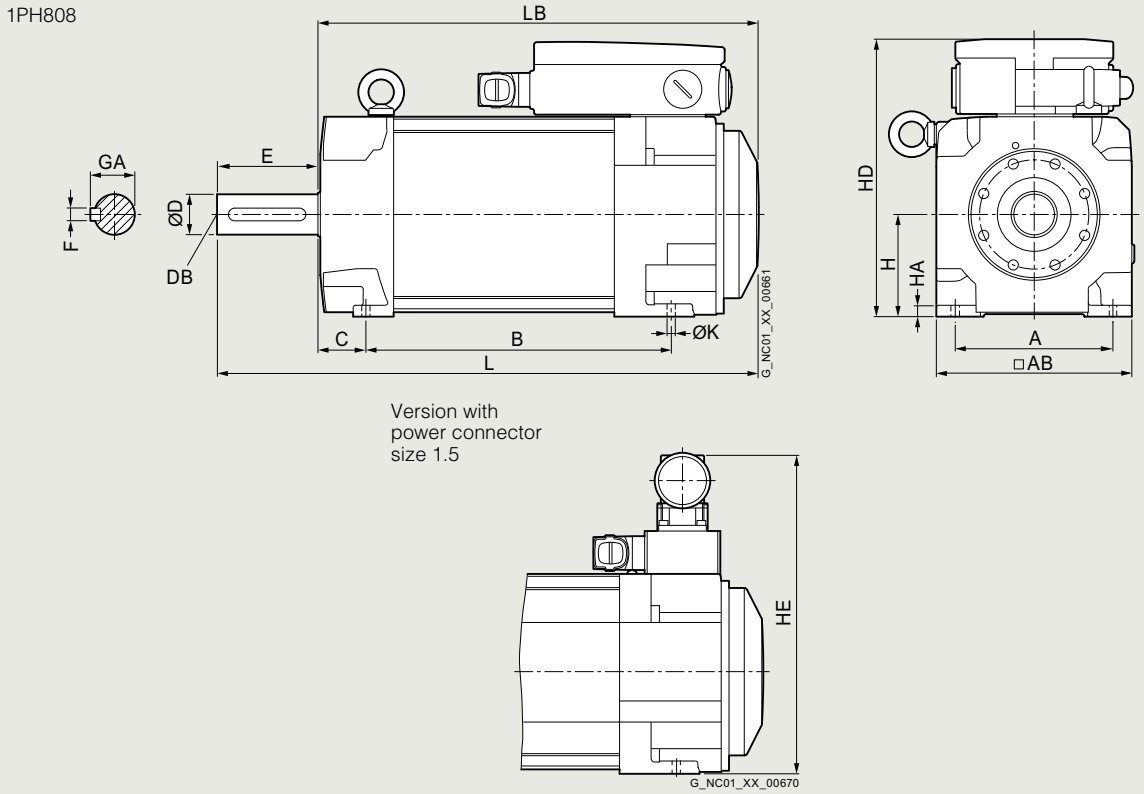


For motor		Dimensions in mm (inches)									
Shaft height	Type	IEC	AB	H	HD	HE	L	LA	LB	M	N
SIMOTICS M-1PH8, type of construction IM B5, forced ventilation											
80	1PH8083		155 (6.10)	77.5 (3.05)	213.5 (8.41)	251 (9.88)	381.5 (15.02)	12 (0.47)	301.5 (6.57)	165 (6.50)	130 (5.12)
	1PH8087						431.5 (16.99)		351.5 (7.97)		

						Shaft end DE				
Shaft height	Type	IEC	P	S	T	**D**	DB	E	F	GA
80	1PH8083		200 (7.87)	12 (0.47)	3.5 (0.14)	**38 (1.50)**	M12	80 (3.15)	10 (0.39)	35 (1.38)
	1PH8087									

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Dimensional drawings



For motor		Dimensions in mm (inches)								
Shaft height	Type	IEC	A	AB	B	C	H	HA	HD	HE
SIMOTICS M-1PH8, type of construction IM B3, water cooling										
80	1PH8083		125 (4.92)	155 (6.10)	194 (7.64)	38 (1.50)	80 (3.15)	8 (0.31)	216 (8.50)	253.5 (9.98)
	1PH8087				244 (9.61)					

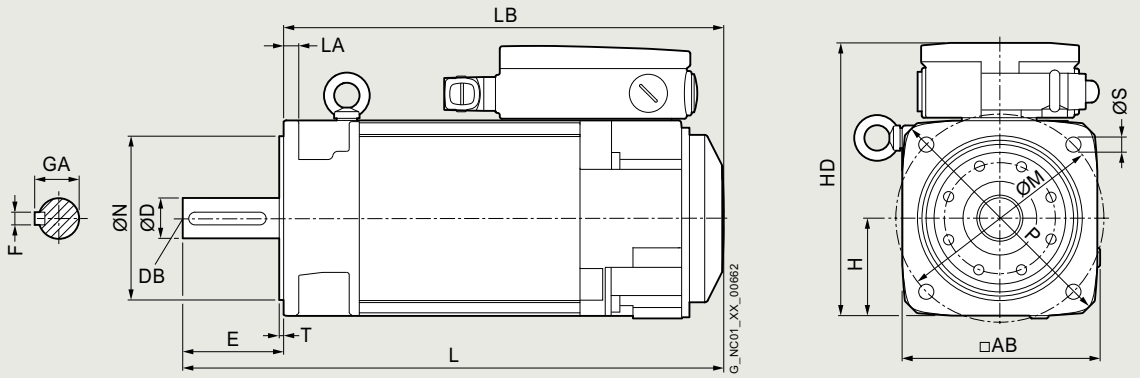
						Shaft end DE				
Shaft height	Type	IEC	K	L	LB	**D**	DB	E	F	GA
80	1PH8093		10 (0.39)	381.5 (15.02)	301.5 (11.87)	**38 (1.50)**	M12	80 (3.15)	10 (0.39)	35 (1.38)
	1PH8087			431.5 (16.99)	351.5 (13.84)					

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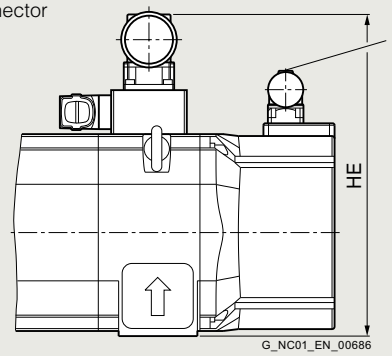
SIMOTICS M-1PH8 asynchronous motors – SH 80 – water cooling

Dimensional drawings

1PH808



Version with power connector size 1.5

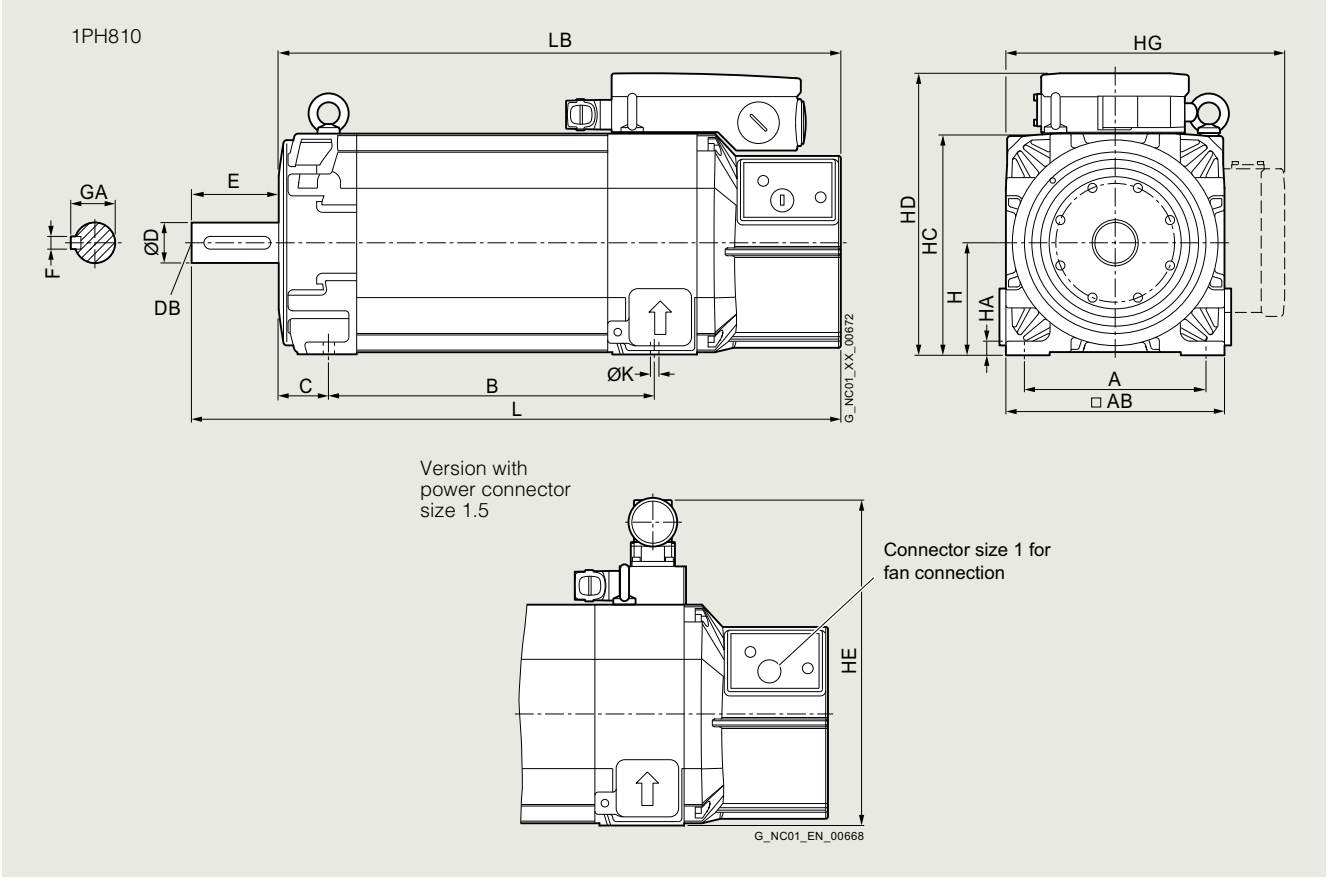


For motor		Dimensions in mm (inches)									
Shaft height	Type	IEC	AB	H	HD	HE	L	LA	LB	M	N
SIMOTICS M-1PH8, type of construction IM B5, water cooling											
80	1PH8083 1PH8087		155 (6.10)	77.5 (3.05)	213.5 (8.41)	251 (9.88)	381.5 (15.02) 431.5 (16.99)	12 (0.47)	301.5 (11.87) 351.5 (13.84)	165 (6.50)	130 (5.12)

						Shaft end DE				
Shaft height	Type	IEC	P	S	T	**D**	DB	E	F	GA
80	1PH8083 1PH8087		200 (7.87)	12 (0.47)	3.5 (0.14)	**32 (1.26)**	M12	80 (3.15)	10 (0.39)	35 (1.38)

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Dimensional drawings



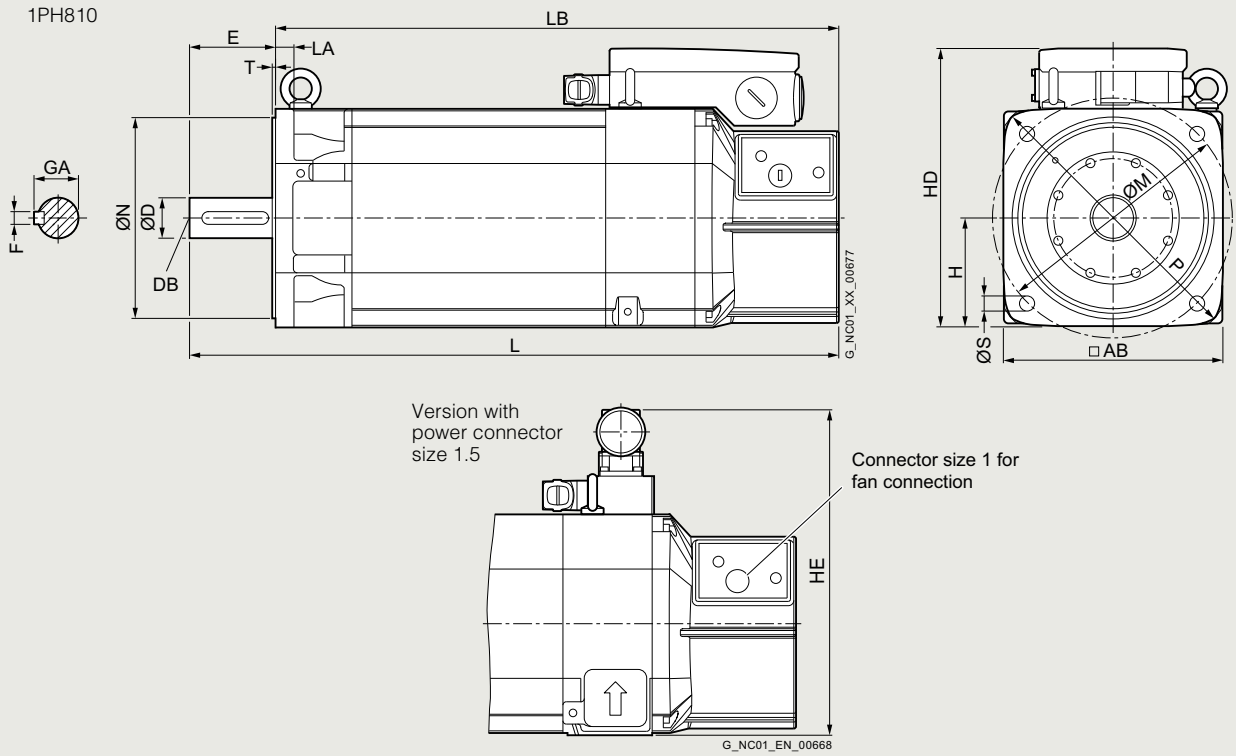
For motor		Dimensions in mm (inches)								
Shaft height	Type	IEC A	AB	C	B	H	HA	HC	HD	HE
SIMOTICS M-1PH8, type of construction IM B3, forced ventilation										
100	1PH8101	160 (6.30)	196 (7.72)	43 (1.69)	167 (6.57)	100 (3.94)	11 (0.43)	198 (7.80)	252 (9.92)	294 (11.57)
	1PH8103				202.5 (7.97)					
	1PH8105				262 (10.31)					
	1PH8107				297.5 (11.71)					

						Shaft end DE				
Shaft height	Type	IEC HG	L	K	LB	**D**	DB	E	F	GA
100	1PH8101	276.5 (10.89)	449.5 (17.70)	12 (0.47)	369.5 (14.55)	**38 (1.50)**	M12	80 (3.15)	10 (0.39)	41 (1.61)
	1PH8103		485 (19.09)		405 (15.94)					
	1PH8105		544.5 (21.44)		464.5 (18.29)					
	1PH8107		580 (22.83)		500 (19.69)					

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SIMOTICS M-1PH8 asynchronous motors – SH 100 – forced ventilation

Dimensional drawings

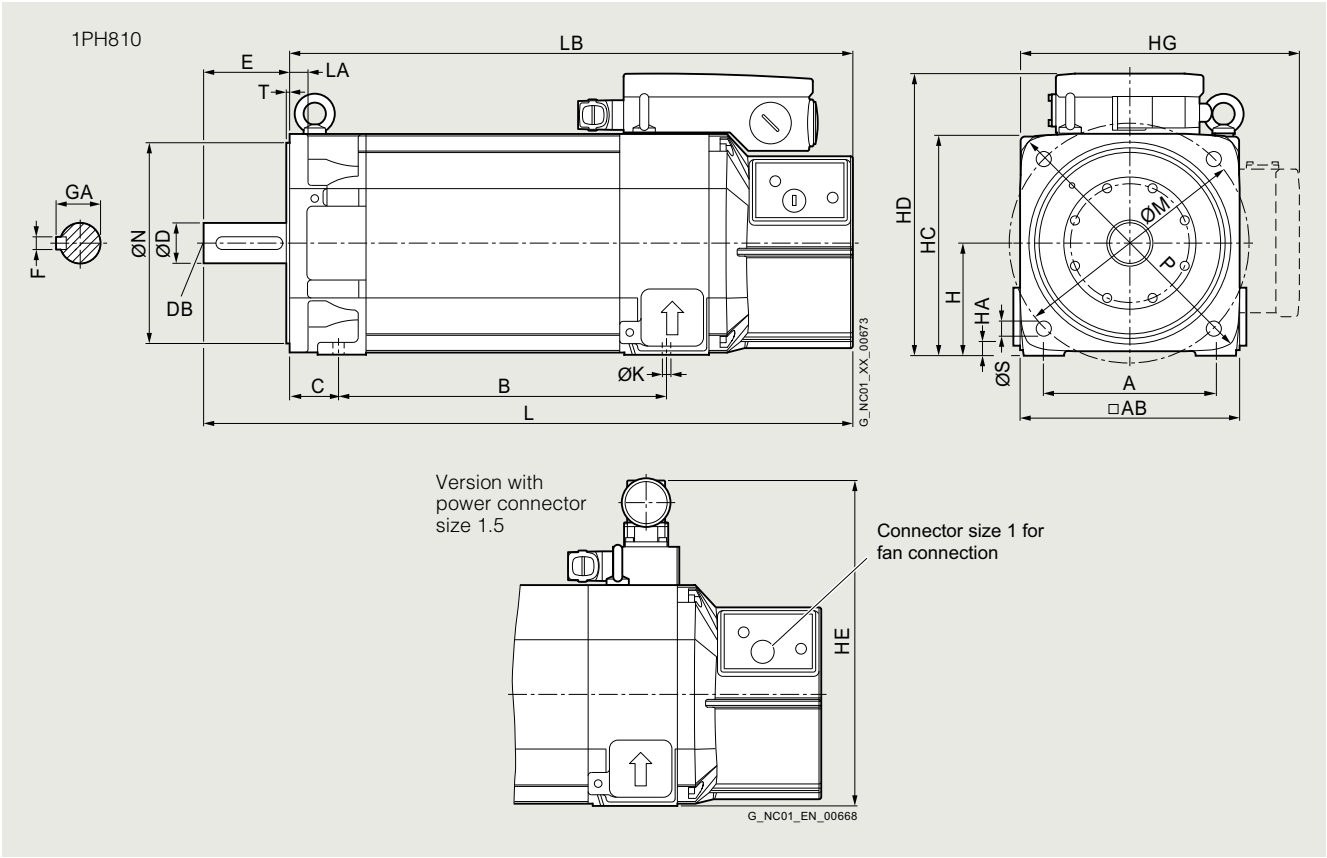


For motor		Dimensions in mm (inches)									
Shaft height	Type	IEC	AB	H	HD	HE	L	LA	LB	M	N
SIMOTICS M-1PH8, type of construction IM B5, forced ventilation											
100	1PH8101		196 (7.72)	98 (3.86)	250 (9.84)	292 (11.50)	449.5 (17.70)	16 (0.63)	369.5 (14.55)	215 (8.46)	180 (7.09)
	1PH8103						485 (19.09)		405 (15.94)		
	1PH8105						544.5 (21.44)		464.5 (18.29)		
	1PH8107						580 (22.83)		500 (19.69)		

					Shaft end DE				
Shaft height	Type	IEC	P	S	T	**D**	DB	E	F	GA
100	1PH8101		250 (9.84)	14 (0.55)	4 (0.16)	**38 (1.50)**	M12	80 (3.15)	10 (0.39)	41 (1.61)
	1PH8103									
	1PH8105									
	1PH8107									

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Dimensional drawings



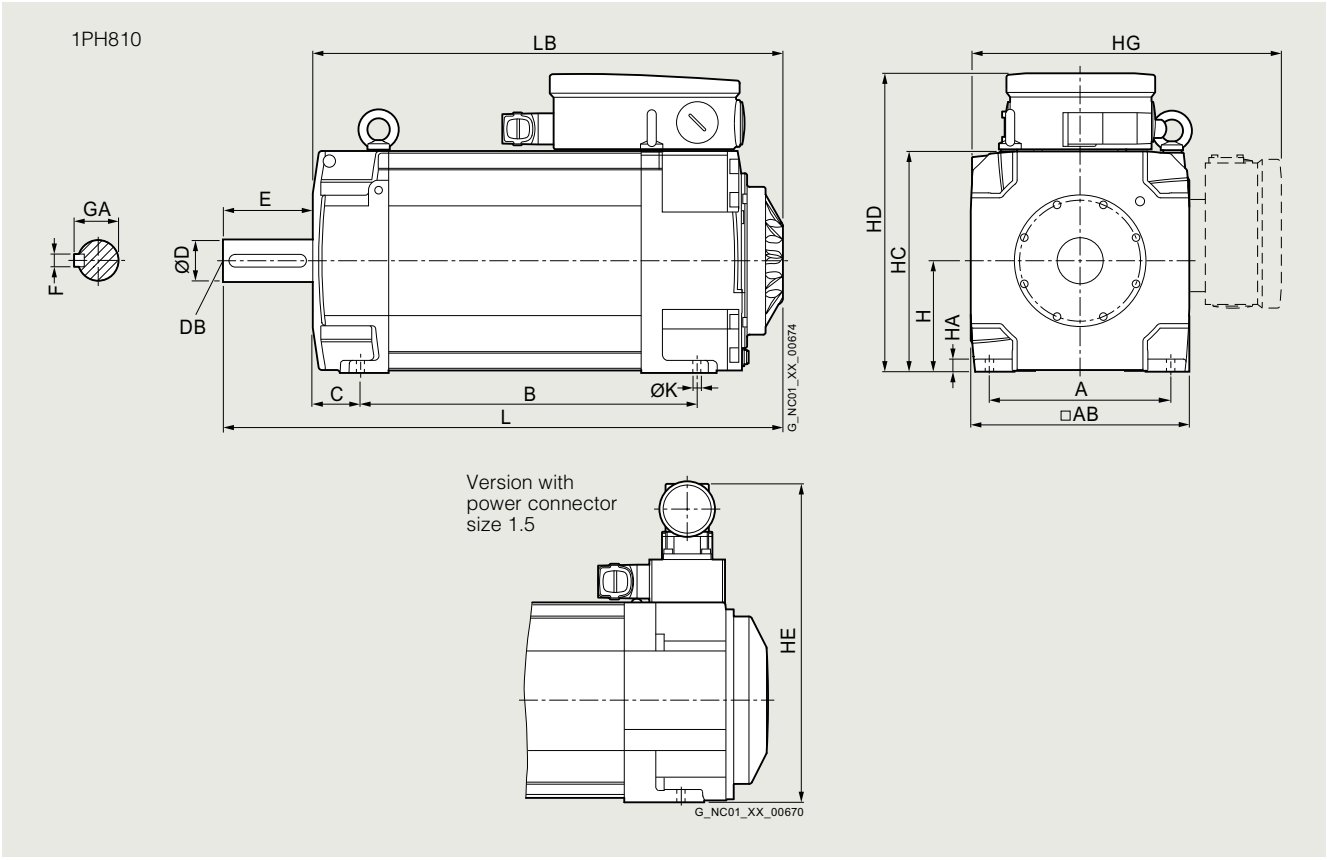
For motor		Dimensions in mm (inches)											
Shaft height	Type	IEC A	AB	B	C	H	HA	HC	HD	HE	HG	K	L
SIMOTICS M-1PH8, type of construction IM B35, forced ventilation													
100	1PH8101	160 (6.30)	196 (7.72)	167 (6.57)	43 (1.69)	100 (3.94)	11 (0.43)	198 (7.80)	252 (9.92)	294 (11.57)	276.5 (10.89)	12 (0.47)	449.5 (17.70)
	1PH8103			202.5 (7.97)									485 (19.09)
	1PH8105			262 (10.31)									544.5 (21.44)
	1PH8107			297.5 (11.71)									580 (22.83)

									Shaft end DE				
Shaft height	Type	IEC LA	LB	M	N	P	S	T	**D**	DB	E	F	GA
100	1PH8101	16 (0.63)	369.5 (14.55)	215 (8.46)	180 (7.09)	250 (9.84)	14 (0.55)	4 (0.16)	**38 (1.50)**	M12	80 (3.15)	10 (0.39)	41 (1.61)
	1PH8103		405 (15.94)										
	1PH8105		464.5 (18.29)										
	1PH8107		500 (19.69)										

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SIMOTICS M-1PH8 asynchronous motors – SH 100 – water cooling

Dimensional drawings



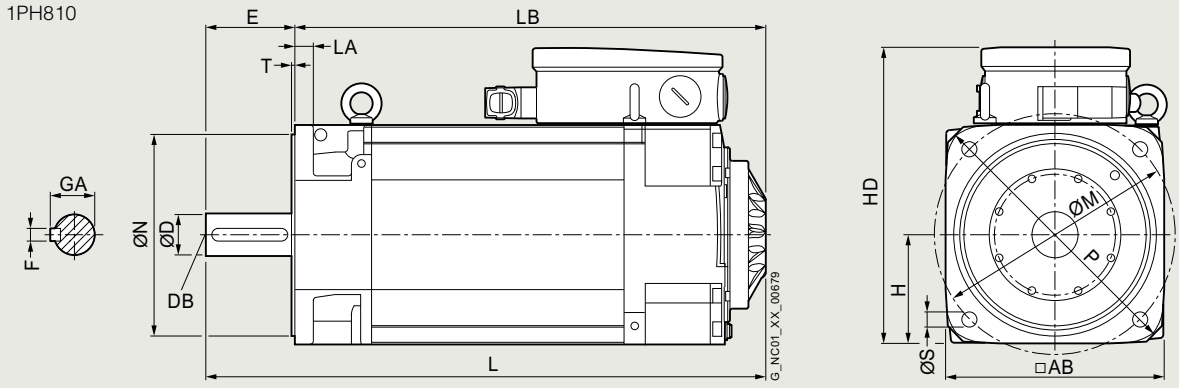
For motor		Dimensions in mm (inches)									
Shaft height	Type	IEC	A	AB	B	C	H	HA	HC	HD	HE
SIMOTICS M-1PH8, type of construction IM B3, water cooling											
100	1PH8101		160 (6.30)	196 (7.72)	167 (6.57)	43 (1.69)	100 (3.94)	11 (0.43)	198 (7.80)	266.5 (10.49)	294 (11.57)
	1PH8103				202.5 (7.97)						
	1PH8105				262 (10.31)						
	1PH8107				297.5 (11.71)						

							Shaft end DE				
Shaft height	Type	IEC	HG	K	L	LB	**D**	DB	E	F	GA
100	1PH8101		276.5 (10.89)	12 (0.47)	369.5 (14.55)	289.5 (11.40)	**38 (1.50)**	M12	80 (3.15)	10 (0.39)	41 (1.61)
	1PH8103				405 (15.94)	325 (12.80)					
	1PH8105				464.5 (18.29)	384.5 (15.14)					
	1PH8107				500 (19.69)	420 (16.54)					

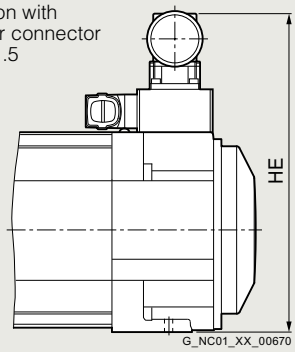
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Dimensional drawings

1PH810



Version with power connector size 1.5



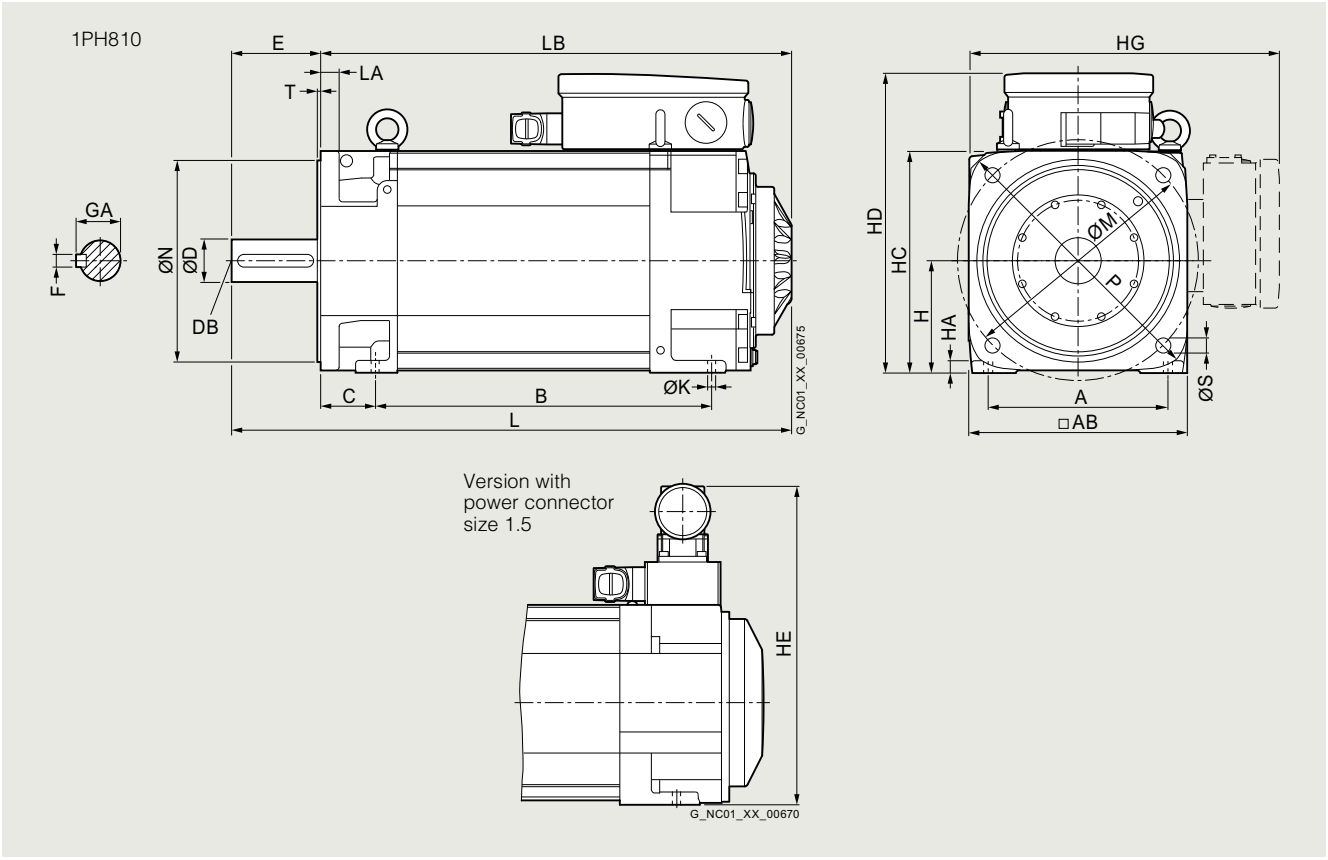
For motor		Dimensions in mm (inches)									
Shaft height	Type	IEC	AB	H	HD	HE	L	LA	LB	M	N
SIMOTICS M-1PH8, type of construction IM B5, water cooling											
100	1PH8101		196 (7.72)	98 (3.86)	264.5 (10.41)	292 (11.50)	369.5 (14.55)	16 (0.63)	289.5 (11.40)	215 (8.46)	180 (7.09)
	1PH8103						405 (15.94)		325 (12.80)		
	1PH8105						464.5 (18.29)		384.5 (15.14)		
	1PH8107						500 (19.69)		420 (16.54)		

						Shaft end DE				
Shaft height	Type	IEC	P	S	T	**D**	DB	E	F	GA
100	1PH8101		250 (9.84)	14 (0.55)	4 (0.16)	**38 (1.50)**	M12	80 (3.15)	10 (0.39)	41 (1.61)
	1PH8103									
	1PH8105									
	1PH8107									

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SIMOTICS M-1PH8 asynchronous motors – SH 100 – water cooling

Dimensional drawings

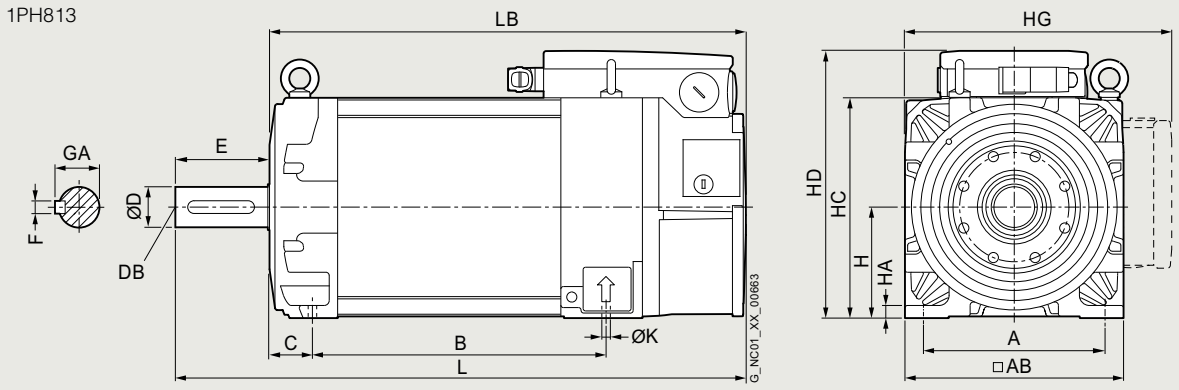


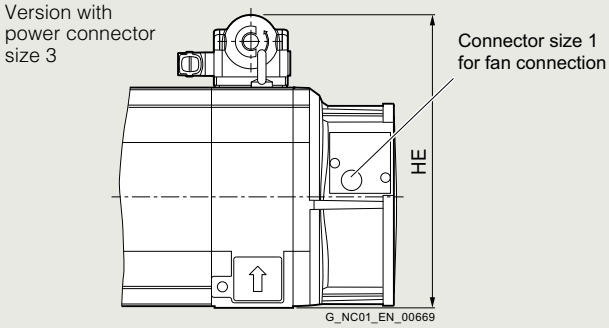
For motor		Dimensions in mm (inches)												
Shaft height	Type	IEC	A	AB	B	C	H	HA	HC	HD	HE	HG	K	L
SIMOTICS M-1PH8, type of construction IM B35, water cooling														
100	1PH8101		160 (6.30)	196 (7.72)	167 (6.57)	43 (1.69)	100 (3.94)	11 (0.43)	198 (7.80)	266.5 (10.49)	294 (11.57)	276.5 (10.89)	12 (0.47)	369.5 (14.55)
	1PH8103				202.5 (7.97)									405 (15.94)
	1PH8105				262 (10.31)									464.5 (18.29)
	1PH8107				297.5 (11.71)									500 (19.69)

									Shaft end DE				
Shaft height	Type	IEC	LA	LB	M	N	P	S	T	**D**	DB	E	F	GA
100	1PH8101		16 (0.63)	289.5 (11.40)	215 (8.46)	180 (7.09)	250 (9.84)	14 (0.55)	4 (0.16)	**38 (1.50)**	M12	80 (3.15)	10 (0.39)	41 (1.61)
	1PH8103			325 (12.80)										
	1PH8105			384.5 (15.14)										
	1PH8107			420 (16.54)										

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Dimensional drawings





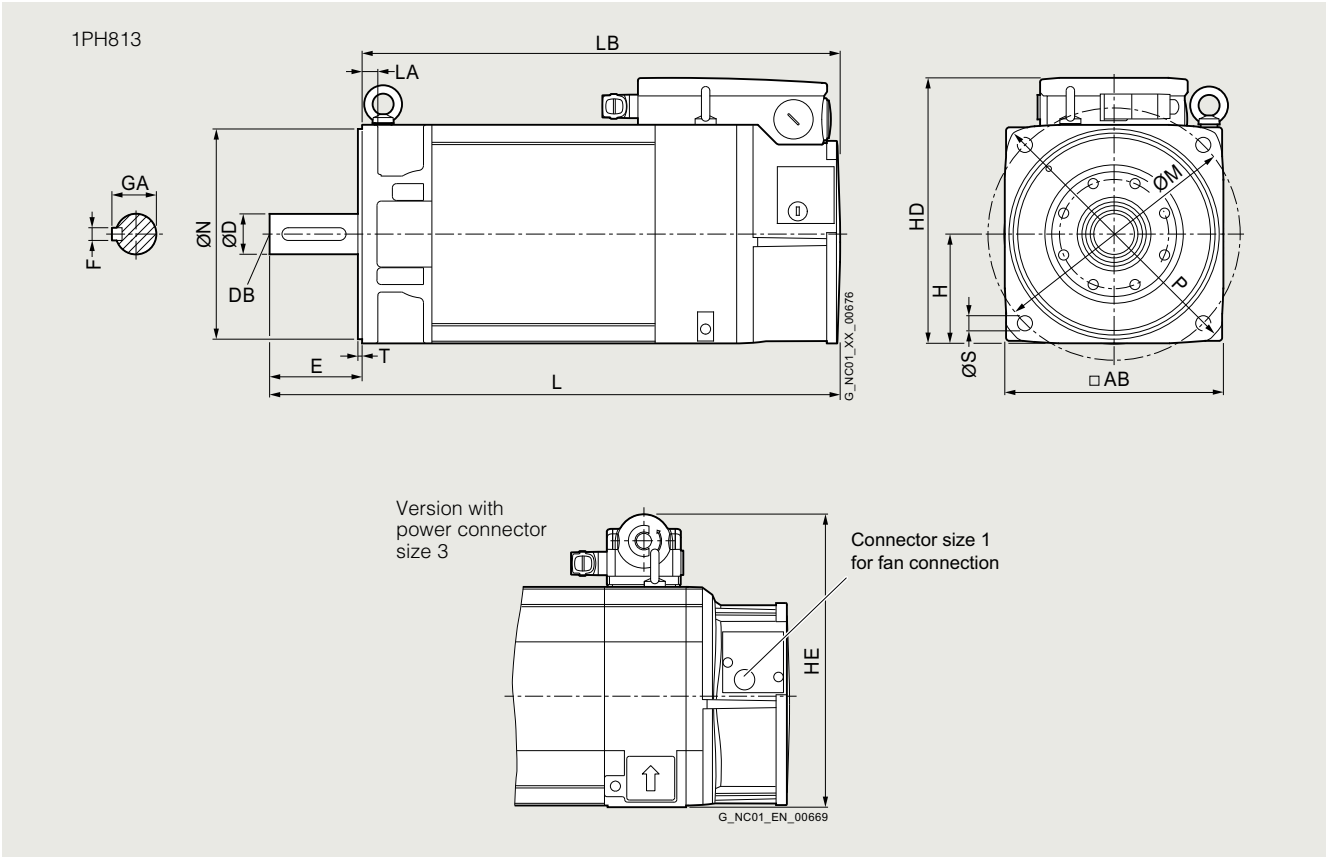
For motor		Dimensions in mm (inches)									
Shaft height	Type	IEC	A	AB	B	C	H	HA	HC	HD	HE
SIMOTICS M-1PH8, type of construction IM B3, forced ventilation											
132	1PH8131		216 (8.50)	260 (10.24)	220.5 (8.68)	53 (2.09)	132 (5.20)	15 (0.59)	262 (10.31)	317.5 (12.50)	347 (13.66)
	1PH8133				265.5 (10.45)						
	1PH8135				310.5 (12.22)						
	1PH8137				350.5 (13.80)						

						Shaft end DE				
Shaft height	Type	IEC	HG	K	L	LB	**D**	DB	E	F	GA
132	1PH8131		357.5 (14.07)	12 (0.47)	549 (21.61)	439 (17.28)	**48 (1.89)**	M16	110 (4.33)	14 (0.55)	51.5 (2.03)
	1PH8133				594 (23.39)	484 (19.06)					
	1PH8135				639 (25.16)	529 (20.83)					
	1PH8137				679 (26.73)	569 (22.40)					

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SIMOTICS M-1PH8 asynchronous and synchronous motors – SH 132 – forced ventilation

Dimensional drawings

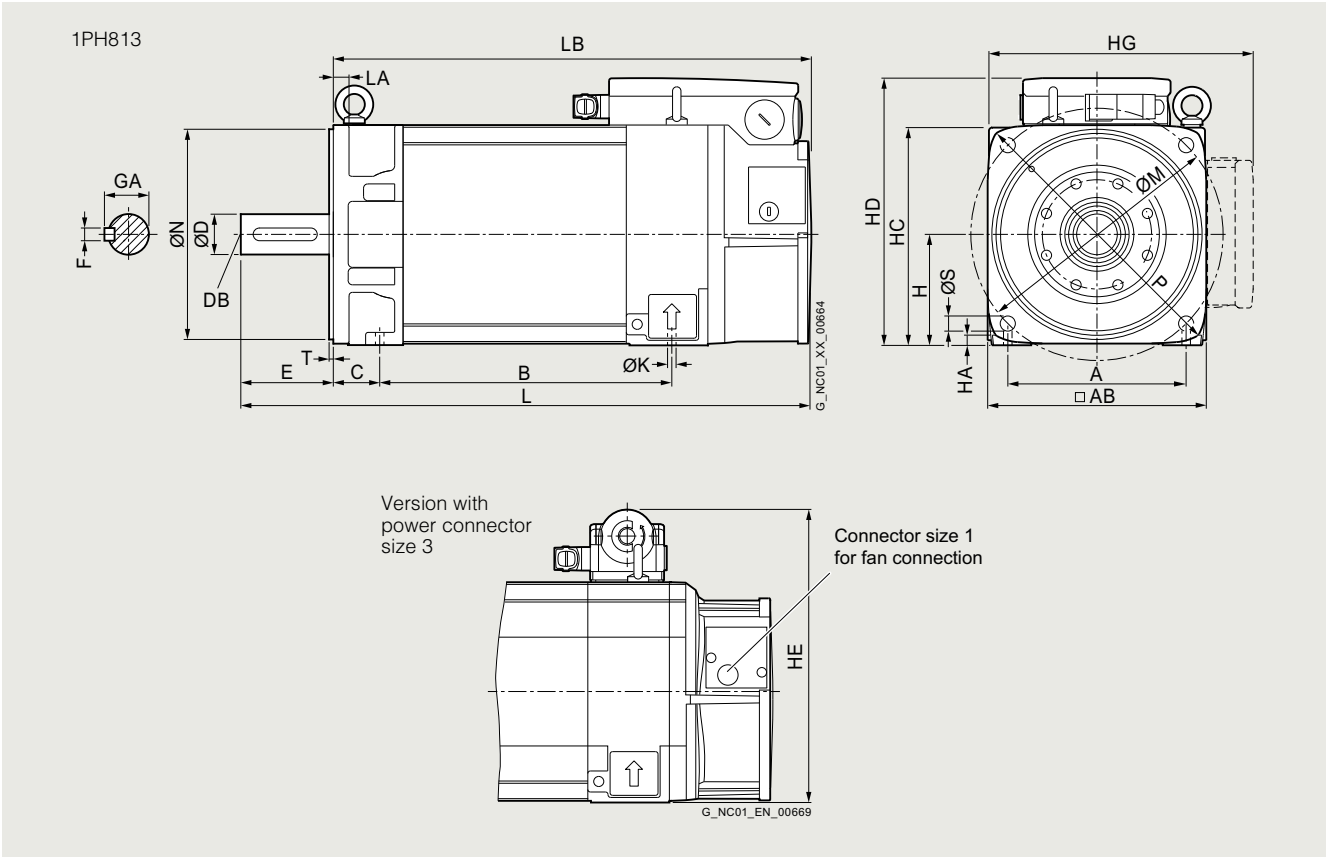


For motor		Dimensions in mm (inches)									
Shaft height	Type	IEC	AB	H	HD	HE	L	LA	LB	M	N
SIMOTICS M-1PH8, type of construction IM B5, forced ventilation											
132	1PH8131		260 (10.24)	130 (5.12)	315.5 (12.42)	345 (13.58)	549 (21.61)	18 (0.71)	439 (17.28)	300 (11.81)	250 (9.84)
	1PH8133						594 (23.39)		484 (19.06)		
	1PH8135						639 (25.16)		529 (20.83)		
	1PH8137						679 (26.73)		569 (22.40)		

						Shaft end DE				
Shaft height	Type	IEC	P	S	T	**D**	DB	E	F	GA
132	1PH8131		340 (13.39)	18 (0.71)	5 (0.20)	**48 (1.89)**	M16	110 (4.33)	14 (0.55)	51.5 (2.03)
	1PH8133									
	1PH8135									
	1PH8137									

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Dimensional drawings



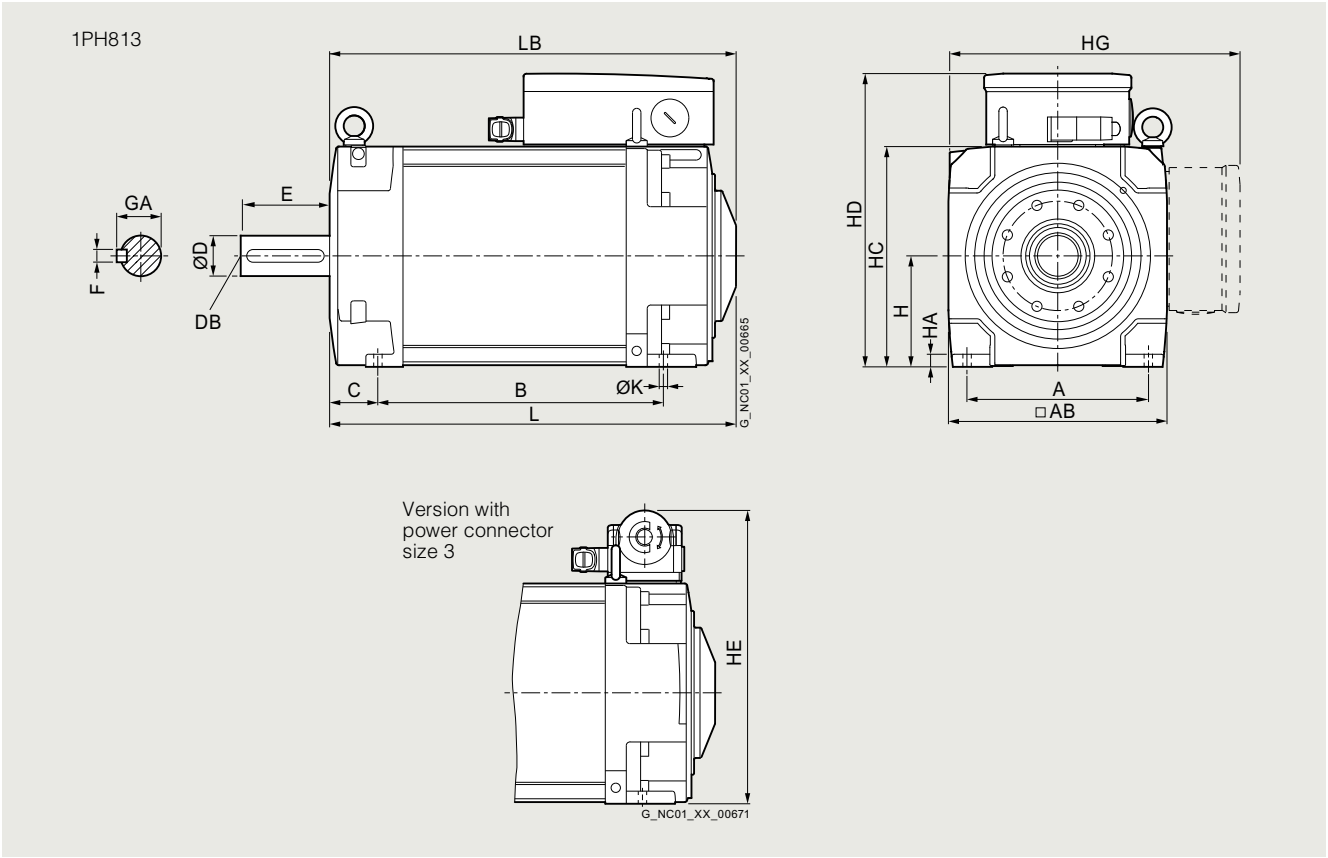
For motor		Dimensions in mm (inches)												
Shaft height	Type	IEC	A	AB	B	C	H	HA	HC	HD	HE	HG	K	L
SIMOTICS M-1PH8, type of construction IM B35, forced ventilation														
132	1PH8131		216 (8.50)	260 (10.24)	220.5 (8.68)	53 (2.09)	132 (5.20)	15 (0.59)	262 (10.31)	317.5 (12.50)	347 (13.66)	357.5 (14.07)	12 (0.47)	549 (21.61)
	1PH8133				265.5 (10.45)									594 (23.39)
	1PH8135				310.5 (12.22)									639 (25.16)
	1PH8137				350.5 (13.80)									679 (26.73)

Shaft height	Type	IEC	LA	LB	M	N	P	S	T	Shaft end DE **D**	DB	E	F	GA
132	1PH8131		18 (0.71)	439 (17.28)	300 (11.81)	250 (9.84)	340 (13.39)	18 (0.71)	5 (0.20)	**48 (1.89)**	M16	110 (4.33)	14 (0.55)	51.5 (2.03)
	1PH8133			484 (19.06)										
	1PH8135			529 (20.83)										
	1PH8137			569 (22.40)										

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SIMOTICS M-1PH8 asynchronous and synchronous motors – SH 132 – water cooling

Dimensional drawings



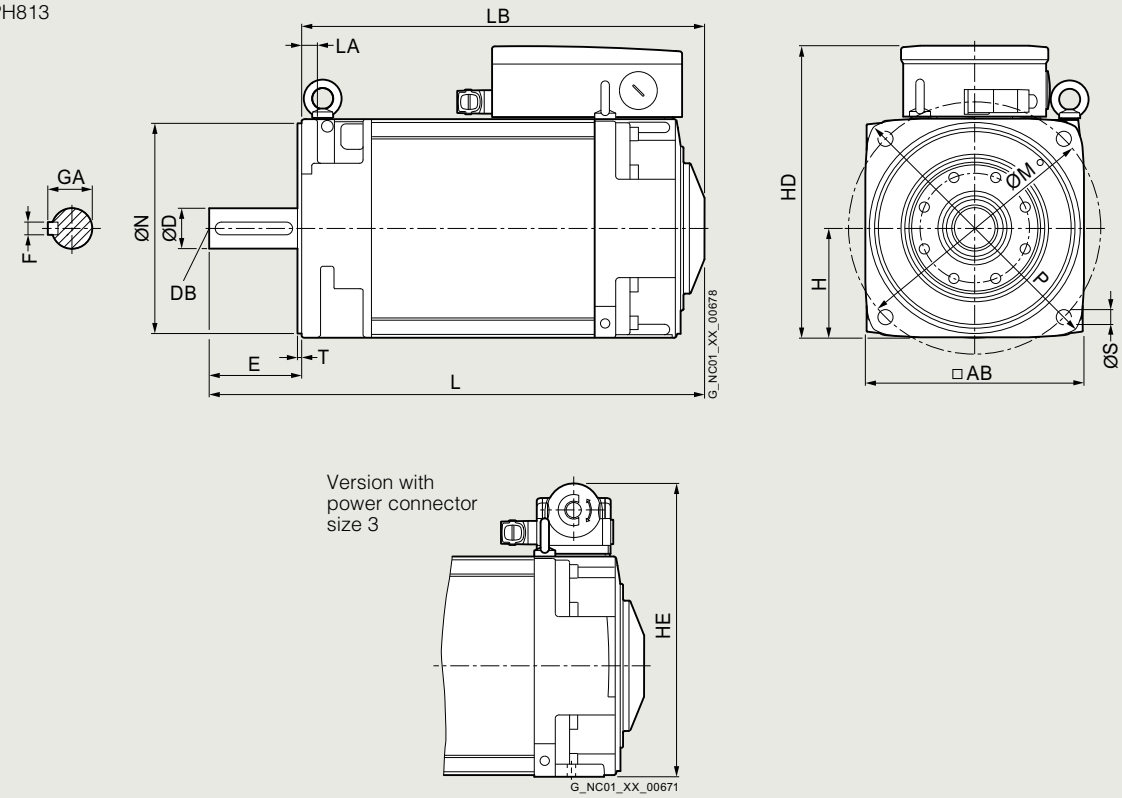
For motor		Dimensions in mm (inches)								
Shaft height	Type	IEC A	AB	B	C	H	HA	HC	HD	HE
SIMOTICS M-1PH8, type of construction IM B3, water cooling										
132	1PH8131	216 (8.50)	260 (10.24)	220.5 (8.68)	53 (2.09)	132 (5.20)	15 (0.59)	262 (10.31)	347.5 (13.68)	347 (13.66)
	1PH8133			265.5 (10.45)						
	1PH8135			310.5 (12.22)						
	1PH8137/ 1PH8138			350.5 (13.80)						

						Shaft end DE				
Shaft height	Type	IEC HG	K	L	LB	**D**	DB	E	F	GA
132	1PH8131	357.5 (14.07)	12 (0.47)	457.5 (18.01)	347.5 (13.68)	**48 (1.89)**	M16	110 (4.33)	14 (0.55)	51.5 (2.03)
	1PH8133			502.5 (19.78)	392.5 (15.45)					
	1PH8135			547.5 (21.56)	437.5 (17.22)					
	1PH8137/ 1PH8138			587.5 (23.13)	477.5 (18.80)					

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Dimensional drawings

1PH813



For motor — Dimensions in mm (inches)

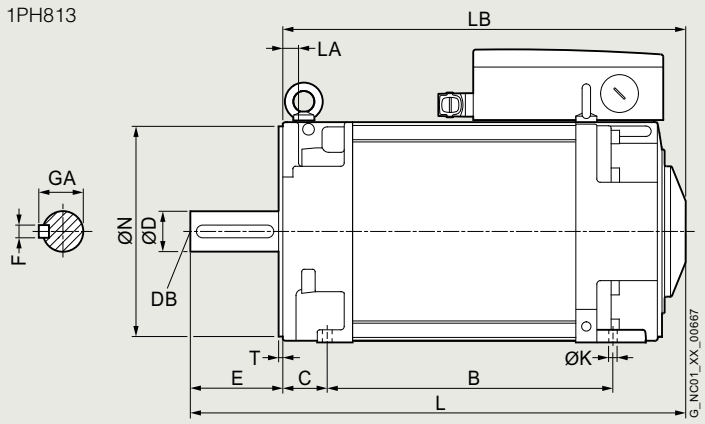
Shaft height	Type	IEC	AB	H	HD	HE	L	LA	LB	M	N
SIMOTICS M-1PH8, type of construction IM B5, water cooling											
132	1PH8131		260 (10.24)	132 (5.20)	345.5 (13.60)	345 (13.58)	457.5 (18.01)	18 (0.71)	347.5 (13.68)	300 (11.81)	250 (9.84)
	1PH8133						502.5 (19.78)		392.5 (15.45)		
	1PH8135						547.5 (21.56)		437.5 (17.22)		
	1PH8137/ 1PH8138						587.5 (23.13)		477.5 (18.80)		

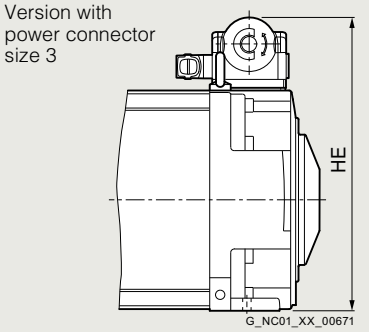
Shaft height	Type	IEC	P	S	T	Shaft end DE **D**	DB	E	F	GA
132	1PH8131		340 (13.39)	18 (0.71)	5 (0.20)	**48 (1.89)**	M16	110 (4.33)	14 (0.55)	51.5 (2.03)
	1PH8133									
	1PH8135									
	1PH8137/ 1PH8138									

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SIMOTICS M-1PH8 asynchronous and synchronous motors – SH 132 – water cooling

Dimensional drawings



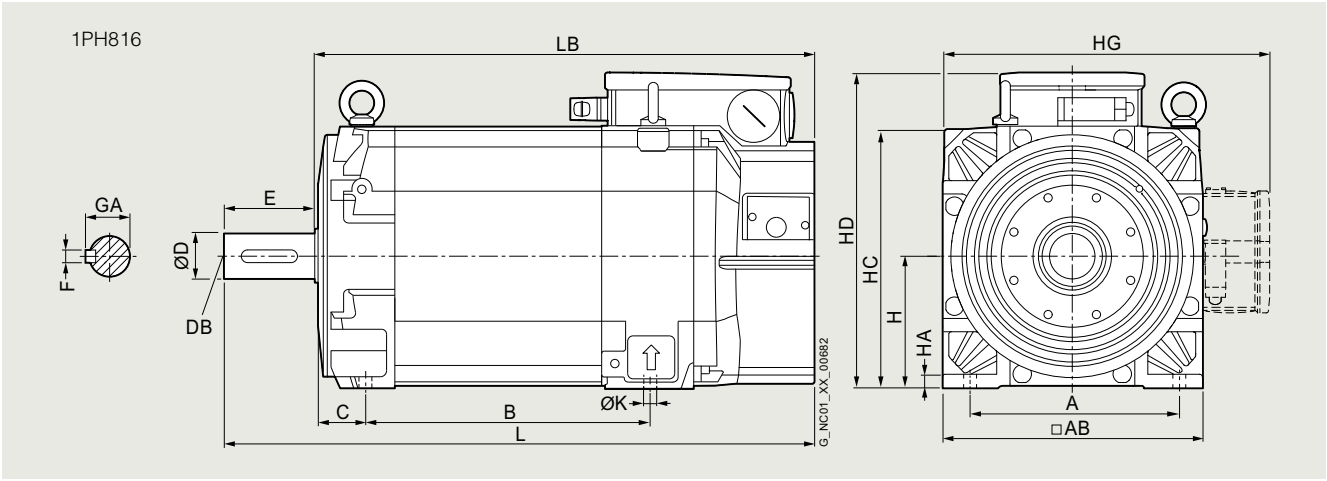


For motor		Dimensions in mm (inches)												
Shaft height	Type	IEC	A	AB	B	C	H	HA	HC	HD	HE	HG	K	L
SIMOTICS M-1PH8, type of construction IM B35, water cooling														
132	1PH8131		216 (8.50)	260 (10.24)	220.5 (8.68)	53 (2.09)	132 (5.20)	15 (0.59)	262 (10.31)	347.5 (13.68)	347 (13.66)	357.5 (14.07)	12 (0.47)	457.5 (18.01)
	1PH8133				265.5 (10.45)									502.5 (19.78)
	1PH8135				310.5 (12.22)									547.5 (21.56)
	1PH8137/ 1PH8138				350.5 (13.80)									587.5 (23.13)

									Shaft end DE				
Shaft height	Type	IEC	LA	LB	M	N	P	S	T	**D**	DB	E	F	GA
132	1PH8131		18 (0.71)	347.5 (13.68)	300 (11.81)	250 (9.84)	340 (13.39)	18 (0.71)	5 (0.20)	**48 (1.89)**	M16	110 (4.33)	14 (0.55)	51.5 (2.03)
	1PH8133			392.5 (15.45)										
	1PH8135			437.5 (17.22)										
	1PH8137/ 1PH8138			477.5 (18.80)										

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Dimensional drawings



For motor — Dimensions in mm (inches)

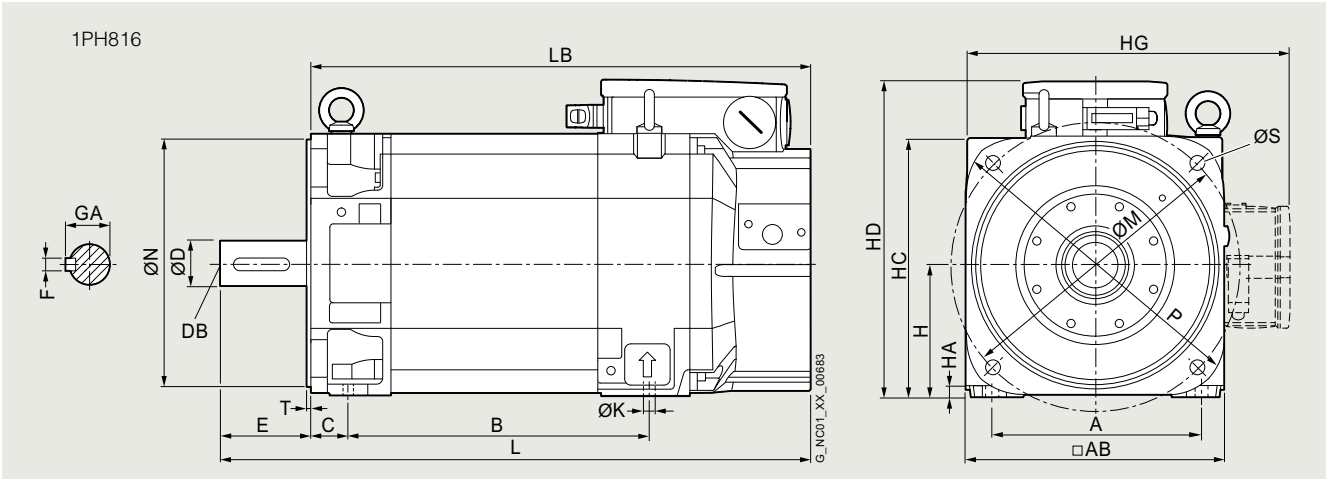
Shaft height	Type	IEC	A	AB	B	C	H	HA	HC	HD	HG
SIMOTICS M-1PH8, type of construction IM B3, forced ventilation											
160	1PH8163		254 (10.00)	314 (12.36)	346.5 (13.64)	61 (2.40)	160 (6.30)	17 (0.67)	317 (12.48)	382.5 (15.06)	412.5 (16.24)
	1PH8165				406.5 (16.00)						

Shaft height	Type	IEC	K	L	LB	Shaft end DE **D**	DB	E	F	GA
160	1PH8163		14 (0.55)	720.5 (28.37)	610.5 (24.04)	**55 (2.17)**	M20	110 (4.33)	16 (0.63)	59 (2.32)
	1PH8165			780.5 (30.73)	670.5 (26.40)					

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SIMOTICS M-1PH8 asynchronous motors – SH 160 – forced ventilation

Dimensional drawings



For motor — Dimensions in mm (inches)

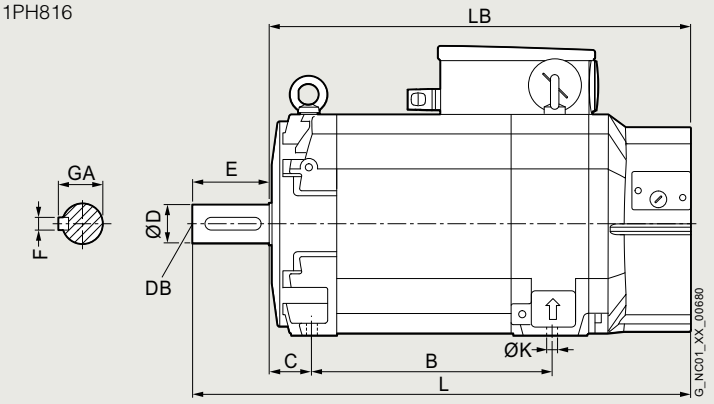
Shaft height	Type	IEC	A	AB	B	C	H	HA	HC	HD	HG	K	L
SIMOTICS M-1PH8, type of construction IM B5/IM B35, forced ventilation													
160	1PH8163		254 (10.00)	314 (12.36)	346.5 (13.64)	61 (2.40)	160 (6.30)	17 (0.67)	317 (12.48)	382.5 (15.06)	412.5 (16.24)	14 (0.55)	720.5 (28.37)
	1PH8165				406.5 (16.00)								780.5 (30.73)

Shaft height	Type	IEC	LB	M	N	P	S	T	Shaft end DE **D**	DB	E	F	GA
160	1PH8163		610.5 (24.04)	350 (13.78)	300 (11.81)	393 (15.47)	18 (0.71)	5 (0.20)	**55 (2.17)**	M20	110 (4.33)	16 (0.63)	59 (2.32)
	1PH8165		670.5 (26.40)										

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Dimensional drawings

1PH816



For motor — Dimensions in mm (inches)

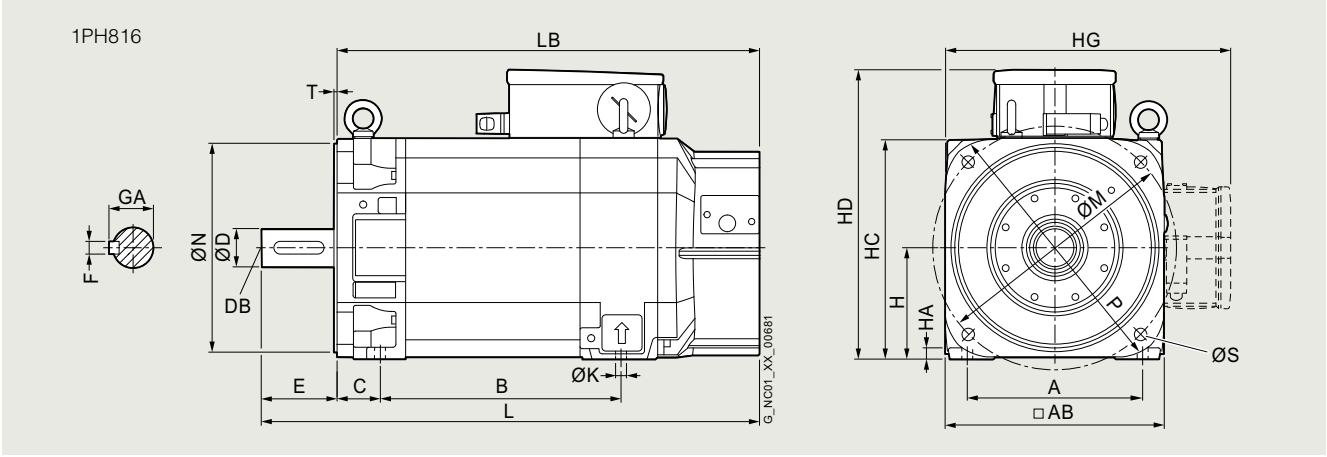
Shaft height	Type	IEC	A	AB	B	C	H	HA	HC	HD	HG
SIMOTICS M-1PH8, type of construction IM B3, forced ventilation											
160	1PH8165		254 (10.00)	314 (12.36)	406.5 (16.00)	61 (2.40)	160 (6.30)	17 (0.67)	317 (12.48)	415.5 (16.36)	412.5 (16.24)
	1PH8167				446.5 (17.58)						

Shaft height	Type	IEC	K	L	LB	Shaft end DE **D**	DB	E	F	GA
160	1PH8165		14 (0.55)	780.5 (30.73)	670.5 (26.40)	**55 (2.17)**	M20	110 (4.33)	16 (0.63)	59 (2.32)
	1PH8167			820.5 (32.30)	710.5 (27.97)					

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SIMOTICS M-1PH8 synchronous motors – SH 160 – forced ventilation

Dimensional drawings



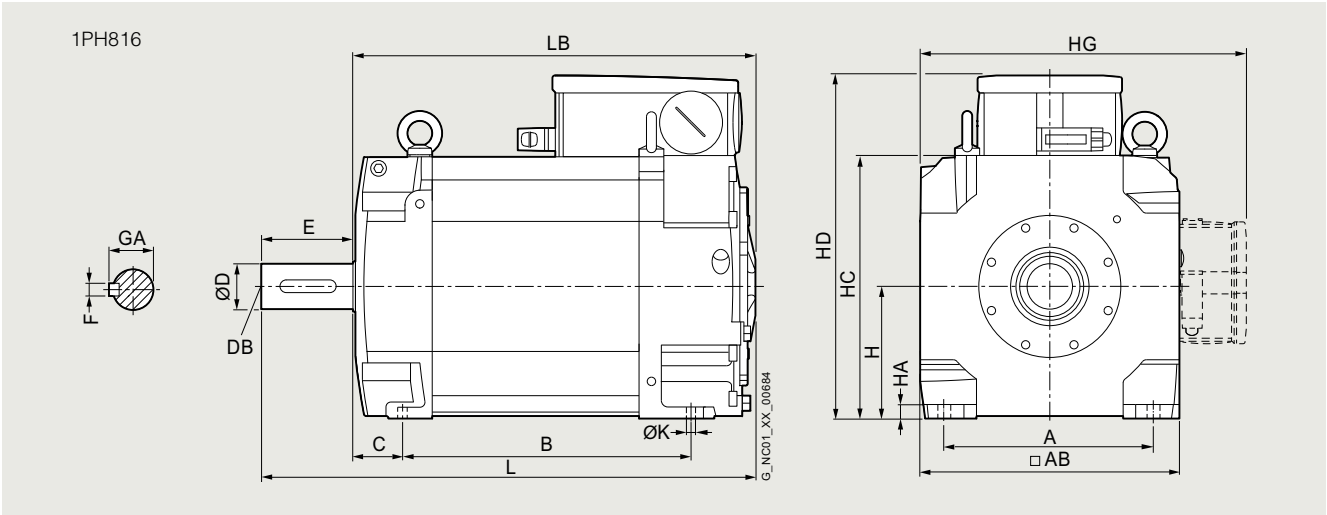
For motor — Dimensions in mm (inches)

Shaft height	Type	IEC	A	AB	B	C	H	HA	HC	HD	HG	K	L
SIMOTICS M-1PH8, type of construction IM B5/IM B35, forced ventilation													
160	1PH8165		254 (10.00)	314 (12.36)	406.5 (16.00)	61 (2.40)	160 (6.30)	17 (0.67)	317 (12.48)	415.5 (16.36)	412.5 (16.24)	14 (0.55)	780.5 (30.73)
	1PH8167				446.5 (17.58)								820.5 (32.30)

Shaft height	Type	IEC	LB	M	N	P	S	T	Shaft end DE **D**	DB	E	F	GA
160	1PH8165		670.5 (26.40)	350 (13.78)	300 (11.81)	393 (15.47)	18 (0.71)	5 (0.20)	**55 (2.17)**	M20	110 (4.33)	16 (0.63)	59 (2.32)
	1PH8167		710.5 (27.97)										

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Dimensional drawings



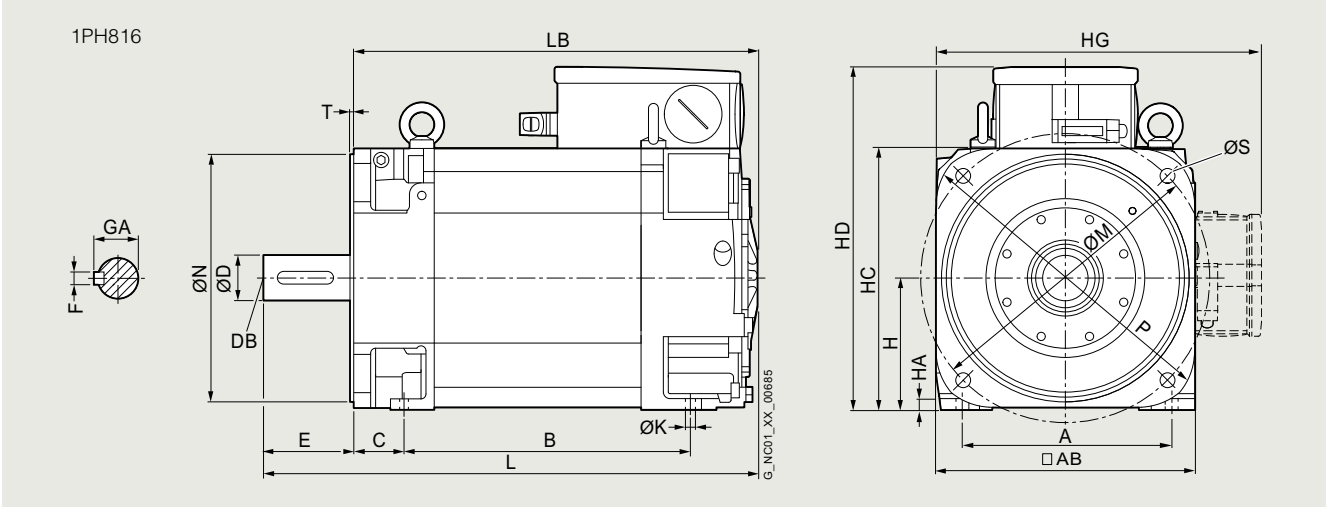
For motor		Dimensions in mm (inches)								
Shaft height	Type	IEC A	AB	B	C	H	HA	HC	HD	HG
SIMOTICS M-1PH8, type of construction IM B3, water cooling										
160	1PH8163/ 1PH8164	254 (10.00)	314 (12.36)	346.5 (13.64)	61 (2.40)	160 (6.30)	17 (0.67)	317 (12.48)	415.5 (16.36)	412.5 (16.24)
	1PH8165/ 1PH8166			406.5 (16.00)						
	1PH8168			446.5 (17.58)						

					Shaft end DE				
Shaft height	Type	IEC K	L	LB	**D**	DB	E	F	GA
160	1PH8163/ 1PH8164	14 (0.55)	598.5 (23.56)	488.5 (19.23)	**55 (2.17)**	M20	110 (4.33)	16 (0.63)	59 (2.32)
	1PH8165/ 1PH8166		658.5 (25.93)	548.5 (21.59)					
	1PH8168		698.5 (27.50)	588.5 (23.17)					

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SIMOTICS M-1PH8 asynchronous and synchronous motors – SH 160 – water cooling

Dimensional drawings



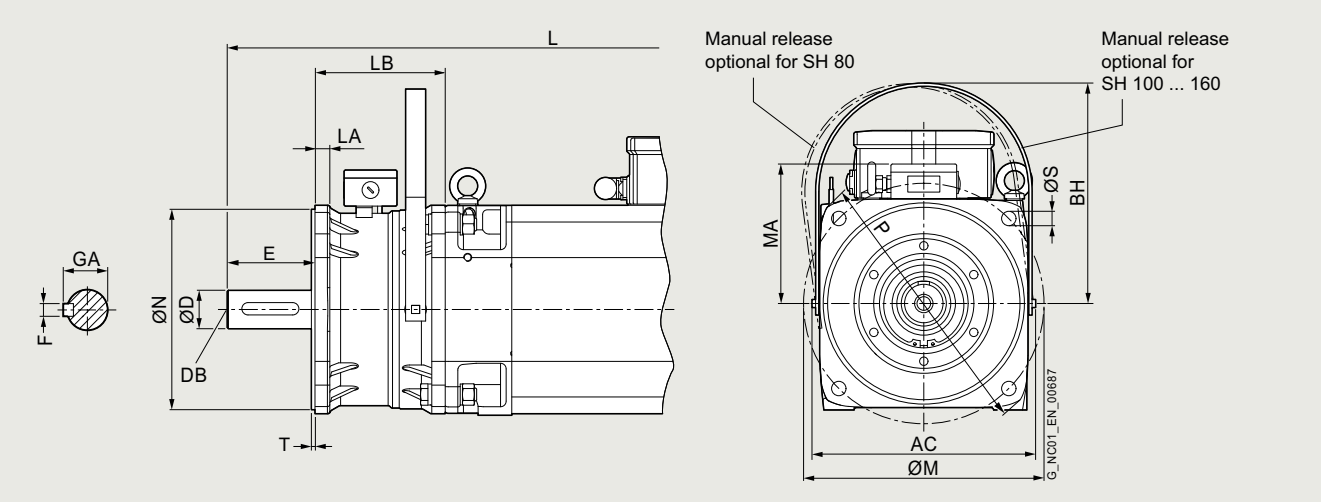
For motor — Dimensions in mm (inches)

Shaft height	Type	IEC	A	AB	B	C	H	HA	HC	HD	HG	K	L
SIMOTICS M-1PH8, type of construction IM B5/IM B35, water cooling													
160	1PH8163/ 1PH8164		254 (10.00)	314 (12.36)	346.5 (13.64)	61 (2.40)	160 (6.30)	17 (0.67)	317 (12.48)	415.5 (16.36)	412.5 (16.24)	14 (0.55)	598.5 (23.56)
	1PH8165/ 1PH8166				406.5 (16.00)								658.5 (25.93)
	1PH8168				446.5 (17.58)								698.5 (27.50)

Shaft height	Type	IEC	LB	M	N	P	S	T	Shaft end DE **D**	DB	E	F	GA
160	1PH8163/ 1PH8164		488.5 (19.23)	350 (13.78)	300 (11.81)	393 (15.47)	18 (0.71)	5 (0.20)	**55 (2.17)**	M20	110 (4.33)	16 (0.63)	59 (2.32)
	1PH8165/ 1PH8166		548.5 (21.59)										
	1PH8168		588.5 (23.17)										

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Dimensional drawings

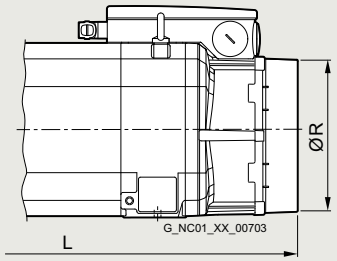


For motor		Dimensions in mm (inches)														Shaft end DE				
Shaft height	Type	IEC	AC	BH	L Forced ventilation	L Water cooling	LA	LB	M	MA	N	P	S	T	D	DB	E	F	GA
SIMOTICS M-1PH8 shaft heights 80 to 132, types of construction IM B5 and IM B35, forced ventilation and water cooling – brake mounting																				
80	1PH8083		164 (6.46)	162 (6.38)	586 (23.07)	506.5 (19.94)	12 (0.47)	125 (4.92)	165 (6.50)	162 (6.38)	130 (5.12)	200 (7.87)	12 (0.47)	3.5 (0.14)	**32 (1.26)**	M12	80 (3.15)	10 (0.39)	35 (1.38)
	1PH8087				636 (25.04)	556.5 (21.91)													
100	1PH8101		220.5 (8.68)	224 (8.82)	579.5 (22.81)	499.5 (19.67)	16 (0.63)	130 (5.12)	215 (8.46)	224 (8.82)	180 (7.09)	250 (9.84)	14 (0.55)	4 (0.16)	**38 (1.50)**	M12	80 (3.15)	10 (0.39)	41 (1.61)
	1PH8103				615 (24.21)	535 (21.06)													
	1PH8105				674.5 (26.56)	594.5 (23.41)													
	1PH8107				710 (27.95)	630 (24.80)													
132	1PH8131		278.5 (10.96)	269 (10.59)	711 (27.99)	619.5 (24.39)	18 (0.71)	162 (6.38)	300 (11.81)	269 (10.59)	250 (9.84)	340 (13.39)	18 (0.71)	5 (0.20)	**48 (1.89)**	M16	110 (4.33)	14 (0.55)	51.5 (2.03)
	1PH8133				756 (29.76)	664.5 (26.16)													
	1PH8135				801 (31.54)	709.5 (27.93)													
	1PH8137/ 1PH8138				841 (33.11)	749.5 (29.51)													
SIMOTICS M-1PH8 shaft height 160, type of construction IM B35, forced ventilation and water cooling – brake mounting																				
160	1PH8163/ 1PH8164		319 (12.56)	328 (12.91)	888.5 (34.98)	766.5 (30.18)	23 (0.91)	168 (6.61)	350 (13.78)	328 (12.91)	300 (11.81)	393 (15.47)	18 (0.71)	5 (0.20)	**55 (2.17)**	M20	110 (4.33)	16 (0.63)	59 (2.32)
	1PH8165/ 1PH8166				948.5 (37.34)	826.5 (32.54)													
	1PH8167/ 1PH8168				988.5 (38.92)	866.5 (34.11)													

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SIMOTICS M-1PH8 asynchronous and synchronous motors – SH 80 to 160 – forced ventilation with pipe connection

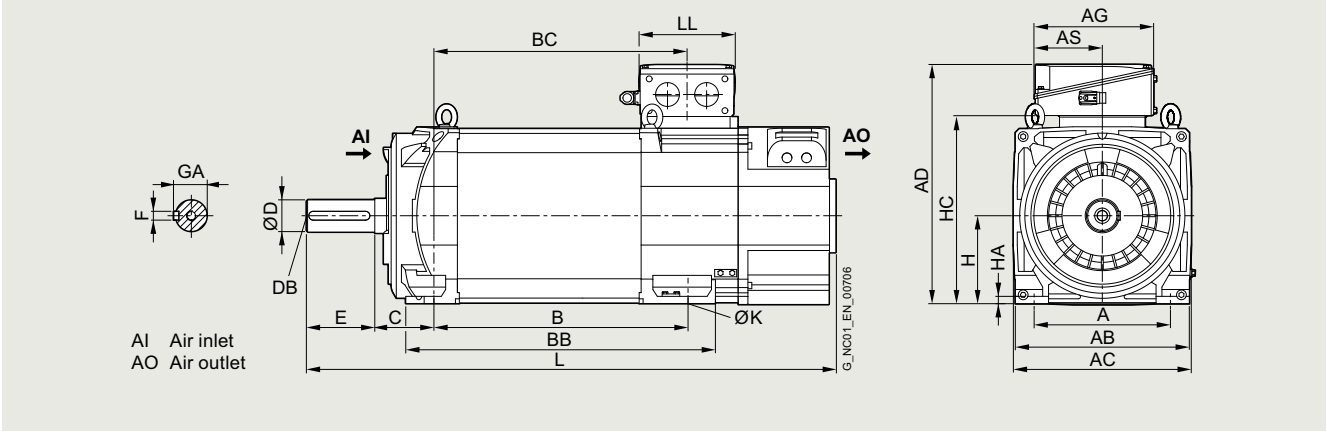
Dimensional drawings



For motor		Dimensions in mm (inches)	
Shaft height	Type	IEC L	R
SIMOTICS M-1PH8 asynchronous motors shaft heights 80 and 100, forced ventilation – pipe connection (option K80)			
80	1PH8083	503 (19.80)	143 (5.63)
	1PH8087	553 (21.77)	
100	1PH8101	496.5 (19.55)	158 (6.22)
	1PH8103	532 (20.94)	
	1PH8105	591.5 (23.29)	
	1PH8107	627 (24.68)	
SIMOTICS M-1PH8 asynchronous and synchronous motors shaft heights 132 and 160, forced ventilation – pipe connection (option K80)			
132	1PH8131	595.5 (23.44)	222 (8.74)
	1PH8133	640.5 (25.22)	
	1PH8135	685.5 (26.99)	
	1PH8137	725.5 (28.56)	
160	1PH8163	792 (31.18)	276 (10.87)
	1PH8165	852 (33.54)	
	1PH8167	892 (35.12)	

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Dimensional drawings



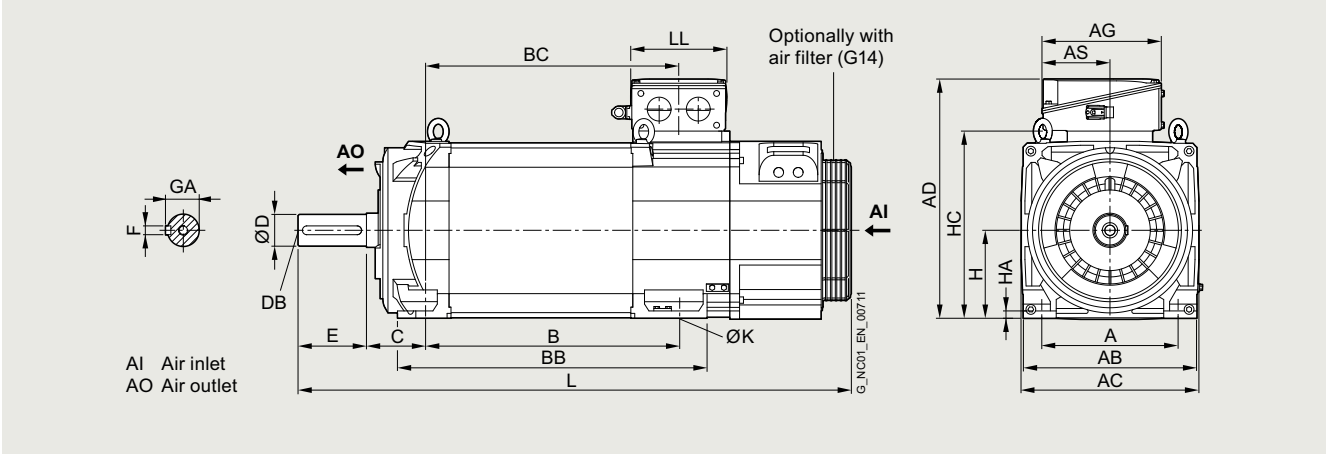
For motor		Dimensions in mm (inches)												Shaft end DE				
Shaft height	Type	IEC	A	AB	AC	B	BB	C	H	HA	HC	K	L	**D**	DB	E	F	GA
SIMOTICS M-1PH8 type of construction IM B3, forced ventilation – direction of air flow DE → NDE																		
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	995 (39.17)	**65 (2.56)**	M20	140 (5.51)	18 (0.71)	69 (2.72)
	1PH8186					520 (20.47)	635 (25.00)						1085 (42.72)					

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7322							
180	1PH8184		490 (19.29)	245 (9.65)	140 (5.51)	429 (16.89)	196 (7.72)
	1PH8186					519 (20.43)	
Terminal box type 1XB7422							
180	1PH8184		533 (20.98)	281 (11.06)	176 (6.93)	429 (16.89)	233 (9.17)
	1PH8186					519 (20.43)	
Terminal box type 1XB7700							
180	1PH8184		586 (23.07)	297 (11.69)	156 (6.14)	429 (16.89)	310 (12.20)
	1PH8186					519 (20.43)	

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SIMOTICS M-1PH8 asynchronous and synchronous motors – SH 180 – forced ventilation

Dimensional drawings

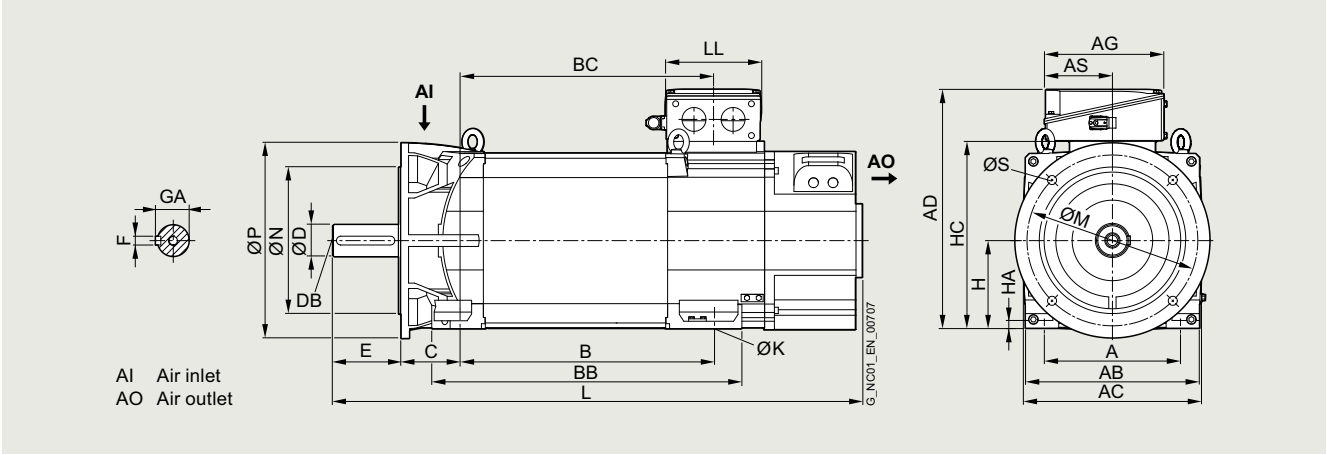


For motor		Dimensions in mm (inches)												Shaft end DE				
Shaft height	Type	IEC	A	AB	AC	B	BB	C	H	HA	HC	K	L	**D**	DB	E	F	GA
SIMOTICS M-1PH8 type of construction IM B3, forced ventilation – direction of air flow NDE → DE																		
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	1047 (41.22)	**65 (2.56)**	M20	140 (5.51)	18 (0.71)	69 (2.72)
	1PH8186					520 (20.47)	635 (25.00)						1137 (44.76)					

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7322							
180	1PH8184		490 (19.29)	245 (9.65)	140 (5.51)	429 (16.89)	196 (7.72)
	1PH8186					519 (20.43)	
Terminal box type 1XB7422							
180	1PH8184		533 (20.98)	281 (11.06)	176 (6.93)	429 (16.89)	233 (9.17)
	1PH8186					519 (20.43)	
Terminal box type 1XB7700							
180	1PH8184		586 (23.07)	297 (11.69)	156 (6.14)	429 (16.89)	310 (12.20)
	1PH8186					519 (20.43)	

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Dimensional drawings



For motor — Dimensions in mm (inches)

Shaft height	Type	IEC	A	AB	AC	B	BB	C	H	HA	HC	K	L	M	N	P	S	Shaft end DE D	DB	E	F	GA
SIMOTICS M-1PH8 type of construction IM B35, forced ventilation – direction of air flow DE → NDE, A400 flange (option K90)																						
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	995 (39.17)	350 (13.78)	300 (11.81)	400 (15.75)	18.5 (0.73)	**65 (2.56)**	M20	140 (5.51)	18 (0.71)	69 (2.72)
	1PH8186					520 (20.47)	635 (25.00)						1085 (42.72)									

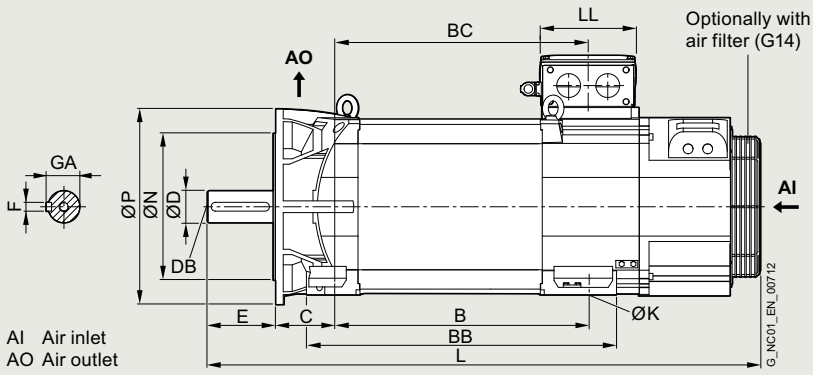
Terminal box — Dimensions in mm (inches)

Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7322							
180	1PH8184		490 (19.29)	245 (9.65)	140 (5.51)	429 (16.89)	196 (7.72)
	1PH8186					519 (20.43)	
Terminal box type 1XB7422							
180	1PH8184		533 (20.98)	281 (11.06)	176 (6.93)	429 (16.89)	233 (9.17)
	1PH8186					519 (20.43)	
Terminal box type 1XB7700							
180	1PH8184		586 (23.07)	297 (11.69)	156 (6.14)	429 (16.89)	310 (12.20)
	1PH8186					519 (20.43)	

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SIMOTICS M-1PH8 asynchronous and synchronous motors – SH 180 – forced ventilation

Dimensional drawings

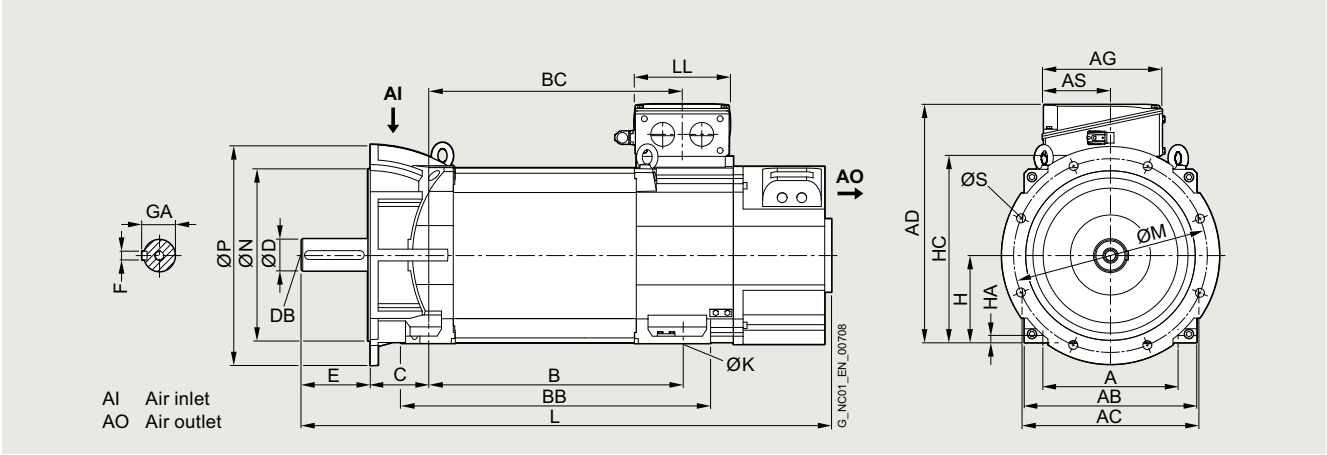


For motor		Dimensions in mm (inches)																Shaft end DE				
Shaft height	Type	IEC	A	AB	AC	B	BB	C	H	HA	HC	K	L	M	N	P	S	**D**	DB	E	F	GA
1PH8 type of construction IM B35, forced ventilation – direction of air flow NDE → DE, A400 flange (option K90)																						
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	1047 (41.22)	350 (13.78)	300 (11.81)	400 (15.75)	18.5 (0.73)	**65 (2.56)**	M20	140 (5.51)	18 (0.71)	69 (2.72)
	1PH8186					520 (20.47)	635 (25.00)						1137 (44.76)									

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7322							
180	1PH8184		490 (19.29)	245 (9.65)	140 (5.51)	429 (16.89)	196 (7.72)
	1PH8186					519 (20.43)	
Terminal box type 1XB7422							
180	1PH8184		533 (20.98)	281 (11.06)	176 (6.93)	429 (16.89)	233 (9.17)
	1PH8186					519 (20.43)	
Terminal box type 1XB7700							
180	1PH8184		586 (23.07)	297 (11.69)	156 (6.14)	429 (16.89)	310 (12.20)
	1PH8186					519 (20.43)	

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Dimensional drawings



For motor		Dimensions in mm (inches)																Shaft end DE				
Shaft height	Type	IEC	A	AB	AC	B	BB	C	H	HA	HC	K	L	M	N	P	S	**D**	DB	E	F	GA
1PH8 type of construction IM B35, forced ventilation – direction of air flow DE → NDE, A450 flange																						
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	995 (39.17)	400 (15.75)	350 (13.78)	450 (17.72)	18.5 (0.73)	**65 (2.56)**	M20	140 (5.51)	18 (0.71)	69 (2.72)
	1PH8186					520 (20.47)	635 (25.00)						1085 (42.72)									

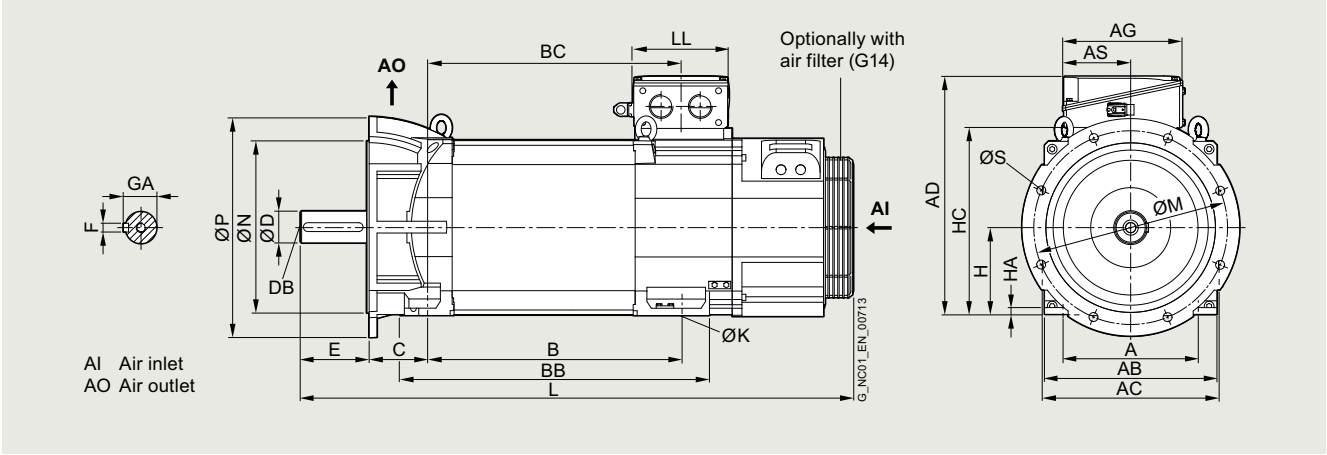
Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7322							
180	1PH8184		490 (19.29)	245 (9.65)	140 (5.51)	429 (16.89)	196 (7.72)
	1PH8186					519 (20.43)	
Terminal box type 1XB7422							
180	1PH8184		533 (20.98)	281 (11.06)	176 (6.93)	429 (16.89)	233 (9.17)
	1PH8186					519 (20.43)	
Terminal box type 1XB7700							
180	1PH8184		586 (23.07)	297 (11.69)	156 (6.14)	429 (16.89)	310 (12.20)
	1PH8186					519 (20.43)	

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SIMOTICS M-1PH8 asynchronous and synchronous motors – SH 180 – forced ventilation

Dimensional drawings



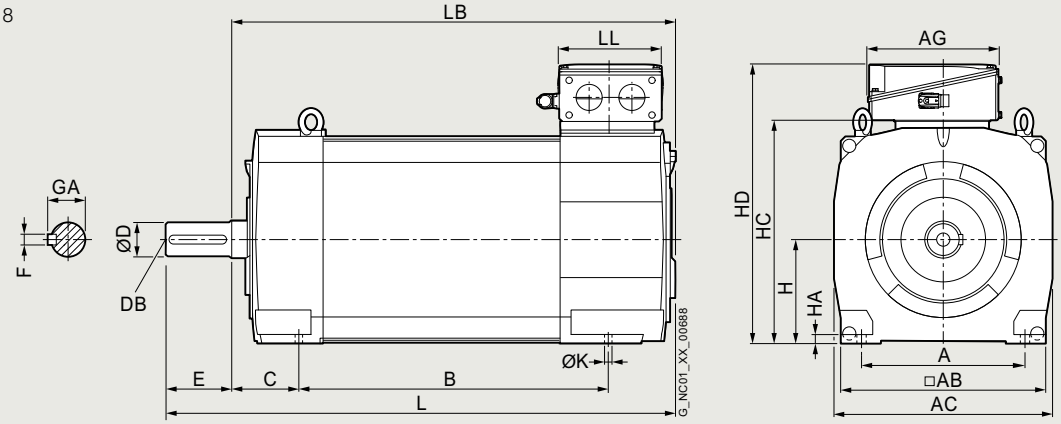
For motor		Dimensions in mm (inches)																Shaft end DE				
Shaft height	Type	IEC	A	AB	AC	B	BB	C	H	HA	HC	K	L	M	N	P	S	**D**	DB	E	F	GA
1PH8 type of construction IM B35, forced ventilation – direction of air flow NDE → DE, A450 flange																						
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	1047 (41.22)	400 (15.75)	350 (13.78)	450 (17.72)	18.5 (0.73)	**65 (2.56)**	M20	140 (5.51)	18 (0.71)	69 (2.72)
	1PH8186					520 (20.47)	635 (25.00)						1137 (44.76)									

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7322							
180	1PH8184		490 (19.29)	245 (9.65)	140 (5.51)	429 (16.89)	196 (7.72)
	1PH8186					519 (20.43)	
Terminal box type 1XB7422							
180	1PH8184		533 (20.98)	281 (11.06)	176 (6.93)	429 (16.89)	233 (9.17)
	1PH8186					519 (20.43)	
Terminal box type 1XB7700							
180	1PH8184		586 (23.07)	297 (11.69)	156 (6.14)	429 (16.89)	310 (12.20)
	1PH8186					519 (20.43)	

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Dimensional drawings

1PH818



For motor		Dimensions in mm (inches)											
Shaft height	Type	IEC	A	AB	AC	B	C	H	HA	HC	K	L	LB
1PH8, types of construction IM B3/IM V5, water cooling													
180	1PH8184		279 (10.98)	356 (14.02)	384 (15.12)	430 (16.93)	121 (4.76)	180 (7.09)	15 (0.59)	372 (14.65)	14.5 (0.57)	810 (31.89)	670 (26.38)
	1PH8186					520 (20.47)						900 (35.43)	760 (29.92)

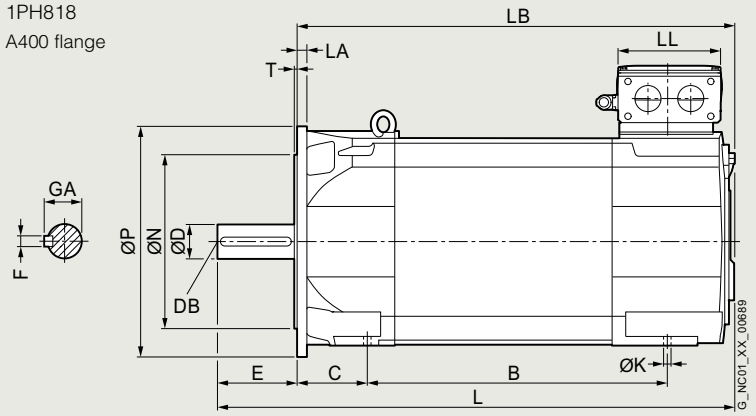
			Shaft end DE					Terminal box type								
								1XB7322			1XB7422			1XB7700		
Shaft height	Type	IEC	**D**	DB	E	F	GA	AG	HD	LL	AG	HD	LL	AG	HD	LL
180	1PH8184		**65 (2.56)**	M20	140 (5.51)	18 (0.71)	69 (2.72)	245 (9.65)	490 (19.29)	196 (7.72)	281 (11.06)	533 (20.98)	233 (9.17)	297 (11.69)	586 (23.07)	310 (12.20)
	1PH8186															

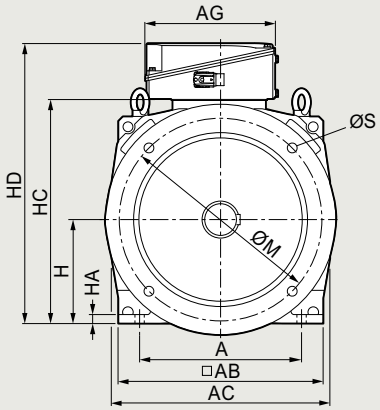
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SIMOTICS M-1PH8 asynchronous and synchronous motors – SH 180 – water cooling

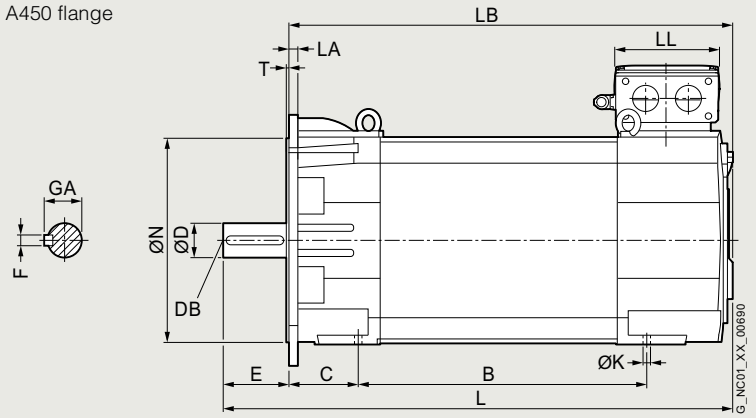
Dimensional drawings

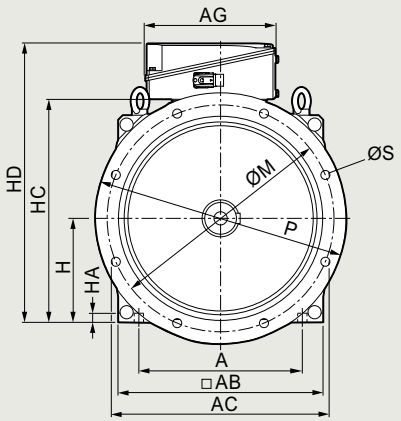
1PH818
A400 flange





A450 flange



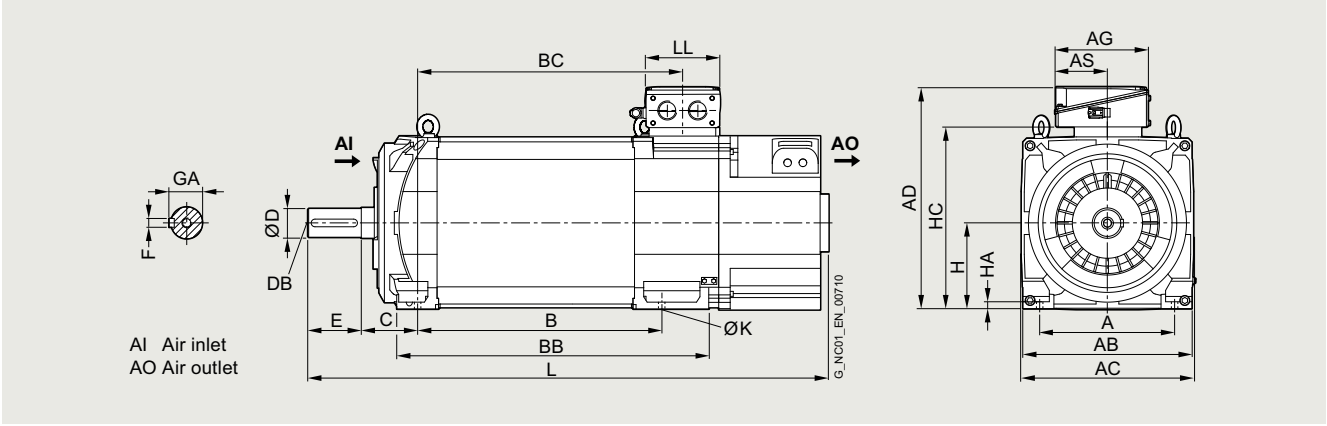


For motor		Dimensions in mm (inches)													A400	A450	A400	A450
Shaft height	Type	IEC	A	AB	AC	B	C	H	HA	HC	K	L	LA	LB	M		N	
1PH8, types of construction IM B5/IM B35/IM V15, water cooling																		
180	1PH8184		279 (10.98)	356 (14.02)	384 (15.12)	430 (16.93)	121 (4.76)	180 (7.09)	15 (0.59)	372 (14.65)	14.5 (0.57)	810 (31.89)	16 (0.63)	670 (26.38)	350 (13.78)	400 (15.75)	300 (11.81)	350 (13.78)
	1PH8186					520 (20.47)						900 (35.43)		760 (29.92)				

			Shaft end DE								Terminal box types 1XB7322, 1XB7422, 1XB7700
			A400	A450							Dimensions as for types of construction IM B3/IM V5
Shaft height	Type	IEC	P		S	T	**D**	DB	E	F	GA
180	1PH8184		400 (15.75)	450 (17.72)	18.5 (0.73)	5 (0.20)	**65 (2.56)**	M20	140 (5.51)	18 (0.71)	69 (2.72)
	1PH8186										

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Dimensional drawings



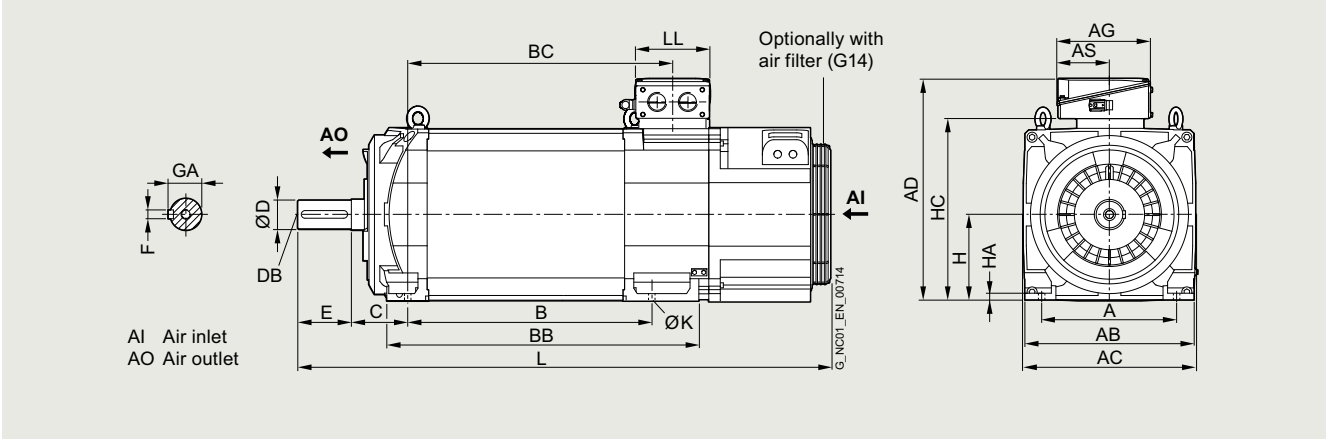
For motor		Dimensions in mm (inches)												Shaft end DE				
Shaft height	Type	IEC	A	AB	AC	B	BB	C	H	HA	HC	K	L	**D**	DB	E	F	GA
1PH8 type of construction IM B3, forced ventilation – direction of air flow DE → NDE																		
225	1PH8224		356 (14.02)	446 (17.56)	454 (17.87)	445 (17.52)	625 (24.61)	149 (5.87)	225 (8.86)	18 (0.71)	475 (18.70)	18.5 (0.73)	1171 (46.10)	**75 (2.95)**	M20	140 (5.51)	20 (0.79)	79.5 (3.13)
	1PH8226					545 (21.46)	725 (28.54)						1271 (40.04)					
	1PH8228					635 (25.00)	815 (32.09)						1361 (53.58)					

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7322							
225	1PH8224		582 (22.91)	245 (9.65)	140 (5.51)	481 (18.94)	196 (7.72)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7422							
225	1PH8224		625 (24.61)	281 (11.06)	176 (6.93)	481 (18.94)	233 (9.17)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7700							
225	1PH8224		678 (26.69)	297 (11.69)	156 (6.14)	481 (18.94)	310 (12.20)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	

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SIMOTICS M-1PH8 asynchronous and synchronous motors – SH 225 – forced ventilation

Dimensional drawings

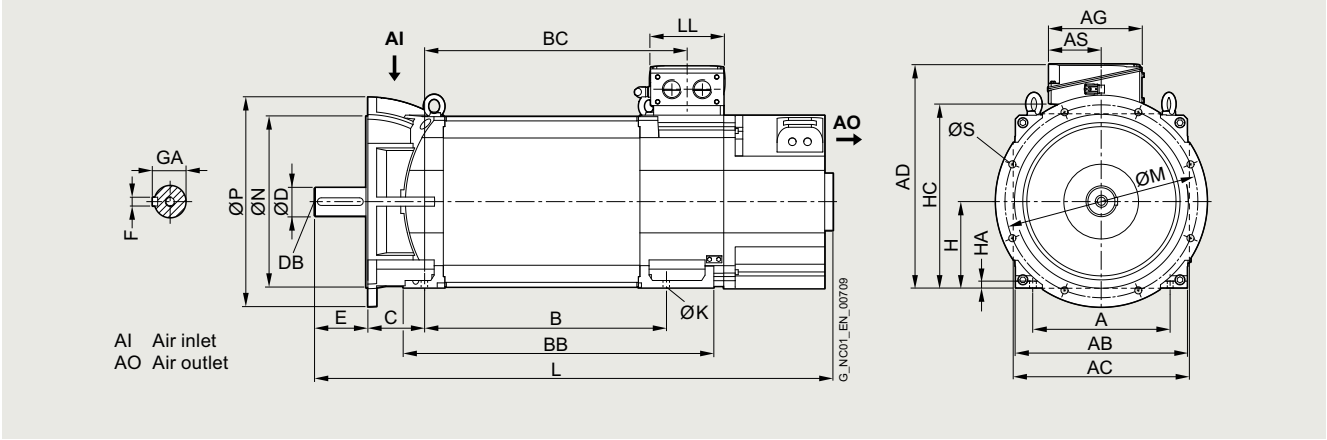


For motor		Dimensions in mm (inches)																
													Shaft end DE					
Shaft height	Type	IEC	A	AB	AC	B	BB	C	H	HA	HC	K	L	**D**	DB	E	F	GA
1PH8 type of construction IM B3, forced ventilation – direction of air flow NDE → DE																		
225	1PH8224		356 (14.02)	446 (17.56)	454 (17.87)	445 (17.52)	625 (24.61)	149 (5.87)	225 (8.86)	18 (0.71)	475 (18.70)	18.5 (0.73)	1206 (47.48)	**75 (2.95)**	M20	140 (5.51)	20 (0.79)	79.5 (3.13)
	1PH8226					545 (21.46)	725 (28.54)						1306 (51.42)					
	1PH8228					635 (25.00)	815 (32.09)						1396 (54.96)					

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7322							
225	1PH8224		582 (22.91)	245 (9.65)	140 (5.51)	481 (18.94)	196 (7.72)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7422							
225	1PH8224		625 (24.61)	281 (11.06)	176 (6.93)	481 (18.94)	233 (9.17)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7700							
225	1PH8224		678 (26.69)	297 (11.69)	156 (6.14)	481 (18.94)	310 (12.20)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	

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Dimensional drawings



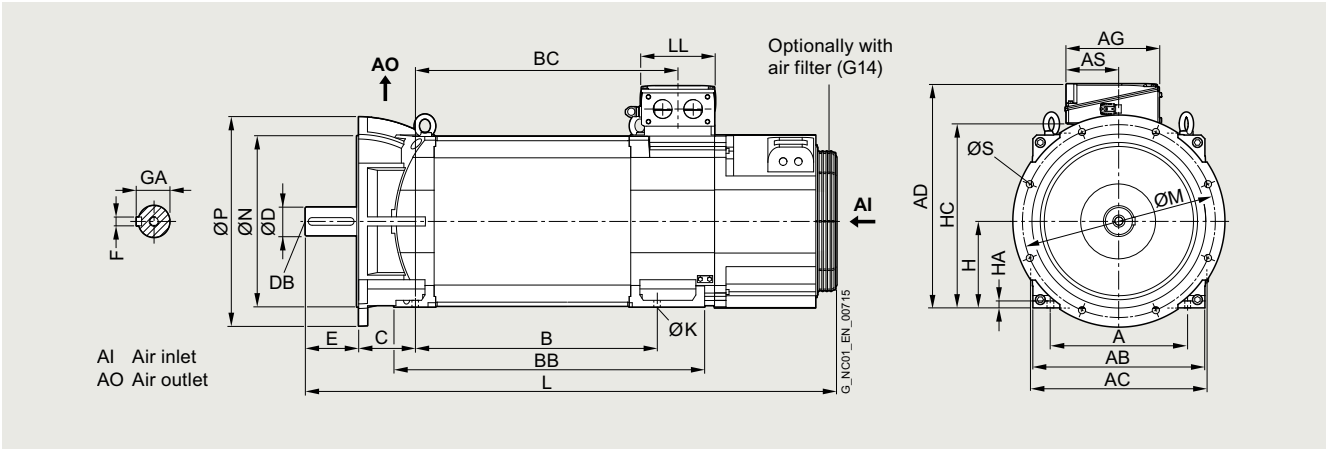
For motor		Dimensions in mm (inches)																Shaft end DE				
Shaft height	Type	IEC	A	AB	AC	B	BB	C	H	HA	HC	K	L	M	N	P	S	**D**	DB	E	F	GA
1PH8 type of construction IM B35, forced ventilation – direction of air flow DE → NDE, A550 flange																						
225	1PH8224		356 (14.02)	446 (17.56)	454 (17.87)	445 (17.52)	625 (24.61)	149 (5.87)	225 (8.86)	18 (0.71)	475 (18.70)	18.5 (0.73)	1171 (46.10)	500 (19.69)	450 (17.72)	550 (21.65)	18.5 (0.73)	**75 (2.95)**	M20	140 (5.51)	20 (0.79)	79.5 (3.13)
	1PH8226					545 (21.46)	725 (28.54)						1271 (50.04)									
	1PH8228					635 (25.00)	815 (32.09)						1361 (53.58)									

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7322							
225	1PH8224		582 (22.91)	245 (9.65)	140 (5.51)	481 (18.94)	196 (7.72)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7422							
225	1PH8224		625 (24.61)	281 (11.06)	176 (6.93)	481 (18.94)	233 (9.17)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7700							
225	1PH8224		678 (26.69)	297 (11.69)	156 (6.14)	481 (18.94)	310 (12.20)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	

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SIMOTICS M-1PH8 asynchronous and synchronous motors – SH 225 – forced ventilation

Dimensional drawings



For motor — Dimensions in mm (inches)

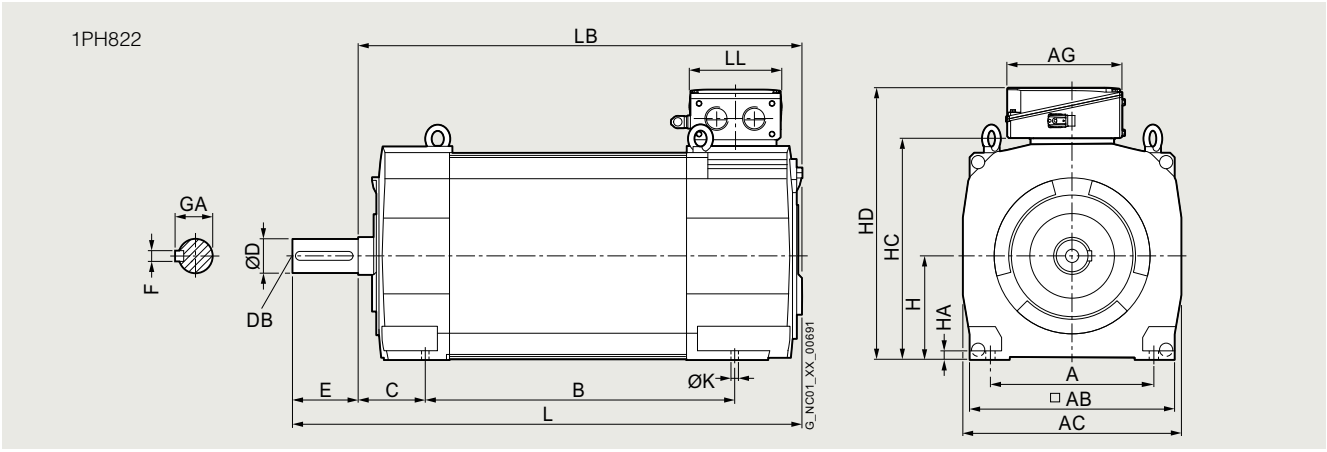
Shaft height	Type	IEC	A	AB	AC	B	BB	C	H	HA	HC	K	L	M	N	P	S	Shaft end DE D	DB	E	F	GA
1PH8 type of construction IM B35, forced ventilation – direction of air flow NDE → DE, A550 flange																						
225	1PH8224		356 (14.02)	446 (17.56)	454 (17.87)	445 (17.52)	625 (24.61)	149 (5.87)	225 (8.86)	18 (0.71)	475 (18.70)	18.5 (0.73)	1206 (47.48)	500 (19.69)	450 (17.72)	550 (21.65)	18.5 (0.73)	**75 (2.95)**	M20	140 (5.51)	20 (0.79)	79.5 (3.13)
	1PH8226					545 (21.46)	725 (28.54)						1306 (51.42)									
	1PH8228					635 (25.00)	815 (32.09)						1396 (54.96)									

Terminal box — Dimensions in mm (inches)

Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7322							
225	1PH8224		582 (22.91)	245 (9.65)	140 (5.51)	481 (18.94)	196 (7.72)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7422							
225	1PH8224		625 (24.61)	281 (11.06)	176 (6.93)	481 (18.94)	233 (9.17)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7700							
225	1PH8224		678 (26.69)	297 (11.69)	156 (6.14)	481 (18.94)	310 (12.20)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	

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Dimensional drawings



For motor — Dimensions in mm (inches)

Shaft height	Type	IEC	A	AB	AC	B	C	H	HA	HC	K	L	LB
1PH8, types of construction IM B3/IM V5, water cooling													
225	1PH8224		356 (14.02)	446 (17.56)	474 (18.66)	445 (17.52)	149 (5.87)	225 (8.86)	18 (0.71)	462 (18.19)	18.5 (0.73)	915 (36.02)	775 (30.51)
	1PH8226					545 (21.46)						1015 (39.96)	875 (34.45)
	1PH8228					635 (25.0)						1105 (43.50)	965 (37.99)

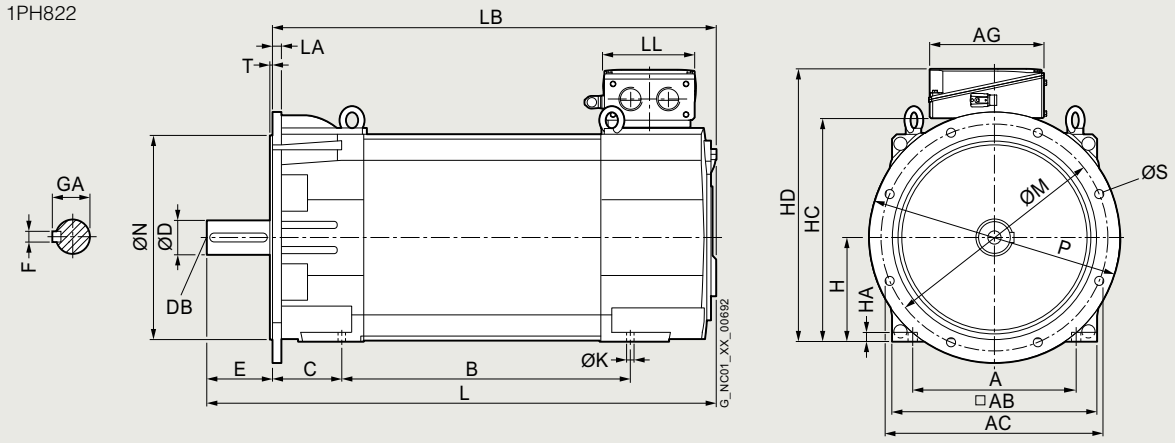
			Shaft end DE					Terminal box type								
								1XB7322			1XB7422			1XB7700		
Shaft height	Type	IEC	**D**	DB	E	F	GA	AG	HD	LL	AG	HD	LL	AG	HD	LL
225	1PH8224		**75 (2.95)**	M20	140 (5.51)	20 (0.79)	79.5 (3.13)	245 (9.65)	585 (23.03)	196 (7.72)	281 (11.06)	628 (24.72)	233 (9.17)	297 (11.69)	677 (26.65)	310 (12.20)
	1PH8226															
	1PH8228															

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SIMOTICS M-1PH8 asynchronous and synchronous motors – SH 225 – water cooling

Dimensional drawings

1PH822



For motor — Dimensions in mm (inches)

Shaft height	Type	IEC	A	AB	AC	B	C	H	HA	HC	K	L	LA	LB	M	N	P	S	T
1PH8, types of construction IM B5/IM B35/IM V15, water cooling, A550 flange																			
225	1PH8224		356 (14.02)	446 (17.56)	474 (18.66)	445 (17.52)	149 (5.87)	225 (8.86)	18 (0.71)	462 (18.19)	18.5 (0.73)	910 (35.83)	20 (0.79)	770 (30.31)	500 (19.69)	450 (17.72)	550 (21.65)	18.5 (0.73)	5 (0.20)
	1PH8226					545 (21.46)						1012 (39.84)		872 (34.33)					
	1PH8228					635 (25.00)						1102 (43.39)		962 (37.87)					

Shaft end DE — Terminal box types 1XB7322, 1XB7422, 1XB7700

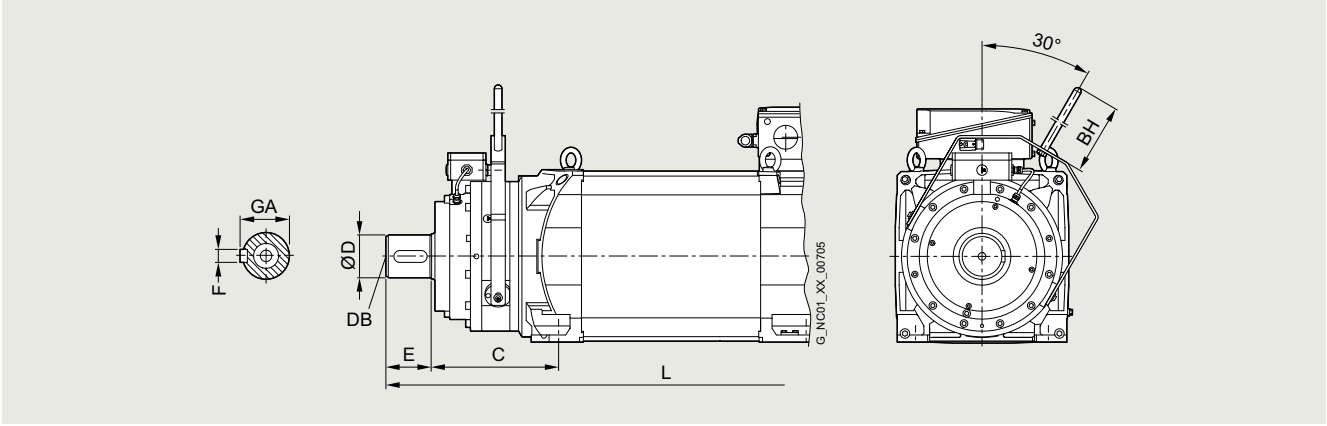
Dimensions as for types of construction IM B3/IM V5

Shaft height	Type	IEC	D	DB	E	F	GA
225	1PH8224		**75 (2.95)**	M20	140 (5.51)	20 (0.79)	79.5 (3.13)
	1PH8226						
	1PH8228						

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SIMOTICS M-1PH8 asynchronous and synchronous motors with holding brake – SH 180 and 225

Dimensional drawings



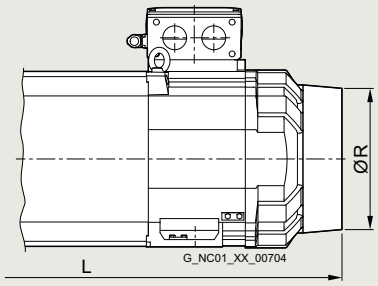
For motor			Dimensions in mm (inches)										
					Forced ventilation		Water cooling	Shaft end DE					
Shaft height	Holding brake	Type	IEC	BH	C	L DE → NDE	L NDE→ DE	L	**D**	DB	E	F	GA
1PH8 type of construction IM B3, forced ventilation – directions of air flow DE → NDE and NDE → DE, water cooling: brake mounting (option U64)													
180	2HPB-30V	1PH8184	252 (9.92)	268 (10.55)	1096 (43.15)	1148 (45.20)	911 (35.87)		**90** **(3.54)**	M20	95 (3.74)	25 (0.98)	95 (3.74)
		1PH8186			1148 (45.20)	1238 (48.74)	1001 (39.41)						
	4HPB-30V	1PH8184		330 (12.99)	1158 (45.59)	1210 (47.64)	973 (38.31)						
		1PH8186			1248 (49.13)	1300 (51.18)	1063 (41.85)						
225	2HPB-40V	1PH8224	493 (19.41)	308 (12.13)	1295 (50.98)	1330 (52.36)	1040 (40.94)		95 (3.74)	M20	105 (4.13)	25 (0.98)	100 (3.94)
		1PH8226			1395 (54.92)	1430 (56.30)	1140 (44.88)						
		1PH8228			1495 (58.86)	1520 (59.84)	1230 (48.43)						
	4HPB-40S	1PH8224		353 (13.90)	1340 (52.76)	1375 (54.13)	1085 (42.72)						
		1PH8226			1440 (56.69)	1475 (58.07)	1185 (46.65)						
		1PH8228			1540 (60.63)	1564 (61.61)	1275 (50.20)						

For motor			Dimensions in mm (inches)									
					Forced ventilation	Water cooling	Shaft end DE					
Shaft height	Holding brake	Type	IEC	BH	C	L NDE→ DE	L	**D**	DB	E	F	GA
1PH8 type of construction IM B3, forced ventilation – direction of air flow NDE → DE, degree of protection IP23: brake mounting (option U64)												
180	2HPB-30V	1PH8184-3_F4 1PH8184-3_L4			295 (11.61)	1175 (46.26)						
		1PH8186-3_L4				1265 (49.80)						
1PH8 type of construction IM B3, water cooling: brake mounting (option U64)												
180	2HPB-30V	1PH8184-3_B2 1PH8184-3_C2 1PH8184-3_D2 1PH8184-3_F2 1PH8184-3_L2			295 (11.61)	938 (36.93)						
		1PH8186-3_L2				1028 (40.47)						

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SIMOTICS M-1PH8 asynchronous and synchronous motors – SH 180 and 225 – forced ventilation with pipe connection

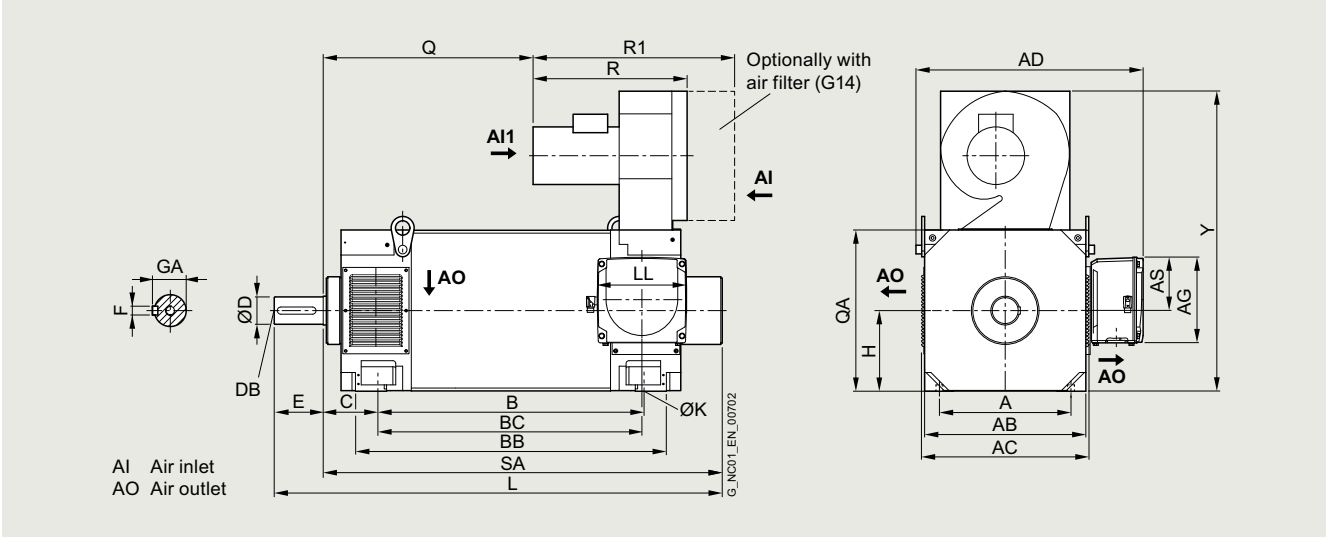
Dimensional drawings



For motor		Dimensions in mm (inches)	
Shaft height	Type	IEC L	R
1PH8 forced ventilation – pipe connection (option K80)			
180	1PH8184	993 (39.09)	300 (11.81)
	1PH8186	1083 (42.64)	
225	1PH8224	1084 (42.68)	350 (13.78)
	1PH8226	1184 (46.61)	
	1PH8228	1274 (50.16)	

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Dimensional drawings



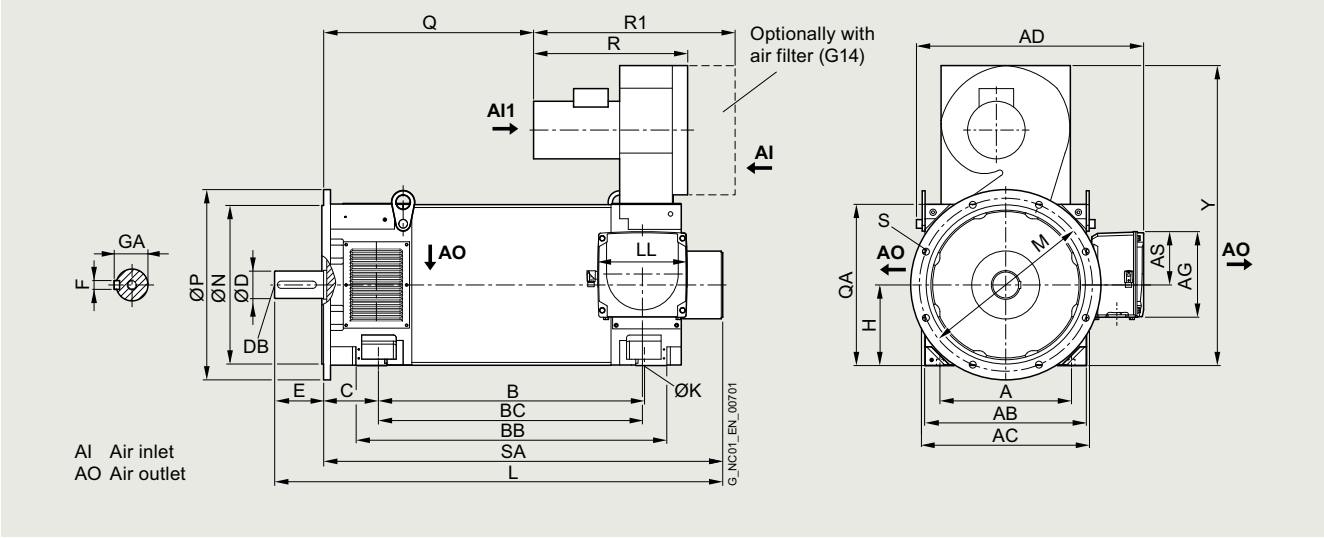
For motor		Dimensions in mm (inches)									
Shaft height	Type	IEC A	AB	AC	B	BB	C	D	DB	E	F
1PH8 type of construction IM B3, forced ventilation – direction of air flow NDE → DE											
280	1PH8284	457 (17.99)	560 (22.05)	582 (22.91)	684 (26.93)	840 (33.07)	190 (7.48)	95 (3.74)	M24	170 (6.69)	25 (0.98)
	1PH8286				794 (31.26)	950 (37.40)					
	1PH8288				924 (36.38)	1080 (42.52)					
		GA	H	K	L	Q	QA	R	R1	SA	Y
	1PH8284	100 (3.94)	280 (11.02)	24 (0.94)	1316 (51.81)	489 (19.25)	560 (22.05)	546 (21.50)	700 (27.56)	1146 (45.12)	1042 (41.02)
	1PH8286				1426 (56.14)	599 (23.58)				1256 (49.45)	
	1PH8288				1556 (61.26)	729 (28.70)				1386 (54.57)	

Terminal box		Dimensions in mm (inches)				
Shaft height	Type	IEC AD	AG	AS	BC	LL
Terminal box type 1XB7700						
280	1PH8284	789 (31.06)	297 (11.69)	186 (7.32)	677 (26.65)	310 (12.20)
	1PH8286				787 (30.98)	
	1PH8288				917 (36.10)	
Terminal box type 1XB7712						
280	1PH8284	836 (32.91)	371 (14.61)	201 (7.91)	691 (27.20)	370 (14.57)
	1PH8286				801 (31.54)	
	1PH8288				931 (36.65)	

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SIMOTICS M-1PH8 asynchronous motors – SH 280 – forced ventilation

Dimensional drawings



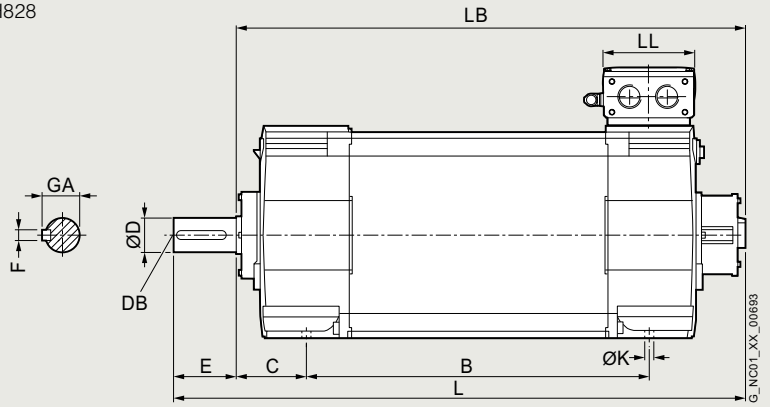
For motor		Dimensions in mm (inches)											
Shaft height	Type	IEC A	AB	AC	B	BB	C	D	DB	E	F	GA	H
1PH8 type of construction IM B35, forced ventilation – direction of air flow NDE → DE, A660 flange													
280	1PH8284	457 (17.99)	560 (22.05)	582 (22.91)	684 (26.93)	840 (33.07)	190 (7.48)	95 (3.74)	M24	170 (6.69)	25 (0.98)	100 (3.94)	280 (11.02)
	1PH8286				794 (31.26)	950 (37.40)							
	1PH8288				924 (36.38)	1080 (42.52)							
		K	L	M	N	P	Q	QA	R	R1	S	SA	Y
	1PH8284	24 (0.94)	1316 (51.81)	600 (23.62)	550 (21.65)	660 (25.98)	489 (19.25)	560 (22.05)	546 (21.50)	700 (27.56)	24 (0.94)	1146 (45.12)	1042 (41.02)
	1PH8286		1426 (56.14)				599 (23.58)					1256 (49.45)	
	1PH8288		1556 (61.26)				729 (28.70)					1386 (54.57)	

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC AD	AG	AS	BC	LL	
Terminal box type 1XB7700							
280	1PH8284	789 (31.06)	297 (11.69)	186 (7.32)	677 (26.65)	310 (12.20)	
	1PH8286				787 (30.98)		
	1PH8288				917 (36.10)		
Terminal box type 1XB7712							
280	1PH8284	836 (32.91)	371 (14.61)	201 (7.91)	691 (27.20)	370 (14.57)	
	1PH8286				801 (31.54)		
	1PH8288				931 (36.65)		

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Dimensional drawings

1PH828



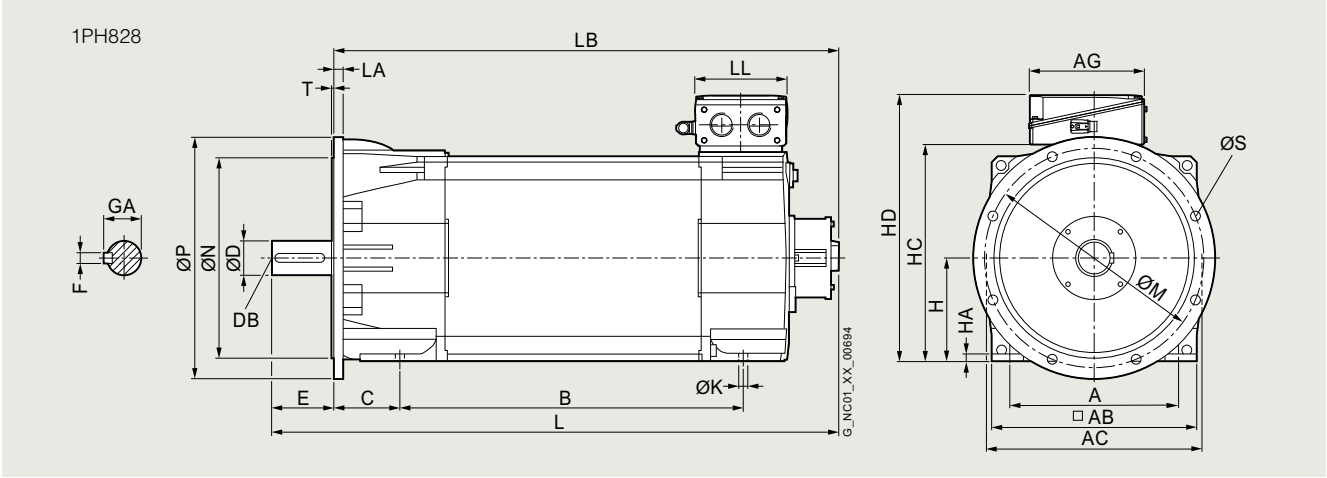
For motor			Dimensions in mm (inches)															
													Shaft end DE					
Shaft height	Type	IEC	A	AB	AC	B	C	H	HA	HC	K	LB	**D**	DB	E	F	GA	L
1PH8, types of construction IM B3/IM V5, water cooling																		
280	1PH8284		457 (17.99)	556 (21.89)	588 (23.15)	684 (26.93)	190 (7.48)	280 (11.02)	21 (0.83)	574 (22.60)	24 (0.94)	1134 (44.65)	**95**	M24	170 (6.69)	25 0.98)	100 (3.94)	1304 (51.34)
	1PH8286					794 (31.26)						1244 (48.98)						1414 (55.67)
	1PH8288					924 (36.38)						1374 (54.09)						1544 (60.79)

			Terminal box type												
			1XB7322			1XB7422			1XB7700			1XB7712			
Shaft height	Type	IEC	AG	HD	LL	AG	HD	LL	AG	HD	LL	AG	HD	LL	
280	1PH8284		245 (9.65)	674 (26.54)	196 (7.72)	281 (11.06)	717 (28.23)	233 (9.17)	297 (11.69)	751 (29.57)	310 (12.20)	371 (14.61)	813 (32.01)	370 (14.57)	
	1PH8286														
	1PH8288														

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SIMOTICS M-1PH8 asynchronous motors – SH 280 – water cooling

Dimensional drawings



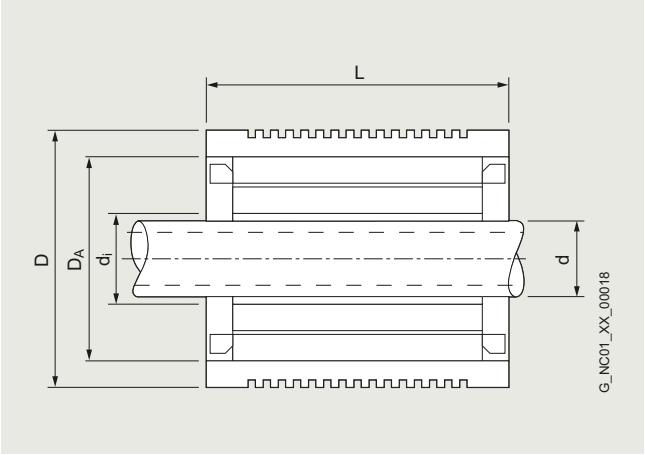
For motor — Dimensions in mm (inches)

Shaft height	Type	IEC	A	AB	AC	B	C	H	HA	HC	K	L	LA	LB	M	N	P
1PH8, types of construction IM B5/IM B35/IM V15, water cooling, A660 flange																	
280	1PH8284		457 (17.99)	556 (21.89)	588 (23.15)	684 (26.93)	190 (7.48)	280 (11.02)	21 (0.83)	574 (22.60)	24 (0.94)	1304 (51.34)	24 (0.94)	1134 (44.65)	600 (23.62)	550 (21.65)	660 (25.98)
	1PH8286					794 (31.26)						1414 (55.67)		1244 (48.98)			
	1PH8288					924 (36.38)						1544 (60.79)		1374 (54.09)			

Shaft height	Type	IEC	S	T	Shaft end DE **D**	DB	E	F	GA	Terminal box types 1XB77322, 1XB7422, 1XB7700, 1XB7712 Dimensions as for types of construction IM B3/IM V5
280	1PH8284		24 (0.94)	6 (0.24)	**95 (3.74)**	M24	170 (6.69)	25 (0.98)	100 (3.94)	
	1PH8286									
	1PH8288									

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Dimensional drawings



For motor Type	Dimensions in mm (inches) Total length L	Total outer diameter D	Stator outer diameter D_A	Rotor inner diameter[1] d_i
1FE1 High Speed series				
1FE1051-4.... -6BA.	130 (5.12)	120 (4.72)	106 (4.17)	46 (1.81)
1FE1052-4.... -6BA.	180 (7.09)			
1FE1053-4.... -6BA.	230 (9.06)			
1FE1072-4W...-6BA.	185 (7.28)	155 (6.10)	135 (5.31)	58 (2.28)
1FE1073-4W...-6BA.	235 (9.25)			
1FE1074-4W...-6BA.	285 (11.22)			
1FE1075-4W...-6BA.	335 (13.19)			
1FE1082-4W...-6BA.	190 (7.48)	180 (7.09)	160 (6.30)	68 (2.68)
1FE1083-4W...-6BA.	240 (9.45)			
1FE1084-4W...-6BA.	290 (11.42)			
1FE1085-4W...-6BA.	340 (13.39)			
1FE1092-4W...-6BR.	200 (7.87)	205 (8.07)	180 (7.09)	80 (3.15)
1FE1093-4W...-6BA.	250 (9.84)			72 (2.83)
1FE1093-4W...-6BR.	250 (9.84)			80 (3.15)
1FE1094-4W...-6BA.	300 (11.81)			72 (2.83)
1FE1094-4W...-6BR.	300 (11.81)			80 (3.15)
1FE1095-4W...-6BA.	350 (13.78)			72 (2.83)
1FE1095-4W...-6BR.	350 (13.78)			80 (3.15)
1FE1096-4W...-6BA.	400 (15.75)			72 (2.83)
1FE1096-4W...-6BR.	400 (15.75)			80 (3.15)
1FE1103-4W...-6BA.	265 (10.43)	230 (9.06)	200 (7.87)	96 (3.78)
1FE1104-4W...-6BA.	315 (12.40)			
1FE1105-4W...-6BA.	365 (14.37)			
1FE1106-4W...-6BA.	415 (16.34)			
1FE1124-4W...-6BA.	315 (12.40)	270 (10.63)	240 (9.45)	110 (4.33)
1FE1125-4W...-6BA.	365 (14.37)			
1FE1126-4W...-6BA.	415 (16.34)			

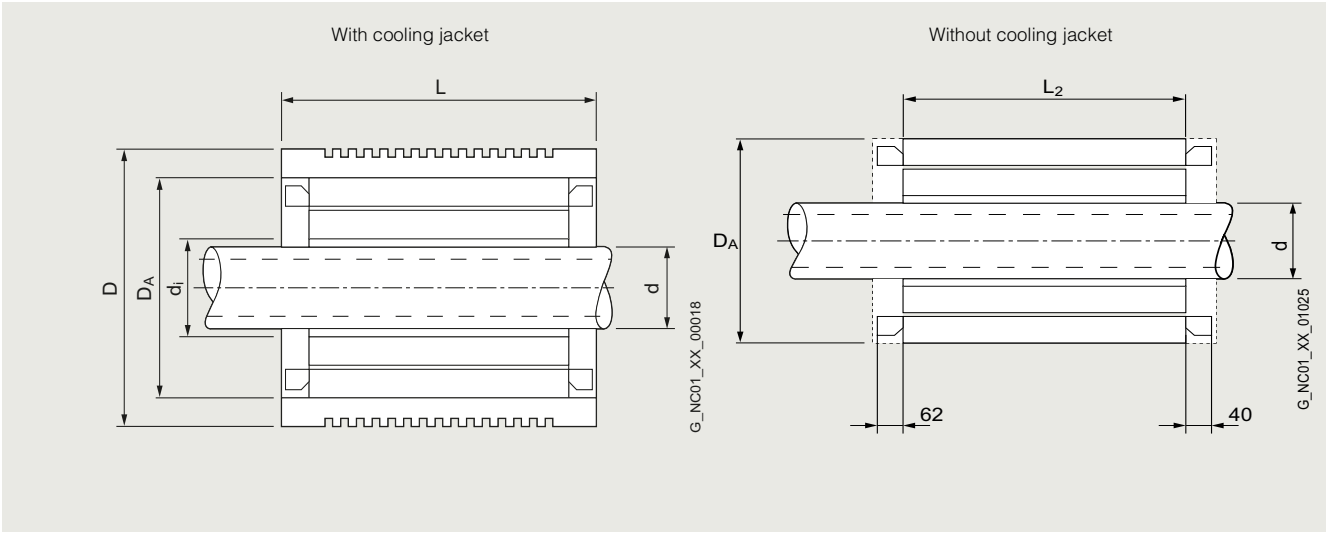
For motor Type	Dimensions in mm (inches) Total length L	Total outer diameter D	Stator outer diameter D_A	Rotor inner diameter without sleeve d_i -..A.	Rotor inner diameter with sleeve d -..B.	d -..C.	d -..D.	d -..E.
1FE1 High Torque series								
1FE1041-6W...	107 (4.21)	95 (3.74)	85 (3.35)	44 (1.73)	–	–	–	–
1FE1042-6W...	157 (6.18)	95 (3.74)	85 (3.35)	44 (1.73)	–	–	–	–
1FE1051-6W...	170 (6.69)	115 (4.53)	103.3 (4.06)	42 (1.65)	–	33 (1.30)	–	–
1FE1052-6W...	220 (8.66)	115 (4.53)	103.3 (4.06)	42 (1.65)	–	33 (1.30)	–	–
1FE1054-6W...	320 (12.60)	115 (4.53)	103.3 (4.06)	42 (1.65)	–	–	–	–
1FE1061-6W...	130 (5.12)	130 (5.12)	117.8 (4.63)	58 (2.28)	48 (1.89)	–	–	–
1FE1062-6W...	180 (7.09)	130 (5.12)	117.8 (4.63)	58 (2.28)	–	–	–	–
1FE1064-6W...	280 (11.02)	130 (5.12)	117.8 (4.63)	58 (2.28)	–	–	–	–
1FE1082-6W...	195 (7.68)	190 (7.48)	169.8 (6.68)	93 (3.66)	67 (2.64)	74 (2.91)	80 (3.15)	–
1FE1083-6W...	245 (9.65)	190 (7.48)	169.8 (6.68)	93 (3.66)	67 (2.64)	74 (2.91)	–	–
1FE1084-6W...	295 (11.61)	190 (7.48)	169.8 (6.68)	93 (3.66)	67 (2.64)	74 (2.91)	–	–
1FE1091-6W...	150 (5.91)	205 (8.07)	179.8 (7.07)	92 (3.62)	67 (2.64)	80 (3.15)	–	–
1FE1092-6W...	200 (7.87)	205 (8.07)	179.8 (7.07)	92 (3.62)	67 (2.64)	80 (3.15)	–	–
1FE1093-6W...	250 (9.84)	205 (8.07)	179.8 (7.07)	92 (3.62)	67 (2.64)	80 (3.15)	–	–
1FE1113-6W...	260 (10.24)	250 (9.84)	219.8 (8.65)	120 (4.72)	–	–	80 (3.15)	105.2 (4.14)
1FE1114-6W...	310 (12.20)	250 (9.84)	219.8 (8.65)	120 (4.72)	82 (3.23)	102 (4.02)	–	–
1FE1115-6W...	360 (14.17)	250 (9.84)	219.8 (8.65)	120 (4.72)	–	102 (4.02)	–	–
1FE1116-6W...	410 (16.14)	250 (9.84)	219.8 (8.65)	120 (4.72)	82 (3.23)	102 (4.02)	–	–
1FE1143-8W...	290 (11.42)	310 (12.20)	280 (11.02)	166.7 (6.56)	–	–	–	–
1FE1144-8W...	340 (13.39)	310 (12.20)	280 (11.02)	166.7 (6.56)	–	150.3 (5.92)	–	–
1FE1145-8W...	390 (15.35)	310 (12.20)	280 (11.02)	166.7 (6.56)	–	150.3 (5.92)	140.3 (5.52)	125 (4.92)
1FE1147-8W...	490 (19.29)	310 (12.20)	280 (11.02)	166.7 (6.56)	–	150.3 (5.92)	140.3 (5.52)	–

[1] if 15th position of the article number
=A → dimension d_i without rotor sleeve
=R → dimension d_i without rotor sleeve

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SIMOTICS M-1FE2 synchronous built-in motors – water cooling

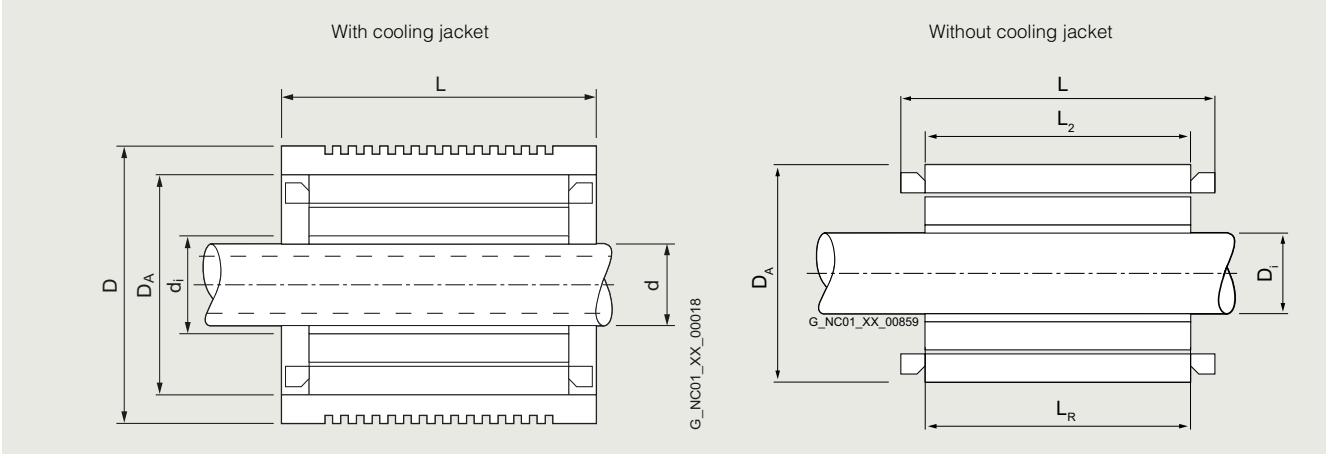
Dimensional drawings



For motor	Dimensions in mm (inches)				
	Total length	Length	Total outer diameter	Stator outer diameter	Rotor inner diameter
Type	L	L_2	D	D_A	d
1FE2 High Torque series					
1FE2182-8...	320 (12.60)	200 (7.87)	400 (15.75)	397 (15.62)	200 (7.87)
1FE2183-8...	370 (14.57)	250 (9.84)			
1FE2184-8...	420 (16.54)	300 (11.81)			
1FE2185-8...	470 (18.50)	350 (13.78)			
1FE2186-8...	520 (20.47)	400 (15.75)			
1FE2187-8...	570 (22.44)	450 (17.72)			

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Dimensional drawings



For motor	Dimensions in mm (inches)				
Type	Total length	Active part length	Stator outer diameter	Rotor inner diameter	Rotor length
	L	L_2	D_A	D_i [1]	L_R
SIMOTICS 1FE2 High-Torque without cooling jacket / without rotor sleeve [2]					
1FE2073-4....-.EA.	233 (9.17)	150 (5.91)	134.7 (5.30)	58 (2.28)	165 (6.5)
1FE2074-4....-.EA.	283 (11.14)	200 (7.87)	134.7 (5.30)	58 (2.28)	215 (8.46)
1FE2093-8A...-.EA.	228 (8.98)	150 (5.91)	179.7 (7.07)	90 (3.54)	178 (7.01)
1FE2094-8A...-.EA.	278 (10.94)	200 (7.87)	179.7 (7.07)	90 (3.54)	228 (8.98)
1FE2094-8C...-.EA.	278 (10.94)	200 (7.87)	179.7 (7.07)	90 (3.54)	224 (8.82)
1FE2095-8C...-.EA.	328 (12.91)	250 (9.84)	179.7 (7.07)	90 (3.54)	274 (10.78)
1FE2114-8....-.EA.	288 (11.34)	200 (7.87)	219.7 (8.65)	110 (4.33)	224 (8.82)
1FE2116-8....-.EA.	388 (15.28)	300 (11.81)	219.7 (8.65)	110 (4.33)	324 (12.76)
1FE2124-8C...-.EA.	290 (11.42)	200 (7.87)	239.7 (9.44)	120 (4.72)	224 (8.82)
1FE2127-8C...-.EA.	440 (17.32)	350 (13.78)	239.7 (9.44)	120 (4.72)	374 (14.72)
1FE2145-8C...-.EA.	343 (13.50)	250 (9.84)	279.7 (11.01)	140 (5.51)	285 (11.22)
1FE2147-8C...-.EA.	443 (14.44)	350 (13.78)	279.7 (11.01)	140 (5.51)	385 (15.16)
SIMOTICS 1FE2 High-Torque with cooling jacket / with rotor sleeve [2]					
1FE2073-4....-.DD.	235 (9.25)	150 (5.91)	152 (5.98)	46 (1.81)	192 (7.56)
1FE2074-4....-.DD.	285 (11.22)	200 (7.87)	152 (5.98)	46 (1.81)	242 (9.53)
1FE2093-8A...-.DD.	230 (9.06)	150 (5.91)	200 (7.87)	76 (2.99)	206 (8.11)
1FE2094-8....-.DD.	280 (11.02)	200 (7.87)	200 (7.87)	76 (2.99)	256 (10.08)
1FE2095-8C...-.DD.	330 (12.99)	250 (9.84)	200 (7.87)	76 (2.99)	306 (12.05)
1FE2114-8....-.DD.	290 (11.42)	200 (7.87)	247 (9.72)	96 (3.78)	252 (9.92)
1FE2116-8....-.DD.	390 (15.35)	300 (11.81)	247 (9.72)	96 (3.78)	352 (13.86)
1FE2124-8C...-.DD.	292 (11.50)	200 (7.87)	267 (10.51)	106 (4.17)	252 (9.92)
1FE2127-8C...-.DD.	442 (17.40)	350 (13.78)	267 (10.51)	106 (4.17)	402 (15.83)
1FE2145-8C...-.DD.	345 (13.58)	250 (9.84)	310 (12.20)	126 (4.96)	313 (12.32)
1FE2147-8C...-.DD.	445 (17.52)	350 (13.78)	310 (12.20)	126 (4.96)	413 (16.26)

[1] Final dimension after final machining
(delivery condition: Rotor unmachined with allowance).

[2] The 1FE2…-…..-.. motor variants are defined as follows:
- 1FE2…-…..-.E..: without cooling jacket
- 1FE2…-…..-..A.: without rotor sleeve
- 1FE2…-…..-.D..: with cooling jacket
- 1FE2…-…..-..D.: with rotor sleeve

All variants can be combined with each other as required.

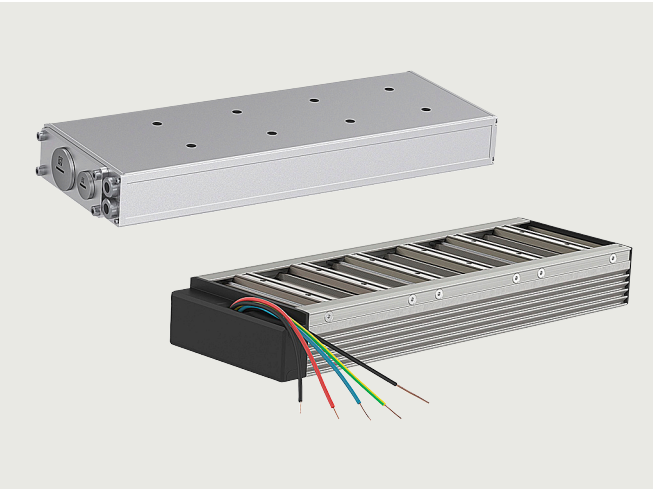
The relevant dimensions vary depending on the variant:
- With/without cooling jacket:
total length, active part length and stator outer diameter.
- With/without rotor sleeve:
rotor inner diameter and rotor length.

For combinations, e.g. without cooling jacket and with rotor sleeve or with cooling jacket and without rotor sleeve, the corresponding dimensions must be taken from the respective versions or combined.

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Notes

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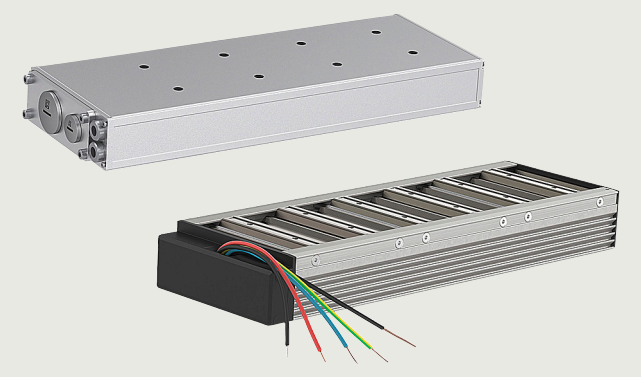
8.3/2 **SIMOTICS L-1FN3 linear motors for SINAMICS S120/S220**
8.3/4 Version for peak load – water cooling
8.3/8 Version for continuous load – water cooling
8.3/12 Standard version – natural cooling
8.3/14 Optional components
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8.3/16 Liquid cooling
8.3/17 **Dimensional drawings**

In addition, the Siemens Product Configurator can be used on the internet at the following address:
www.siemens.com/spc
See under:
Motors →
Motors for Motion Control →
SIMOTICS L linear motors

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SIMOTICS L-1FN3 linear motors with water cooling/natural cooling

Overview



SIMOTICS L-1FN3 linear motor, primary section, water cooling/natural cooling (from left to right)

In combination with the SINAMICS S120/S220 drive system, SIMOTICS L-1FN3 linear motors provide an optimally tuned linear direct drive system for the requirements of modern mechanical engineering.

The motors comprise a primary section and a secondary section track with magnets made of rare-earth material. The primary section has fixed dimensions, while the secondary section track is made up of individual elements (secondary sections) to correspond with the required traversing range. Through parallel operation of the motors, feedrate force and length can be scaled beyond the available spectrum.

Benefits

- Outstanding dynamic response and very high traversing velocity
- Excellent precision
- Easy installation
- Drive components are free of wear thanks to contactless drive force transmission

The main advantage of linear direct drive technology is the extensive avoidance of the effects of elasticity, play, and friction, as well as natural oscillation in the drive train. This results in a higher dynamic response and increased precision. When suitable measuring systems are used and the temperature conditions are appropriate, the motors can be positioned in the nanometer range.

Configuration

You can find the Configuration Manual for SIMOTICS L-1FN3 for SINAMICS S120 at:
https://support.industry.siemens.com/cs/ww/en/view/109475768

The compatibility list for SINAMICS S120/S220 Booksize Modules can be found at:
https://support.industry.siemens.com/cs/ww/en/view/109806050

The SINAMICS S220 Booksize power units along with the Motor Modules are available at:
https://support.industry.siemens.com/cs/ww/en/view/109803552

Application

Linear motors with water cooling

Version for peak load

Used in machine axes that are temporarily accelerated (e.g. S3 duty), or when large forces are required for a short time.

Typical applications:

- Highly dynamic, flexible machine tool and production machine construction
- Laser machining
- Handling

Version for continuous load

Used in machine axes with constant acceleration changes (e.g. S1 duty), with high process/weight forces or for operation without water cooling.

Typical applications:

- Grinding
- Non-circular machining, e.g. oscillating applications
- Z axes without weight compensation, quills
- Handling, Cartesian robots

Linear motors with natural cooling

The degree of protection depends on the design of the machine and must therefore be implemented by the machine manufacturer.

Typical applications:

- Handling axes
- Feed axes
- Woodworking machines
- 3D printing
- 2D/3D handling portals
- Laser cutting/water jet cutting machines
- Pick-and-place machines

Design

Linear motors with water cooling/natural cooling

The simple mechanical design without transmission elements such as ballscrew, coupling or belt, enhances the reliability of the drive components.

The stainless steel encapsulation of the primary section ensures the high mechanical ruggedness and resistance to dirt and pollution required for use in machine tools and production machines, as well as high resistance to corrosive liquids. In addition, the motor places minimal demands on the preparation of mounting surfaces thanks to the generous installation dimensions. The tolerance of the installation height for motor installation is + 0.3 mm.

Linear motors with water cooling

Heat loss occurs almost exclusively in the primary section and is dissipated via an integrated liquid cooling system. The Thermo-Sandwich dual-circuit cooling system allows the motor to be thermally decoupled from the machine, and is also an inexpensive cooling design.

Design variants (water/natural cooling)

SIMOTICS L-1FN3 linear motors are available as single-sided or double-sided motors.

- Single-sided motors
  The single-sided version consists of a primary section that is mounted in parallel to the associated secondary section.
- Double-sided motors
  The special secondary section of the double-sided version lies between two primary sections (one primary section with standard winding and one with complementary winding).
  The design as a double-sided motor is particularly suitable for applications where the secondary section is moved and small traversing paths with high acceleration levels, e.g. out-of-center machining.

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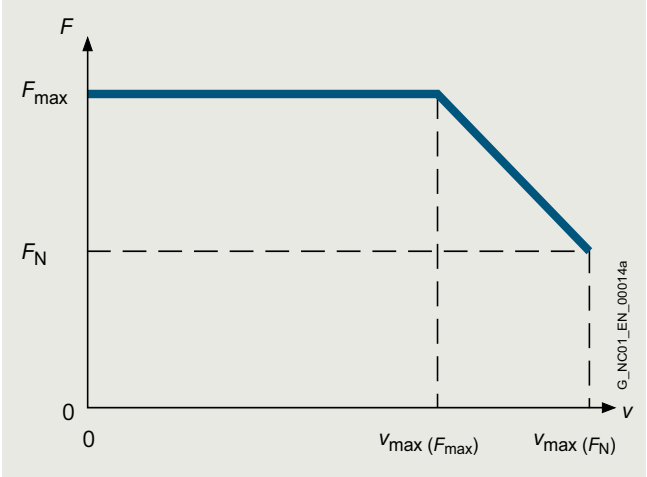
Technical specifications

Product name	SIMOTICS L-1FN3 linear motor
Motor type	Permanent-magnet linear motor
Magnet material	Rare-earth permanent magnets
Overload ratio (F_{max}:F_N) up to max.	
• Version for peak load	2.75
• Version for continuous load	1.7
Cooling	Water/natural cooling
Water cooler connections	G 1/8" internal thread on all primary and secondary section coolers
Temperature influence on the surrounding construction with precision cooling, max.	+4 K
Coolant inlet temperature, permissible	35 °C (95 °F) (avoid condensation) > 35 °C (95 °F) if rated motor power is reduced
Temperature monitoring installed in the primary section winding for water cooling [1]	2 monitoring circuits: Temp-S with PTC thermistor and Temp-F with Pt1000 temperature sensor
Thermal motor protection Temperature sensors for natural cooling installed in the primary section [1]	1 PTC thermistor triplet with response threshold +120 °C (248 °F) acc. to DIN 44081/44082
Insulation according to EN 60034-1 (IEC 60034-1)	Temperature class 155 (F) for a winding temperature of 120 °C (248 °F)
Degree of protection according to EN 60034-5 (IEC 60034-5)	
• Water cooling	IP65
• Natural cooling	IP23 The achievable degree of protection depends on the machine design and must be implemented by the machine manufacturer.
Design options	Different graduations due to the modular design
Secondary section cover	Exchangeable through the entire secondary section track or segment by segment
2nd rating plate	Enclosed separately
Encoder system [2] (Not included in scope of supply)	Select according to the constraints specific to the application and the drive.
Connection (water cooling)	
• 1FN3050	Permanently connected signal and power cable pre-assembled with connectors or with bare wire ends
• 1FN3100 ... 1FN3900	Connection cover prepared for separate power and signal cable
• 1FN3100 ... 1FN3900	Connection cover prepared for a heavy-gauge threaded joint Version for peak load
Connection (natural cooling)	
• 1FN3050 ... 1FN3150	Permanently connected signal and power cable as single cores with bare wire ends
Certificate of suitability	cURus UR for 1FN3900-4WC00-...

[1] Evaluation via SME120/SME125 Sensor Module External or TM120 Terminal Module, see SINAMICS S120 drive system.

[2] See recommended linear measuring systems.

Characteristic curves



Velocity/force characteristic curve

The SIMOTICS L-1FN3 linear motors have an overload range available for acceleration processes.
The maximum force F_{max} can only be utilized up to a maximum velocity $v_{max(Fmax)}$;
up to velocity $v_{max(FN)}$ only the feedrate force F_N is available.

Characteristics for the SIMOTICS motors are available via selectors through to the exact article number with the Siemens Product Configurator.

Access to the Siemens Product Configurator

The Siemens Product Configurator can be accessed without having to register or log in:

www.siemens.com/spc

→ SIMOTICS L-1FN3 in the SPC

Dimensional drawings

Dimensional drawings for the SIMOTICS motors are available via selectors through to the exact article number with the Siemens Product Configurator.

Access to the Siemens Product Configurator

The Siemens Product Configurator can be accessed without having to register or log in:

www.siemens.com/spc

→ SIMOTICS L-1FN3 in the SPC

More information

Some motor types can be express delivered as replacement motors in the event of plant outages and offer the advantage of a quicker spare parts supply.

Siemens provides comprehensive support when selecting the optimum motor solution.
Any questions regarding SIMOTICS L-1FN3 linear motors can be emailed to:

motor.support.motioncontrol@siemens.com

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Selection and ordering data

Feedrate force		Maximum velocity [3]		SIMOTICS L-1FN3 linear motors Version for peak load			Weight, approx.	
				Primary section	**Secondary section** Standard – matching the motor of the relevant component size	**Secondary section** Standard extended – matching the motor of the relevant component size	Primary section without/with precision cooling	Secondary section without/with heatsink profiles
F_N [1) 2)]	F_{max}	v_{max} at F_{max}	v_{max} at F_N					
N (lb$_f$)	N (lb$_f$)	m/min (ft/min)	m/min (ft/min)	Article No.	Article No.	Article No.	kg (lb)	kg (lb)
Water cooling								
200 (45.0)	550 (124)	170 (558)	408 (1339)	**1FN3050-2WC00-0 E A3**	**1FN3050-4SA00-0AA0**		3.0/3.5 (6.6/7.7)	0.4/0.5 (0.9/1.1)
				1FN3050-2WC00-0 F A3				
				1FN3050-2WC00-0 H A3				
				1FN3050-2WC00-0 J A3				
200 (45.0)	490 (110)	147 (482)	335 (1099)	**1FN3100-1WC00-0 ■ A3**	**1FN3100-4SA00-0AA0**		2.0/– (4.4/–) [4]	0.7/0.8 (1.5/1.8)
450 (101)	1100 (247)	148 (486)	323 (1060)	**1FN3100-2WC00-0 ■ A3**			4.0/4.6 (8.8/10.1)	
		258 (846)	535 (1755)	**1FN3100-2WE00-0 ■ A3**				
		488 (1601)	984 (3229)	**1FN3100-2WJ20-0 ■ A3**				
675 (152)	1650 (371)	137 (449)	303 (994)	**1FN3100-3WC00-0 ■ A3**			5.6/6.4 (12.3/14.1)	
		258 (846)	534 (1752)	**1FN3100-3WE00-0 ■ A3**				
900 (202)	2200 (495)	148 (486)	324 (1063)	**1FN3100-4WC00-0 ■ A3**			7.4/8.5 (16.3/18.7)	
		258 (846)	535 (1755)	**1FN3100-4WE00-0 ■ A3**				
1120 (252)	2750 (618)	125 (410)	278 (912)	**1FN3100-5WC00-0 ■ A3**			9.1/10.4 (20.1/22.9)	
340 (76.4)	820 (184)	140 (459)	303 (994)	**1FN3150-1WC00-0 ■ A3**	**1FN3150-4SA00-0AA0**		2.9/– (6.4/–) [4]	1.2/1.3 (2.6/2.9)
		278 (912)	569 (1867)	**1FN3150-1WE00-0 ■ A3**			3.0/– (6.61/–) [4]	
675 (152)	1650 (371)	141 (463)	306 (1004)	**1FN3150-2WC00-0 ■ A3**			5.3/6.0 (11.7/13.2)	
1010 (227)	2470 (555)	138 (453)	302 (991)	**1FN3150-3WC00-0 ■ A3**			7.7/8.6 (17.0/19.0)	
1350 (303)	3300 (742)	141 (463)	306 (1004)	**1FN3150-4WC00-0 ■ A3**			10.4/11.6 (22.9/25.6)	
1690 (380)	4120 (926)	141 (463)	306 (1004)	**1FN3150-5WC00-0 ■ A3**			12.5/13.9 (27.6/30.6)	
610 (137)	1720 (387)	138 (453)	325 (1066)	**1FN3300-1WC00-0 ■ A3**	**1FN3300-4SA00-0AA0**	**1FN3300-4SA12-0AA0**	6.6/– (14.6/–) [4]	2.4/2.6 (5.3/5.7)
1220 (274)	3450 (776)	77 (253)	194 (637)	**1FN3300-2WB00-0 ■ A3**			11.5/12.5 (25.4/27.6)	
1230 (277)	3450 (776)	140 (459)	322 (1056)	**1FN3300-2WC00-0 ■ A3**				
		399 (1309)	868 (2848)	**1FN3300-2WG00-0 ■ A3**				
1840 (414)	5170 (1162)	142 (466)	327 (1073)	**1FN3300-3WC00-0 ■ A3**			17.0/18.4 (37.5/40.6)	
		405 (1329)	881 (2891)	**1FN3300-3WG00-0 ■ A3**				
2450 (551)	6900 (1551)	77 (253)	194 (637)	**1FN3300-4WB00-0 ■ A3**			22.2/24 (49.0/52.9)	
		140 (459)	323 (1060)	**1FN3300-4WC00-0 ■ A3**				

Article No. supplements

Type of connection:	
1FN3100 to 1FN3900 motors	
Power and signals connected using one cable Terminal box cover prepared for a heavy-gauge cable gland	**A**
Separate power and signal connections Terminal box cover prepared for metric cable gland	**B**
Connection of power and signal separated with fixed-connected cables, length 2 m (6.56 ft) with bare wire ends	**E**
Connection of power and signal separated with fixed-connected cables, length: 0.5 m (1.64 ft) with connectors	**F**
Connection of power and signal combined with fixed-connected cable, length 2 m (6.56 ft) with bare wire ends	**H**
Connection of power and signal combined with fixed-connected cable, length: 0.5 m (1.64 ft) with connector	**J**

Description	Article No.
Signal cable, pre-assembled with M17 connector	
For SIMOTICS L-1FN3 linear motors	
• 1FN3100/1FN3150	**6FX8002-2SL01-....**
• 1FN3300 ... 1FN3900	**6FX8002-2SL02-....**

For more information about cables, see MOTION-CONNECT connection systems

For footnotes, see next page.

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Motor type Primary section (repeated)	Rated current	Maximum current	Calculated power	**SINAMICS S120 Motor Module [5] Booksize format** Internal air cooling		**Power cable with complete shield** Motor connection via adapter cable with power connector for increased velocity/acceleration			
				Required rated current	For further components, see SINAMICS S120 drive system	Pre-assembled adapter cable for motor [6]	Power connectors	Cable cross-section [7]	Pre-assembled basic cable to the drive system
	I_N [1]	I_{max}	$P_{el, max.}$	I_N/I_{max}					
	A	A	kW (hp)	A	Article No.	Article No.	Size	mm^2	Article No.
1FN3050-2WC00-...	2.7	8.2	4.0 (5.4)	3/9	**6SL3120-■TE13-0AD0**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3050-2WC00-...	2.7	8.2	4.0 (5.4)	3/9	**6SL3120-■TE13-0AD0**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3050-2WC00-...	2.7	8.2	4.0 (5.4)	3/9	**6SL3120-■TE13-0AD0**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3050-2WC00-...	2.7	8.2	4.0 (5.4)	3/9	**6SL3120-■TE13-0AD0**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3100-1WC00-...	2.4	6.5	3.1 (4.2)	3/9	**6SL3120-■TE13-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3100-2WC00-...	5.1	13.5	6.3 (8.4)	5/15	**6SL3120-■TE15-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3100-2WE00-...	8.0	21.4	8.3 (11.1)	9/27	**6SL3120-■TE21-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3100-2WJ20-...	14.4	38.3	12.5 (16.8)	18/54	**6SL3120-■TE21-8AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3100-3WC00-...	7.2	19.1	9.1 (12.2)	9/27	**6SL3120-■TE21-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3100-3WE00-...	12.1	32.1	12.4 (16.6)	18/36	**6SL3120-■TE21-8AC0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3100-4WC00-...	10.2	27.1	12.5 (16.8)	18/36	**6SL3120-■TE21-8AC0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3100-4WE00-...	16.1	42.9	16.6 (22.3)	18/54	**6SL3120-1TE21-8AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3100-5WC00-...	11.0	29.5	14.3 (19.2)	18/36	**6SL3120-■TE21-8AC0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3150-1WC00-...	3.6	9.5	4.3 (5.8)	5/15	**6SL3120-■TE15-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3150-1WE00-...	6.4	17.1	6.2 (8.3)	9/27	**6SL3120-■TE21-0AD0**	**6FX7002-5LM42-....**	1	4 x 2.5	**6FX8002-5CS16 ....**
1FN3150-2WC00-...	7.2	19.1	8.7 (11.7)	9/27	**6SL3120-■TE21-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3150-3WC00-...	10.7	28.6	12.8 (17.2)	18/36	**6SL3120-■TE21-8AC0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3150-4WC00-...	14.3	38.2	17.3 (23.2)	18/54	**6SL3120-1TE21-8AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3150-5WC00-...	17.9	47.7	21.6 (29.0)	18/54	**6SL3120-1TE21-8AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3300-1WC00-...	6.5	20.0	8.3 (11.1)	9/27	**6SL3120-■TE21-0AD0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3300-2WB00-...	8.0	24.7	12.6 (16.9)	9/27	**6SL3120-■TE21-0AD0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3300-2WC00-...	12.6	39.0	16.2 (21.7)	18/54	**6SL3120-1TE21-8AD0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3300-2WG00-...	32.4	100.0	30.8 (41.3)	60/120	**6SL3120-1TE26-0AC0**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS54-....**
1FN3300-3WC00-...	19.2	59.5	24.9 (33.4)	24/72	**6SL3120-1TE22-4AD0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3300-3WG00-...	49.4	153.0	47.0 (63.0)	132/210	**6SL3120-1TE31-3AA3**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS46-....**
1FN3300-4WB00-...	16.0	49.4	25.2 (33.8)	18/54	**6SL3120-1TE21-8AD0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3300-4WC00-...	25.3	78.3	32.6 (43.7)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS46-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

....	Length code	**....**

For more information about cables, see MOTION-CONNECT connection systems

1) For water cooling with inlet temperature 35 °C (95 °F).
2) A reduction of up to 30 % must be expected in case of motor standstill, for very low velocities or very short traversing paths.
3) Velocity values refer to a drive system DC link voltage of 600 V DC.
4) No precision cooler available.
5) Optimized selection for full performance of linear motors.
6) Pre-assembled adapter cable for motor with connection type B.
7) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

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Selection and ordering data

Feedrate force		Maximum velocity [3]		SIMOTICS L-1FN3 linear motors Version for peak load			Weight, approx.	
				Primary section	**Secondary section** Standard – matching the motor of the relevant component size	**Secondary section** Standard extended – matching the motor of the relevant component size	Primary section without/with precision cooling	Secondary section without/with heatsink profiles
F_N [1) 2)]	F_{max}	v_{max} at F_{max}	v_{max} at F_N					
N (lb$_f$)	N (lb$_f$)	m/min (ft/min)	m/min (ft/min)	Article No.	Article No.	Article No.	kg (lb)	kg (lb)
Water cooling								
1920 (432)	5180 (1165)	264 (866)	569 (1867)	**1FN3450-2WE00-0 ■ A3**	**1FN3450-4SA00-0AA0**	**1FN3450-4SA12-0AA0**	16.5/17.7 (36.4/39.0)	3.8/4 (8.4/8.82)
1930 (434)		41 (135)	112 (367)	**1FN3450-2WA50-0 ■ A3**				
		103 (338)	235 (771)	**1FN3450-2WB70-0 ■ A3**				
		135 (443)	275 (902)	**1FN3450-2WC00-0 ■ A3**				
		177 (581)	385 (1263)	**1FN3450-2WD00-0 ■ A3**				
2900 (652)	7760 (1745)	41 (135)	121 (397)	**1FN3450-3WA50-0 ■ A3**			24.0/25.7 (52.9/56.7)	3.8/4 (8.4/8.82)
		72.7 (238.5)	179 (587)	**1FN3450-3WB00-0 ■ A3**				
		102 (335)	236 (774)	**1FN3450-3WB50-0 ■ A3**				
		133 (436)	298 (978)	**1FN3450-3WC00-0 ■ A3**				
		260 (853)	561 (1841)	**1FN3450-3WE00-0 ■ A3**				
3860 (868)	10300 (2316)	72.9 (239.2)	179 (587)	**1FN3450-4WB00-0 ■ A3**			31.7/33.9 (69.9/74.7)	
		102 (335)	236 (774)	**1FN3450-4WB50-0 ■ A3**				
		133 (436)	298 (978)	**1FN3450-4WC00-0 ■ A3**				
		261 (856)	560 (1837)	**1FN3450-4WE00-0 ■ A3**				
2610 (587)	6900 (1551)	45.4 (149.0)	128 (420)	**1FN3600-2WA50-0 ■ A3**	**1FN3600-4SA00-0AA0**		22.5/23.9 (49.6/52.7)	4.6/5 (10.1/11.0)
		69.6 (228.4)	172 (564)	**1FN3600-2WB00-0 ■ A3**				
		105 (345)	238 (781)	**1FN3600-2WB50-0 ■ A3**				
		125 (410)	283 (929)	**1FN3600-2WC00-0 ■ A3**				
3920 (881)	10300 (2316)	69.4 (227.7)	171 (561)	**1FN3600-3WB00-0 ■ A3**			33.5/35.4 (73.9/78.1)	
		69.4 (227.7)	171 (561)	**1FN3600-3WB50-0 ■ A3**				
		128 (420)	282 (925)	**1FN3600-3WC00-0 ■ A3**				
5220 (1174)	13800 (3102)	35.5 (116.5)	112 (367)	**1FN3600-4WA30-0 ■ A3**			43.0/45.5 (94.8/100.3)	
		68.1 (223.4)	170 (558)	**1FN3600-4WB00-0 ■ A3**				
		102 (335)	234 (768)	**1FN3600-4WB50-0 ■ A3**				
		125 (410)	279 (915)	**1FN3600-4WC00-0 ■ A3**				
6530 (1468)	17200 (3867)	69.6 (228.4)	171 (561)	**1FN3600-5WB00-0 ■ A3**			56.0/59.1 (123.5/130.3)	
4050 (910)	10300 (2316)	78 (256)	179 (587)	**1FN3900-2WB00-0 ■ A3**	**1FN3900-4SA00-0AA0**		32.2/33.7 (71.0/74.3)	7.5/7.9 (16.5/17.4)
		123 (404)	269 (883)	**1FN3900-2WC00-0 ■ A3**				
6080 (1367)	15500 (3485)	78.7 (258.2)	188 (617)	**1FN3900-3WB00-0 ■ A3**			47.0/47.8 (103.6/105.4)	
8100 (1821)	20700 (4654)	31.1 (102.0)	98.9 (324.5)	**1FN3900-4WA50-0 ■ A3**			62.7/65.4 (138.3/144.2)	
		77.2 (253.3)	178 (584)	**1FN3900-4WB00-0 ■ A3**				
		98.6 (323.5)	222 (728)	**1FN3900-4WB50-0 ■ A3**				
		122 (400)	266 (873)	**1FN3900-4WC00-0 ■ A3**				

Article No. supplements

Type of connection:

1FN3100 to 1FN3900 motors

Power and signals connected using one cable Terminal box cover prepared for a heavy-gauge cable gland	**A**
Separate power and signal connections Terminal box cover prepared for metric cable gland	**B**
Connection of power and signal separated with fixed-connected cables, length 2 m (6.56 ft) with bare wire ends	**E**
Connection of power and signal separated with fixed-connected cables, length: 0.5 m (1.64 ft) with connectors	**F**
Connection of power and signal combined with fixed-connected cable, length 2 m (6.56 ft) with bare wire ends	**H**
Connection of power and signal combined with fixed-connected cable, length: 0.5 m (1.64 ft) with connector	**J**

Description	Article No.
Signal cable, pre-assembled with M17 connector	
For SIMOTICS L-1FN3 linear motors	
• 1FN3100/1FN3150	**6FX8002-2SL01-....**
• 1FN3300 ... 1FN3900	**6FX8002-2SL02-....**

For more information about cables, see MOTION-CONNECT connection systems

For footnotes, see next page.

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Motor type Primary section (repeated)	Rated current	Maximum current	Calculated power	**SINAMICS S120 Motor Module** [4] **Booksize format** Internal air cooling		**Power cable with complete shield** Motor connection via adapter cable with power connector for increased velocity/acceleration			
				Required rated current	For further components, see SINAMICS S120 drive system				
	I_N [1]	I_{max}	$P_{el, max.}$	I_N/I_{max}		Pre-assembled adapter cable for motor [8]	Power connectors	Cable cross-section [5]	Pre-assembled basic cable to the drive system
	A	A	kW (hp)	A	Article No.	Article No.	Size	mm^2	Article No.
1FN3450-2WE00-...	36.3	102.0	33.8 (45.3)	60/120	**6SL3120-1TE26-0AC0**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3450-2WA50-...	8.9	25.0	15.1 (20.2)	9/27	**6SL3120-■TE21-0AD0**	**6FX7002-5LM62-....**	1	4 x 2.5	**6FX8002-5CS16-....**
1FN3450-2WB70-...	16.2	45.4	20.6 (27.6)	18/54	**6SL3120-■TE21-8AD0**	**6FX7002-5LM42-....**	1	4 x 2.5	**6FX8002-5CS16 ....**
1FN3450-2WC00-...	20.0	56.2	23.3 (31.2)	24/72	**6SL3120-1TE22-4AD0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3450-2WD00-...	25.0	70.2	25.8 (34.6)	24/72	**6SL3120-1TE22-4AD0**	**6FX7002-5LM72-....**	1.5	4 x 4	**6FX8002-5CS46 ....**
1FN3450-3WA50-...	12.9	38.0	22.6 (30.3)	18/54	**6SL3120-■TE21-8AD0**	**6FX7002-5LM42-....**	1	4 x 2.5	**6FX8002-5CS16 ....**
1FN3450-3WB00-...	17.9	52.7	26.7 (35.8)	18/54	**6SL3120-1TE21-8AD0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3450-3WB50-...	22.9	67.4	30.4 (40.8)	24/72	**6SL3120-1TE22-4AD0**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS46-....**
1FN3450-3WC00-...	28.3	83.5	34.3 (46.0)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS56-....**
1FN3450-3WE00-...	51.3	151.0	49.8 (66.8)	132/210	**6SL3120-1TE31-3AA3**	**6FX7002-5LM02-....**	1.5	4 × 16	**6FX8002-5CS24-....**
1FN3450-4WB00-...	23.8	70.1	35.5 (47.6)	24/72	**6SL3120-1TE22-4AD0**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS46-....**
1FN3450-4WB50-...	30.3	89.5	40.4 (54.2)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS56-....**
1FN3450-4WC00-...	37.6	111.0	45.6 (61.1)	60/120	**6SL3120-1TE26-0AC0**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3450-4WE00-...	68.0	201.0	66.3 (88.9)	132/210	**6SL3120-1TE31-3AA3**	**6FX7008-1BB61-....** [6]	–	4 × 25	**6FX8008-1BA25-....** [7]
1FN3600-2WA50-...	13.2	35.9	21.4 (28.7)	18/36	**6SL3120-■TE21-8AC0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3600-2WB00-...	16.8	45.8	24.1 (32.3)	18/54	**6SL3120-■TE21-8AD0**	**6FX7002-5LM42-....**	1	4 x 2.5	**6FX8002-5CS16 ....**
1FN3600-2WB50-...	22.3	60.7	27.5 (36.9)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS46-....**
1FN3600-2WC00-...	26.1	70.9	29.2 (39.2)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS46-....**
1FN3600-3WB00-...	24.8	68.2	35.8 (48.0)	24/72	**6SL3120-1TE22-4AD0**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS46-....**
1FN3600-3WB50-...	24.8	68.2	35.8 (48.0)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS46-....**
1FN3600-3WC00-...	35.7	106.0	43.4 (58.2)	60/120	**6SL3120-1TE26-0AC0**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS56-....**
1FN3600-4WA30-...	22.3	63.7	39.7 (53.2)	24/72	**6SL3120-1TE22-4AD0**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS46-....**
1FN3600-4WB00-...	31.5	90.1	46.8 (62.8)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS56-....**
1FN3600-4WB50-...	41.8	120.0	53.4 (71.6)	85/141	**6SL3120-1TE28-5AA3**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CG61-....**
1FN3600-4WC00-...	48.8	139.0	56.8 (76.2)	85/141	**6SL3120-1TE28-5AA3**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CG61-....**
1FN3600-5WB00-...	42.7	114	60.2 (80.7)	85/141	**6SL3120-1TE28-5AA3**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3900-2WB00-...	25.5	70.5	33.5 (44.9)	24/72	**6SL3120-1TE22-4AD0**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS46-....**
1FN3900-2WC00-...	37.0	102.0	42.2 (56.6)	60/120	**6SL3120-1TE26-0AC0**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3900-3WB00-...	40.6	114.0	55.3 (74.2)	60/120	**6SL3120-1TE26-0AC0**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3900-4WA50-...	30.7	86.3	54.4 (73.0)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS56-....**
1FN3900-4WB00-...	49.7	140.0	66.0 (88.5)	85/141	**6SL3120-1TE28-5AA3**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CG61-....**
1FN3900-4WB50-...	61.4	173.6	77.7 (104)	132/210	**6SL3120-1TE31-3AA3**	**6FX7002-5LM02-....**	1.5	4 × 16	**6FX8002-5CG24-....**
1FN3900-4WC00-...	72.0	202.0	83.0 (111)	132/210	**6SL3120-1TE31-3AA3**	**6FX8008-1BB61-....** [6]	–	4 × 25	**6FX8008-1BB25-....** [7]

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

....	Length code	**....**

For more information about cables, see MOTION-CONNECT connection systems

1) For water cooling with inlet temperature 35 °C (95 °F).
2) A reduction of up to 30 % must be expected in case of motor standstill, for very low velocities or very short traversing paths.
3) Velocity values refer to a drive system DC link voltage of 600 V DC.
4) Optimized selection for full performance of linear motors.
5) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).
6) Sold by the meter only (4 × 16 mm^2). Connected to primary section with 16 mm^2 (< 1.5 m (4.92 ft)), then routed onwards via the terminal box with 25 mm^2.
7) Sold by the meter only (4 × 25 mm^2).
8) Pre-assembled adapter cable for motor with connection type B.

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Selection and ordering data

Feedrate force		Maximum velocity [3]		SIMOTICS L-1FN3 linear motors Version for continuous load		Weight, approx.	
				Primary section	**Secondary section** Standard – matching the motor of the relevant component size	Primary section without/with precision cooling	Secondary section without/with heatsink profiles
F_N [1] [2]	F_{max}	v_{max} at F_{max}	v_{max} at F_N				
N (lb_f)	N (lb_f)	m/min (ft/min)	m/min (ft/min)	Article No.	Article No.	kg (lb)	kg (lb)
Water cooling							
151 (33.9)	255 (57.3)	236 (774)	429 (1408)	**1FN3050-1ND00-0EA3**	**1FN3050-4SA00-0AA0**	2.2/2.7 (4.9/6.0)	0.4/0.5 (0.9/1.1)
				1FN3050-1ND00-0FA3			
				1FN3050-1ND00-0HA3			
				1FN3050-1ND00-0JA3			
302 (67.9)	510 (115)	104 (341)	199 (653)	**1FN3050-2NB80-0EA3**		3.2/4.0 (7.1/8.8)	
				1FN3050-2NB80-0FA3			
				1FN3050-2NB80-0HA3			
				1FN3050-2NB80-0JA3			
		229 (751)	419 (1375)	**1FN3050-2NE00-0EA3**		3.9/4.6 (8.6/10.1)	
				1FN3050-2NE00-0FA3			
				1FN3050-2NE00-0HA3			
				1FN3050-2NE00-0JA3			
302 (67.9)	510 (115)	115 (377)	212 (696)	**1FN3100-1NC00-0■A3**	**1FN3100-4SA00-0AA0**	3.0/3.5 (6.6/7.7)	0.7/0.8 (1.5/1.8)
604 (136)	1020 (229)	164 (538)	300 (984)	**1FN3100-2NC80-0■A3**		5.4/6.2 (11.9/13.7)	
905 (203)	1530 (344)	491 (1611)	101 (331)	**1FN3100-3NA80-0■A3**		7.5/8.6 (16.5/19.0)	
905 (203)	1530 (344)	111 (364)	206 (676)	**1FN3100-3NC00-0■A3**		7.5/8.5 (16.5/18.7)	
1210 (272)	2040 (459)	162 (532)	296 (971)	**1FN3100-4NC80-0■A3**		9.9/11.2 (21.8/24.7)	
453 (102)	766 (172)	127 (417)	230 (755)	**1FN3150-1NC20-0■A3**	**1FN3150-4SA00-0AA0**	4.1/4.6 (9.0/10.1)	1.2/1.3 (2.6/2.9)
905 (203)	1530 (344)	106 (348)	197 (646)	**1FN3150-2NB80-0■A3**		7.3/8.2 (16.1/18.1)	
1360 (306)	2300 (517)	105 (345)	195 (640)	**1FN3150-3NB80-0■A3**		10.5/11.7 (23.2/25.8)	
		156 (512)	284 (932)	**1FN3150-3NC70-0■A3**			
1810 (407)	3060 (688)	105 (345)	195 (640)	**1FN3150-4NB80-0■A3**		13.9/15.3 (30.6/33.7)	

Article No. supplements

Type of connection:	
1FN3100 to 1FN3900 motors	
Separate power and signal connections Terminal box cover prepared for metric cable gland	**B**
Connection of power and signal separated with fixed-connected cables, length 2 m (6.56 ft) with bare wire ends	**E**
Connection of power and signal separated with fixed-connected cables, length: 0.5 m (1.64 ft) with connectors	**F**
Connection of power and signal combined with fixed-connected cable, length 2 m (6.56 ft) with bare wire ends	**H**
Connection of power and signal combined with fixed-connected cable, length: 0.5 m (1.64 ft) with connector	**J**

Description	Article No.
Signal cable, pre-assembled with M17 connector	
For SIMOTICS L-1FN3 linear motors	
• 1FN3100/1FN3150	**6FX8002-2SL01-....**
• 1FN3300 ... 1FN3900	**6FX8002-2SL02-....**

For more information about cables, see MOTION-CONNECT connection systems

For footnotes, see next page.

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Motor type Primary section (repeated)	Rated current	Maxi-mum cur-rent	Calculated power	**SINAMICS S120 Motor Module [4] Booksize format** Internal air cooling		**Power cable with complete shield** Motor connection via adapter cable with power connector for increased velocity/acceleration			
				Required rated current	For further components, see SINAMICS S120 drive system				
	I_N [1]	I_{max}	$P_{el, max.}$	I_N/I_{max}		Pre-assembled adapter cable for motor [6]	Power connec-tors	Cable cross-section [5]	Pre-assembled basic cable to the drive system
	A	A	kW (hp)	A	Article No.	Article No.	Size	mm^2	Article No.
1FN3050-1ND00-....	2.8	5.9	1.7 (2.3)	3/9	**6SL3120-■TE13-0AD0**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3050-1ND00-....	2.8	5.9	1.7 (2.3)	3/9	**6SL3120-■TE13-0AD0**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3050-1ND00-....	2.8	5.9	1.7 (2.3)	3/9	**6SL3120-■TE13-0AD0**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3050-1ND00-....	2.8	5.9	1.7 (2.3)	3/9	**6SL3120-■TE13-0AD0**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3050-2NB80-....	2.8	5.9	2.3 (3.1)	3/9	**6SL3120-1TE13-0AD0**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3050-2NB80-....	2.8	5.9	2.3 (3.1)	3/9	**6SL3120-1TE13-0AD0**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3050-2NB80-....	2.8	5.9	2.3 (3.1)	3/9	**6SL3120-1TE13-0AD0**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3050-2NB80-....	2.8	5.9	2.3 (3.1)	3/9	**6SL3120-1TE13-0AD0**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3050-2NE00-....	5.65	11.7	3.32 (4.45)	5/15	**6SL3120-■TE15-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3050-2NE00-....	5.65	11.7	3.32 (4.45)	5/15	**6SL3120-■TE15-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3050-2NE00-....	5.65	11.7	3.32 (4.45)	5/15	**6SL3120-■TE15-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3050-2NE00-....	5.65	11.7	3.32 (4.45)	5/15	**6SL3120-■TE15-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3100-1NC00-....	2.8	5.9	2.1 (2.8)	3/9	**6SL3120-■TE13-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3100-2NC80-....	8	16.5	5.1 (6.8)	9/27	**6SL3120-■TE21-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3100-3NA80-....	4.52	9.39	4.51 (6.05)	5/15	**6SL3120-■TE15-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3100-3NC00-....	8.5	17.6	6.3 (8.4)	9/27	**6SL3120-■TE21-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3100-4NC80-....	15.9	33.1	10.2 (13.7)	18/36	**6SL3120-■TE21-8AC0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3150-1NC20-....	4.5	9.4	3.2 (4.3)	5/15	**6SL3120-■TE15-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3150-2NB80-....	8	16.5	5.8 (7.8)	9/27	**6SL3120-■TE21-0AD0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3150-3NB80-....	11.9	24.8	8.44 (11.32)	18/36	**6SL3120-■TE21-8AC0**	**6FX7002-5LM42-....**	1	4 x 2.5	**6FX8002-5CS16 ....**
1FN3150-3NC70-....	16.9	35.2	10.8 (14.5)	18/36	**6SL3120-■TE21-8AC0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3150-4NB80-....	15.9	33.1	11.6 (15.6)	18/36	**6SL3120-■TE21-8AC0**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS16-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

....	Length code	**....**

For more information about cables, see MOTION-CONNECT connection systems

[1] For water cooling with inlet temperature 35 °C (95 °F).

[2] A reduction of up to 30 % must be expected in case of motor standstill, for very low velocities or very short traversing paths.

[3] Velocity values refer to a drive system DC link voltage of 600 V DC.

[4] Optimized selection for full performance of linear motors.

[5] The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

[6] Pre-assembled adapter cable for motor with connection type B.

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Selection and ordering data

Feedrate force		Maximum velocity [3]		SIMOTICS L-1FN3 linear motors Version for continuous load			Weight, approx.	
				Primary section	**Secondary section** Standard – matching the motor of the relevant component size	**Secondary section** Standard extended – matching the motor of the relevant component size	Primary section without/with precision cooling	Secondary section without/with heatsink profiles
F_N [1) 2)]	F_{max}	v_{max} at F_{max}	v_{max} at F_N					
N (lb$_f$)	N (lb$_f$)	m/min (ft/min)	m/min (ft/min)	Article No.	Article No.	Article No.	kg (lb)	kg (lb)
Water cooling								
864 (194)	1470 (330)	127 (417)	228 (748)	**1FN3300-1NC10-0■A3**	**1FN3300-4SA00-0AA0**	**1FN3300-4SA12-0AA0**	8.8/9.5 (19.4/20.9)	2.4/2.6 (5.3/5.7)
1730 (389)	2940 (661)	127 (417)	224 (735)	**1FN3300-2NC10-0■A3**			15.9 (35.1)	17.0 (37.5)
		402 (1319)	715 (2346)	**1FN3300-2NH00-0■A3**			15.9/17.0 (35.1/37.5)	
2595 (583)	4400 (989)	88 (289)	160 (525)	**1FN3300-3NB50-0■A3**			23.0/24.3 (50.7/53.6)	
		144 (472)	257 (843)	**1FN3300-3NC40-0■A3**			23.0/24.4 (50.7/53.8)	
3460 (778)	5870 (1320)	105 (345)	193 (633)	**1FN3300-4NB80-0■A3**			29.9/31.8 (65.9/70.1)	
1300 (292)	2200 (495)	93.5 (306.8)	169 (554)	**1FN3450-1NB50-0■A3**	**1FN3450-4SA00-0AA0**	**1FN3450-4SA12-0AA0**	12/12.8 (26.5/28.2)	3.8/4 (8.4/8.82)
2590 (582)	4400 (989)	80 (262)	147 (482)	**1FN3450-2NB40-0■A3**			22.5/23.7 (49.6/52.3)	
		104 (341)	188 (617)	**1FN3450-2NB80-0■A3**				
		148 (486)	266 (873)	**1FN3450-2NC50-0■A3**				
3890 (875)	6600 (1484)	34.3 (112.5)	69.9 (229.3)	**1FN3450-3NA50-0■A3**			32.7/34.3 (72.1/75.6)	
		91 (299)	165 (541)	**1FN3450-3NB50-0■A3**				
		147 (482)	264 (866)	**1FN3450-3NC50-0■A3**				
5190 (1167)	8810 (1981)	67.5 (221.5)	126 (413)	**1FN3450-4NB20-0■A3**			42.0/44.0 (92.6/97.0)	
		102 (335)	186 (610)	**1FN3450-4NB80-0■A3**			42.0/44.1 (92.6/97.2)	
3460 (778)	5870 (1320)	56.8 (186.4)	107 (351)	**1FN3600-2NB00-0■A3**	**1FN3600-4SA00-0AA0**		30.4/32.0 (67.0/70.6)	4.6/5 (10.1/11.0)
		109 (358)	197 (646)	**1FN3600-2NB80-0■A3**				
		259 (850)	460 (1509)	**1FN3600-2NE50-0■A3**				
5190 (1167)	8810 (1981)	74.3 (243.8)	137 (449)	**1FN3600-3NB00-0■A3**			44.3/46.4 (97.7/102.3)	
		108 (354)	196 (643)	**1FN3600-3NB80-0■A3**				
6920 (1556)	11700(2630)	43 (141)	86 (282)	**1FN3600-4NA70-0■A3**			58.2/60.8 (128.3/134.1)	
		108 (354)	195 (640)	**1FN3600-4NB80-0■A3**				
5190 (1167)	8810 (1981)	69 (226)	128 (420)	**1FN3900-2NB20-0■A3**	**1FN3900-4SA00-0AA0**		43.5/45.3 (95.9/99.9)	7.5/7.9 (16.5/17.4)
		170 (558)	307 (1007)	**1FN3900-2NC80-0■A3**				
7780 (1749)	13200(2967)	69 (226)	127 (417)	**1FN3900-3NB20-0■A3**			63.0/65.5 (138.9/144.4)	
10400(2338)	14600(3282)	28 (91.9)	59 (194)	**1FN3900-4NA50-0■A3**			82.0/85.1 (180.8/187.6)	
	17600(3957)	45.6 (149.6)	87.9 (288.4)	**1FN3900-4NA80-0■A3**				
	17610(3959)	69 (226)	127 (417)	**1FN3900-4NB20-0■A3**				

Article No. supplements

Type of connection:	
1FN3100 to 1FN3900 motors	
Separate power and signal connections Terminal box cover prepared for metric cable gland	**B**
Connection of power and signal separated with fixed-connected cables, length 2 m (6.56 ft) with bare wire ends	**E**
Connection of power and signal separated with fixed-connected cables, length: 0.5 m (1.64 ft) with connectors	**F**
Connection of power and signal combined with fixed-connected cable, length 2 m (6.56 ft) with bare wire ends	**H**
Connection of power and signal combined with fixed-connected cable, length: 0.5 m (1.64 ft) with connector	**J**

Description	Article No.
Signal cable, pre-assembled with M17 connector	
For SIMOTICS L-1FN3 linear motors	
• 1FN3100/1FN3150	**6FX8002-2SL01-....**
• 1FN3300 ... 1FN3900	**6FX8002-2SL02-....**

For more information about cables, see MOTION-CONNECT connection systems

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Motor type Primary section (repeated)	Rated current	Maxi-mum cur-rent	Calculated power	**SINAMICS S120 Motor Module [4] Booksize format** Internal air cooling		**Power cable with complete shield** Motor connection via adapter cable with power connector for increased velocity/acceleration			
				Required rated current	For further components, see SINAMICS S120 drive system				
	I_N [1]	I_{max}	$P_{el, max.}$	I_N / I_{max}		Pre-assembled adapter cable for motor [6]	Power connec-tors	Cable cross-section [5]	Pre-assembled basic cable to the drive system
	A	A	kW (hp)	A	Article No.	Article No.	Size	mm^2	Article No.
1FN3300-1NC10-....	8.1	17.1	5.4 (7.2)	9/27	**6SL3120-■TE21-0AD0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3300-2NC10-....	16.2	34.1	10.5 (14.1)	18/36	**6SL3120-■TE21-8AC0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3300-2NH00-....	49.9	105	24.5 (32.9)	132/210	**6SL3120-1TE31-3AA3**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3300-3NB50-....	17.6	36.9	13 (17.4)	18/36	**6SL3120-■TE21-8AC0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16 ....**
1FN3300-3NC40-....	27.3	57.4	17.3 (23.2)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS46-....**
1FN3300-4NB80-....	28.4	59.6	19.3 (25.9)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS56-....**
1FN3450-1NB50-....	9.1	19.1	6.49 (8.70)	9/27	**6SL3120-■TE21-0AD0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16-....**
1FN3450-2NB40-....	16.2	34.1	12 (16.1)	18/36	**6SL3120-■TE21-8AC0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16 ....**
1FN3450-2NB80-....	20.4	42.9	13.7 (18.4)	24/48	**6SL3120-1TE22-4AC0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16 ....**
1FN3450-2NC50-....	28.4	59.6	17.0 (22.8)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS56-....**
1FN3450-3NA50-....	12.7	26.7	13.0 (17.4)	18/36	**6SL3120-■TE21-8AC0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16 ....**
1FN3450-3NB50-....	27.3	57.4	19.1 (25.6)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS46 ....**
1FN3450-3NC50-....	42.5	89.5	25.4 (34.1)	45/90	**6SL3120-1TE24-5AC0**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3450-4NB20-....	28.4	59.6	22.2 (29.8)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS46 ....**
1FN3450-4NB80-....	40.8	85.8	27.3 (36.6)	45/90	**6SL3120-1TE24-5AC0**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3600-2NB00-....	16.2	34.1	13.8 (18.5)	18/54	**6SL3120-■TE21-8AD0**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS16 ....**
1FN3600-2NB80-....	28.4	59.6	18.9 (25.3)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS56-....**
1FN3600-2NE50-....	64.2	135	34.4 (46.1)	85/141	**6SL3120-1TE28-5AA3**	**6FX7002-5LM02-....**	1.5	4 × 16	**6FX8002-5CS24 ....**
1FN3600-3NB00-....	30.6	64.4	23.3 (31.2)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS56-....**
1FN3600-3NB80-....	42.5	89.5	28.2 (37.8)	45/90	**6SL3120-1TE24-5AC0**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3600-4NA70-....	26.3	55.3	24.8 (33.3)	30/56	**6SL3120-1TE23-0AC0**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS46 ....**
1FN3600-4NB80-....	56.7	119.3	37.6 (50.4)	60/120	**6SL3120-1TE26-0AC0**	**6FX7002-5LM02-....**	1.5	4 × 16	**6FX8002-5CS24-....**
1FN3900-2NB20-....	28.4	59.6	21.9 (29.4)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS56-....**
1FN3900-2NC80-....	64.2	135	37.8 (50.7)	85/141	**6SL3120-1TE28-5AA3**	**6FX7002-5LM02-....**	1.5	4 × 16	**6FX8002-5CS24 ....**
1FN3900-3NB20-....	42.5	89.5	32.7 (43.9)	45/90	**6SL3120-1TE24-5AC0**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3900-4NA50-....	29.3	61.6	31.6 (42.4)	30/90	**6SL3120-1TE23-0AD0**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS56 ....**
1FN3900-4NA80-....	40.8	85.8	36.8 (49.3)	45/85	**6SL3120-1TE24-5AC0**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3900-4NB20-....	56.7	119.3	43.5 (58.3)	60/120	**6SL3120-1TE26-0AC0**	**6FX7002-5LM02-....**	1.5	4 × 16	**6FX8002-5CS24-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

....	Length code	....

For more information about cables, see MOTION-CONNECT connection systems

[1] For water cooling with inlet temperature 35 °C (95 °F).

[2] A reduction of up to 30 % must be expected in case of motor standstill, for very low velocities or very short traversing paths.

[3] Velocity values refer to a drive system DC link voltage of 600 V DC.

[4] Optimized selection for full performance of linear motors.

[5] The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

[6] Pre-assembled adapter cable for motor with connection type B.

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Selection and ordering data

Feedrate force		Maximum velocity [2]		SIMOTICS L-1FN3 linear motors Standard version			Weight, approx.	
				Primary section	**Secondary section** Standard – matching the motor of the relevant component size	**Secondary section** Standard extended – matching the motor of the relevant component size	Primary section	Secondary section
F_N [1]	F_{max}	v_{max} at F_{max}	v_{max} at F_N					
N (lb_f)	N (lb_f)	m/min (ft/min)	m/min (ft/min)	Article No.	Article No.	Article No.	kg (lb)	kg (lb)
Natural cooling								
133 (29.9)	320 (71.9)	175 (574)	477 (1565)	**1FN3050-1KD00-0 S A0**	**1FN3050-4SA00-0AA0**	—	1.42 (3.13)	0.4 (0.9)
266 (59.8)	640 (144)	134 (440)	377 (1237)	**1FN3050-2KC40-0 S A0**			2.5 (5.5)	
242 (54.4)	676 (152)	145 (476)	406 (1332)	**1FN3100-1KC50-0 S A0**	**1FN3100-4SA00-0AA0**	—	2.3 (5.1)	0.7 (1.5)
483 (109)	1350 (303)	141 (463)	401 (1316)	**1FN3100-2KC50-0 S A0**			4.31 (9.50)	
725 (163)	2030 (456)	139 (456)	399 (1309)	**1FN3100-3KC50-0 S A0**			6.25 (13.78)	
331 (74.4)	1030 (232)	156 (512)	449 (1473)	**1FN3150-1KC70-0 S A0**	**1FN3150-4SA00-0AA0**	—	3.32 (7.32)	1.2 (2.6)
663 (149)	2060 (463)	152 (499)	445 (1460)	**1FN3150-2KC70-0 S A0**			6.0 (13.2)	
994 (223)	3100 (697)	150 (492)	443 (1453)	**1FN3150-3KC70-0 S A0**			8.91 (19.65)	

Article No. supplements

Type of connection:	
1FN3050 to 1FN3150 motors:	
Separate power and signal connections permanently connected with bare wire ends: Power cable: 0.5 m (1.64 ft) Signal cable: 0.26 m (0.82 ft)	**S**

Description	Article No.
Signal cable, pre-assembled with M17 connector For SIMOTICS L-1FN3 linear motors with natural cooling • 1FN3050/1FN3100/1FN3150	**6FX8002-2SL00-....**
Signal cable, sold by the meter For SIMOTICS L-1FN3 linear motors with natural cooling • 1FN3050/1FN3100/1FN3150	**6FX8008-1BD00-....**

For more information about cables, see MOTION-CONNECT connection systems

For footnotes, see next page.

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Motor type Primary section (repeated)	Rated current	Maximum current	Calculated power	**SINAMICS S120 Motor Module [3] Booksize format** Internal air cooling		**Power cable with complete shield** Motor connection via basis cable with power connector		
				Required rated current	For further components, see SINAMICS S120 drive system			
	I_N	I_{max}	$P_{el, max.}$	I_N / I_{max}		Power cable at the motor with bare wire ends	Cable cross-section [4]	Sold by the meter (ring) basic cable to the drive system
	A	A	kW (hp)	A	Article No.		mm^2	Article No.
1FN3050-1KD00-...	2.09	7.74	2.04 (2.74)	3/9	**6SL3120-■TE13-0AD0**	Permanent cable connection	4 × 1.5	**6FX8008-1BB11-** ....
1FN3050-2KC40-...	3.39	12.6	3.67 (4.92)	5/15	**6SL3120-■TE15-0AD0**	Permanent cable connection	4 × 1.5	**6FX8008-1BB11-** ....
1FN3100-1KC50-...	2.95	12.5	3.39 (4.55)	5/15	**6SL3120-■TE15-0AD0**	Permanent cable connection	4 × 1.5	**6FX8008-1BB11-** ....
1FN3100-2KC50-...	5.9	25.1	6.67 (8.94)	9/27	**6SL3120-■TE21-0AD0**	Permanent cable connection	4 × 1.5	**6FX8008-1BB11-** ....
1FN3100-3KC50-...	8.85	37.6	9.94 (13.33)	18/54	**6SL3120-■TE21-8AD0**	Permanent cable connection	4 × 1.5	**6FX8008-1BB11-** ....
1FN3150-1KC70-...	4.25	20.2	5.14 (6.89)	9/27	**6SL3120-■TE21-0AD0**	Permanent cable connection	4 × 1.5	**6FX8008-1BB11-** ....
1FN3150-2KC70-...	8.5	40.4	10.1 (13.5)	18/54	**6SL3120-■TE21-8AD0**	Permanent cable connection	4 × 1.5	**6FX8008-1BB11-** ....
1FN3150-3KC70-...	12.8	60.6	15.1 (20.2)	24/72	**6SL3120-1TE22-4AD0**	Permanent cable connection	4 × 1.5	**6FX8008-1BB11-** ....

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Length code	....

For more information about cables, see MOTION-CONNECT connection systems

1) A reduction of up to 30 % must be expected in case of motor standstill, for very low velocities or very short traversing paths.

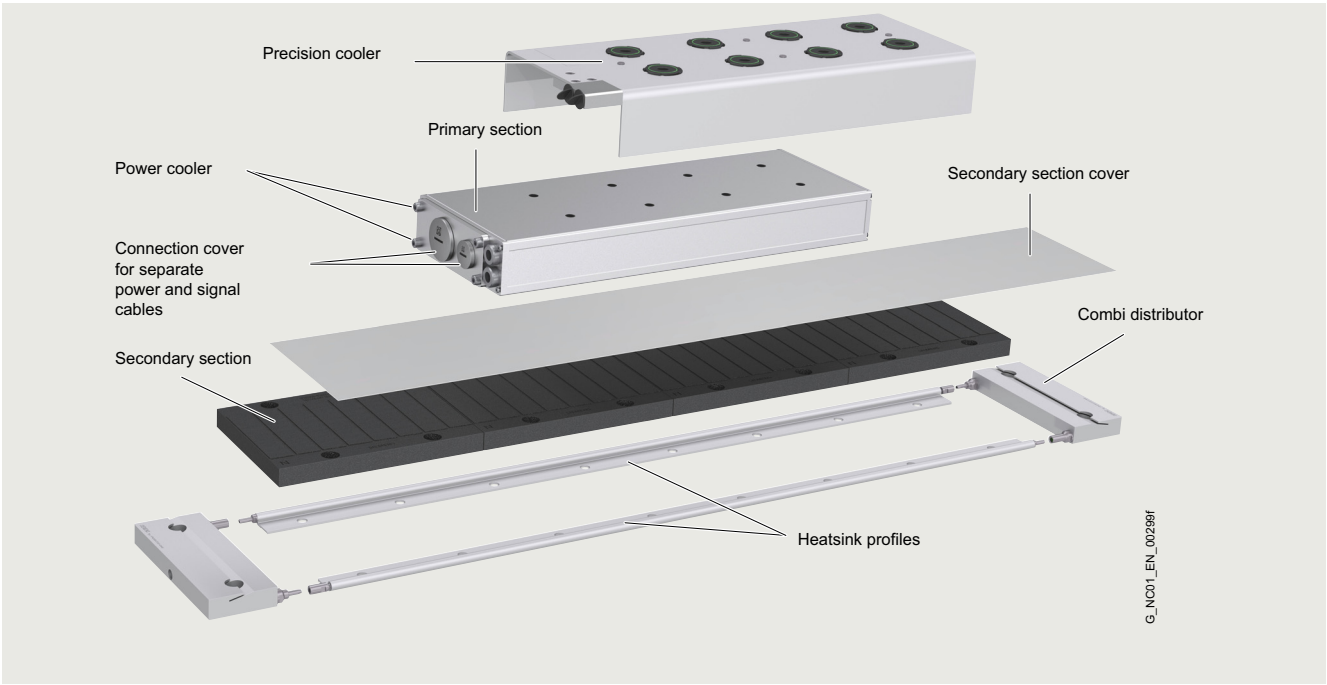
2) Velocity values refer to a drive system DC link voltage of 600 V DC.

3) Optimized selection for full performance of linear motors.

4) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

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Selection and ordering data



SIMOTICS L-1FN3 linear motors Version for peak load	**Optional components** **Precision cooler**
Type	Article No.
1FN3050-2W...	**1FN3050-2PK00-0AA0**
1FN3100-2W...	**1FN3100-2PK00-0AA0**
1FN3100-3W...	**1FN3100-3PK00-0AA0**
1FN3100-4W...	**1FN3100-4PK00-0AA0**
1FN3100-5W...	**1FN3100-5PK00-0AA0**
1FN3150-2W...	**1FN3150-2PK00-0AA0**
1FN3150-3W...	**1FN3150-3PK00-0AA0**
1FN3150-4W...	**1FN3150-4PK00-0AA0**
1FN3150-5W...	**1FN3150-5PK00-0AA0**
1FN3300-2W...	**1FN3300-2PK00-0AA0**
1FN3300-3W...	**1FN3300-3PK00-0AA0**
1FN3300-4W...	**1FN3300-4PK00-0AA0**
1FN3450-2W...	**1FN3450-2PK00-0AA0**
1FN3450-3W...	**1FN3450-3PK00-0AA0**
1FN3450-4W...	**1FN3450-4PK00-0AA0**
1FN3600-2W...	**1FN3600-2PK00-0AA0**
1FN3600-3W...	**1FN3600-3PK00-0AA0**
1FN3600-4W...	**1FN3600-4PK00-0AA0**
1FN3900-2W...	**1FN3900-2PK00-0AA0**
1FN3900-3W...	**1FN3900-3PK00-0AA0**
1FN3900-4W...	**1FN3900-4PK00-0AA0**
Can be ordered optionally in version with increased ruggedness, incl. O-rings	**1FN3...- ■ PK00-0AA0-Z R01**

SIMOTICS L-1FN3 linear motors Version for continuous load	**Optional components** **Precision cooler**
Type	Article No.
1FN3050-1N...	**1FN3050-1PK10-0AA0**
1FN3050-2N...	**1FN3050-2PK10-0AA0**
1FN3100-1N...	**1FN3100-1PK10-0AA0**
1FN3100-2N...	**1FN3100-2PK10-0AA0**
1FN3100-3N...	**1FN3100-3PK10-0AA0**
1FN3100-4N...	**1FN3100-4PK10-0AA0**
1FN3150-1N...	**1FN3150-1PK10-0AA0**
1FN3150-2N...	**1FN3150-2PK10-0AA0**
1FN3150-3N...	**1FN3150-3PK10-0AA0**
1FN3150-4N...	**1FN3150-4PK10-0AA0**
1FN3300-1N...	**1FN3300-1PK10-0AA0**
1FN3300-2N...	**1FN3300-2PK10-0AA0**
1FN3300-3N...	**1FN3300-3PK10-0AA0**
1FN3300-4N...	**1FN3300-4PK10-0AA0**
1FN3450-2N...	**1FN3450-2PK10-0AA0**
1FN3450-3N...	**1FN3450-3PK10-0AA0**
1FN3450-4N...	**1FN3450-4PK10-0AA0**
1FN3600-2N...	**1FN3600-2PK10-0AA0**
1FN3600-3N...	**1FN3600-3PK10-0AA0**
1FN3600-4N...	**1FN3600-4PK10-0AA0**
1FN3900-2N...	**1FN3900-2PK10-0AA0**
1FN3900-3N...	**1FN3900-3PK10-0AA0**
1FN3900-4N...	**1FN3900-4PK10-0AA0**
Can be ordered optionally in version with increased ruggedness, incl. O-rings	**1FN3...- ■ PK10-0AA0-Z R01**

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Selection and ordering data

SIMOTICS L-1FN3 linear motors	**Optional components**			
	Secondary section cover		**Cover end pieces for secondary section cover** [2]	**Protective mat with yoke function** [3]
Type	Continuous [1]	Segmented	Retains continuous cover without heatsink profile	
	Article No.	Article No.	Article No.	Article No.
1FN3050-...	**1FN3050-0TB00-1 ■ ■ 0**	**1FN3050-4TP00-1A ■ ■**	**1FN3050-0TC00-0AA0**	**–**
1FN3100-...	**1FN3100-0TB00-1 ■ ■ 0**	**1FN3100-4TP00-1A ■ ■**	**1FN3100-0TC00-0AA0**	**–**
1FN3150-...	**1FN3150-0TB00-1 ■ ■ 0**	**1FN3150-4TP00-1A ■ ■**	**1FN3150-0TC00-0AA0**	**–**
1FN3300-...	**1FN3300-0TB00-1 ■ ■ 0**	**1FN3300-4TP00-1A ■ ■**	**1FN3300-0TC00-0AA0**	**1FN3300-4RS00-0AB0**
1FN3450-...	**1FN3450-0TB00-1 ■ ■ 0**	**1FN3450-4TP00-1A ■ ■**	**1FN3450-0TC00-0AA0**	**1FN3450-4RS00-0AB0**
1FN3600-...	**1FN3600-0TB00-1 ■ ■ 0**	**1FN3600-4TP00-1A ■ ■**	**–**	**–**
1FN3900-...	**1FN3900-0TB00-1 ■ ■ 0**	**1FN3900-4TP00-1A ■ ■**	**–**	**–**

Number of secondary sections		
	0	**A**
	10	**B**
	20	**C**
	30	**D**
	40	**E**
	50	**F**

Example:

Maximum length of the continuous secondary section cover for motors:
- 1FN3050 to 1FN3150
  corresponds to length code xxx-1FA0 50 units.
- 1FN3100 to 1FN3900
  corresponds to length code xxx-1DC0 32 units.

0	**A**
1	**B**
2	**C**
3	**D**
4	**E**
5	**F**
6	**G**
7	**H**
8	**J**
9	**K**

Number of secondary sections for all motors		
	2.5	**C 5**
	3.0	**D 0**
	3.5	**D 5**
	4.0	**E 0**
	5.0	**F 0**

Number of secondary sections for 1FN3600/ 1FN3900 motors		
	5.5	**F 5**
	6.5	**G 5**

[1] Continuous cover for several secondary sections. The maximum length of the secondary section cover is 6 m (19.69 ft). For the following motors, this corresponds to: 1FN3050 to 1FN3150, a maximum number of 50 secondary sections (AB to FA). 1FN3300 to 1FN3900, a maximum number of 32 secondary sections (AB to DC).

[2] The secondary section end pieces are designed to allow clamping of the integrated secondary section cover.

[3] Can be ordered with a batch size of 4 units.

SIMOTICS L-1FN3 linear motors	**Optional components**			
	Heatsink profile [4]	**Secondary section end pieces**		
		Combi distributor	**Combi adapter**	**Combi end piece**
		Parallel water connection for all heatsink profiles	Combi adapter and end piece can only be implemented together.	
			Single-sided water connection	Water diversion
Type	Article No.	Article No.	Article No.	Article No.
1FN3050-...	**1FN3002-0TK0 ■ -1 ■ ■ 0**	**1FN3050-0TJ01-0AA0**	**1FN3050-0TG01-0AA0**	**1FN3050-0TF01-0AA0**
1FN3100-...	**1FN3002-0TK0 ■ -1 ■ ■ 0**	**1FN3100-0TJ01-0AA0**	**1FN3100-0TG01-0AA0**	**1FN3100-0TF01-0AA0**
1FN3150-...	**1FN3002-0TK0 ■ -1 ■ ■ 0**	**1FN3150-0TJ01-0AA0**	**1FN3150-0TG01-0AA0**	**1FN3150-0TF01-0AA0**
1FN3300-...	**1FN3003-0TK0 ■ -1 ■ ■ 0**	**1FN3300-0TJ01-0AA0**	**1FN3300-0TG01-0AA0**	**1FN3300-0TF01-0AA0**
1FN3450-...	**1FN3003-0TK0 ■ -1 ■ ■ 0**	**1FN3450-0TJ01-0AA0**	**1FN3450-0TG01-0AA0**	**1FN3450-0TF01-0AA0**
1FN3600-...	**1FN3004-0TK0 ■ -1 ■ ■ 0**	**1FN3600-0TJ01-0AA0**	**–**	**–**
1FN3900-...	**1FN3005-0TK0 ■ -1 ■ ■ 0**	**1FN3900-0TJ01-0AA0**	**–**	**–**

Prepared with plug-in coupling for connection to combi distributor with plug-in coupling, combi adapter with plug-in coupling, combi end piece with plug-in coupling or as intermediate unit for heatsink profile with cable grommet nipple	**4**		
1FN3050 to 1FN3450 motors[4]: **Grommet nipple only at the right-hand end** of secondary section track	**6**		
1FN3600/1FN3900 motors: **Grommet nipple at both ends** of secondary section track	**6**		
1FN3050 to 1FN3450 motors [5]: **Grommet nipple only at the left-hand end** of secondary section track	**7**		

Number of secondary sections		
	0	**A**
	10	**B**
	20	**C**

0	**A**
1	**B**
2	**C**
3	**D**
4	**E**
5	**F**
6	**G**
7	**H**
8	**J**
9	**K**

[4] 1FN3050 to 1FN3450 motors:
2 units required per secondary section track.
1FN3600 to 1FN3900:
3 units required per secondary section track.
The maximum available length of a single-part heatsink profile is 3 m (9.84 ft).
For the following motors, this corresponds to:
1FN3050 to 1FN3150, a maximum number of 24 secondary sections (AB to CE)
1FN3300 to 1FN3900, a maximum number of 16 secondary sections (AB to BG).

[5] Available only in length AC (corresponds to 2 secondary sections).
The difference in the secondary section track length must be compensated through assembly using the heatsink profile 1FN300.-0TK04-1..0.

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Overview

Recommended linear measuring systems for SIMOTICS L-1FN3 linear motors

Type	Incremental encoder sin/cos 1 V_{pp} encapsulated	
	Heidenhain LS 187	**Heidenhain LS 487**
Signal cycle	20 µm	20 µm
Acceleration in measuring direction, max.	100 m/s^2 (328 ft/s^2)	100 m/s^2 (328 ft/s^2)
Traversing velocity, max.	120 m/min (394 ft/min)	120 m/min (394 ft/min)
Measuring length, max.	3040 mm (120 in)	2040 mm (80.3 in)
Output signal	1 V_{pp}	1 V_{pp}

Type	Incremental encoder sin/cos 1 V_{pp} open	
	Heidenhain LIDA 485	**Renishaw RTLC 20/TONIC**
Signal cycle	20 µm	20 µm
Acceleration in measuring direction, max. [1]	200 m/s^2 (656 ft/s^2)	600 m/s^2 (1969 ft/s^2)
Traversing velocity, max.	480 m/min (1575 ft/min)	600 m/min (1969 ft/min)
Measuring length, max.	30040 mm (1183 in)	25000 mm (984 in)
Output signal	1 V_{pp}	1 V_{pp}

Absolute encoders with DRIVE-CLiQ

Absolute measuring systems with integrated DRIVE-CLiQ interface are available from various manufacturers. The absolute encoders can be used as a motor feedback system.

A current overview of the various manufacturers and available measuring systems is available on the internet at:
http://support.automation.siemens.com/WW/view/en/65402168
It is also possible to use absolute measuring systems with EnDat 2.1.

Overview

Liquid cooling

These are third-party products whose fundamental suitability is familiar to us. It goes without saying that equivalent products from other manufacturers may be used. Our recommendations are to be seen as helpful information, not as requirements or regulations. We do not accept liability for the quality of non-Siemens products.

Please get in touch with the cooler manufacturers listed below for technical information.

ait-deutschland GmbH
www.kkt-chillers.com

BKW Kälte-Wärme-Versorgungstechnik GmbH
www.bkw-kuema.de

Helmut Schimpke und Team Industriekühlanlagen GmbH + Co. KG
www.schimpke.com

Hydac System GmbH
www.hydac.com

Pfannenberg GmbH
www.pfannenberg.com

Rittal GmbH & Co. KG
www.rittal.com

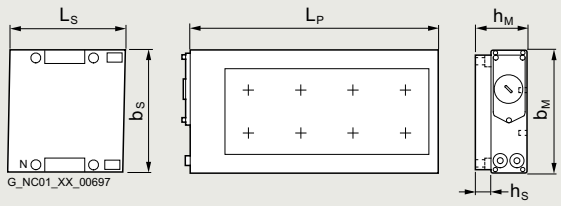
For design information about the coolers, refer to the SIMOTICS L-1FN3 Linear Motors Configuration Manual.

https://support.industry.siemens.com/cs/ww/en/view/109475768

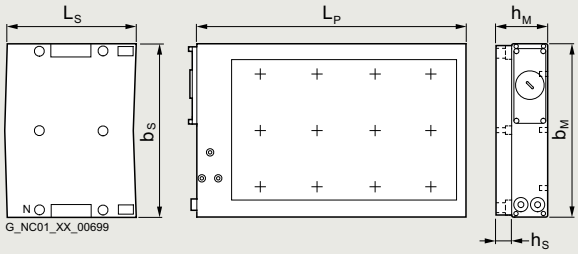
[1] Data refers to the measuring head.

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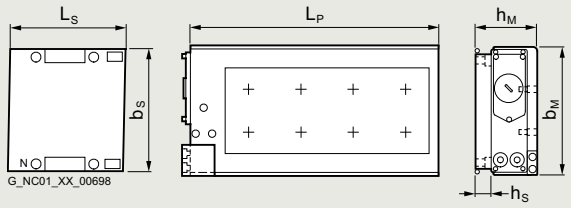
Dimensional drawings



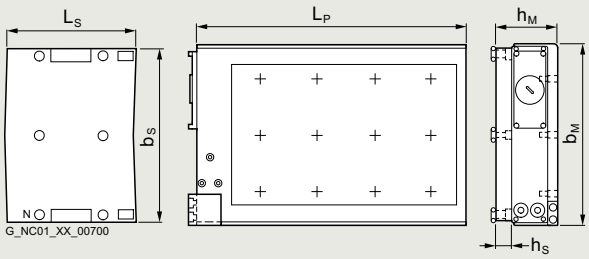
1FN3050 to 1FN3450 without precision cooling



1FN3600 to 1FN3900 without precision cooling
Note: 4-row drilling pattern with 1FN3900 for fixing the primary section



1FN3050 to 1FN3450 with precision cooling

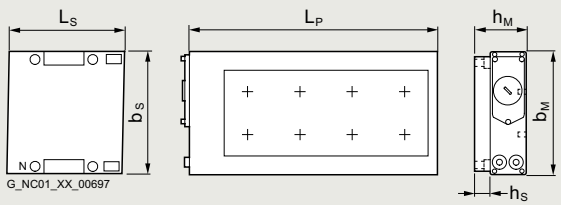


1FN3600 to 1FN3900 with precision cooling
Note: 4-row drilling pattern with 1FN3900 for fixing the primary section

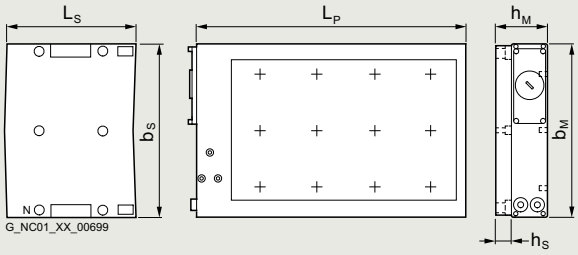
Primary section	Dimensions in mm (inches)					Secondary section	Dimensions in mm (inches)				
	Without precision cooling		With precision cooling		Primary section length		Without cover and without precision cooling		With cover and with precision cooling		Secondary section length
Type	b_M	h_M	b_M	h_M	L_P	Type	b_S	h_S	b_S	h_S	L_S
SIMOTICS L-1FN3 linear motors, version for peak load – water cooling											
1FN3050-2W	67 (2.64)	48.5 (1.91)	76 (2.99)	63.4 (2.50)	255 (10.04)	1FN3050-4SA00-0AA0	58 (2.28)	11.8 (0.46)	75 (2.95)	14.8 (0.58)	120 (4.72)
1FN3100-1W	96 (3.78)	48.5 (1.91)	–	–	150 (5.91)	1FN3100-4SA00-0AA0	88 (3.46)	11.8 (0.46)	105 (4.13)	14.8 (0.58)	120 (4.72)
1FN3100-2W			105 (4.13)	63.4 (2.50)	255 (10.04)						
1FN3100-3W					360 (14.17)						
1FN3100-4W					465 (18.31)						
1FN3100-5W					570 (22.44)						
1FN3150-1W	126 (4.96)	50.5 (1.99)	–	–	150 (5.91)	1FN3150-4SA00-0AA0	118 (4.65)	13.8 (0.54)	135 (5.31)	16.8 (0.66)	120 (4.72)
1FN3150-2W			135 (5.31)	65.4 (2.57)	255 (10.04)						
1FN3150-3W					360 (14.17)						
1FN3150-4W					465 (18.31)						
1FN3150-5W					570 (22.44)						
1FN3300-1W	141 (5.55)	64.1 (2.52)	–	–	221 (8.70)	1FN3300-4SA00-0AA0	134 (5.28)	16.5 (0.65)	151 (5.94)	19.5 (0.77)	184 (7.24)
1FN3300-2W			150 (5.91)	79 (3.11)	382 (15.04)						
1FN3300-3W					543 (21.38)	1FN3300-4SA12-0AA0					276 (10.89)
1FN3300-4W					704 (27.72)						
1FN3450-2W	188 (7.40)	66.1 (2.60)	197 (7.76)	81 (3.19)	382 (15.04)	1FN3450-4SA00-0AA0	180 (7.09)	18.5 (0.73)	197 (7.76)	21.5 (0.85)	184 (7.24)
1FN3450-3W					543 (21.38)	1FN3450-4SA12-0AA0					276 (10.89)
1FN3450-4W					704 (27.72)						
1FN3600-2W	248 (9.76)	64.1 (2.52)	257 (10.12)	86 (3.39)	382 (15.04)	1FN3600-4SA00-0AA0	240 (9.45)	16.5 (0.65)	247 (9.72)	26.5 (1.04)	184 (7.24)
1FN3600-3W					543 (21.38)						
1FN3600-4W					704 (27.72)						
1FN3600-5W					865 (34.06)						
1FN3900-2W	342 (13.46)	66.1 (2.60)	351 (13.82)	88 (3.46)	382 (15.04)	1FN3900-4SA00-0AA0	334 (13.15)	18.5 (0.73)	341 (13.43)	28.5 (1.12)	184 (7.24)
1FN3900-3W					543 (21.38)						
1FN3900-4W					704 (27.72)						

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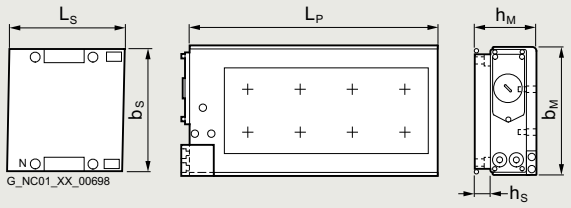
Dimensional drawings



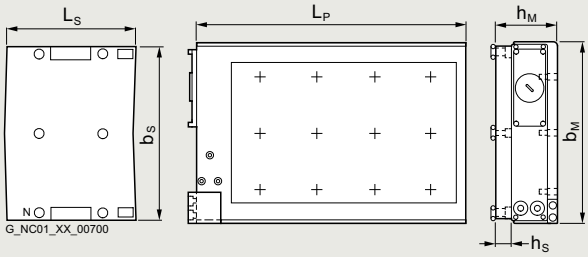
1FN3050 to 1FN3450 without precision cooling



1FN3600 to 1FN3900 without precision cooling
Note: 4-row drilling pattern with 1FN3900 for fixing the primary section



1FN3050 to 1FN3450 with precision cooling

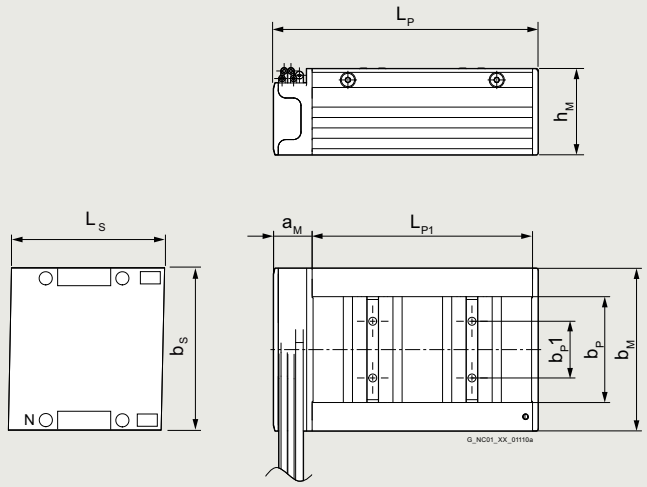


1FN3600 to 1FN3900 with precision cooling
Note: 4-row drilling pattern with 1FN3900 for fixing the primary section

Primary section	Dimensions in mm (inches)					Secondary section	Dimensions in mm (inches)				
	Without precision cooling		With precision cooling		Primary section length		Without cover and without precision cooling		With cover and with precision cooling		Secondary section length
Type	b_M	h_M	b_M	h_M	L_P	Type	b_S	h_S	b_M	h_M	L_S
SIMOTICS L-1FN3 linear motors, version for continuous load – water cooling											
1FN3050-1N	67 (2.64)	59.4 (2.34)	76 (2.99)	74.3 (2.93)	162 (6.38)	1FN3050-4SA00-0AA0	58 (2.28)	11.8 (0.46)	75 (2.95)	14.8 (0.58)	120 (4.72)
1FN3050-2N					267 (10.51)						
1FN3100-1N	96 (3.78)	59.4 (2.34)	105 (4.13)	74.3 (2.93)	162 (6.38)	1FN3100-4SA00-0AA0	88 (3.46)	11.8 (0.46)	105 (4.13)	14.8 (0.58)	120 (4.72)
1FN3100-2N					267 (10.51)						
1FN3100-3N					372 (14.65)						
1FN3100-4N					477 (18.78)						
1FN3150-1N	126 (4.96)	61.4 (2.42)	135 (5.31)	76.3 (3.00)	162 (6.38)	1FN3150-4SA00-0AA0	118 (4.65)	13.8 (0.54)	135 (5.31)	16.8 (0.66)	120 (4.72)
1FN3150-2N					267 (10.51)						
1FN3150-3N					372 (14.65)						
1FN3150-4N					477 (18.78)						
1FN3300-1N	141 (5.55)	78 (3.07)	150 (5.91)	92.9 (3.66)	238 (9.37)	1FN3300-4SA00-0AA0	134 (5.28)	16.5 (0.65)	151 (5.94)	19.5 (0.77)	184 (7.24)
1FN3300-2N					399 (15.71)						
1FN3300-3N					560 (22.05)	1FN3300-4SA12-0AA0					276 (10.89)
1FN3300-4N					721 (28.39)						
1FN3450-1N	188 (7.40)	80 (3.15)	197 (7.76)	94.9 (3.74)	238 (9.37)	1FN3450-4SA00-0AA0	180 (7.09)	18.5 (0.73)	197 (7.76)	21.5 (0.85)	184 (7.24)
1FN3450-2N					399 (15.71)						
1FN3450-3N					560 (22.05)	1FN3450-4SA12-0AA0					276 (10.89)
1FN3450-4N					721 (28.39)						
1FN3600-2N	248 (9.76)	78 (3.07)	257 (10.12)	99.9 (3.93)	399 (15.71)	1FN3600-4SA00-0AA0	240 (9.45)	16.5 (0.65)	247 (9.72)	26.5 (1.04)	184 (7.24)
1FN3600-3N					560 (22.05)						
1FN3600-4N					721 (28.39)						
1FN3900-2N	342 (13.46)	80 (3.15)	351 (13.82)	101.9 (4.01)	399 (15.71)	1FN3900-4SA00-0AA0	334 (13.15)	18.5 (0.73)	341 (13.43)	28.5 (1.12)	184 (7.24)
1FN3900-3N					560 (22.05)						
1FN3900-4N					721 (28.39)						

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Dimensional drawings



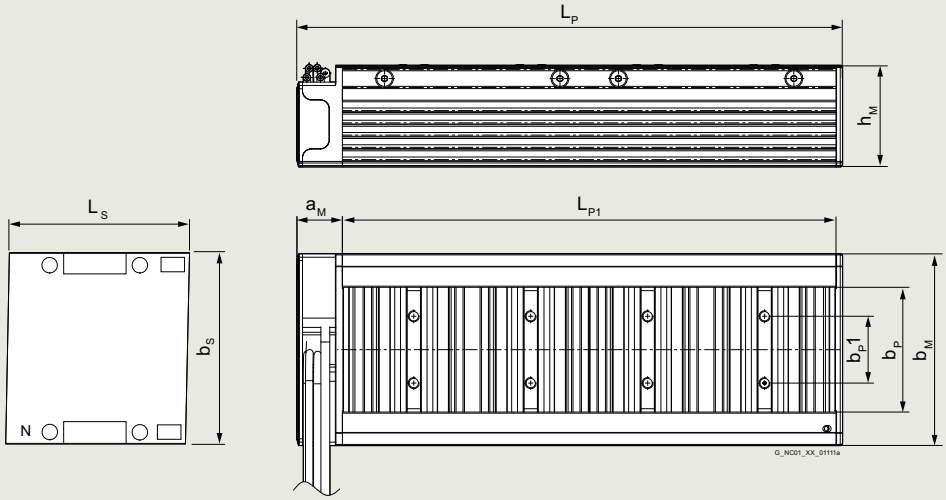
1FN3050 to 1FN3150 with natural cooling

h_S = height/thickness of the secondary section

Primary section	Dimensions in mm (inches)							Secondary section	Dimensions in mm (inches)		
							Primary section length				Secondary section length
Type	a_M	b_M	b_{P1}	b_P	h_M	L_{P1}	L_P	Type	b_S	h_S	L_S
SIMOTICS L-1FN3 linear motors, Standard version – natural cooling											
1FN3050-1K	20.4 (0.80)	58.0 (2.28)	20.0 (0.79)	28.0 (1.10)	45.7 (1.80)	116.6 (4.59)	140 (5.51)	1FN3050-4SA00-0AA0	58 (2.28)	11.8 (0.46)	120 (4.72)
1FN3100-1K	20.4 (0.80)	86.0 (3.39)	30.0 (1.18)	56.0 (2.20)	45.7 (1.80)	116.6 (4.59)	140 (5.51)	1FN3100-4SA00-0AA0	88 (3.46)	11.8 (0.46)	120 (4.72)
1FN3150-1K	20.4 (0.80)	115.5 (4.55)	45.0 (1.77)	85.5 (3.37)	45.7 (1.80)	116.6 (4.59)	140 (5.51)	1FN3150-4SA00-0AA0	118 (4.65)	13.8 (0.54)	120 (4.72)

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Dimensional drawings



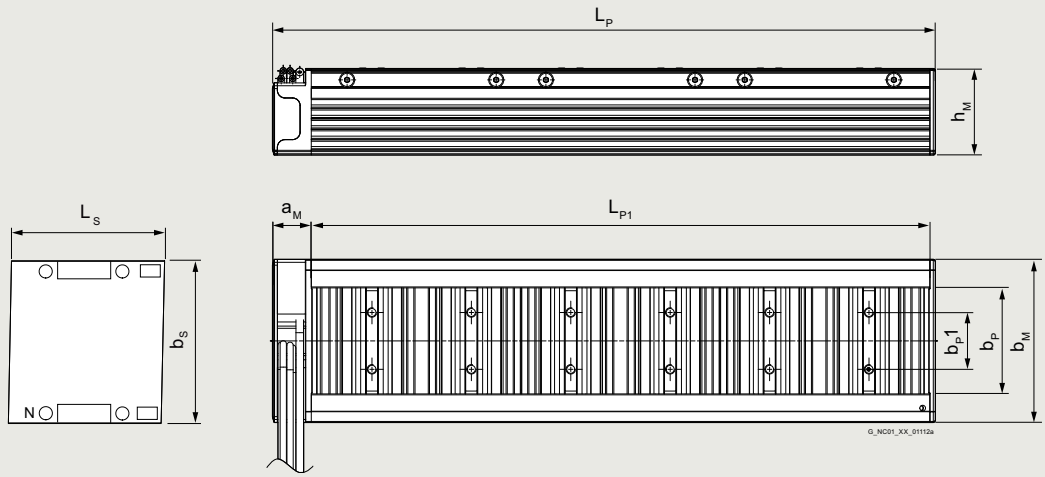
1FN3050 to 1FN3150 with natural cooling

h_S = height/thickness of the secondary section

Primary section	Dimensions in mm (inches)							Secondary section	Dimensions in mm (inches)		
							Primary section length				Secondary section length
Type	a_M	b_M	b_{P1}	b_P	h_M	LP1	L_P	Type	b_S	h_S	L_S
SIMOTICS L-1FN3 linear motors, Standard version – natural cooling											
1FN3050-2K	20.4 (0.80)	58.0 (2.28)	20.0 (0.79)	28.0 (1.10)	45.7 (1.80)	221.6 (8.72)	245 (9.65)	1FN3050-4SA00-0AA0	58 (2.28)	11.8 (0.46)	120 (4.72)
1FN3100-2K	20.4 (0.80)	86.0 (3.39)	30.0 (1.18)	56.0 (2.20)	45.7 (1.80)	221.6 (8.72)	245 (9.65)	1FN3100-4SA00-0AA0	88 (3.46)	11.8 (0.46)	120 (4.72)
1FN3150-2K	20.4 (0.80)	115.5 (4.55)	45.0 (1.77)	85.5 (3.37)	45.7 (1.80)	221.6 (8.72)	245 (9.65)	1FN3150-4SA00-0AA0	118 (4.65)	13.8 (0.54)	120 (4.72)

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Dimensional drawings



1FN3100 to 1FN3150 with natural cooling

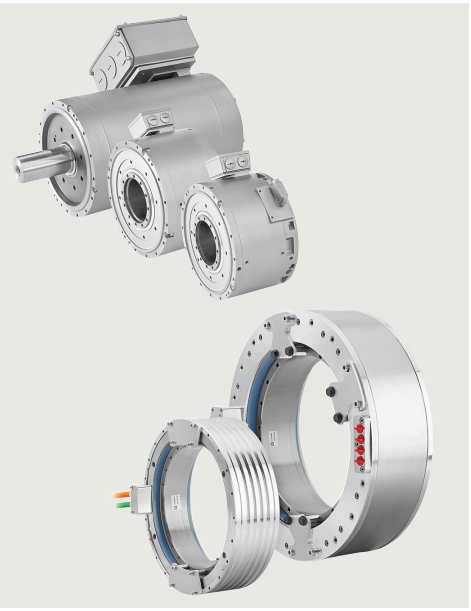
h_S = height/thickness of the secondary section

Primary section	Dimensions in mm (inches)							Secondary section	Dimensions in mm (inches)		
							Primary section length				Secondary section length
Type	a_M	b_M	b_{P1}	b_P	h_M	LP1	L_P	Type	b_S	h_S	L_S
SIMOTICS L-1FN3 linear motors, Standard version – natural cooling											
1FN3100-3K	20.4 (0.80)	86.0 (3.39)	30.0 (1.18)	56.0 (2.20)	45.7 (1.80)	326.6 (12.86)	350 (13.78)	1FN3100-4SA00-0AA0	58 (2.28)	11.8 (0.46)	120 (4.72)
1FN3150-3K	20.4 (0.80)	115.0 (4.53)	45.0 (1.77)	85.5 (3.37)	45.7 (1.80)	326.6 (12.86)	350 (13.78)	1FN3150-4SA00-0AA0	88 (3.46)	13.8 (0.54)	120 (4.72)

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Notes

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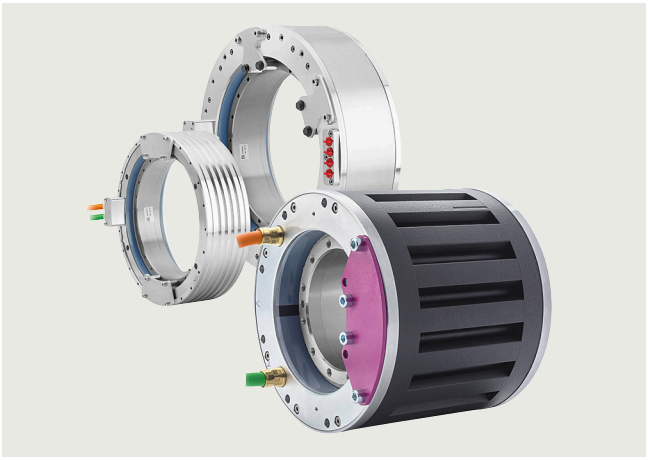
8.4/2	**SIMOTICS T-1FW6 built-in torque motors for SINAMICS S120/S220**
8.4/6	Internal rotor, Standard – natural cooling
8.4/8	Internal rotor, Standard – water cooling
8.4/19	Accessories
8.4/20	Internal rotor, High Speed – water cooling
8.4/24	Internal rotor, High Torque – water cooling
8.4/23	Accessories
8.4/26	External rotor, Standard – water cooling
8.4/30	**SIMOTICS T-1FW3 complete torque motors for SINAMICS S120/S220**
8.4/32	Water cooling
8.4/42	Article No. supplements for shaft version
8.4/42	- Hollow shaft
8.4/43	- Plug-on shaft
8.4/44	- Solid shaft
8.4/45	Options
8.4/46	Accessories
8.4/47	**Dimensional drawings**
8.4/47	SIMOTICS T-1FW6 built-in torque motors with internal rotor
8.4/52	SIMOTICS T-1FW6 built-in torque motors with external rotor
8.4/53	SIMOTICS T-1FW3 complete torque motors

In addition, the Siemens Product Configurator can be used on the internet at the following address:
www.siemens.com/spc
See under:
Motors →
Motion Control →
SIMOTICS T torque motors

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SIMOTICS T-1FW6 built-in torque motors with internal rotor

Overview



SIMOTICS T-1FW6 built-in torque motors with jacket cooling (center), naturally cooled (right), and with integrated cooling (left)

SIMOTICS T-1FW6 built-in torque motors are liquid-cooled or naturally cooled multi-pole permanent-magnet three-phase synchronous motors with a hollow shaft. The motors are supplied as built-in components. An additional bearing and a rotary encoder are required for a complete drive unit.

Each frame size is available in different axis lengths. For installation in the machine, stators and rotors are equipped with flanges with centering surfaces and threaded holes.

Benefits

- No elasticity in the drive train
- High degree of availability, as there are no gearbox components that are subject to wear in the drive train
- High torque, compact design, and low construction volume
- Low moment of inertia
- Directly flanged to the machine

Additionally for SIMOTICS T-1FW6 High Speed:

- Higher speeds while maintaining the main dimensions

Configuration

You can find the Configuration Manual for SIMOTICS T-1FW6 for SINAMICS S120 at:

https://support.industry.siemens.com/cs/ww/en/ps/13375/man

The compatibility list for SINAMICS S120/S220 Booksize Modules can be found at:

https://support.industry.siemens.com/cs/ww/en/view/109806050

The SINAMICS S220 Booksize power units along with the Motor Modules are available at:

https://support.industry.siemens.com/cs/ww/en/view/109803552

More information

Some motor types can be express delivered as replacement motors in the event of plant outages and offer the advantage of a quicker spare parts supply.

Siemens provides comprehensive support when selecting the optimum motor solution.
Any questions relating to SIMOTICS T-1FW6 torque motors can be emailed to:

motor.support.motioncontrol@siemens.com

Application

In conjunction with the SINAMICS S120/S220 drive system, SIMOTICS T-1FW6 built-in torque motors can be used for the following machine applications:

- Rotary indexing tables and subunits
- Rotary indexing machines
- Swivel axes
- Tool turrets
- Tool spindles
- Roller and cylinder drives
- Infeed and handling axes
- Tablet presses
- Medical systems
- Measuring machines

Additional applications for SIMOTICS T-1FW6 High Speed:

- Rotary tables for milling/turning applications
- Gear cutting machines
- Turning spindles

Design

SIMOTICS T-1FW6 built-in torque motors comprise the following components:

Stator

Version with 3-phase winding. The stator is generally designed for operation with liquid cooling.

Rotor

Cylindrical hollow shaft equipped with permanent magnets.

If the main cooler and precision cooler are connected in parallel to a cooling unit for motors with integrated dual-circuit cooling, a cooling connection adapter (accessories) can be ordered to simplify the connection.

Cooling variants

The design of the cooling system is dependent on the size (outer diameter) of the motor.

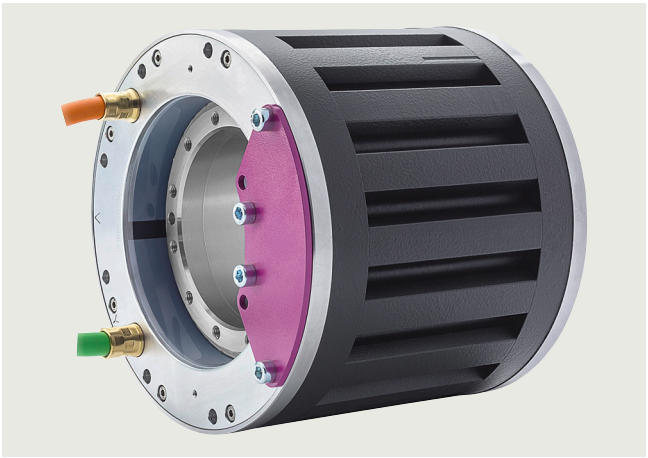
SIMOTICS T-1FW6 built-in torque motor		Frame size	Cooling method
Internal rotor	Standard	1FW6050 and 1FW6060	Integrated one circuit water cooling
Internal rotor	Standard	1FW6053 and 1FW6063	Natural cooling
Internal rotor	Standard	1FW6090 ... 1FW6150	Jacket water cooling
Internal rotor	Standard	1FW6092 ... 1FW6152	Jacket water cooling
Internal rotor	High Torque	1FW6154	Jacket water cooling
Internal rotor	Standard	1FW6160 ... 1FW6290	Integrated dual circuit water cooling
Internal rotor	High Speed	1FW6092 and 1FW6152	Jacket water cooling
Internal rotor	High Speed	1FW6192 and 1FW6233	Integrated dual circuit water cooling
External rotor	Standard	1FW6720	Integrated one circuit water cooling

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Design

Motors with natural cooling

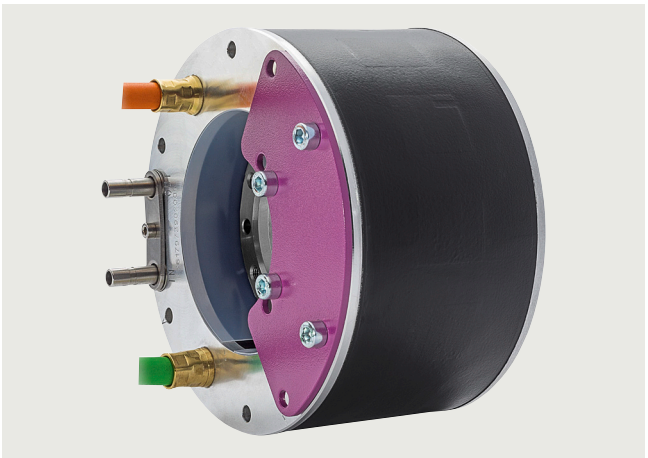
The naturally cooled motors have the same dimensions as water-cooled motors in frame sizes 1FW6050 and 1FW6060, but have a lower continuous torque capability as a result of the cooling method. They can be used for any application for which liquid cooling is considered undesirable or unnecessary. As the mechanical interfaces are also compatible in addition to the dimensions, the cooling method can be simply changed.



Motor components, frame sizes 1FW6053 and 1FW6063 with natural cooling (rotor and stator)

Motors with integrated single-circuit water cooling

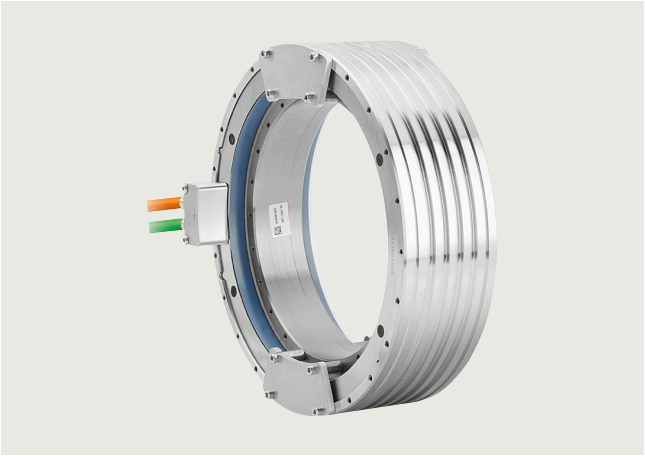
These motors have a ready-to-connect, integrated single-circuit cooling system; they are compact, and can therefore be simply integrated into machines.



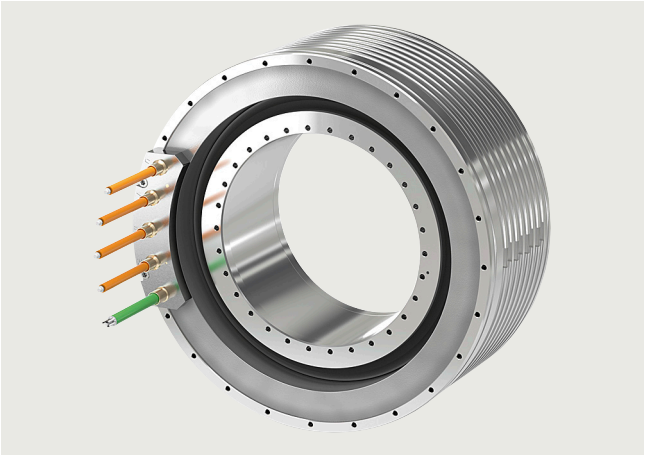
Motor components, frame sizes 1FW6050 and 1FW6060 with integrated single-circuit cooling (rotor and stator)

Motors with jacket water cooling

The coolant inlet/return circuit must be provided by the machine manufacturer in the machine itself.



Motor components, frame sizes 1FW6090 to 1FW6150 in Standard version and 1FW6154 in High Torque version with jacket water cooling (rotor and stator)



Motor components, frame sizes 1FW6092 to 1FW6152 in the High Speed version with jacket water cooling (rotor and stator)

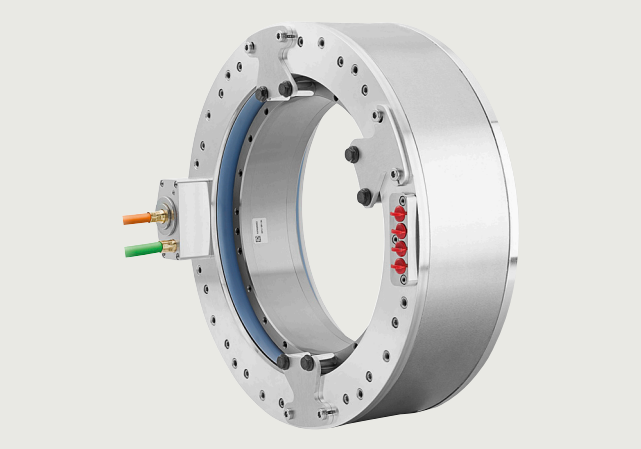
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SIMOTICS T-1FW6 built-in torque motors with internal rotor

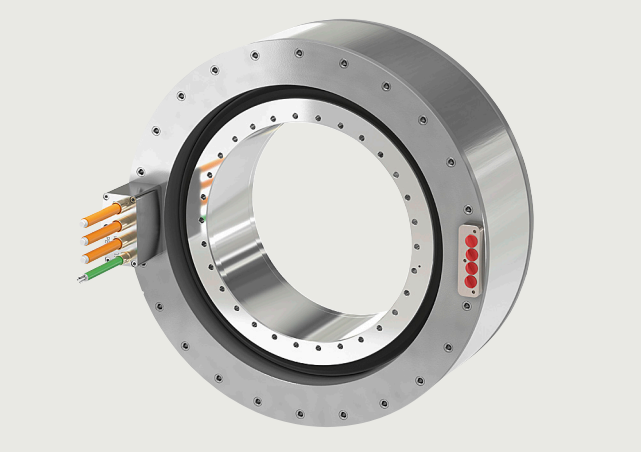
Design

Motors with integrated dual-circuit water cooling

These motors feature a ready-to-connect, integrated dual-circuit water cooling system and are therefore thermally insulated against the mechanical axis construction to a considerable extent.



Motor components, frame sizes 1FW6160 to 1FW6290 with integrated dual-circuit water cooling (rotor and stator)



Motor components, frame sizes 1FW6192 and 1FW6232 in the High Speed version with integrated dual circuit water cooling (rotor and stator)

Integration

SIMOTICS T-1FW6 built-in torque motors controlled by a SINAMICS S120/S220 drive system are designed for operation at a 600 V DC link voltage level.

The cable connection is brought out at the front face of the stator. The cable end either has a connector or bare wire ends depending on the motor design. The length of the power and signal cables from the motor to the drive system must not exceed 50 m.

Absolute measuring systems with DRIVE-CLiQ

Measuring systems with integrated DRIVE-CLiQ interface are available from various manufacturers. The encoders can be used as motor feedback system.

A current overview of the various manufacturers and available measuring systems is available on the internet at:

https://support.automation.siemens.com/WW/view/en/65402168

It is also possible to use absolute measuring systems with EnDat 2.1 or incremental systems with 1 V_{PP}.

Technical specifications

Product name	SIMOTICS T-1FW6 built-in torque motor
Motor type	Synchronous motor with permanent-magnet rotor
Torque ripple	≤ 1.5 % M_0
Coolant inlet temperature, maximum	35 °C (95 °F) for 1FW6 Standard 20 °C (68 °F) for 1FW6 High Speed
Pressure in cooling circuit, maximum	10 bar (static)
Thermal motor protection according to DIN 44081/DIN 44082 [1]	1 × PTC thermistor with response threshold +130 °C (266 °F)
Temperature monitoring according to DIN EN 60034-11) [1]	1 × Pt1000 temperature sensor
Stator winding insulation according to DIN EN 60034-1	Temperature class 155 (F)
Type of construction	Individual components: Stator, rotor
Degree of protection according to DIN EN 60034-5	IP23 The final degree of protection (minimum degree of protection is IP54) for the installed motor is determined by the machine manufacturer. Protection against touch, foreign bodies, and water for electrical equipment is specified in accordance with IEC 60034-5.
Measuring system (Not included in scope of supply)	Select based on application and drive-specific constraints.
Connection, electrical	Permanently connected power and signal cables
Paint finish	Without paint finish
Rating plate	2 units, inc. 1 unit enclosed separately
Certificate of suitability	cURus

[1] Evaluation via SME120/SME125 Sensor Module or TM120 Terminal Module (see SINAMICS S120 drive system).

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Characteristic curves

Characteristics for the SIMOTICS motors are available via selectors through to the exact article number with the Siemens Product Configurator.

Access to the Siemens Product Configurator

The Siemens Product Configurator can be accessed without having to register or log in:

www.siemens.com/spc

→ SIMOTICS T-1FW6 in the SPC

Dimensional drawings

Dimensional drawings for the SIMOTICS motors are available via selectors through to the exact article number with the Siemens Product Configurator.

Access to the Siemens Product Configurator

The Siemens Product Configurator can be accessed without having to register or log in:

www.siemens.com/spc

→ SIMOTICS T-1FW6 in the SPC

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – natural cooling

Selection and ordering data

Maximum torque	Static torque [1]	Rated torque [2]	Speed at maximum torque, max. [2]	Rated speed [2]	**SIMOTICS T-1FW6 built-in torque motors Standard**	Moment of inertia rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_N	n_{max} at M_{max}	n_N		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	r/min	r/min	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Natural cooling							
34.4 (25.4)	11.3 (8.3)	9.91 (7.31)	695	600	**1FW6053-0■B03-0F■3**	0.139 (0.012)	3.7 (8.2)
57.5 (42.4)	16.6 (12.2)	13.8 (10.2)	374	600	**1FW6053-0■B05-0F■3**	0.267 (0.024)	6.5 (14.3)
81.2 (59.9)	19.2 (14.2)	15.2 (11.2)	677	600	**1FW6053-0■B07-0K■3**	0.39 (0.03)	8.5 (18.7)
116 (85.6)	24.6 (18.1)	18.6 (13.7)	428	600	**1FW6053-0■B10-0K■3**	0.488 (0.043)	12 (26.5)
174 (128)	32.5 (24.0)	22.9 (16.9)	653	600	**1FW6053-0■B15-1J■3**	0.691 (0.061)	19.8 (43.7)
64.5 (47.6)	15.5 (11.4)	14 (10.3)	325	400	**1FW6063-0■B03-0F■3**	0.347 (0.031)	7.7 (17.0)
123 (90.7)	25.7 (19.0)	22.2 (16.4)	396	400	**1FW6063-0■B05-0K■3**	0.665 (0.059)	10.5 (23.2)
166 (122)	31.5 (23.2)	25.9 (19.1)	250	400	**1FW6063-0■B07-0K■3**	0.904 (0.080)	13.1 (28.9)
226 (167)	38.1 (28.1)	28.5 (21.0)	470	400	**1FW6063-0■B10-1J■3**	1.21 (0.11)	16.8 (37.0)
332 (245)	49 (36.1)	38.9 (28.7)	257	400	**1FW6063-0■B15-1J■3**	1.72 (0.15)	23 (50.7)

Article No. supplements

Cable outlet only for 1FW6053 and 1FW6063: Axial Tangential	**K** **L**
Type of connection: Permanently connected power and signal cables with bare wire ends [4] Length: 2 m (6.56 ft) Permanently connected power and signal cables pre-assembled with connectors Length: 0.5 m (1.64 ft)	**C** **D**

For footnotes, see next page.

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – natural cooling

Motor type (repeated)	Stall current [1]	Rated current [2]	Maximum current [2]	Calculated power	SINAMICS S120 Motor Module [3]		Power cable with complete shield Motor connection via power connector [4]		
					Required rated current	Booksize format Internal air cooling For further components, see SINAMICS S120 drive system	Power connector	Cable cross-section [5]	Pre-assembled basic cable to the drive system
	I_0	I_N	I_{max}	$P_{el, max}$	I_N / I_{max}				
	A	A	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
Natural cooling									
1FW6053-0.B03-0F..	2.3	2.04	7.61	4.2 (5.6)	3/9	**6SL3120-■TE13-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6053-0.B05-0F..	2	1.7	7.64	4.6 (6.2)	3/9	**6SL3120-■TE13-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6053-0.B07-0K..	3.4	2.68	14.6	8.8 (11.8)	5/15	**6SL3120-■TE15-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6053-0.B10-0K..	3.1	2.31	14.6	9.2 (12.3)	5/15	**6SL3120-■TE15-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6053-0.B15-1J..	5.4	3.78	29.1	17.5 (23.5)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6063-0.B03-0F..	2.1	1.86	9.81	6 (8.05)	3/9	**6SL3120-■TE13-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6063-0.B05-0K..	3.3	2.8	17.7	10.3 (13.8)	9/27	**6SL3120-■TE21-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6063-0.B07-0K..	3	2.42	17.8	10.9 (14.6)	9/27	**6SL3120-■TE21-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6063-0.B10-1J..	5	3.71	31.5	19.1 (25.6)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6063-0.B15-1J..	4.3	3.45	31.5	20.4 (27.4)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Length code	**....**

For more information about cables, see MOTION-CONNECT connection systems

[1] Torque and current at low speeds.

[2] The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).

[3] Optimized selection for full performance of torque motors.

[4] For type of connection with bare wire ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.

[5] The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – water cooling

Selection and ordering data

Maximum torque	Static torque [1) 3)]	Rated torque [2) 3)]	Speed at maximum torque, max. [2)]	Rated speed [2)]	**SIMOTICS T-1FW6 built-in torque motors Standard**	Moment of inertia rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_N	n_{max} at M_{max}	n_N		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	r/min	r/min	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling							
34.4 (25.4)	24.2 (17.8)	23.2 (17.1)	697	940	**1FW6050-0■B03-0F■3**	0.139 (0.012)	3.1 (6.8)
57.5 (42.4)	40.4 (29.8)	39.5 (29.1)	376	525	**1FW6050-0■B05-0F■3**	0.267 (0.024)	5.9 (13.0)
80.6 (59.5)	56.6 (41.7)	55.7 (41.1)	236	349	**1FW6050-0■B07-0F■3**	0.39 (0.03)	7.9 (17.4)
81.2 (59.9)	53 (39.1)	50.9 (37.5)	685	895	**1FW6050-0■B07-0K■3**		
116 (85.6)	75.8 (55.9)	73.7 (54.4)	437	589	**1FW6050-0■B10-0K■3**	0.488 (0.043)	11.4 (25.1)
174 (128)	114 (84.1)	112 (82.6)	234	348	**1FW6050-0■B15-0K■3**	0.691 (0.061)	19.2 (42.3)
		109 (80.4)	658	850	**1FW6050-0■B15-1J■3**		
64.5 (47.6)	33.3 (24.6)	32 (23.6)	330	633	**1FW6060-0■B03-0F■3**	0.347 (0.031)	7.1 (15.7)
123 (90.7)	63.1 (46.5)	62 (45.7)	126	309	**1FW6060-0■B05-0F■3**	0.665 (0.059)	9.9 (21.8)
		60.6 (44.7)	399	663	**1FW6060-0■B05-0K■3**		
166 (122)	85.4 (63.0)	84.3 (62.2)	43.3	203	**1FW6060-0■B07-0F■3**	0.904 (0.080)	12.5 (27.6)
163 (120)	83.7 (61.7)	78.4 (57.8)	730	1040	**1FW6060-0■B07-1J■3**		
166 (122)	85.4 (63.0)	83 (61.2)	256	464	**1FW6060-0■B07-0K■3**		
231 (170)	119 (87.8)	117 (86.3)	133	302	**1FW6060-0■B10-0K■3**	1.21 (0.11)	16.2 (35.7)
226 (167)	116 (85.6)	111 (81.9)	471	708	**1FW6060-0■B10-1J■3**		
339 (250)	174 (128)	172 (127)	27.6	174	**1FW6060-0■B15-0K■3**	1.72 (0.15)	22.4 (49.4)
332 (245)	171 (126)	166 (122)	260	442	**1FW6060-0■B15-1J■3**		

Article No. supplements

Cable outlet only for 1FW6050 and 1FW6060: Axial Tangential	**W** **T**
Type of connection: Permanently connected power and signal cables with bare wire ends [4)] Length: 2 m (6.56 ft) Permanently connected power and signal cables pre-assembled with connectors Length: 0.5 m (1.64 ft)	**C** **D**

For footnotes, see next page.

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – water cooling

Motor type (repeated)	Stall current [1] [3]	Rated current [2] [3]	Maximum current [2]	Calculated power	SINAMICS S120 Motor Module [5]		Power cable with complete shield Motor connection via power connector [4]		
					Required rated current	Booksize format Internal air cooling For further components, see SINAMICS S120 drive system	Power connector	Cable cross-section [6]	Pre-assembled basic cable to the drive system
	I_0	I_N	I_{max}	$P_{el, max}$	I_N / I_{max}				
	A	A	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
Water cooling									
1FW6050-0.B03-0F..	5	4.8	7.6	4.23 (5.67)	5/15	**6SL3120-■TE15-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6050-0.B05-0F..	5.1	4.9	7.6	4.59 (6.16)	5/15	**6SL3120-■TE15-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6050-0.B07-0F..	5.1	5.2	7.6	4.85 (6.50)	5/15	**6SL3120-■TE15-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6050-0.B07-0K..	9.3	9	14	8.79 (11.79)	9/27	**6SL3120-■TE21-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6050-0.B10-0K..	9.3	9.1	14	9.16 (12.28)	9/27	**6SL3120-■TE21-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6050-0.B15-0K..	9.3	9.2	14	9.74 (13.06)	9/27	**6SL3120-■TE21-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6050-0.B15-1J..	18	18	29	17.5 (23.5)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6060-0.B03-0F..	4.5	4.3	9.8	5.91 (7.93)	5/15	**6SL3120-■TE15-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6060-0.B05-0F..	4.5	4.4	9.8	6.65 (8.92)	5/15	**6SL3120-■TE15-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6060-0.B05-0K..	8.1	7.7	17	10.2 (13.7)	9/27	**6SL3120-■TE21-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6060-0.B07-0F..	4.5	4.4	9.8	7.06 (9.47)	5/15	**6SL3120-■TE15-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6060-0.B07-1J..	15.3	14.3	31.4	18.3 (24.5)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6060-0.B07-0K..	8.1	7.9	17	10.8 (14.5)	9/27	**6SL3120-■TE21-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6060-0.B10-0K..	8.1	7.9	17	11.8 (15.8)	9/27	**6SL3120-■TE21-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6060-0.B10-1J..	15	14	31	19.1 (25.6)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6060-0.B15-0K..	8.1	8	17	12.9 (17.3)	9/27	**6SL3120-■TE21-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6060-0.B15-1J..	15	14	31	20.3 (27.2)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Length code	....

For more information about cables, see MOTION-CONNECT connection systems

[1] Torque and current at low speeds.

[2] The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).

[3] For water cooling with inlet temperature e of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

[4] For type of connection with bare wire ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.

[5] Optimized selection for full performance of torque motors.

[6] The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – water cooling

Selection and ordering data

Maximum torque	Static torque [1) 3)]	Rated torque [2) 3)]	Speed at maximum torque, max. [2)]	Rated speed [2)]	**SIMOTICS T-1FW6 built-in torque motors Standard**	Moment of inertia rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_N	n_{max} at M_{max}	n_N		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	r/min	r/min	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling							
179 (132)	119 (87.8)	113 (83.3)	50.2	142	**1FW6090-0■B05-0F■3**	1.52 (0.13)	9.2 (20.3)
		109 (80.4)	142	250	**1FW6090-0■B05-0K■3**		
251 (185)	166 (122)	154 (114)	128	224	**1FW6090-0■B07-0K■3**	2.2 (0.2)	12.2 (26.9)
		142 (105)	278	428	**1FW6090-0■B07-1J■2**		
358 (264)	238 (176)	231 (170)	12.4	83.9	**1FW6090-0■B10-0K■3**	3.09 (0.27)	17.2 (37.9)
		216 (159)	170	272	**1FW6090-0■B10-1J■3**		
537 (396)	357 (263)	338 (249)	80.6	154	**1FW6090-0■B15-1J■3**	4.65 (0.41)	27.2 (60.0)
		319 (235)	202	312	**1FW6090-0■B15-2J■3**		
439 (324)	258 (190)	241 (178)	46.5	132	**1FW6130-0■B05-0K■3**	6.37 (0.56)	13.2 (29.1)
		217 (160)	181	308	**1FW6130-0■B05-1J■3**		
614 (453)	361 (266)	344 (254)	21.5	96.1	**1FW6130-0■B07-0K■3**	8.92 (0.79)	18.2 (40.1)
		324 (239)	109	201	**1FW6130-0■B07-1J■3**		
878 (648)	516 (381)	484 (357)	50.9	123	**1FW6130-0■B10-1J■3**	12.7 (1.1)	25.2 (55.6)
		449 (331)	148	249	**1FW6130-0■B10-2J■3**		
1320 (974)	775 (572)	743 (548)	16	78.4	**1FW6130-0■B15-1J■3**	19.1 (1.7)	38.2 (84.2)
		714 (527)	78.8	152	**1FW6130-0■B15-2J■3**		
710 (524)	360 (266)	338 (249)	108	234	**1FW6150-0■B05-1J■3**	10.1 (0.9)	21.7 (47.8)
		298 (220)	332	654	**1FW6150-0■B05-4F■3**		
994 (733)	504 (372)	483 (356)	64.2	157	**1FW6150-0■B07-1J■3**	14.2 (1.3)	33.52 (73.91)
1420 (1047)	720 (531)	701 (517)	28.5	100	**1FW6150-0■B10-1J■3**	20.9 (1.8)	47.5 (104.7)
994 (733)	504 (372)	470 (347)	126	259	**1FW6150-0■B07-2J■3**	14.2 (1.3)	33.5 (73.9)
		444 (327)	230	449	**1FW6150-0■B07-4F■3**		
1420 (1047)	720 (531)	688 (507)	75.9	171	**1FW6150-0■B10-2J■3**	20.9 (1.8)	47.5 (104.7)
		663 (489)	152	301	**1FW6150-0■B10-4F■3**		
2130 (1571)	1080 (797)	1050 (774)	33.1	103	**1FW6150-0■B15-2J■3**	31.3 (2.8)	70.8 (156.1)
		1030 (760)	89.1	188	**1FW6150-0■B15-4F■3**		

Article No. supplements

Cable outlet only for 1FW6090/1FW6130/1FW6150: Axial Radially outwards Tangential	**P** **Q** **N**
Type of connection: Permanently connected power and signal cables with bare wire ends [4)] Length: 2 m (6.56 ft) Permanently connected power and signal cables pre-assembled with connectors Length: 0.5 m (1.64 ft)	**C** **D**

For footnotes, see next page.

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – water cooling

Motor type (repeated)	Stall current [1) 3)]	Rated current [2) 3)]	Maximum current [2)]	Calculated power	SINAMICS S120 Motor Module [5)]		Power cable with complete shield Motor connection via power connector [4)]		
					Required rated current	Booksize format Internal air cooling For further components, see SINAMICS S120 drive system	Power connector	Cable cross-section [6)]	Pre-assembled basic cable to the drive system
	I_0	I_N	I_{max}	$P_{el, max}$	I_N / I_{max}				
	A	A	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
Water cooling									
1FW6090-0.B05-0F..	5.9	5.6	9.5	6.66 (8.93)	5/15	**6SL3120-■TE15-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6090-0.B05-0K..	8.2	7.5	13	8.23 (11.04)	9/27	**6SL3120-■TE21-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6090-0.B07-0K..	10	9.5	16	10.4 (13.9)	9/27	**6SL3120-■TE21-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6090-0.B07-1J..	16	14	26	14.3 (19.2)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6090-0.B10-0K..	8.2	8.0	13	9.64 (12.93)	9/27	**6SL3120-■TE21-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6090-0.B10-1J..	16	15	27	15.5 (20.8)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6090-0.B15-1J..	16	15	27	17.3 (23.2)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6090-0.B15-2J..	27	24	43	24.4 (32.7)	30/56	**6SL3120-1TE23-0AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6130-0.B05-0K..	9.7	9.1	18	12.5 (16.8)	9/27	**6SL3120-■TE21-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6130-0.B05-1J..	17	14	32	18.7 (25.1)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6130-0.B07-0K..	11	10	20	14.5 (19.4)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6130-0.B07-1J..	17	15	32	20.1 (27.0)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6130-0.B10-1J..	17	16	32	21.8 (29.2)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6130-0.B10-2J..	28	25	53	31.2 (41.8)	30/56	**6SL3120-1TE23-0AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6130-0.B15-1J..	19	19	36	25.9 (34.7)	18/36	**6SL3120-■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6130-0.B15-2J..	28	27	54	34.6 (46.4)	30/56	**6SL3120-1TE23-0AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6150-0.B05-1J..	18	17	44	23.3 (31.2)	18/54	**6SL3120-■TE21-8AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6150-0.B05-4F..	44	36	106	39.8 (53.4)	60/120	**6SL3120-1TE26-0AC0**	1.5	4 × 10	**6FX8002-5CS64-....**
1FW6150-0.B07-1J..	18.4	17.6	44.1	26.1 (35.0)	18/54	**6SL3120-1TE21-8AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6150-0.B10-1J..	18.4	17.9	44.1	29.6 (39.7)	18/54	**6SL3120-1TE21-8AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6150-0.B07-2J..	28	26	66	32.5 (43.6)	30/90	**6SL3120-■TE23-0AD0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6150-0.B07-4F..	44	39	106	43.2 (57.9)	60/120	**6SL3120-1TE26-0AC0**	1.5	4 × 10	**6FX8002-5CS64-....**
1FW6150-0.B10-2J..	28	26	66	36.9 (49.5)	30/90	**6SL3120-■TE23-0AD0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6150-0.B10-4F..	44	40	106	47.9 (64.2)	60/120	**6SL3120-1TE26-0AC0**	1.5	4 × 10	**6FX8002-5CS64-....**
1FW6150-0.B15-2J..	28	27	66	43.2 (57.9)	30/90	**6SL3120-■TE23-0AD0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6150-0.B15-4F..	44	41	106	55.3 (74.2)	60/120	**6SL3120-1TE26-0AC0**	1.5	4 × 10	**6FX8002-5CS64-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Length code	....

For more information about cables, see MOTION-CONNECT connection systems

1) Torque and current at low speeds.

2) The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).

3) For water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

4) For type of connection with bare wire ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.

5) Optimized selection for full performance of torque motors.

6) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – water cooling

Selection and ordering data

Maximum torque	Static torque [1) 3)]	Rated torque [2) 3)]	Speed at maximum torque, max. [2)]	Rated speed [2)]	**SIMOTICS T-1FW6 built-in torque motors Standard**	Moment of inertia rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_N	n_{max} at M_{max}	n_N		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	r/min	r/min	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling							
716 (528)	467 (344)	432 (319)	80.6	140	**1FW6160-0■B05-1J■3**	19.0 (1.7)	36.3 (80.0)
		405 (299)	142	242	**1FW6160-0■B05-2J■3**		
		317 (234)	308	574	**1FW6160-0■B05-5G■3**		
		453 (334)	20.3	53.4	**1FW6160-0■B05-0K■3**		
1000 (738)	653 (482)	621 (458)	51.7	93.5	**1FW6160-0■B07-1J■3**	25.8 (2.3)	48.3 (106.5)
		596 (440)	97.2	164	**1FW6160-0■B07-2J■3**		
		517 (381)	218	379	**1FW6160-0■B07-5G■3**		
		436 (322)	320	594	**1FW6160-0■B07-8F B3**		
1430 (1055)	933 (688)	904 (667)	28.5	59	**1FW6160-0■B10-1J■3**	36.0 (3.2)	66.3 (146.2)
		893 (659)	44.3	80.7	**1FW6160-0■B10-2E■3**		
		880 (649)	62.4	108	**1FW6160-0■B10-2J■3**		
		807 (595)	149	250	**1FW6160-0■B10-5G■3**		
		737 (544)	221	383	**1FW6160-0■B10-8F B3**		
		629 (464)	317	584	**1FW6160-0■B10-2P B3**		67.4 (148.6)
2150 (1586)	1400 (1033)	1350 (996)	33.8	64.6	**1FW6160-0■B15-2J■3**	53.1 (4.7)	95.3 (210.1)
		1280 (944)	93.8	156	**1FW6160-0■B15-5G■3**		
		1220 (900)	142	237	**1FW6160-0■B15-8F B3**		
		1130 (833)	208	355	**1FW6160-0■B15-2P B3**		96.4 (212.6)
		970 (715)	304	551	**1FW6160-0■B15-0W B3**		
2860 (2110)	1870 (1379)	1760 (1298)	65.5	111	**1FW6160-0■B20-5G■3**	70.1 (6.2)	124.3 (274.1)
		1700 (1254)	103	170	**1FW6160-0■B20-8F B3**		
		1610 (1188)	152	253	**1FW6160-0■B20-2P B3**		125.4 (276.5)
		1470 (1084)	225	387	**1FW6160-0■B20-0W B3**		

Article No. supplements

Cable outlet only for 1FW6160 to 1FW6290: Axial Radially outwards Tangential (only for type of connection C and D)	**W** **V** **T**
Type of connection: Permanently connected power and signal cables with bare wire ends [4)] Length: 2 m (6.56 ft) Permanently connected power and signal cables pre-assembled with connectors Length: 0.5 m (1.64 ft)	**C** **D**
Type of connection only for specific motors (not selectable)**:** Permanently connected power and signal cables with bare wire ends [4)] Length: 1 m (3.28 ft)	**B**

For footnotes, see next page.

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – water cooling

Motor type (repeated)	Stall current [1) 3)]	Rated current [2) 3)]	Maximum current [2)]	Calculated power	SINAMICS S120 Motor Module [5)]		Power cable with complete shield Motor connection via power connector [4)]		
					Required rated current	Booksize format Internal air cooling For further components, see SINAMICS S120 drive system	Power connector	Cable cross-section [6)]	Pre-assembled basic cable to the drive system
	I_0	I_N	I_{max}	$P_{el, max}$	I_N / I_{max}				
	A	A	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
Water cooling									
1FW6160-0.B05-1J..	18	16	32	15.2 (20.4)	18/36	**6SL3120 - ■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6160-0.B05-2J..	28	24	49	19.8 (26.6)	30/56	**6SL3120 - 1TE23-0AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6160-0.B05-5G..	56	37	99	32.4 (43.4)	60/120	**6SL3120 - 1TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6160-0.B05-0K..	9.0	8.7	15.8	10.5 (14.1)	9/27	**6SL3120 - ■TE21-0AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6160-0.B07-1J..	18	17	32	16.9 (22.7)	18/36	**6SL3120 - ■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6160-0.B07-2J..	28	25	49	21.7 (29.1)	30/56	**6SL3120 - 1TE23-0AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6160-0.B07-5G..	56	44	99	34.5 (46.3)	60/120	**6SL3120 - 1TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6160-0.B07-8FB.	80	52	141	45.5 (61.0)	85/141	**6SL3120 - 1TE28-5AA3**	–	–	**–**
1FW6160-0.B10-1J..	18	17	32	19.2 (25.7)	18/36	**6SL3120 - ■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6160-0.B10-2E..	22.5	21.4	39.5	21.5 (28.8)	30/56	**6SL3120 - ■TE23-8AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6160-0.B10-2J..	28	26	49	24.4 (32.7)	30/56	**6SL3120 - 1TE23-0AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6160-0.B10-5G..	56	48	99	37.5 (50.3)	60/120	**6SL3120 - 1TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6160-0.B10-8FB.	80	62	141	48.6 (65.2)	85/141	**6SL3120 - 1TE28-5AA3**	–	–	**–**
1FW6160-0.B10-2PB.	112	74	198	62.8 (84.2)	132/210	**6SL3120 - 1TE31-3AA3**	–	–	**–**
1FW6160-0.B15-2J..	28	27	49	28.4 (38.1)	30/56	**6SL3120 - 1TE23-0AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6160-0.B15-5G..	56	51	99	42.1 (56.5)	60/120	**6SL3120 - 1TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6160-0.B15-8FB.	80	69	141	53.6 (71.9)	85/141	**6SL3120 - 1TE28-5AA3**	–	–	**–**
1FW6160-0.B15-2PB.	112	89	198	67.8 (90.9)	132/210	**6SL3120 - 1TE31-3AA3**	–	–	**–**
1FW6160-0.B15-0WB.	160	109	282	89.9 (120.6)	200/282	**6SL3120 - 1TE32-0AA4**	–	–	**–**
1FW6160-0.B20-5G..	56	52	99	46.6 (62.5)	60/120	**6SL3120 - 1TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6160-0.B20-8FB.	80	72	141	58.4 (78.3)	85/141	**6SL3120 - 1TE28-5AA3**	–	–	**–**
1FW6160-0.B20-2PB.	112	96	198	72.6 (97.4)	132/210	**6SL3120 - 1TE31-3AA3**	–	–	**–**
1FW6160-0.B20-0WB.	160	124	282	95 (127)	200/282	**6SL3120 - 1TE32-0AA4**	–	–	**–**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Length code	....

For more information about cables, see MOTION-CONNECT connection systems

1) Torque and current at low speeds.

2) The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).

3) For water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

4) For type of connection with bare wire ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.

5) Optimized selection for full performance of torque motors.

6) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – water cooling

Selection and ordering data

Maximum torque	Static torque [1) 3)]	Rated torque [2) 3)]	Speed at maximum torque, max. [2)]	Rated speed [2)]	**SIMOTICS T-1FW6 built-in torque motors Standard**	Moment of inertia rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_N	n_{max} at M_{max}	n_N		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	r/min	r/min	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling							
990 (730)	672 (496)	634 (468)	51.7	92.7	**1FW6190-0■B05-1J■3**	35.8 (3.2)	42.8 (94.4)
		608 (448)	91	155	**1FW6190-0■B05-2J■3**		
		516 (381)	204	364	**1FW6190-0■B05-5G■3**		
1390 (1025)	941 (694)	907 (669)	31.2	61	**1FW6190-0■B07-1J■3**	48.6 (4.3)	55.8 (123.0)
		881 (650)	60.8	105	**1FW6190-0■B07-2J■3**		
		798 (589)	143	244	**1FW6190-0■B07-5G■3**		
		714 (527)	212	377	**1FW6190-0■B07-8F B3**		
1980 (1460)	1340 (988)	1310 (966)	14.2	37.2	**1FW6190-0■B10-1J■3**	67.8 (6.0)	75.8 (167.1)
		1290 (952)	37.1	67.6	**1FW6190-0■B10-2J■3**		
		1210 (892)	96.6	161	**1FW6190-0■B10-5G■3**		
		1140 (841)	145	246	**1FW6190-0■B10-8F B3**		
		971 (716)	238	431	**1FW6190-0■B10-2P B3**		77.1 (170.0)
2970 (2191)	2020 (1490)	1970 (1453)	16.9	39	**1FW6190-0■B15-2J■3**	99.8 (8.8)	107.8 (237.7)
		1890 (1394)	59.4	99.8	**1FW6190-0■B15-5G■3**		
		1830 (1350)	92.3	153	**1FW6190-0■B15-8F B3**		
		1680 (1239)	155	263	**1FW6190-0■B15-2P B3**		109.1 (240.6)
		1560 (1151)	201	352	**1FW6190-0■B15-0W B3**		
3960 (2921)	2690 (1984)	2580 (1903)	40.1	70.1	**1FW6190-0■B20-5G■3**	132.0 (11.7)	136.2 (300.3)
		2610 (1925)	26.5	51.1	**1FW6190-0■B20-4F■3**		
		2510 (1851)	65.4	109	**1FW6190-0■B20-8F B3**		
		2380 (1755)	113	188	**1FW6190-0■B20-2P B3**		137.5 (303.2)
		2270 (1674)	148	249	**1FW6190-0■B20-0W B3**		

Article No. supplements

Cable outlet only for 1FW6160 to 1FW6290: Axial Radially outwards Tangential (only for type of connection C and D)	**W** **V** **T**
Type of connection: Permanently connected power and signal cables with bare wire ends [4)] Length: 2 m (6.56 ft) Permanently connected power and signal cables pre-assembled with connectors Length: 0.5 m (1.64 ft)	**C** **D**
Type of connection only for specific motors (not selectable): Permanently connected power and signal cables with bare wire ends [4)] Length: 1 m (3.28 ft)	**B**

For footnotes, see next page.

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – water cooling

Motor type (repeated)	Stall current [1] [3]	Rated current [2] [3]	Maximum current [2]	Calculated power	SINAMICS S120 Motor Module [5]		Power cable with complete shield Motor connection via power connector [4]		
					Required rated current	Booksize format Internal air cooling For further components, see SINAMICS S120 drive system	Power connector	Cable cross-section [6]	Pre-assembled basic cable to the drive system
	I_0	I_N	I_{max}	$P_{el, max}$	I_N / I_{max}				
	A	A	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
Water cooling									
1FW6190-0.B05-1J..	18	17	32	16.4 (22.0)	18/36	**6SL3120 - ■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6190-0.B05-2J..	27	24	48	20.5 (27.5)	30/56	**6SL3120 - 1 TE23-0AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6190-0.B05-5G..	55	41	95	32.2 (43.2)	60/120	**6SL3120 - 1 TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6190-0.B07-1J..	18	17	32	18.4 (24.7)	18/36	**6SL3120 - ■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6190-0.B07-2J..	27	25	48	22.7 (30.4)	30/56	**6SL3120 - 1 TE23-0AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6190-0.B07-5G..	55	45	95	34.6 (46.4)	60/120	**6SL3120 - 1 TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6190-0.B07-8FB.	78	57	136	45 (60.3)	85/141	**6SL3120 - 1 TE28-5AA3**	–	–	**–**
1FW6190-0.B10-1J..	18	18	32	21 (28.2)	18/36	**6SL3120 - ■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6190-0.B10-2J..	27	26	48	25.8 (34.6)	30/56	**6SL3120 - 1 TE23-0AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6190-0.B10-5G..	55	48	95	38.1 (51.1)	60/120	**6SL3120 - 1 TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6190-0.B10-8FB.	78	65	136	48.7 (65.3)	85/141	**6SL3120 - 1 TE28-5AA3**	–	–	**–**
1FW6190-0.B10-2PB.	123	86	214	67.7 (90.8)	132/210	**6SL3120 - 1 TE31-3AA3**	–	–	**–**
1FW6190-0.B15-2J..	27	26	48	30.4 (40.8)	30/56	**6SL3120 - 1 TE23-0AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6190-0.B15-5G..	55	51	95	43.6 (58.5)	60/120	**6SL3120 - 1 TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6190-0.B15-8FB.	78	70	136	54.6 (73.2)	85/141	**6SL3120 - 1 TE28-5AA3**	–	–	**–**
1FW6190-0.B15-2PB.	123	100	214	73.7 (98.8)	132/210	**6SL3120 - 1 TE31-3AA3**	–	–	**–**
1FW6190-0.B15-0WB.	156	118	272	88.5 (118.7)	200/282	**6SL3120 - 1 TE32-0AA4**	–	–	**–**
1FW6190-0.B20-5G..	55	52	95	48.8 (65.4)	60/120	**6SL3120 - 1 TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6190-0.B20-4F..	43.4	41.9	75.6	43.7 (58.6)	60/120	**6SL3120 - 1 TE26-0AC0**	1.5	4 × 10	**6FX8002-5CS64-....**
1FW6190-0.B20-8FB.	78	72	136	60.3 (80.9)	85/141	**6SL3120 - 1 TE28-5AA3**	–	–	**–**
1FW6190-0.B20-2PB.	123	107	214	79.5 (106.6)	132/210	**6SL3120 - 1 TE31-3AA3**	–	–	**–**
1FW6190-0.B20-0WB.	156	129	272	94.6 (126.9)	200/282	**6SL3120 - 1 TE32-0AA4**	–	–	**–**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Length code	....

For more information about cables, see MOTION-CONNECT connection systems

[1] Torque and current at low speeds.

[2] The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).

[3] For water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

[4] For type of connection with bare wire ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.

[5] Optimized selection for full performance of torque motors.

[6] The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – water cooling

Selection and ordering data

Maximum torque	Static torque [1) 3)]	Rated torque [2) 3)]	Speed at maximum torque, max. [2)]	Rated speed [2)]	**SIMOTICS T-1FW6 built-in torque motors Standard**	Moment of inertia rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_N	n_{max} at M_{max}	n_N		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	r/min	r/min	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling							
1320 (974)	841 (620)	801 (591)	32.6	66.1	**1FW6230-0■B05-1J■3**	62.2 (5.5)	44.8 (98.8)
		778 (574)	56	104	**1FW6230-0■B05-2J■3**		
		669 (493)	147	275	**1FW6230-0■B05-5G■3**		
1840 (1357)	1180 (870)	1140 (841)	18	43.2	**1FW6230-0■B07-1J■3**	84.3 (7.5)	58.8 (129.7)
		1120 (826)	35.9	69.8	**1FW6230-0■B07-2J■3**		
		1020 (752)	103	185	**1FW6230-0■B07-5G■3**		
		936 (690)	148	275	**1FW6230-0■B07-8FB3**		
2630 (1940)	1680 (1239)	1630 (1202)	19.8	44.4	**1FW6230-0■B10-2J■3**	118.0 (10.4)	81.8 (180.4)
		1530 (1129)	69.3	123	**1FW6230-0■B10-5G■3**		
		1460 (1077)	101	181	**1FW6230-0■B10-8FB3**		
		1330 (981)	150	278	**1FW6230-0■B10-2PB3**		
3950 (2914)	2520 (1859)	2450 (1807)	18.5	41.5	**1FW6230-0■B15-4C■3**	173.0 (15.3)	117.8 (259.7)
		2380 (1755)	41.8	76.2	**1FW6230-0■B15-5G■3**		
		2320 (1711)	64	113	**1FW6230-0■B15-8FB3**		
		2210 (1630)	97.1	172	**1FW6230-0■B15-2PB3**		
		2040 (1505)	141	258	**1FW6230-0■B15-0WB3**		119.4 (263.3)
5260 (3880)	3360 (2478)	3230 (2382)	27.5	53.4	**1FW6230-0■B20-5G■3**	228.0 (20.2)	153.8 (339.1)
		3170 (2338)	44.8	80.7	**1FW6230-0■B20-8FB3**		
		3060 (2257)	70	123	**1FW6230-0■B20-2PB3**		
		2910 (2146)	104	184	**1FW6230-0■B20-0WB3**		155.4 (342.7)

Article No. supplements

Cable outlet only for 1FW6160 to 1FW6290: Axial Radially outwards Tangential (only for type of connection C and D)	**W** **V** **T**
Type of connection: Permanently connected power and signal cables with bare wire ends [4)] Length: 2 m (6.56 ft) Permanently connected power and signal cables pre-assembled with connectors Length: 0.5 m (1.64 ft)	**C** **D**
Type of connection only for specific motors (not selectable): Permanently connected power and signal cables with bare wire ends [4)] Length: 1 m (3.28 ft)	**B**

For footnotes, see next page.

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – water cooling

Motor type (repeated)	Stall current [1) 3)]	Rated current [2) 3)]	Maximum current [2)]	Calculated power	SINAMICS S120 Motor Module [5)]		Power cable with complete shield Motor connection via power connector [4)]		
					Required rated current	Booksize format Internal air cooling For further components, see SINAMICS S120 drive system	Power connector	Cable cross-section [6)]	Pre-assembled basic cable to the drive system
	I_0	I_N	I_{max}	$P_{el, max}$	I_N / I_{max}				
	A	A	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
Water cooling									
1FW6230-0.B05-1J..	17	16	32	17.4 (23.3)	18/36	**6SL3120 - ■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6230-0.B05-2J..	24	22	45	21.1 (28.3)	24/48	**6SL3120 - 1TE22-4AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6230-0.B05-5G..	53	41	101	33.1 (44.4)	60/120	**6SL3120 - 1TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6230-0.B07-1J..	17	16	32	19.7 (26.4)	18/36	**6SL3120 - ■TE21-8AC0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6230-0.B07-2J..	24	23	45	23.7 (31.8)	24/48	**6SL3120 - 1TE22-4AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6230-0.B07-5G..	53	45	101	36.3 (48.7)	60/120	**6SL3120 - 1TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6230-0.B07-8FB.	74	57	139	45.1 (60.5)	85/141	**6SL3120 - 1TE28-5AA3**	–	–	**–**
1FW6230-0.B10-2J..	24	23	45	27.3 (36.6)	24/48	**6SL3120 - 1TE22-4AC0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6230-0.B10-5G..	53	48	101	40.5 (54.3)	60/120	**6SL3120 - 1TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6230-0.B10-8FB.	74	63	139	49.5 (66.4)	85/141	**6SL3120 - 1TE28-5AA3**	–	–	**–**
1FW6230-0.B10-2PB.	106	81	199	63.5 (85.2)	132/210	**6SL3120 - 1TE31-3AA3**	–	–	**–**
1FW6230-0.B15-4C..	34	33	64	38.3 (51.4)	45/90	**6SL3120 - 1TE24-5AC0**	1.5	4 × 6	**6FX8002-5CS54-....**
1FW6230-0.B15-5G..	53	50	101	47.1 (63.2)	60/120	**6SL3120 - 1TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6230-0.B15-8FB.	74	67	139	56.4 (75.6)	85/141	**6SL3120 - 1TE28-5AA3**	–	–	**–**
1FW6230-0.B15-2PB.	106	91	199	70.8 (94.9)	132/210	**6SL3120 - 1TE31-3AA3**	–	–	**–**
1FW6230-0.B15-0WB.	148	117	279	88.3 (118.4)	200/282	**6SL3120 - 1TE32-0AA4**	–	–	**–**
1FW6230-0.B20-5G..	53	51	101	53.3 (71.5)	60/120	**6SL3120 - 1TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6230-0.B20-8FB.	74	69	139	63 (84.5)	85/141	**6SL3120 - 1TE28-5AA3**	–	–	**–**
1FW6230-0.B20-2PB.	106	95	199	77.9 (104.5)	132/210	**6SL3120 - 1TE31-3AA3**	–	–	**–**
1FW6230-0.B20-0WB.	148	126	279	95.5 (128.1)	200/282	**6SL3120 - 1TE32-0AA4**	–	–	**–**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Length code	....

For more information about cables, see MOTION-CONNECT connection systems

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1) Torque and current at low speeds.

2) The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).

3) For water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

4) For type of connection with bare wire ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.

5) Optimized selection for full performance of torque motors.

6) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – water cooling

Selection and ordering data

Maximum torque	Static torque [1) 3)]	Rated torque [2) 3)]	Speed at maximum torque, max. [2)]	Rated speed [2)]	**SIMOTICS T-1FW6 built-in torque motors Standard**	Moment of inertia rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_N	n_{max} at M_{max}	n_N		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	r/min	r/min	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling							
4000 (2950)	2220 (1637)	2060 (1519)	57.5	106	**1FW6290-0■B07-5G■3**	228 (20.2)	103.6 (228.4)
		1920 (1416)	110	204	**1FW6290-0■B07-0L B3**		
		1810 (1335)	144	272	**1FW6290-0■B07-2P B3**		108.8 (239.9)
6280 (4632)	3490 (2574)	3320 (2449)	39.3	72.9	**1FW6290-0■B11-7A■3**	334 (29.6)	159 (351)
		3340 (2464)	34.1	64.3	**1FW6290-0■B11-5G■3**		
		3200 (2360)	68.6	125	**1FW6290-0■B11-0L B3**		
		3110 (2294)	90.4	165	**1FW6290-0■B11-2P B3**		164.2 (362.1)
8570 (6321)	4760 (3511)	4600 (3393)	26.6	51.3	**1FW6290-0■B15-7A■3**	440 (38.9)	214.6 (473.2)
		4480 (3304)	48.7	88.5	**1FW6290-0■B15-0L B3**		
		4390 (3238)	64.9	117	**1FW6290-0■B15-2P B3**		219.8 (484.7)
10900 (8040)	6030 (4448)	5760 (4249)	36.9	67.9	**1FW6290-0■B20-0L B3**	546 (48.3)	260.6 (574.6)
		5670 (4182)	49.9	90.3	**1FW6290-0■B20-2P B3**		265.8 (586.1)

Article No. supplements

Cable outlet only for 1FW6160 to 1FW6290: Axial Radially outwards Tangential (only for type of connection C and D)	**W** **V** **T**
Type of connection: Permanently connected power and signal cables with bare wire ends [4)] Length: 2 m (6.56 ft) Permanently connected power and signal cables pre-assembled with connectors Length: 0.5 m (1.64 ft)	**C** **D**
Type of connection only for specific motors (not selectable)**:** Permanently connected power and signal cables with bare wire ends [4)] Length: 1 m (3.28 ft)	**B**

For footnotes, see next page.

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – water cooling

Motor type (repeated)	Stall current [1] [3]	Rated current [2] [3]	Maximum current [2]	Calculated power	SINAMICS S120 Motor Module [5]		Power cable with complete shield Motor connection via power connector [4]		
					Required rated current	Booksize format Internal air cooling For further components, see SINAMICS S120 drive system	Power connector	Cable cross-section [6]	Pre-assembled basic cable to the drive system
	I_0	I_N	I_{max}	$P_{el, max}$	I_N / I_{max}				
	A	A	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
Water cooling									
1FW6290-0.B07-5G..	56	52	119	46.9 (62.9)	60/120	**6SL3120-1TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6290-0.B07-0LB.	101	86	212	68.9 (92.4)	132/210	**6SL3120-1TE31-3AA3**	–	–	**–**
1FW6290-0.B07-2PB.	129	105	272	83.2 (111.6)	200/282	**6SL3120-1TE32-0AA4**	–	–	**–**
1FW6290-0.B11-7A..	63	59.8	133	57.5 (77.1)	85/141	**6SL3120-1TE28-5AA3**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6290-0.B11-5G..	56.5	54	119	53.9 (72.3)	60/120	**6SL3120-1TE26-0AC0**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6290-0.B11-0LB.	101	92	212	76.6 (102.7)	132/210	**6SL3120-1TE31-3AA3**	–	–	**–**
1FW6290-0.B11-2PB.	129	114	272	91.2 (122.3)	200/282	**6SL3120-1TE32-0AA4**	–	–	**–**
1FW6290-0.B15-7A..	63	61	133	64 (85.8)	85/141	**6SL3120-1TE28-5AA3**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6290-0.B15-0LB.	101	94	212	83.8 (112.4)	132/210	**6SL3120-1TE31-3AA3**	–	–	**–**
1FW6290-0.B15-2PB.	129	118	272	98.8 (132.5)	200/282	**6SL3120-1TE32-0AA4**	–	–	**–**
1FW6290-0.B20-0LB.	101	96	212	90.8 (121.8)	132/210	**6SL3120-1TE31-3AA3**	–	–	**–**
1FW6290-0.B20-2PB.	129	121	272	106 (142)	200/282	**6SL3120-1TE32-0AA4**	–	–	**–**

Motor Module: Single Motor Module	**1**

Length code	**....**

For more information about cables, see MOTION-CONNECT connection systems

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Accessories

Description	Article No.
Cooling connection adapter For SIMOTICS T-1FW6 built-in torque motors	
• 1FW6160 ... 1FW6230	**1FW6160-1BA00-0AA0**
• 1FW6290	**1FW6290-1BA00-0AA0**

Description	Article No.
Power connector [4] For SIMOTICS T-1FW6 built-in torque motors	
• Size 1 for 4 × 2.5 mm^2	**6FX2003-0LA00**
• Size 1.5 for 4 × 4/4 × 10/4 × 16 mm^2	**6FX2003-0LA10**
Signal connector [4] For SIMOTICS T-1FW6 built-in torque motors	
• M17 (socket) for 6 × 0.5 + 1 × 1.0 mm^2	**6FX2003-0SU07**
Signal cable, pre-assembled [7] For SIMOTICS T-1FW6 built-in torque motors	**6FX8002-2SL10-....**

1) Torque and current at low speeds.
2) The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).
3) For water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).
4) For type of connection with bare wire ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.
5) Optimized selection for full performance of torque motors.
6) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).
7) For length code, see MOTION-CONNECT connection systems.

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, High Speed – water cooling

Selection and ordering data

Maximum torque	Static torque [1) 3)]	Rated torque [2) 3)]	Speed at maximum torque, max. [2)]	Rated speed [2)]	Maximum speed	**SIMOTICS T-1FW6 built-in torque motors High Speed** **Stator** [4)]	Moment of inertia rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_N	n_{max} at M_{max}	n_N	n_{max}		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	r/min	r/min	r/min	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling								
214 (158)	157 (116)	153 (113)	434	571	1890	**1FW6092-8PC05-2EB3**	3.68 (0.33)	15.5 (34.2)
	157 (116)	150 (111)	814	1040	3000	**1FW6092-8PC05-4FB3**		
429 (316)	313 (231)	305 (225)	457	590	1890	**1FW6092-8PC10-4FB3**	6.89 (0.61)	26 (57.3)
	313 (231)	299 (221)	837	1060	3000	**1FW6092-8PC10-8FB3**		26.5 (58.4)
643 (474)	470 (347)	459 (339)	434	560	1790	**1FW6092-8PC15-6AB3**	10.1 (0.9)	37 (81.6)
	470 (347)	453 (334)	647	824	2520	**1FW6092-8PC15-8FB3**		
432 (319)	276 (204)	268 (198)	332	490	1730	**1FW6132-8PC05-3AB3**	11.8 (1.0)	28.5 (62.8)
	276 (204)	260 (192)	723	1050	3000	**1FW6132-8PC05-6AB3**		
864 (637)	552 (407)	537 (396)	344	500	1730	**1FW6132-8PC10-6AB3**	21.3 (1.9)	48.5 (106.9)
	552 (407)	519 (383)	735	1060	3000	**1FW6132-8PC10-2PB3**		49 (108)
1300 (959)	829 (611)	811 (598)	249	365	1290	**1FW6132-8PC15-6AB3**	30.8 (2.7)	67 (148)
	829 (611)	792 (584)	544	777	2400	**1FW6132-8PC15-2PB3**		67.5 (148.8)
800 (590)	545 (402)	536 (395)	121	203	890	**1FW6152-8PC05-3AB3**	29.2 (2.6)	41 (90.4)
	545 (402)	525 (387)	296	460	1800	**1FW6152-8PC05-6AB3**		
1600 (1180)	1090 (804)	1070 (789)	134	216	902	**1FW6152-8PC10-6AB3**	45.4 (4.0)	69.5 (153.2)
	1090 (804)	1050 (774)	303	467	1800	**1FW6152-8PC10-2PB3**		70 (154)
2400 (1770)	1630 (1202)	1610 (1188)	133	213	890	**1FW6152-8PC15-8FB3**	65.8 (5.8)	97.5 (215.0)
	1630 (1202)	1590 (1173)	222	343	1350	**1FW6152-8PC15-2PB3**		98 (216)

Article No. supplements

Type of connection only for specific motors (not selectable): Permanently connected power and signal cables with bare wire ends [5)] Length: 1 m (3.28 ft)	**B**

Options

Factory-installed option only for 1FW6092

Description	Article No.
Outer cooling sleeve mounted option: -Z R06	**1FW6092-8PC10-4FB3-Z R06**
	1FW6092-8PC10-4FT3-Z R06
	1FW6092-8PC15-8FB3-Z R06

For footnotes, see next page.

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, High Speed – water cooling

Motor type (repeated)	Stall current [1) 3)]	Rated current [2) 3)]	Maximum current [2)]	Calculated power	Voltage Protection Module (VPM)	SINAMICS S120 Motor Module [6)]	
						Required rated current	**Booksize format** Internal air cooling For further components, see SINAMICS S120 drive system
	I_0	I_N	I_{max}	$P_{el, max}$		I_N / I_{max}	
	A	A	A	kW (hp)		A	Article No.
Water cooling							
1FW6092-8PC05-2EB3	19.6	19	30.1	15.8 (21.2)	VPM 120	24/48	**6SL3120-1TE22-4AC0**
1FW6092-8PC05-4FB3	33	31.3	50.8	24.2 (32.5)	VPM 120	45/90 [7)]	**6SL3120-1TE24-5AC0**
1FW6092-8PC10-4FB3	39.1	38	60.2	30.5 (40.9)	VPM 120	45/90	**6SL3120-1TE24-5AC0**
1FW6092-8PC10-8FB3	66	62.5	102	47.5 (63.7)	VPM 200	85/141 [7)]	**6SL3120-1TE28-5AA3**
1FW6092-8PC15-6AB3	55.6	54	85.5	43.3 (58.1)	VPM 120	60/120	**6SL3120-1TE26-0AC0**
1FW6092-8PC15-8FB3	78.2	75	120	57.7 (77.4)	VPM 200	85/141 [7)]	**6SL3120-1TE28-5AA3**
1FW6132-8PC05-3AB3	28.1	27.2	52.9	23.6 (31.6)	VPM 120	30/56	**6SL3120-1TE23-0AC0**
1FW6132-8PC05-6AB3	56.2	52.3	106	41.2 (55.2)	VPM 120	85/141 [7)]	**6SL3120-1TE28-5AA3**
1FW6132-8PC10-6AB3	56.2	54.3	106	45.1 (60.5)	VPM 120	60/120	**6SL3120-1TE26-0AC0**
1FW6132-8PC10-2PB3	112	104	211	80.4 (107.8)	VPM 200	132/210 [7)]	**6SL3120-1TE31-3AA3**
1FW6132-8PC15-6AB3	62.9	61.3	118	53.2 (71.3)	VPM 120	60/120	**6SL3120-1TE26-0AC0**
1FW6132-2PC15-2PB3	126	119	237	93.2 (125.0)	VPM 200	132/210 [7)]	**6SL3120-1TE31-3AA3**
1FW6152-8PC05-3AB3	27.1	26.6	53	25.3 (33.9)	VPM 120	30/56	**6SL3120-1TE23-0AC0**
1FW6152-8PC05-6AB3	55	52.5	107	39.1 (52.4)	VPM 120	85/141 [7)]	**6SL3120-1TE28-5AA3**
1FW6152-8PC10-6AB3	55	53.8	107	46.2 (62.0)	VPM 120	60/120	**6SL3120-1TE26-0AC0**
1FW6152-8PC10-2BP3	110	105	215	74.4 (99.8)	VPM 200	132/210 [7)]	**6SL3120-1TE31-3AA3**
1FW6152-8PC15-8FB3	81.4	79.7	159	68.5 (91.9)	VPM 200	85/141	**6SL3120-1TE28-5AA3**
1FW6152-8PC15-2PB3	123	119	241	88.8 (119.1)	VPM 200	132/210 [7)]	**6SL3120-1TE31-3AA3**

Motor Module: Single Motor Module	**1**

[1)] Torque and current at low speeds.
[2)] The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).
[3)] For water cooling with inlet temperature of 20 °C (68 °F) and maximum rotor flange temperature of 60 °C (140 °F).
[4)] The corresponding rotor can be ordered with article number 1FW6. 2-8RA.. -0AA0
[5)] For type of connection with bare wire ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.
[6)] Dimensioned for motor continuous current, for full utilization of motor I_{max}, a larger Motor Module is required.
[7)] PWM clock cycle must be increased.

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, High Speed – water cooling

Selection and ordering data

Maximum torque	Static torque [1) 3)]	Rated torque [2) 3)]	Speed at maximum torque, max. [2)]	Rated speed [2)]	Maximum speed	**SIMOTICS T-1FW6 built-in torque motors High Speed** **Stator** [4)]	Moment of inertia rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_N	n_{max} at M_{max}	n_N	n_{max}		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	r/min	r/min	r/min	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling								
1180 (870)	868 (640)	849 (626)	138	196	893	**1FW6192-8 ■ C05-4FB3**	70.3 (6.2)	62.5 (137.8)
	868 (640)	826 (609)	300	423	1500	**1FW6192-8 ■ C05-8FB3**		
2350 (1733)	1740 (1283)	1700 (1254)	142	200	893	**1FW6192-8 ■ C10-8FB3**	125 (11.1)	101.5 (223.8)
	1740 (1283)	1670 (1232)	235	329	1410	**1FW6192-8 ■ C10-2FB3**		104 (229)
3530 (2604)	2600 (1918)	2570 (1896)	89.9	128	596	**1FW6192-8 ■ C15-8FB3**	181 (16.0)	141.5 (312.0)
	2600 (1918)	2520 (1859)	198	277	1190	**1FW6192-8 ■ C15-0WB3**		144 (318)
4700 (3467)	3470 (2559)	3440 (2537)	63	92	447	**1FW6192-8 ■ C20-8FB3**	237 (21.0)	181 (399)
	3470 (2559)	3390 (2500)	145	203	893	**1FW6192-8 ■ C20-0WB3**		183.5 (404.6)
1490 (1099)	1090 (804)	1060 (782)	156	227	943	**1FW6232-8 ■ C05-6AB3**	167 (14.8)	75 (165)
	1090 (804)	1040 (767)	224	326	1300	**1FW6232-8 ■ C05-8FB3**		
2990 (2205)	2180 (1608)	2120 (1564)	159	230	934	**1FW6232-8 ■ C10-2PB3**	227 (20.1)	121 (267)
	2180 (1608)	2090 (1542)	230	331	1300	**1FW6232-8 ■ C10-0WB3**		123.5 (272.3)
4480 (3304)	3280 (2419)	3210 (2368)	102	148	623	**1FW6232-8 ■ C15-2PB3**	327 (28.9)	169 (373)
	3280 (2419)	3180 (2346)	150	215	872	**1FW6232-8 ■ C15-0WB3**		171.5 (378.2)
5980 (4411)	4370 (3223)	4310 (3179)	73.1	108	467	**1FW6232-8 ■ C20-2PB3**	427 (37.8)	216.5 (477.4)
	4370 (3223)	4280 (3157)	109	158	654	**1FW6232-8 ■ C20-0WB3**		219 (483)

Article No. supplements

Cable outlet only for 1FW6192 to 1FW6232: Axial Radially outwards	**W** **V**
Type of connection only for specific motors (not selectable)**:** Permanently connected power and signal cables with bare wire ends [5)] Length: 1 m (3.28 ft)	**B**

For footnotes, see next page.

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Motor type (repeated)	Stall current [1) 3)]	Rated current [2) 3)]	Maximum current [2)]	Calculated power	Voltage Protection Module (VPM)	SINAMICS S120 Motor Module [6)] Required rated current	Booksize format Internal air cooling For further components, see SINAMICS S120 drive system
	I_0	I_N	I_{max}	$P_{el, max}$		I_N / I_{max}	
	A	A	A	kW (hp)		A	Article No.
Water cooling							
1FW6192-8.C05-4FB3	41.5	40.3	68	28.2 (37.8)	VPM 120	45/90	**6SL3120-1TE22-5AC0**
1FW6192-8.C05-8FB3	83	77.7	136	48.1 (64.5)	VPM 120	85/141	**6SL3120-1TE28-5AA3**
1FW6192-8.C10-8FB3	83	80.5	136	53.3 (71.5)	VPM 120	85/141	**6SL3120-1TE28-5AA3**
1FW6192-8.C10-2PB3	131	124	214	75.8 (101.6)	VPM 200	132/210	**6SL3120-1TE31-3AA3**
1FW6192-8.C15-8FB3	83	81.4	136	58.6 (78.6)	VPM 120	85/141	**6SL3120-1TE28-5AA3**
1FW6192-8.C15-0WB3	166	159	272	98.6 (132.2)	VPM 200	200/282	**6SL3120-1TE32-0AA4**
1FW6192-8.C20-8FB3	83	81.9	136	63.8 (85.6)	VPM 120	85/141	**6SL3120-1TE23-5AA3**
1FW6192-8.C20-0WB3	166	161	272	104 (139)	VPM 200	200/282	**6SL3120-1TE32-0AA4**
1FW6232-8.C05-6AB3	59	56.6	100	37.2 (49.9)	VPM 120	60/120	**6SL3120-1TE26-0AC0**
1FW6232-8.C05-8FB3	81.9	77.2	139	47.9 (64.2)	VPM 120	85/141	**6SL3120-1TE28-5AA3**
1FW6232-8.C10-2PB3	117	112	199	71.5 (95.9)	VPM 200	132/210	**6SL3120-1TE31-3AA3**
1FW6232-8.C10-0WB3	164	154	279	93 (125)	VPM 200	200/282	**6SL3120-1TE32-0AA4**
1FW6232-8.C15-2PB3	117	114	199	78 (105)	VPM 200	132/210	**6SL3120-1TE31-3AA3**
1FW6232-8.C15-0WB3	164	158	279	99.6 (133.6)	VPM 200	200/282	**6SL3120-1TE32-0AA4**
1FW6232-8.C20-2PB3	117	115	199	84.6 (113.4)	VPM 200	132/210	**6SL3120-1TE31-3AA3**
1FW6232-8.C20-0WB3	164	159	279	106 (142)	VPM 200	200/282	**6SL3120-1TE32-0AA4**

Motor Module: Single Motor Module	**1**

Accessories

Description	Article No.
Cooling connection adapter For SIMOTICS T-1FW6 built-in torque motors	
• 1FW6192 ... 1FW6232	**1FW6160-1BA00-0AA0**

Description	Article No.
Signal connector [5)] For SIMOTICS T-1FW6 built-in torque motors	
• M17 (socket) for 6 × 0.5 + 1 × 1.0 mm^2	**6FX2003-0SU07**
Signal cable, pre-assembled [7)] For SIMOTICS T-1FW6 built-in torque motors	**6FX8002-2SL10-....**

1) Torque and current at low speeds.
2) The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).
3) For water cooling with inlet temperature of 20 °C (68 °F) and maximum rotor flange temperature of 60 °C (140 °F).
4) The corresponding rotor can be ordered with article number 1FW6. 2-8RA.. -0AA0
5) For type of connection with bare wire ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.
6) Optimized selection for full performance of torque motors.
7) For length code, see MOTION-CONNECT connection systems.

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, High Torque – water cooling

Selection and ordering data

Maximum torque	Static torque [1) 3)]	Rated torque [2) 3)]	Speed at maximum torque, max. [2)]	Rated speed [2)]	Maximum speed	**SIMOTICS T-1FW6 built-in torque motors High Torque**	Moment of inertia rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_N	n_{max} at M_{max}	n_N	n_{max}		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	r/min	r/min	r/min	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling								
842 (621)	413 (305)	395 (291)	51.1	165	534	**1FW6154-8 ■ B05-1J■3**	10.7 (0.9)	30.5 (67.3)
	413 (305)	367 (271)	190	436	1200	**1FW6154-8 ■ B05-4F■3**		
1180 (870)	578 (426)	551 (406)	61.5	179	564	**1FW6154-8 ■ B07-2E■3**	15 (1.33)	39.7 (87.5)
	578 (426)	534 (394)	127	299	855	**1FW6154-8 ■ B07-4F■3**		
1680 (1239)	862 (636)	838 (618)	25.3	112	395	**1FW6154-8 ■ B10-3A■3**	21.4 (1.9)	51.9 (114.4)
	862 (636)	821 (606)	78.4	194	599	**1FW6154-8 ■ B10-4F■3**		
2530 (1866)	1290 (952)	1260 (929)	36.8	119	399	**1FW6154-8 ■ B15-4F■3**	32.2 (2.8)	73.3 (161.6)
	1290 (952)	1260 (929)	82.3	197	599	**1FW6154-8 ■ B15-6A■3**		

Article No. supplements

Cable outlet only for 1FW6154:	
Axial	**P**
Radially outwards	**Q**
Tangential	**N**
Type of connection:	
Permanently connected power and signal cables with bare wire ends [4)] Length: 2 m (6.56 ft)	**C**
Permanently connected power and signal cables pre-assembled with connectors Length: 0.5 m (1.64 ft)	**D**

For footnotes, see next page.

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, High Torque – water cooling

Motor type (repeated)	Stall current [1) 3)]	Rated current [2) 3)]	Maximum current [2)]	Calculated power	SINAMICS S120 Motor Module [5)]		Power cable with complete shield Motor connection via power connector [4)]		
					Required rated current	Booksize format Internal air cooling For further components, see SINAMICS S120 drive system	Power connector	Cable cross-section [6)]	Pre-assembled basic cable to the drive system
	I_0	I_N	I_{max}	$P_{el, max}$	I_N / I_{max}				
	A	A	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
Water cooling									
1FW6154-8 .B05-1J.3	16.3	15.6	45.6	27.6 (37.0)	18/54	**6SL3120-■TE21-8AD0**	1	4 × 2.5	**6FX8002-5CS16-....**
1FW6154-8 .B05-4F.3	36.6	32.2	102	39.9 (53.5)	60/120	**6SL3120-1TE26-0AC0**	1.5	4 × 10	**6FX8002-5CS64-....**
1FW6154-8 .B07-2E.3	24.2	23	67.4	38.8 (52.0)	24/72	**6SL3120-1TE22-4AD0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6154-8 .B07-4F.3	36.6	33.6	102	45.1 (60.5)	60/120	**6SL3120-1TE26-0AC0**	1.5	4 × 10	**6FX8002-5CS64-....**
1FW6154-8 .B10-3A.3	25.4	24.6	67.4	45.2 (60.6)	30/90	**6SL3120-1TE23-0AD0**	1.5	4 × 4	**6FX8002-5CS46-....**
1FW6154-8 .B10-4F.3	38.4	36.4	102	52.3 (70.1)	60/120	**6SL3120-1TE26-0AC0**	1.5	4 × 10	**6FX8002-5CS64-....**
1FW6154-8 .B15-4F.3	38.4	37.2	102	63.2 (84.8)	60/120	**6SL3120-1TE26-0AC0**	1.5	4 × 10	**6FX8002-5CS64-....**
1FW6154-8 .B15-6A.3	57.7	54.5	153	75.2 (100.8)	85/141	**6SL3120-1TE28-5AA0**	1.5	4 × 16	**6FX8002-5CS24-....**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Length code	**....**

For more information about cables, see MOTION-CONNECT connection systems

Accessories

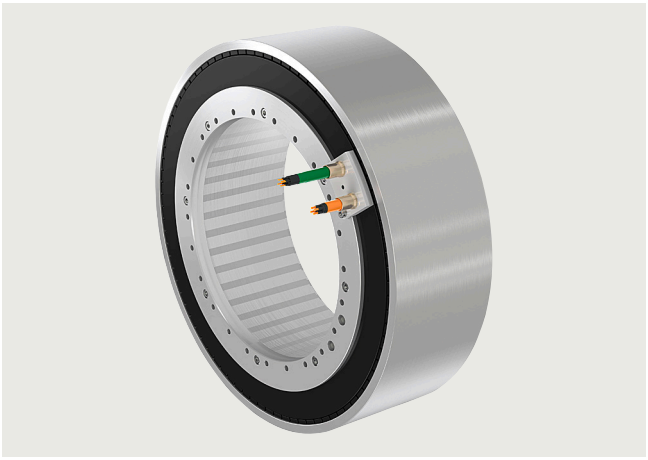
Description	Article No.
Power connector [4)] For SIMOTICS T-1FW6 built-in torque motors	
• Size 1 for 4 × 2.5 mm^2	**6FX2003-0LA00**
• Size 1.5 for 4 × 4/4 × 10/4 × 16 mm^2	**6FX2003-0LA10**
Signal cable, pre-assembled [7)] For SIMOTICS T-1FW6 built-in torque motors	**6FX8002-2SL10-....**

1) Torque and current at low speeds.
2) The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).
3) For water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).
4) For type of connection with bare wire ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.
5) Optimized selection for full performance of torque motors.
6) The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).
7) For length code, see MOTION-CONNECT connection systems.

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SIMOTICS T-1FW6 built-in torque motors with external rotor

Overview



SIMOTICS T-1FW6 external rotor built-in torque motors with integrated single-circuit water cooling

SIMOTICS T-1FW6 external rotor built-in torque motors are designed as built-in motors for use as low-speed direct drives with a high torque output. These built-in torque motors are liquid-cooled, permanent-magnet-excited, (high pole number) three-phase synchronous motors.

The motors are supplied as built-in components. When delivered, the stators and rotors are separate and are inserted into the actual machine by the machine manufacturer during installation. Additional bearings and encoders are required for a complete drive unit.

The range of types includes a frame size with 4 lengths. For installation in the machine, stators and rotors are equipped with flanges with centering surfaces and threaded holes.

Benefits

- Very high power density
- High torque, compact design, and low construction volume
- High overload capability (factor 1.7)
- High degree of availability, as there are no gearbox parts that are subject to wear in the drive train
- No elasticity in the drive train
- Water cooling to increase the rated power
- Directly flanged to the machine
- Axial cable outlet
- Optimized for the SINAMICS S120/S220 drive system

The water cooling system ensures that the stringent machine design requirements regarding thermal behavior are fulfilled by the motors.

Application

In conjunction with the SINAMICS S120/S220 drive system, SIMOTICS T-1FW6 external rotor built-in torque motors can be used for the following machine applications:

- Rotary indexing tables and subunits
- Rotary indexing machines
- Swivel axes
- Roller and cylinder drives
- Tablet presses

Design

SIMOTICS T-1FW6 external rotor built-in torque motors comprise the following components:

Stator

Version with 3-phase winding and an iron core. The winding is encapsulated for better dissipation of the heat loss. The motor is designed for liquid cooling with water as coolant.

Rotor

Reaction part of the motor.

It comprises a cylindrical steel bell which has permanent magnets around its circumference on the inside.

Cooling variants

Motors with integrated single-circuit water cooling

These motors have a ready-to-connect, integrated single-circuit cooling system; they are compact, and can therefore be simply integrated into machines.

SIMOTICS T-1FW6 built-in torque motor Type	**Cooling method**
1FW67	Integrated water cooling with one cooling circuit

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Integration

The SIMOTICS T-1FW6 external rotor built-in torque motors supplied via the SINAMICS S120/S220 drive system are designed for operation at a 600 V DC link voltage level.

The cable connection is brought out at the front face of the stator (B flange). The cables have open cable ends. The length of the power and signal cables from the motor to the drive system must not exceed 50 m.

Absolute measuring systems with DRIVE-CLiQ

Measuring systems with integrated DRIVE-CLiQ interface are available from various manufacturers. The encoders can be used as motor feedback system.

A current overview of the various manufacturers and available measuring systems is available on the internet at:

https://support.automation.siemens.com/WW/view/en/65402168

It is also possible to use absolute measuring systems with EnDat 2.1 or incremental systems with 1 V_{PP}.

Configuration

You can find the Configuration Manual for SIMOTICS T-1FW6 with external rotor for SINAMICS S120 at:

https://support.industry.siemens.com/cs/ww/en/view/109791889

The compatibility list for SINAMICS S120/S220 Booksize Modules can be found at:

https://support.industry.siemens.com/cs/ww/en/view/109806050

The SINAMICS S220 Booksize power units along with the Motor Modules are available at:

https://support.industry.siemens.com/cs/ww/en/view/109803552

Technical specifications

Product name	SIMOTICS T-1FW6 built-in torque motor with external rotor
Motor type	Synchronous motor with permanent-magnet rotor
Torque ripple	≤ 0.5 % M_0
Coolant inlet temperature, maximum	35 °C (95 °F) for 1FW6720
Pressure in cooling circuit, maximum	10 bar (static)
Thermal motor protection according to DIN 44081/DIN 44082 [1]	2 × PTC thermistor triplet with +130 °C (266 °F) response threshold (1 × reserve)
Temperature monitoring according to DIN EN 60034-11) [1]	2 × Pt1000 temperature sensor (1 × reserve)
Stator winding insulation according to DIN EN 60034-1	Temperature class 155 (F)
Type of construction	Individual components: Stator, rotor
Degree of protection according to DIN EN 60034-5	IP23 The final degree of protection (minimum degree of protection is IP54) for the installed motor is determined by the machine manufacturer. Protection against touch, foreign bodies, and water for electrical equipment is specified in accordance with IEC 60034-5.
Measuring system (Not included in scope of supply)	Select based on application and drive-specific constraints.
Connection, electrical	Permanently connected power and signal cables with bare wire ends (0.5 m (1.64 ft))
Paint finish	Without paint finish
Rating plate	1 unit enclosed separately
Certificate of suitability	cURus

More information

Some motor types can be express delivered as replacement motors in the event of plant outages and offer the advantage of a quicker spare parts supply.

Siemens provides comprehensive support when selecting the optimum motor solution. Any questions regarding SIMOTICS T-1FW6 torque motors can be emailed to:

motor.support.motioncontrol@siemens.com

[1] Evaluation via SME120/SME125 Sensor Module or TM120 Terminal Module (see SINAMICS S120 drive system).

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SIMOTICS T-1FW6 built-in torque motors with external rotor, Standard – water cooling

Selection and ordering data

Maximum torque	Static torque [1]	Rated torque [2]	Speed at maximum torque, max. [2]	Rated speed [2]	**SIMOTICS T-1FW6 built-in torque motors Standard** **Stator** [8]	Moment of inertia rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_N	n_{max} at M_{max}	n_N		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	r/min	r/min	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling							
2100 (1549)	1190 (878)	1150 (848)	66.2	110.0	**1FW6720-8 PB07-3AA3**	89.9/91.7 (8.0/8.1) [7]	69/72.2 (152/159.2) [7]
2790 (2058)	1660 (1224)	1640 (1210)	18.4	44.0	**1FW6720-8 PB10-2EA3**	108/113 (9.56/10.0) [7]	84/87 (185/192) [7]
2790 (2058)	1660 (1224)	1600 (1180)	72.9	116.0	**1FW6720-8 PB10-4FA3**	108/113 (9.56/10.0) [7]	84/87 (185/192) [7]
3210 (2368)	1910 (1409)	1850 (1365)	57.1	95.8	**1FW6720-8 PB12-4FA3**	114/120 (10.1/10.6) [7]	95/98 (209/216) [7]
3850 (2840)	2290 (1689)	2240 (1652)	43.0	76.2	**1FW6720-8 PB14-4FA3**	133/139 (11.8/12.3) [7]	111/114 (245/251) [7]

Article No. supplements

Cable outlet: Axial	**P**
Type of connection: Permanently connected power and signal cables with bare wire ends [4]	**A**

For footnotes, see next page.

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SIMOTICS T-1FW6 built-in torque motors with external rotor, Standard – water cooling

Motor type (repeated)	Stall current [1]	Rated current [2]	Maximum current [2]	Calculated power	SINAMICS S120 Motor Module [3] [5]		Power cable with complete shield Motor connection via power connector [4]		
					Required rated current	Booksize format Internal air cooling For further components, see SINAMICS S120 drive system	Power connector	Cable cross-section [6]	Pre-assembled basic cable to the drive system
	I_0	I_N	I_{max}	$P_{el, max}$	I_N / I_{max}				
	A	A	A	kW (hp)	A	Article No.	Size	mm^2	Article No.
1FW6720-8PB07-3A..	27.1	26.1	56.3	30.2 (40.5)	30/56	**6SL3120-1TE23-0AC0**	1.5	4 × 4	**6FX8002-5CS16-....**
1FW6720-8PB10-2E..	19.0	18.8	37.5	24.9 (33.4)	24/48	**6SL3120-1TE22-4AC0**	1.0	4 × 2.5	**6FX8002-5CS16-....**
1FW6720-8PB10-4F..	40.0	38.4	78.7	41.1 (55.1)	45/90	**6SL3120-1TE24-5AC0**	1.5	4 × 10	**6FX8002-5CS64-....**
1FW6720-8PB12-4F..	40.0	38.7	78.7	42.6 (57.1)	45/90	**6SL3120-1TE24-5AC0**	1.5	4 × 10	**6FX8002-5CS64-....**
1FW6720-8PB14-4F..	40.0	38.9	78.8	45.0 (60.3)	45/90	**6SL3120-1TE24-5AC0**	1.5	4 × 10	**6FX8002-5CS64-....**

Motor Module: Single Motor Module	**1**

Length code	**....**

For more information about cables, see MOTION-CONNECT connection systems

[1] Torque and current at low speeds.

[2] The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).

[3] For water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

[4] For type of connection with bare wire ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.

[5] Optimized selection for full performance of torque motors.

[6] The current-carrying capacity of the power cables complies with EN 60204-1 for installation type C, under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

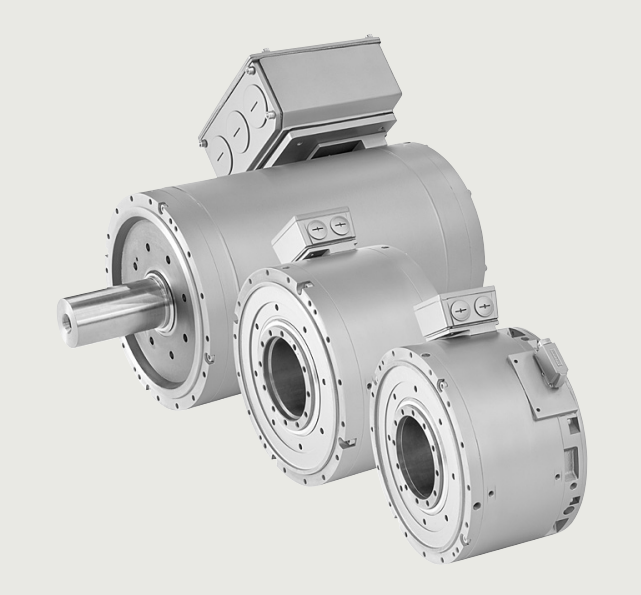
[7] With Z-option S80, a flange variant with a smaller circle of fastening holes is available.

[8] The corresponding rotor can be ordered with article number 1FW6720-8RA..-0AA0.

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SIMOTICS T-1FW3 complete torque motors

Overview



SIMOTICS T-1FW3 complete torque motors

The SIMOTICS T-1FW3 complete torque motors are water-cooled, high-pole (slow running) permanent-magnet synchronous motors. The operating characteristics are comparable to those of regular synchronous motors.

The motor spectrum comprises 3 outer diameters in various shaft lengths as well as 3 different shaft designs.

- Hollow shaft
  (not available in the High Speed version 1FW3200)
  - For feed-through of cooling and heating media, measurement cables, etc.
  - Motors with various lengths can be connected to the machine shaft
- Plug-on shaft with integrated shaft centering
  - Quick and easy installation as a result of the integrated shaft adapter with centering
  - Simple clamping element
  - Easy encoder replacement (safety-capability)
  - Longer bearing lifetime
- Solid shaft
  - Classic motor mounting
  - Simple replacement of a geared motor with a complete SIMOTICS T-1FW3 torque motor without having to change the connection at the machine
  - Easy encoder replacement (safety-capability)

The SIMOTICS T-1FW3 compact complete torque motors are flanged onto the machine using the specially-developed stator torque arms. The rotor is coupled to the machine shaft using the clamping element that will be supplied if required. This results in a perfectly rigid drive train that can be optimally controlled.

SIMOTICS T-1FW3 complete torque motors can be combined with the SINAMICS S120/S220 drive system to create a powerful, high-performance system with a high degree of functionality. The integrated encoder systems for closed-loop speed and position control can be selected depending on the application.

Benefits

- High torque, compact design, and low construction volume
- Optimized mechatronic solution
  - Highest degree of stiffness
  - High speeds possible
  - Innovative machine concepts are possible
  - Increased productivity and quality
- The right design for every application
  - Large power range
  - Hollow shaft, plug-on shaft, or solid shaft
  - Different encoder types for speed control and high-precision positioning
- Excellent performance
  - Maximum speeds up to 1800 r/min
  - Excellent radial eccentricity
  - High dynamic response, i.e. short acceleration times and rotational accuracy
- The ideal motor for energy-saving solutions
- Simple encoder replacement without requiring any readjustment for plug-on and solid shafts

Application

The SIMOTICS T-1FW3 complete torque motors were developed as direct drives. These direct drives form a compact drive unit where the mechanical motor power is transferred directly to the driven machine without any mechanical transmission elements.

- Extruder main drives
- Screw drives for injection molding machines
- Roll drive
- Winder
- Fleece folding machines
- Pull-roll drives for foil drawing machines
- Stretch, calender, casting, and chill rolls
- Dynamic positioning tasks, e.g. rotary tables, clocked conveyor belts
- Replacing hydraulic motors
- Roll drives in paper machines
- Cross-cutter drives for continuous material webs, e.g. paper, textiles, sheet metal
- Wire drawing machines

Configuration

You can find the Configuration Manual for SIMOTICS T-1FW3 for SINAMICS S120 at:

https://support.industry.siemens.com/cs/ww/en/view/60151497

Characteristic curves

Characteristics for the SIMOTICS motors are available via selectors through to the exact article number with the Siemens Product Configurator.

Access to the Siemens Product Configurator

www.siemens.com/spc

→ SIMOTICS T-1FW3 in the SPC

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Technical specifications

Product name	SIMOTICS T-1FW3 complete torque motor
Motor type	Permanent-magnet synchronous motor
Magnet material	Rare-earth magnet material
Stator winding insulation according to EN 60034-1 (IEC 60034-1)	Temperature class 155 (F) for a winding temperature rise of ΔT = 100 K at a coolant (water) inlet temperature of 30 °C (86 °F)
Cooling according to EN 60034-6 (IEC 60034-6)	Water cooling
Thermal motor protection according to EN 60034-11 (IEC 60034-11)	Pt1000 thermistor in the stator winding
Type of construction according to EN 60034-7 (IEC 60034-7)	
• 1FW315/1FW320	IM B14, IM V18, IM V19
• 1FW328	IM B35, IM B34, IM B3, IM B5, IM V1, IM V3, IM V15, IM V35
Degree of protection according to EN 60034-5 (IEC 60034-5)	
• Hollow shaft	IP54
• Plug-on shaft	IP55 (IP54 for 1FW328)
• Solid shaft	IP55 (IP54 for 1FW328)
Shaft end according to DIN 748-3 (IEC 60072-1)	Hollow shaft, plug-on shaft, solid shaft
Shaft and flange accuracy according to DIN 42955 (IEC 60072-1) [1]	Tolerance N (at operating temperature)
Vibration severity according to EN 60034-14 (IEC 60034-14)	Grade A (is maintained up to the rated speed)
Sound pressure level L_{pA} (1 m) according to EN ISO 1680, max.	73 dB at 4 kHz rated pulse frequency at the rated operating point
Shock load	Maximum permissible radial acceleration 50 m/s^2 (164 ft/s^2) (not in operating state)
Bearing	Roller bearing with permanent grease lubrication (Bearing replacement interval with regreasing system up to L_{h10} = 60000 h)
Connection	Terminal box for power cable Connector for encoder signals and temperature sensor
Paint finish	Anthracite RAL 7016
2nd rating plate	Enclosed separately
Certificate of suitability	cURus

Dimensional drawings

Dimensional drawings for the SIMOTICS motors are available via selectors through to the exact article number with the Siemens Product Configurator.

Access to the Siemens Product Configurator

www.siemens.com/spc

→ SIMOTICS T-1FW3 in the SPC

More information

A list of motors with and without a DRIVE-CLiQ interface, as well as individual encoders and measuring systems used in conjunction with Safety Integrated, is available on the internet at:

https://support.industry.siemens.com/cs/ww/en/view/33512621

[1] Radial eccentricity of the shaft end, concentricity of the centering ring, and axial eccentricity of the mounting flange to the axis of the shaft end.

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SIMOTICS T-1FW3 complete torque motors – water cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	**SIMOTICS T-1FW3 complete torque motors Water cooling**
n_N	SH	P_N at ΔT=100 K	M_N at ΔT=100 K	I_N at ΔT=100 K	U_N	f_N	$n_{max, Inv}$	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC Active Line Module									
150	200	4.7 (6.3)	300 (221)	13	373	35	380	1000	**1FW3201-1■E■ 2-■■■0**
		7.9 (10.6)	500 (369)	21	350	35	380	1000	**1FW3202-1■E■ 2-■■■0**
		11.8 (15.8)	750 (553)	30	357	35	370	1000	**1FW3203-1■E■ 2-■■■0**
		15.7 (21.1)	1000 (738)	40	351	35	360	1000	**1FW3204-1■E■ 2-■■■0**
		23.6 (31.6)	1500 (1106)	65	331	35	390	1000	**1FW3206-1■E■ 2-■■■0**
		31.4 (42.1)	2000 (1475)	84	337	35	380	1000	**1FW3208-1■E■ 2-■■■0**
	280	39.0 (52.3)	2500 (1844)	82	390	25	290	1000	**1FW3281-2■E■■-■■■0**
		55.0 (73.8)	3500 (2582)	115	388	25	290	1000	**1FW3283-2■E■■-■■■0**
		79.0 (105.9)	5000 (3688)	160	391	25	290	1000	**1FW3285-2■E■■-■■■0**
		110.0 (147.5)	7000 (5163)	230	382	25	290	1000	**1FW3287-2■E■■-■■■0**
250	280	64.0 (85.8)	2450 (1807)	126	396	41.7	460	1000	**1FW3281-2■G■■-■■■0**
		90.0 (120.7)	3450 (2545)	176	397	41.7	460	1000	**1FW3283-2■G■■-■■■0**
		130 (174)	4950 (3651)	244	408	41.7	440	1000	**1FW3285-2■G■■-■■■0**
		181 (243)	6900 (5089)	352	393	41.7	460	1000	**1FW3287-2■G■■-■■■0**

Shaft design:	
Hollow shaft	**A**
Plug-on shaft	**S**
Solid shaft without feather key	**M**
Solid shaft with feather key (half-key balanced)	**H**

For more information on dependencies and other options, see Article No. supplements for shaft design
> Hollow shaft > Plug-on shaft > Solid shaft

Further rated speeds on request.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Effi-ciency [3]	Moment of inertia	Weight, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [4]	Internal air cooling For further components, see SINAMICS S120 drive system
	M_0 at ΔT=100 K	I_0 at ΔT=100 K	η	J	m		I_N	
	Nm (lb_f-ft)	A	%	kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
1FW3201-1.E.2-....	315 (232)	13	91	0.22 (1.95)	127 (280)	gk230	18	**6SL3120-1TE21-8AD0**
1FW3202-1.E.2-....	525 (387)	22	0.93	0.36 (3.19)	156 (344)	gk230	24	**6SL3120-1TE22-4AD0**
1FW3203-1.E.2-....	790 (583)	32	94	0.49 (4.34)	182 (401)	gk230	45	**6SL3120-1TE24-5AC0**
1FW3204-1.E.2-....	1050 (774)	42	94	0.70 (6.20)	225 (496)	gk230	45	**6SL3120-1TE24-5AC0**
1FW3206-1.E.2-....	1575 (1162)	68	94	0.97 (8.59)	280 (617)	gk420	85	**6SL3120-1TE28-5AA3**
1FW3208-1.E.2-....	2100 (1549)	88	94	1.31 (11.59)	350 (772)	gk420	85	**6SL3120-1TE28-5AA3**
1FW3281-2.E.3-....	2550 (1881)	84	94	3.78 (33.46)	600 (1323)	1XB7700	85	**6SL3120-1TE28-5AA3**
1FW3283-2.E.3-....	3550 (2618)	116	95	4.64 (41.07)	690 (1521)	1XB7700	132	**6SL3120-1TE31-3AA3**
1FW3285-2.E.3-....	5100 (3762)	163	95	5.98 (52.93)	860 (1896)	1XB7700	200	**6SL3120-1TE32-0AA4**
1FW3287-2.E.3-....	7150 (5274)	234	96	7.81 (69.13)	1030 (2271)	1XB7700	260	**6SL3320-1TE32-6AA3**
1FW3281-2.G.3-....	2550 (1881)	131	95	3.78 (33.46)	600 (1323)	1XB7700	132	**6SL3120-1TE31-3AA3**
1FW3283-2.G.3-....	3550 (2618)	181	96	4.64 (41.07)	690 (1521)	1XB7700	200	**6SL3120-1TE32-0AA4**
1FW3285-2.G.3-....	5100 (3762)	251	96	5.98 (52.93)	860 (1896)	1XB7700	260	**6SL3320-1TE32-6AA3**
1FW3287-2.G.3-....	7150 (5274)	365	96	7.81 (69.13)	1030 (2271)	1XB7700	380	**6SL3320-1TE33-8AA3**

Format:	
Booksize	**1**
Chassis	**3**
Motor Module:	
Single Motor Module	**1**

8
4

[1] Maximum permissible operating speed based on the voltage induced in the motor and the voltage strength of the converter (without protective circuit).
[2] Maximum speed that must not be exceeded. Certain constraints may apply, see article number supplements.
[3] Optimum efficiency in continuous duty.
[4] The rated pulse frequencies must be taken into account. The rated motor data is valid for 4 kHz or 2 kHz.

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SIMOTICS T-1FW3 complete torque motors – water cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	**SIMOTICS T-1FW3 complete torque motors Water cooling**
n_N	SH	P_N at ΔT=100 K	M_N at ΔT=100 K	I_N at ΔT=100 K	U_N	f_N	$n_{max, Inv}$	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC Active Line Module									
300	150	3.1 (4.2)	100 (73.8)	8	403	35	630	1700	**1FW3150-1■H■ 2-■■■0**
		6.3 (8.4)	200 (148)	14	404	35	630	1700	**1FW3152-1■H■ 2-■■■0**
		9.4 (12.6)	300 (221)	20.5	405	35	610	1700	**1FW3154-1■H■ 2-■■■0**
		12.6 (16.9)	400 (295)	28	395	35	630	1700	**1FW3155-1■H■ 2-■■■0**
		15.7 (21.1)	500 (369)	34	403	35	610	1700	**1FW3156-1■H■ 2-■■■0**
	200	9.4 (12.6)	300 (221)	23	377	70	680	1000	**1FW3201-1■H■ 2-■■■0**
		15.7 (21.1)	500 (369)	37	365	70	670	1000	**1FW3202-1■H■ 2-■■■0**
		23.6 (31.6)	750 (553)	59	343	70	710	1000	**1FW3203-1■H■ 2-■■■0**
		31.4 (42.1)	1000 (738)	74	355	70	670	1000	**1FW3204-1■H■ 2-■■■0**
		47.1 (63.2)	1500 (1106)	118	351	70	700	1000	**1FW3206-1■H■ 2-■■■0**
		62.8 (84.2)	2000 (1475)	153	346	70	690	1000	**1FW3208-1■H■ 2-■■■0**
400	280	98.0 (131.4)	2350 (1733)	188	389	66.7	720	1000	**1FW3281-3■J■■-■■■0**
		138.0 (185.1)	3300 (2434)	275	373	66.7	750	1000	**1FW3283-3■J■■-■■■0**
		197.0 (264.2)	4700 (3467)	376	386	66.7	720	1000	**1FW3285-3■J■■-■■■0**
		276.0 (370.1)	6600 (4868)	504	405	66.7	690	1000	**1FW3287-3■J■■-■■■0**

Shaft design:	
Hollow shaft	**A**
Plug-on shaft	**S**
Solid shaft without feather key	**M**
Solid shaft with feather key (half-key balanced)	**H**

For more information on dependencies and other options, see Article No. supplements for shaft design
> Hollow shaft > Plug-on shaft > Solid shaft

Further rated speeds on request.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Effi-ciency [3]	Moment of inertia	Weight, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [4]	Internal air cooling For further components, see SINAMICS S120 drive system
	M_0 at ΔT=100 K	I_0 at ΔT=100 K	η	J	m		I_N	
	Nm (lb_f-ft)	A	%	kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
1FW3150-1.H.2-....	105 (77.4)	7.3	89	0.12 (1.06)	87 (192)	gk230	9	**6SL3120-1TE21-0AD0**
1FW3152-1.H.2-....	210 (155)	15	92	0.16 (1.42)	108 (238)	gk230	18	**6SL3120-1TE21-8AD0**
1FW3154-1.H.2-....	315 (232)	21.5	93	0.20 (1.77)	129 (284)	gk230	24	**6SL3120-1TE22-4AD0**
1FW3155-1.H.2-....	420 (310)	29	94	0.24 (2.12)	150 (331)	gk230	30	**6SL3120-1TE23-0AD0**
1FW3156-1.H.2-....	525 (387)	35	94	0.28 (2.48)	171 (377)	gk230	45	**6SL3120-1TE24-5AA0**
1FW3201-1.H.2-....	315 (232)	24	92	0.22 (1.95)	127 (280)	gk230	24	**6SL3120-1TE22-4AD0**
1FW3202-1.H.2-....	525 (387)	39	94	0.36 (3.19)	156 (344)	gk230	45	**6SL3120-1TE24-5AA0**
1FW3203-1.H.2-....	790 (583)	62	95	0.49 (4.34)	182 (401)	gk420	60	**6SL3120-1TE26-0AA3**
1FW3204-1.H.2-....	1050 (774)	77	95	0.70 (6.20)	225 (496)	gk420	85	**6SL3120-1TE28-5AA3**
1FW3206-1.H.2-....	1575 (1162)	121	95	0.97 (8.59)	280 (617)	gk630	132	**6SL3120-1TE31-3AA3**
1FW3208-1.H.2-....	2100 (1549)	160	94	1.31 (11.59)	350 (772)	gk630	200	**6SL3120-1TE32-0AA4**
1FW3281-3.J.3-....	2500 (1844)	200	96	3.78 (33.46)	600 (1323)	1XB7700	200	**6SL3120-1TE32-0AA4**
1FW3283-3.J.3-....	3500 (2582)	292	96	4.64 (41.07)	690 (1521)	1XB7700	310	**6SL3320-1TE33-1AA3**
1FW3285-3.J.3-....	5000 (3688)	400	96	5.98 (52.93)	860 (1896)	1XB7700	380	**6SL3320-1TE33-8AA3**
1FW3287-3.J.3-....	7000 (5163)	534	97	7.81 (69.13)	1030 (2271)	1XB7712	618 [5]	**6SL3320-1TE37-5AA3**

Format:	
Booksize	**1**
Chassis	**3**
Motor Module:	
Single Motor Module	**1**

8
4

[1] Maximum permissible operating speed based on the voltage induced in the motor and the voltage strength of the converter (without protective circuit).
[2] Maximum speed that must not be exceeded. Certain constraints may apply, see article number supplements.
[3] Optimum efficiency in continuous duty.
[4] The rated pulse frequencies must be taken into account. The rated motor data is valid for 4 kHz or 2 kHz.
[5] The rated output current of the Motor Module was calculated with a derating factor based on the rated pulse frequency.

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SIMOTICS T-1FW3 complete torque motors – water cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	SIMOTICS T-1FW3 complete torque motors Water cooling
n_N	SH	P_N at ΔT=100 K	M_N at ΔT=100 K	I_N at ΔT=100 K	U_N	f_N	$n_{max, Inv}$	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC Active Line Module									
500	150	5.2 (7.0)	100 (73.8)	12	413	58.3	960	1700	**1FW3150-1■L■ 2-■■■0**
		10.5 (14.1)	200 (148)	22	415	58.3	960	1700	**1FW3152-1■L■ 2-■■■0**
		15.7 (21.1)	300 (221)	32	415	58.3	950	1700	**1FW3154-1■L■ 2-■■■0**
		20.9 (28.0)	400 (295)	43	412	58.3	960	1700	**1FW3155-1■L■ 2-■■■0**
		26.2 (35.1)	500 (369)	53	415	58.3	950	1700	**1FW3156-1■L■ 2-■■■0**
	200	15.7 (21.1)	300 (221)	37	386	116.7	1110	1000	**1FW3201-1■L■ 2-■■■0**
		26.2 (35.1)	500 (369)	59	376	116.7	1070	1000	**1FW3202-1■L■ 2-■■■0**
		39.3 (52.7)	750 (553)	92	366	116.7	1110	1000	**1FW3203-1■L■ 2-■■■0**
		52.3 (70.1)	1000 (738)	118	371	116.7	1060	1000	**1FW3204-1■L■ 2-■■■0**
		73.3 (98.3)	1400 (1033)	169	353	116.7	1090	1000	**1FW3206-1■L■ 2-■■■0**
		96.8 (129.8)	1850 (1365)	226	368	116.7	1100	1000	**1FW3208-1■L■ 2-■■■0**
600	280	138.0 (185.1)	2200 (1623)	256	387	100.0	1050	1000	**1FW3281-3■M■■-■■■0**
		195.0 (261.5)	3100 (2287)	357	394	100.0	1030	1000	**1FW3283-3■M■■-■■■0**
		276.0 (370.1)	4400 (3245)	469	415	100.0	960	1000	**1FW3285-3■M■■-■■■0**
		380.0 (509.6)	6050 (4462)	696	389	100.0	1030	1000	**1FW3287-3■M■■-■■■0**

Shaft design:

Hollow shaft	**A**
Plug-on shaft	**S**
Solid shaft without feather key	**M**
Solid shaft with feather key (half-key balanced)	**H**

For more information on dependencies and other options, see Article No. supplements for shaft design
> Hollow shaft > Plug-on shaft > Solid shaft

Further rated speeds on request.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Effi-ciency [3]	Moment of inertia	Weight, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [4]	Internal air cooling For further components, see SINAMICS S120 drive system
	M_0 at ΔT=100 K	I_0 at ΔT=100 K	η	J	m		I_N	
	Nm (lb_f-ft)	A	%	kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
1FW3150-1.L.2-....	105 (77.4)	11.5	90	0.12 (1.06)	87 (192)	gk230	18	**6SL3120-1TE21-8AD0**
1FW3152-1.L.2-....	210 (155)	22.5	92	0.16 (1.42)	108 (238)	gk230	24	**6SL3120-1TE22-4AD0**
1FW3154-1.L.2-....	315 (232)	33	93	0.20 (1.77)	129 (284)	gk230	45	**6SL3120-1TE24-5AC0**
1FW3155-1.L.2-....	420 (310)	45	94	0.24 (2.12)	150 (331)	gk230	45	**6SL3120-1TE24-5AC0**
1FW3156-1.L.2-....	525 (387)	55	94	0.28 (2.48)	171 (377)	gk420	60	**6SL3120-1TE26-0AC0**
1FW3201-1.L.2-....	315 (232)	38	92	0.22 (1.95)	127 (280)	gk230	45	**6SL3120-1TE24-5AC0**
1FW3202-1.L.2-....	525 (387)	62	94	0.36 (3.19)	156 (344)	gk420	60	**6SL3120-1TE26-0AC0**
1FW3203-1.L.2-....	790 (583)	100	95	0.49 (4.34)	182 (401)	gk420	132	**6SL3120-1TE31-3AA3**
1FW3204-1.L.2-....	1050 (774)	129	95	0.70 (6.20)	225 (496)	gk630	132	**6SL3120-1TE31-3AA3**
1FW3206-1.L.2-....	1575 (1162)	189	95	0.97 (8.59)	280 (617)	gk630	200	**6SL3120-1TE32-0AA4**
1FW3208-1.L.2-....	2100 (1549)	255	94	1.31 (11.59)	350 (772)	gk630	260	**6SL3320-1TE32-6AA3**
1FW3281-3.M.3-....	2500 (1844)	291	96	3.78 (33.46)	600 (1323)	1XB7700	310	**6SL3320-1TE33-1AA3**
1FW3283-3.M.3-....	3500 (2582)	402	96	4.64 (41.07)	690 (1521)	1XB7700	380	**6SL3320-1TE33-8AA3**
1FW3285-3.M.3-....	5000 (3688)	532	97	5.98 (52.93)	860 (1896)	1XB7712	490	**6SL3320-1TE35-0AA3**
1FW3287-3.M.3-....	6850 (5053)	787	97	7.81 (69.13)	1030 (2271)	1XB7712	734 [5]	**6SL3320-1TE38-4AA3**

Format:	
Booksize	**1**
Chassis	**3**
Motor Module:	
Single Motor Module	**1**

8
4

[1] Maximum permissible operating speed based on the voltage induced in the motor and the voltage strength of the converter (without protective circuit).
[2] Maximum speed that must not be exceeded. Certain constraints may apply, see article number supplements.
[3] Optimum efficiency in continuous duty.
[4] The rated pulse frequencies must be taken into account. The rated motor data is valid for 4 kHz or 2 kHz.
[5] The rated output current of the Motor Module was calculated with a derating factor based on the rated pulse frequency.

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SIMOTICS T-1FW3 complete torque motors – water cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	**SIMOTICS T-1FW3 complete torque motors Water cooling**
n_N	SH	P_N at ΔT=100 K	M_N at ΔT=100 K	I_N at ΔT=100 K	U_N	f_N	$n_{max, Inv}$	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC Active Line Module									
750	150	7.9 (10.6)	100 (73.8)	18	410	87.5	1470	1700	**1FW3150-1■P■2-■■■0**
		15.7 (21.1)	200 (148)	32.5	415	87.5	1450	1700	**1FW3152-1■P■2-■■■0**
		23.6 (31.6)	300 (221)	47.5	412	87.5	1420	1700	**1FW3154-1■P■2-■■■0**
		31.4 (42.1)	400 (295)	64	401	87.5	1450	1700	**1FW3155-1■P■2-■■■0**
		39.3 (52.7)	500 (369)	76	415	87.5	1380	1700	**1FW3156-1■P■2-■■■0**

Shaft design:	
Hollow shaft	**A**
Plug-on shaft	**S**
Solid shaft without feather key	**M**
Solid shaft with feather key (half-key balanced)	**H**

For more information on dependencies and other options, see Article No. supplements for shaft design
> Hollow shaft > Plug-on shaft > Solid shaft

Further rated speeds on request.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Effi-ciency [3]	Moment of inertia	Weight, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [4]	Internal air cooling For further components, see SINAMICS S120 drive system
	M_0 at ΔT=100 K	I_0 at ΔT=100 K	η	J	m		I_N	
	Nm (lb_f-ft)	A	%	kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
1FW3150-1.P.2-....	105 (77.4)	17.5	90	0.12 (1.06)	87 (192)	gk230	18	**6SL3■20-1TE21-8AD0**
1FW3152-1.P.2-....	210 (155)	33.5	93	0.16 (1.42)	108 (238)	gk230	45	**6SL3■20-1TE24-5AC0**
1FW3154-1.P.2-....	315 (232)	49	93	0.20 (1.77)	129 (284)	gk230	60	**6SL3■20-1TE26-0AC0**
1FW3155-1.P.2-....	420 (310)	67	94	0.24 (2.12)	150 (331)	gk420	85	**6SL3■20-1TE28-5AA3**
1FW3156-1.P.2-....	525 (387)	80	94	0.28 (2.48)	171 (377)	gk420	85	**6SL3■20-1TE28-5AA3**

Format:	
Booksize	**1**
Chassis	**3**
Motor Module:	
Single Motor Module	**1**

8
4

[1] Maximum permissible operating speed based on the voltage induced in the motor and the voltage strength of the converter (without protective circuit).
[2] Maximum speed that must not be exceeded. Certain constraints may apply, see article number supplements.
[3] Optimum efficiency in continuous duty.
[4] The rated pulse frequencies must be taken into account. The rated motor data is valid for 4 kHz or 2 kHz.

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SIMOTICS T-1FW3 complete torque motors – water cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed, max. [1]	Speed, max. [2]	**SIMOTICS T-1FW3 complete torque motors Water cooling**
n_N	SH	P_N at ΔT=100 K	M_N at ΔT=100 K	I_N at ΔT=100 K	U_N	f_N	$n_{max, Inv}$	n_{max}	
r/min		kW (hp)	Nm (lb_f-ft)	A	V	Hz	r/min	r/min	Article No.
Line voltage 400 V 3 AC Active Line Module									
800	200	20.5 (27.5)	245 (181)	37	350	106.7	1320	1800	**1FW3201-3■P■2-■■■0**
		39.5 (53.0)	470 (347)	69	358	106.7	1290	1800	**1FW3202-3■P■2-■■■0**
		57 (76.4)	680 (502)	96	368	106.7	1250	1800	**1FW3203-3■P■2-■■■0**
		78 (105)	930 (686)	137	353	106.7	1310	1800	**1FW3204-3■P■2-■■■0**
		114 (153)	1360 (1003)	192	368	106.7	1260	1800	**1FW3206-3■P■2-■■■0**
		159 (213)	1900 (1401)	270	365	106.7	1270	1800	**1FW3208-3■P■2-■■■0**
1200	200	29 (38.9)	230 (170)	50	367	160	1890	1800	**1FW3201-3■S■2-■■■0**
		55 (73.8)	440 (325)	92	376	160	1850	1800	**1FW3202-3■S■2-■■■0**
		79 (106)	630 (465)	131	377	160	1840	1800	**1FW3203-3■S■2-■■■0**
		108 (145)	860 (634)	191	353	160	1970	1800	**1FW3204-3■S■2-■■■0**
		152 (204)	1210 (892)	270	351	160	1980	1800	**1FW3206-3■S■2-■■■0**
		215 (288)	1700 (1254)	385	342	160	2050	1800	**1FW3208-3■S■2-■■■0**

Shaft design:	
Hollow shaft	**A**
Plug-on shaft	**S**
Solid shaft without feather key	**M**
Solid shaft with feather key (half-key balanced)	**H**

For more information on dependencies and other options, see Article No. supplements for shaft design
> Hollow shaft > Plug-on shaft > Solid shaft

Further rated speeds on request.

For footnotes, see next page.

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Motor type (repeated)	Static torque	Stall current	Effi-ciency [3]	Moment of inertia	Weight, approx.	Terminal box	SINAMICS S120 Motor Module	
							Rated output current [4]	Internal air cooling For further components, see SINAMICS S120 drive system
	M_0 at ΔT=100 K	I_0 at ΔT=100 K	η	J	m		I_N	
	Nm (lb_f-ft)	A	%	kgm^2 (lb_f-in-s^2)	kg (lb)	Type	A	Article No.
1FW3201-3.P..	260 (192)	38	88.7	0.27 (2.39)	159 (351)	gk420	45	**6SL3120-1TE24-5AC0**
1FW3202-3.P..	500 (369)	72	91	0.40 (3.54)	188 (415)	gk420	85	**6SL3120-1TE28-5AA3**
1FW3203-3.P..	730 (538)	102	92.2	0.52 (4.60)	215 (474)	gk420	132	**6SL3120-1TE31-3AA3**
1FW3204-3.P..	1000 (738)	145	92.8	0.69 (6.11)	259 (571)	gk630	200	**6SL3120-1TE32-0AA4**
1FW3206-3.P..	1500 (1106)	210	93.3	0.94 (8.32)	342 (754)	1XB7700	200	**6SL3120-1TE32-0AA4**
1FW3208-3.P..	2100 (1549)	295	93.7	1.24 (10.98)	412 (908)	1XB7700	310	**6SL3320-1TE33-1AA3**
1FW3201-3.S..	260 (192)	54	90.1	0.27 (2.39)	159 (351)	gk420	60	**6SL3120-1TE26-0AC0**
1FW3202-3.S..	500 (369)	102	92.2	0.40 (3.54)	188 (415)	gk420	132	**6SL3120-1TE31-3AA3**
1FW3203-3.S..	730 (538)	149	93.5	0.52 (4.60)	215 (474)	gk630	132	**6SL3120-1TE31-3AA3**
1FW3204-3.S..	1000 (738)	220	94	0.69 (6.11)	259 (571)	gk630	200	**6SL3120-1TE32-0AA4**
1FW3206-3.S..	1500 (1106)	330	94.3	0.94 (8.32)	342 (754)	1XB7700	310	**6SL3320-1TE33-1AA3**
1FW3208-3.S..	2100 (1549)	470	94.6	1.24 (10.98)	412 (908)	1XB7700	490	**6SL3320-1TE35-0AA3**

Format:	
Booksize	**1**
Chassis	**3**
Motor Module:	
Single Motor Module	**1**

8
4

[1] Maximum permissible operating speed based on the voltage induced in the motor and the voltage strength of the converter (without protective circuit).
[2] Maximum speed that must not be exceeded.
[3] Optimum efficiency in continuous duty.
[4] The rated pulse frequencies must be taken into account. The rated motor data is valid for 4 kHz or 2 kHz.

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Selection and ordering data

Article No. supplements for shaft design: Hollow shaft

Data position of the Article No.	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	-	Z
Shaft height 150	**1**	**F**	**W**	**3**	**1**	**5**	**.**	**–**	**1**	■	**.**	■	**2**	**–**	■	■	**A**	**0**	**–**	**Z**
Shaft height 200	**1**	**F**	**W**	**3**	**2**	**0**	**.**	**–**	**1**	■	**.**	■	**2**	**–**	■	■	**A**	**0**	**–**	**Z**
Shaft height 280	**1**	**F**	**W**	**3**	**2**	**8**	**.**	**–**	**.**	■	**.**	■	**3**	**–**	■	■	**A**	**0**	**–**	**Z**
Length [1]							**.**													
Standard version shaft height 150/shaft height 200									**1**											
Standard version shaft height 280									**2**											
High Speed version, shaft height 280									**3**											
Encoder systems for motors without DRIVE-CLiQ interface					**Mounting**											**D**				
Without encoder					–					**W**		**6**								
IC2048S/R encoder					Via toothed belt					**A**		**7**								
AM2048S/R encoder					Via toothed belt					**E**		**7**								
Multi-pole resolver					Via toothed belt					**S**		**7**								
Encoder systems for motors with DRIVE-CLiQ interface					**Mounting**											**A**				
IC22DQ encoder					Via toothed belt					**D**		**7**								
AM22DQ encoder					Via toothed belt					**F**		**7**								
R15DQ resolver					Via toothed belt					**U**		**7**								
Rated speeds at 400 V 3 AC (winding design)																				
150 r/min for Standard version, shaft height 200/shaft height 280											**E**									
250 r/min for Standard version, shaft height 280											**G**									
300 r/min for Standard version shaft height 150/shaft height 200											**H**									
400 r/min for High Speed version, shaft height 280											**J**									
500 r/min for Standard version, shaft height 150/shaft height 200											**L**									
600 r/min for High Speed version, shaft height 280											**M**									
750 r/min for Standard version, shaft height 150											**P**									
Type of construction																				
IM B14 for shaft height 150/shaft height 200 (flange mounting without feet, with threaded hole)													**2**							
IM B35 for shaft height 280 (hollow shaft design (flange and foot mounting)													**3**							
Power connection (when viewing DE)	**Cable outlet**																			
Terminal box top	Transverse right														**5**					
Terminal box top	Transverse left														**6**					
Terminal box top	NDE														**7**					
Terminal box top	DE														**8**					
Shaft version																				
Hollow shaft																	**A**			
Special version (order codes required for options)																			**–**	**Z**

[1] Not selectable. Determined by the choice of rated power.

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Selection and ordering data

Article No. supplements for shaft design: Plug-on shaft

Data position of the Article No.	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	-	Z
Shaft height 150	**1**	**F**	**W**	**3**	**1**	**5**	**.**	**–**	**1**	■	**.**	**6**	**2**	**–**	■	**A**	**S**	**0**	**–**	**Z**
Shaft height 200	**1**	**F**	**W**	**3**	**2**	**0**	**.**	**–**	**.**	■	**.**	**6**	**2**	**–**	■	**A**	**S**	**0**	**–**	**Z**
Shaft height 280	**1**	**F**	**W**	**3**	**2**	**8**	**.**	**–**	**1**	■	**.**	**6**	**2**	**–**	■	**A**	**S**	**0**	**–**	**Z**
Length [1]							**.**													
Standard version shaft height 150/shaft height 200									**1**											
Standard version shaft height 280									**2**											
High Speed version shaft height 200/shaft height 280									**3**											
Encoder systems for motors without DRIVE-CLiQ interface					**Mounting**															
AM2048S/R encoder					Coaxial					**E**		**6**								
Encoder systems for motors with DRIVE-CLiQ interface					**Mounting**															
AS24DQI encoder					Coaxial					**B**		**6**								
AM24DQI encoder					Coaxial					**C**		**6**								
Rated speeds at 400 V 3 AC (winding design)																				
150 r/min for Standard version, shaft height 200/shaft height 280											**E**									
250 r/min for Standard version, shaft height 280											**G**									
300 r/min for Standard version shaft height 150/shaft height 200											**H**									
400 r/min for High Speed version, shaft height 280											**J**									
500 r/min for Standard version, shaft height 150/shaft height 200											**L**									
600 r/min for High Speed version, shaft height 280											**M**									
750 r/min for Standard version, shaft height 150											**P**									
800 r/min for High Speed version, shaft height 200											**P**									
1200 r/min for High Speed version, shaft height 200											**S**									
Type of construction																				
Plug-on mounting performed by the customer for shaft height 150/shaft height 200 (not according to EN 60034-7 (IEC 60034-7))													**2**							
Plug-on mounting performed by the customer for shaft height 280 (not according to EN 60034-7 (IEC 60034-7))													**8**							
Power connection (when viewing DE)	**Cable outlet**																			
Terminal box top	Transverse right														**5**					
Terminal box top	Transverse left														**6**					
Terminal box top	NDE														**7**					
Terminal box top	DE														**8**					
Shaft version																				
Plug-on shaft																	**S**			
Special version (order codes required for options)																			**–**	**Z**

[1] Not selectable. Determined by the choice of rated power.

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Selection and ordering data

Article No. supplements for shaft design: Solid shaft

Data position of the Article No.	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	-	Z
Shaft height 150	**1**	**F**	**W**	**3**	**1**	**5**	**.**	**–**	**.**	■	**.**	**6**	**2**	**–**	■	**A**	■	**0**	**–**	**Z**
Shaft height 200	**1**	**F**	**W**	**3**	**2**	**0**	**.**	**–**	**.**	■	**.**	**6**	**2**	**–**	■	**A**	■	**0**	**–**	**Z**
Shaft height 280	**1**	**F**	**W**	**3**	**2**	**8**	**.**	**–**	**.**	■	**.**	**6**	■	**–**	■	**A**	■	**0**	**–**	**Z**
Length [1]							**.**													
Standard version shaft height 150/shaft height 200									**1**											
Standard version shaft height 280									**2**											
High Speed version shaft height 200/shaft height 280									**3**											
Encoder systems for motors without DRIVE-CLiQ interface					**Mounting**															
AM2048S/R encoder					Coaxial					**E**		**6**								
Encoder systems for motors with DRIVE-CLiQ interface					**Mounting**															
AS24DQI encoder					Coaxial					**B**		**6**								
AM24DQI encoder					Coaxial					**C**		**6**								
Rated speeds at 400 V 3 AC (winding design)																				
150 r/min for Standard version, shaft height 200/shaft height 280											**E**									
250 r/min for Standard version, shaft height 280											**G**									
300 r/min for Standard version shaft height 150/shaft height 200											**H**									
400 r/min for High Speed version, shaft height 280											**J**									
500 r/min for Standard version, shaft height 150/shaft height 200											**L**									
600 r/min for High Speed version, shaft height 280											**M**									
750 r/min for Standard version, shaft height 150											**P**									
1050 r/min for High Speed version, shaft height 200											**P**									
1200 r/min for High Speed version, shaft height 200											**S**									
Type of construction																				
IM B14 for shaft height 150/shaft height 200 (flange mounting without feet, with threaded hole)													**2**							
IM B3 for shaft height 280 (foot mounting)													**6**							
IM B34 for shaft height 280 (flange mounting with feet, with threaded hole)													**4**							
Power connection (when viewing DE)	**Cable outlet**																			
Terminal box top	Transverse right														**5**					
Terminal box top	Transverse left														**6**					
Terminal box top	NDE														**7**					
Terminal box top	DE														**8**					
Shaft version																				
Solid shaft without feather key																	**M**			
Solid shaft with feather key (half-key balanced)																	**H**			
Special version (order codes required for options)																			**–**	**Z**

[1] Not selectable. Determined by the choice of rated power.

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Options

Order code	Description
A11	Motor protection using PTC thermistor (3 × PTC thermistor)
B02	Acceptance test certificate acc. to EN 10 204-3.1
G50	Sensor bore M8; DE and NDE
K40	Regreasing device
L03	Heavy-duty design for increased shock load
M02	Terminal box GK 603 with removable front plate
P01	Cable entry plate with 3 × M63 × 1.5 for terminal box 1XB7-700
P04	Cable entry plate with 4 × M63 × 1.5 for terminal box 1XB7-712
Q95	Special paint finish ALEXIT in color (X01 to X91)
T20	Shaft cover at NDE for hollow shaft
V07	Special grease lubrication for low speeds
X01	Paint finish jet black, matt RAL 9005
X02	Paint finish cream RAL 9001
X03	Paint finish reseda green RAL 6011
X04	Paint finish pebble gray RAL 7032
X05	Paint finish sky blue RAL 5015
X06	Paint finish light ivory RAL 1015
X08	Paint finish white aluminum RAL 9006
X14	Paint finish traffic blue RAL 5017
X15	Paint finish pure white RAL 9010
X16	Paint finish yellow green RAL 6018
X22	Paint finish gray white RAL 9002
X53	Paint finish light gray RAL 7035

-Z must be added to the article number to order a motor with options.

Example:
Article No. with Pt1000
1FW3150-1AH72-5DA0**-Z**
A11+**X05**

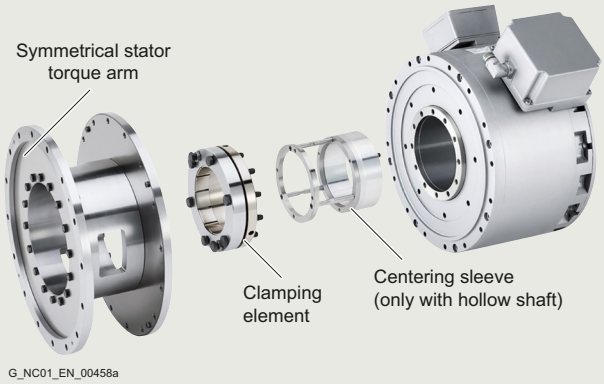
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Accessories

Order code	Description
T32	Stator torque arm [4) 5)]
Q30	Clamping element [5)] • 1-section for plug-on shaft • 2-section for hollow shaft (not available for 1FW328)

-Z must be added to the article number to order a motor with options.

Example:
1FW3150-1AH72-5ADA0**-Z**
T32



Terminal box, max. connectable cable cross-sections

Terminal box Type	Cable entry Power	 External signals	Outer cable diameter, max. [1)] mm (in)	Number of main terminals	Cross-section per terminal, max mm²	Rated current, max. [2)] A
gk230	2 × M32 × 1.5	1 × M16 × 1.5 [3)]	16 (0.63)	Phases: 3 × M5 Grounding: 1 × M4	2 × 16	50
gk420	2 × M40 × 1.5	1 × M16 × 1.5 [3)]	35 (1.38)	Phases: 3 × M10 Grounding: 1 × M6	2 × 35	105
gk630	2 × M50 × 1.5	2 × M16 ×1.5 [3)]	50 (1.97)	Phases: 3 × M10 Grounding: 1 × M10	2 × 50	260
1XB7700	3 × M75 × 1.5	2 × M16 × 1.5 [3)]	120 (4.72)	Phases: 3 × M12 Grounding: 1 × M12	3 × 120	450
1XB7712	4 × M75 × 1.5	4 × PG 13.5 1 × M20 × 1.5 1 × M25 × 1.5 [3)]	120 (4.72)	Phases: 3 × M16 Grounding: 1 × M16	4 × 120	800

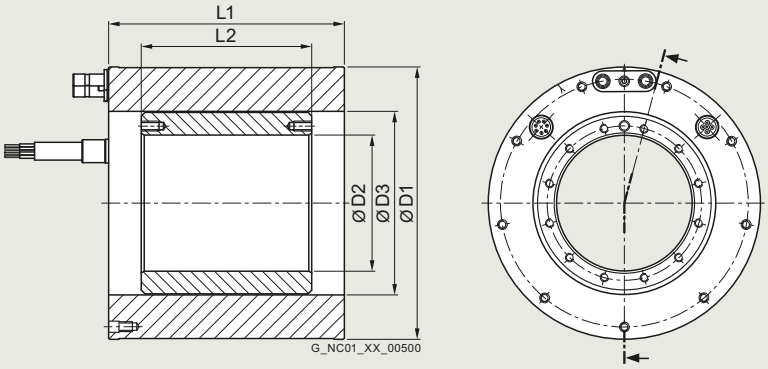
[1)] Dependent on the design of the metric gland.
[2)] Current-carrying capacity based on EN 60204-1 and IEC 60364-5-52 for installation type C.
[3)] For option A11 or 9th data position W (without encoder).
[4)] Depending on motor type. Availability on request.
[5)] Not for solid shaft.

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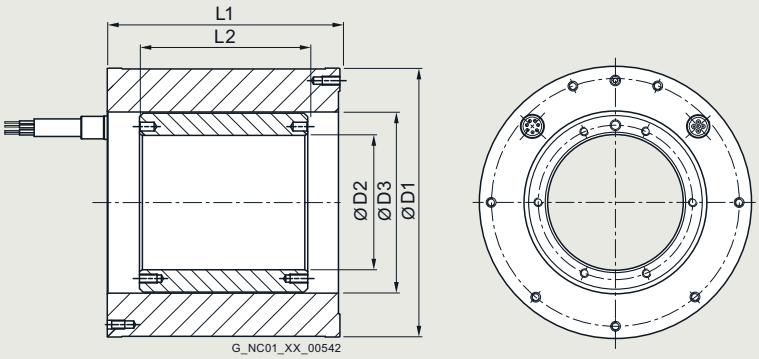
SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – water cooling or natural cooling

Dimensional drawings

Water cooling
1FW6050
1FW6060



Natural cooling
1FW6053
1FW6063



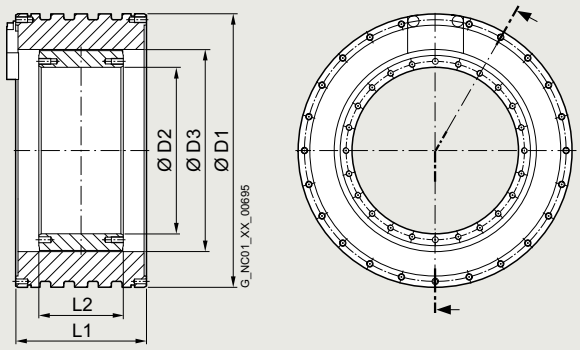
For motor	Dimensions in mm (inches)				
Type	D1	D2	D3	L1	L2
SIMOTICS T-1FW6 built-in torque motors Standard, water cooling or natural cooling					
1FW605.-0.B03	159 (6.26)	64 (2.52)	96 (3.78)	89 (3.50)	35 (1.38)
1FW605.-0.B05				109 (4.29)	65 (2.56)
1FW605.-0.B07				129 (5.08)	85 (3.35)
1FW605.-0.B10				159 (6.26)	115 (4.53)
1FW605.-0.B15				209 (8.23)	165 (6.50)
1FW606.-0.B03	184 (7.24)	92 (3.62)	124 (4.88)	89 (3.50)	35 (1.38)
1FW606.-0.B05				109 (4.29)	65 (2.56)
1FW606.-0.B07				129 (5.08)	85 (3.35)
1FW606.-0.B10				159 (6.26)	115 (4.53)
1FW606.-0.B15				209 (8.23)	165 (6.50)

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, Standard – water cooling

Dimensional drawings

Water cooling
1FW6090
1FW6130
1FW6150

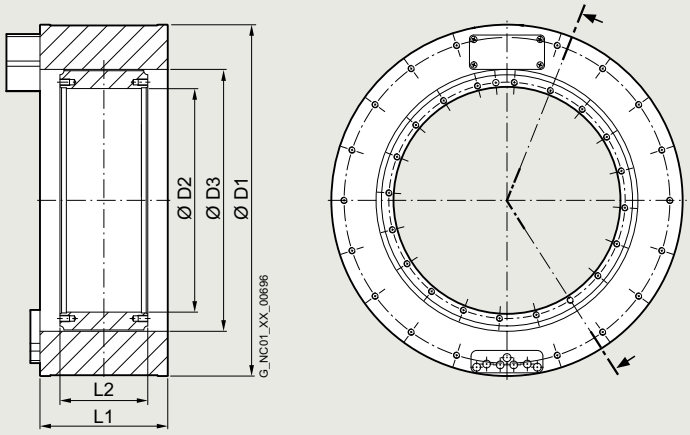


For motor	Dimensions in mm (inches)				
Type	D1	D2	D3	L1	L2
SIMOTICS T-1FW6 built-in torque motors Standard, water cooling					
1FW6090-0.B05	230 (9.06)	140 (5.51)	170 (6.69)	90 (3.54)	51 (2.01)
1FW6090-0.B07				110 (4.33)	71 (2.80)
1FW6090-0.B10				140 (5.51)	101 (3.98)
1FW6090-0.B15				190 (7.48)	151 (5.94)
1FW6130-0.B05	310 (12.20)	220 (8.66)	254 (10.00)	90 (3.54)	51 (2.01)
1FW6130-0.B07				110 (4.33)	71 (2.80)
1FW6130-0.B10				140 (5.51)	101 (3.98)
1FW6130-0.B15				190 (7.48)	151 (5.94)
1FW6150-0.B05	385 (15.16)	265 (10.43)	300 (11.81)	110 (4.33)	51 (2.01)
1FW6150-0.B07				130 (5.12)	71 (2.80)
1FW6150-0.B10				160 (6.30)	101 (3.98)
1FW6150-0.B15				210 (8.27)	151 (5.94)
SIMOTICS T-1FW6 built-in torque motors High Torque, water cooling					
1FW6154-8.B05	385 (15.16)	265 (10.43)	300 (11.81)	110 (4.33)	51 (2.01)
1FW6154-8.B07				130 (5.12)	71 (2.80)
1FW6154-8.B10				160 (6.30)	101 (3.98)
1FW6154-8.B15				210 (8.27)	151 (5.94)
SIMOTICS T Rotor for High Torque built-in motors 1FW6154-8RA..					
1FW6154-8RA05		265 (10.43)	300 (11.81)		51 (2.01)
1FW6154-8RA07					71 (2.80)
1FW6154-8RA10					101 (3.98)
1FW6154-8RA15					151 (5.94)

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Dimensional drawings

Water cooling
1FW6160
1FW6190
1FW6230
1FW6290



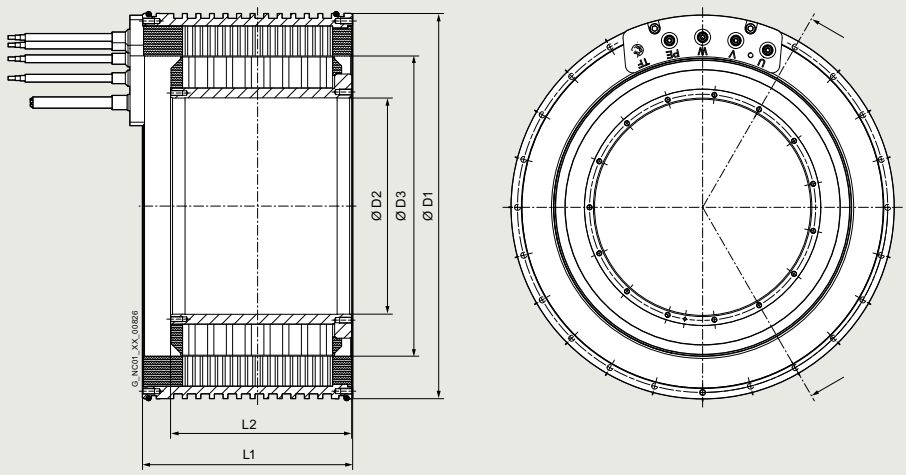
For motor	Dimensions in mm (inches)				
Type	D1	D2	D3	L1	L2
SIMOTICS T-1FW6 built-in torque motors Standard, water cooling					
1FW6160-0.B05	440 (17.32)	282 (11.10)	328 (12.91)	110 (4.33)	60 (2.36)
1FW6160-0.B07				130 (5.12)	80 (3.15)
1FW6160-0.B10-.J.2/-5G.2/-8FB2				160 (6.30)	110 (4.33)
1FW6160-0.B10-2PB2				170 (6.69)	110 (4.33)
1FW6160-0.B15-2J.2/-5G.2/-8FB2				210 (8.27)	160 (6.30)
1FW6160-0.B15-2PB2/-0WB2				220 (8.66)	160 (6.30)
1FW6160-0.B20-5G.2/-8FB2				260 (10.24)	210 (8.27)
1FW6160-0.B20-2PB2/-0WB2				270 (10.63)	210 (8.27)
1FW6190-0.B05	502 (19.76)	344 (13.54)	389 (15.31)	110 (4.33)	60 (2.36)
1FW6190-0.B07				130 (5.12)	80 (3.15)
1FW6190-0.B10-.J.2/-5G.2/-8FB2				160 (6.30)	110 (4.33)
1FW6190-0.B10-2PB2				170 (6.69)	110 (4.33)
1FW6190-0.B15-2J.2/-5G.2/-8FB2				210 (8.27)	160 (6.30)
1FW6190-0.B15-2PB2/-0WB2				220 (8.66)	160 (6.30)
1FW6190-0.B20-5G.2/-8FB2				260 (10.24)	210 (8.27)
1FW6190-0.B20-2PB2/-0WB2				270 (10.63)	210 (8.27)
1FW6230-0.B05	576 (22.68)	418 (16.46)	463 (18.23)	110 (4.33)	60 (2.36)
1FW6230-0.B07				130 (5.12)	80 (3.15)
1FW6230-0.B10				160 (6.30)	110 (4.33)
1FW6230-0.B15-4C.2/-5G.2/-8FB2/-2PB2				210 (8.27)	160 (6.30)
1FW6230-0.B15-0WB2				220 (8.66)	160 (6.30)
1FW6230-0.B20-5G.2/-8FB2/-2PB2				260 (10.24)	210 (8.27)
1FW6230-0.B20-0WB2				270 (10.63)	210 (8.27)
1FW6290-0.B07-5G.2/-0LB2	730 (28.74)	522 (20.55)	580 (22.83)	140 (5.51)	90 (3.54)
1FW6290-0.B07-2PB2				160 (6.30)	90 (3.54)
1FW6290-0.B11-7A.2/-0LB2				180 (7.09)	130 (5.12)
1FW6290-0.B11-2PB2				200 (7.87)	130 (5.12)
1FW6290-0.B15-7A.2/-0LB2				220 (8.66)	170 (6.69)
1FW6290-0.B15-2PB2				240 (9.45)	170 (6.69)
1FW6290-0.B20-0LB2				260 (10.24)	210 (8.27)
1FW6290-0.B20-2PB2				280 (11.02)	210 (8.27)

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, High Speed – water cooling

Dimensional drawings

Water cooling
1FW6092
1FW6132
1FW6152



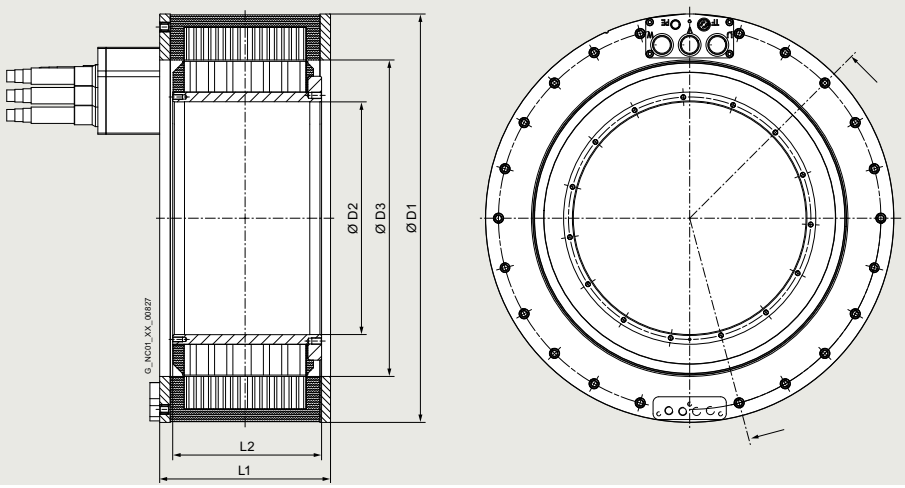
For motor	Dimensions in mm (inches)				
Type	D1	D2	D3	L1	L2
SIMOTICS T-1FW6 High Speed built-in torque motors, water cooling					
1FW6092-8PC05	230 (9.06)	89 (3.50)	170 (6.69)	100 (3.94)	81 (3.19)
1FW6092-8PC10				150 (5.91)	131 (5.16)
1FW6092-8PC15				200 (7.87)	181 (7.13)
1FW6132-8PC05	310 (12.20)	156 (6.14)	240 (9.45)	100 (3.94)	81 (3.19)
1FW6132-8PC10				150 (5.91)	131 (5.16)
1FW6132-8PC15				200 (7.87)	181 (7.13)
1FW6152-8PC05	385 (15.16)	216 (8.50)	300 (11.81)	110 (4.33)	81 (3.19)
1FW6152-8PC10				160 (6.30)	131 (5.16)
1FW6152-8PC15				210 (8.27)	181 (7.13)
SIMOTICS T Rotor for High Speed built-in motors 1FW6..2-8RA..					
1FW6092-8RA05		89 (3.50)	170 (6.69)		81 (3.19)
1FW6092-8RA10					131 (5.16)
1FW6092-8RA15					181 (7.13)
1FW6132-8RA05		156 (6.14)	240 (9.45)		81 (3.19)
1FW6132-8RA10					131 (5.16)
1FW6132-8RA15					181 (7.13)
1FW6152-8RA05		216 (8.50)	300 (11.81)		81 (3.19)
1FW6152-8RA10					131 (5.16)
1FW6152-8RA15					181 (7.13)

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SIMOTICS T-1FW6 built-in torque motors with internal rotor, High Speed – water cooling

Dimensional drawings

Water cooling
1FW6192
1FW6232



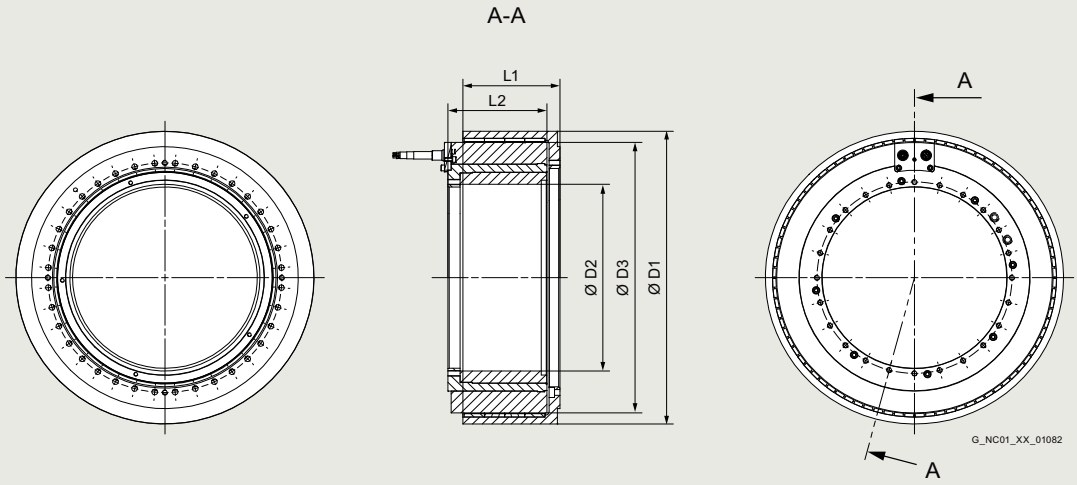
For motor	Dimensions in mm (inches)				
Type	D1	D2	D3	L1	L2
SIMOTICS T-1FW6 High Speed built-in torque motors, water cooling					
1FW6192-8.C05	502 (19.76)	286 (11.26)	389 (15.31)	110 (4.33)	83 (3.27)
1FW6192-8.C10-8F..				160 (6.30)	133 (5.24)
1FW6192-8.C10-2P..				170 (6.69)	133 (5.24)
1FW6192-8.C15-8F..				210 (8.27)	183 (7.20)
1FW6192-8.C15-0W..				220 (8.66)	183 (7.20)
1FW6192-8.C20-8F..				260 (10.24)	233 (9.17)
1FW6192-8.C20-0W..				270 (10.63)	233 (9.17)
1FW6232-8.C05	576 (22.68)	360 (14.17)	463 (18.23)	110 (4.33)	83 (3.27)
1FW6232-8.C10-2P..				160 (6.30)	133 (5.24)
1FW6232-8.C10-0W..				170 (6.69)	133 (5.24)
1FW6232-8.C15-2P..				210 (8.27)	183 (7.20)
1FW6232-8.C15-0W..				220 (8.66)	183 (7.20)
1FW6232-8.C20-2P..				260 (10.24)	233 (9.17)
1FW6232-8.C20-0W..				270 (10.63)	233 (9.17)
SIMOTICS T Rotor for High Speed built-in motors 1FW6..2-8RA..					
1FW6192-8RA05		286 (11.26)	389 (15.31)		83 (3.27)
1FW6192-8RA10					133 (5.24)
1FW6192-8RA15					183 (7.20)
1FW6192-8RA20					233 (9.17)
1FW6232-8RA05		360 (14.17)	463 (18.23)		83 (3.27)
1FW6232-8RA10					133 (5.24)
1FW6232-8RA15					183 (7.20)
1FW6232-8RA20					233 (9.17)

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SIMOTICS T-1FW6 built-in torque motors with external rotor, Standard – water cooling

Dimensional drawings

Water cooling
1FW6720

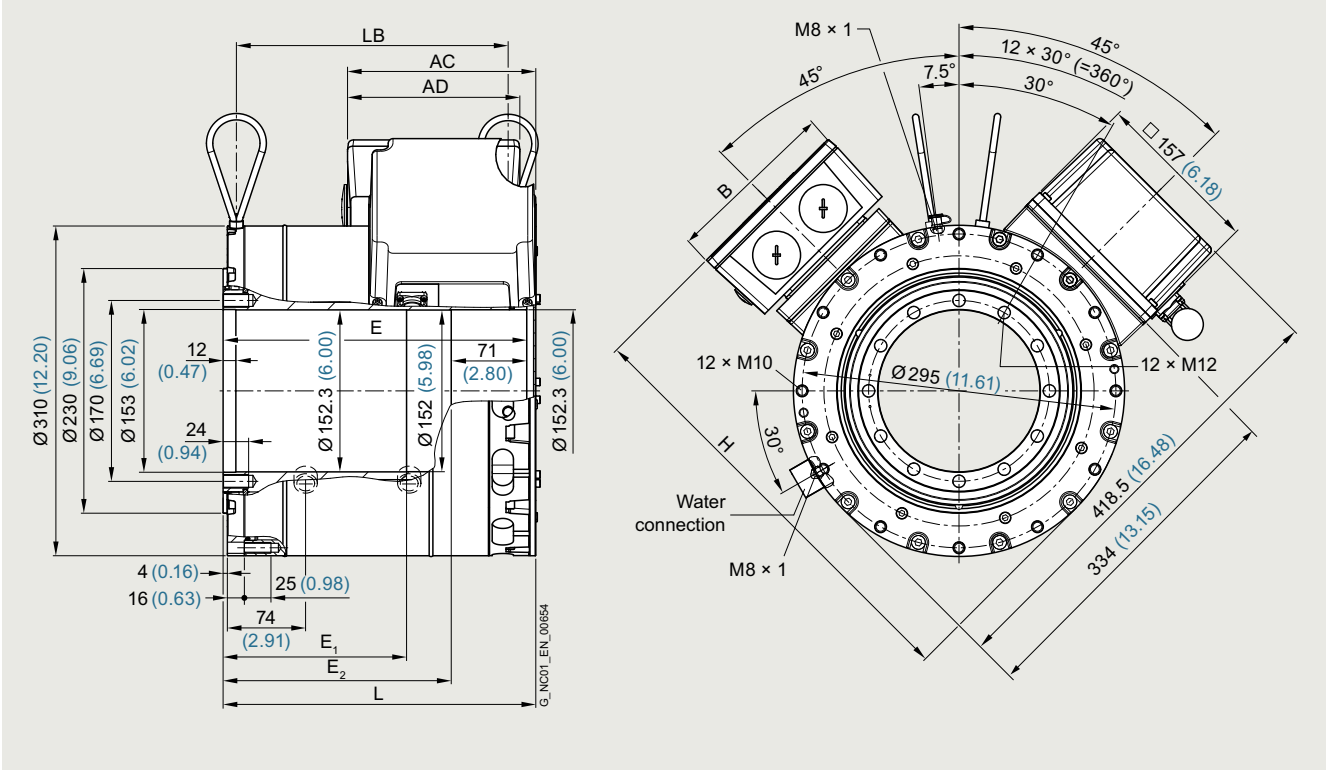


For motor	Dimensions in mm (inches)					
Type	D1 (outer diameter)	D2 (inner diameter stator)	D3 (inner diameter rotor)	L1 (total length)	L2 (rotor length)	L3 (stator length)
SIMOTICS T-1FW6 built-in torque motors with external rotor, water cooling						
1FW6720-8PB07	436 (17.70)	270 (10.36)	325 [1] (12.80)	140 (5.51)	116 (4.57)	121 (4.76)
1FW6720-8PB10				164 (6.46)	142 (5.59)	145 (5.71)
1FW6720-8PB12				186 (7.32)	153 (6.02)	167 (6.57)
1FW6720-8PB14				212 (8.35)	181 (7.13)	193 (7.60)
SIMOTICS T Rotor for built-in motors 1FW6720-8RA..						
1FW6720-8RA07		270 (10.36)	325 [1] (12.80)		116 (4.57)	
1FW6720-8RA10					142 (5.59)	
1FW6720-8RA12					153 (6.02)	
1FW6720-8RA14					181 (7.13)	

[1] With option S80, the inner diameter of the rotor is 260 mm (10.24 in).

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Dimensional drawings

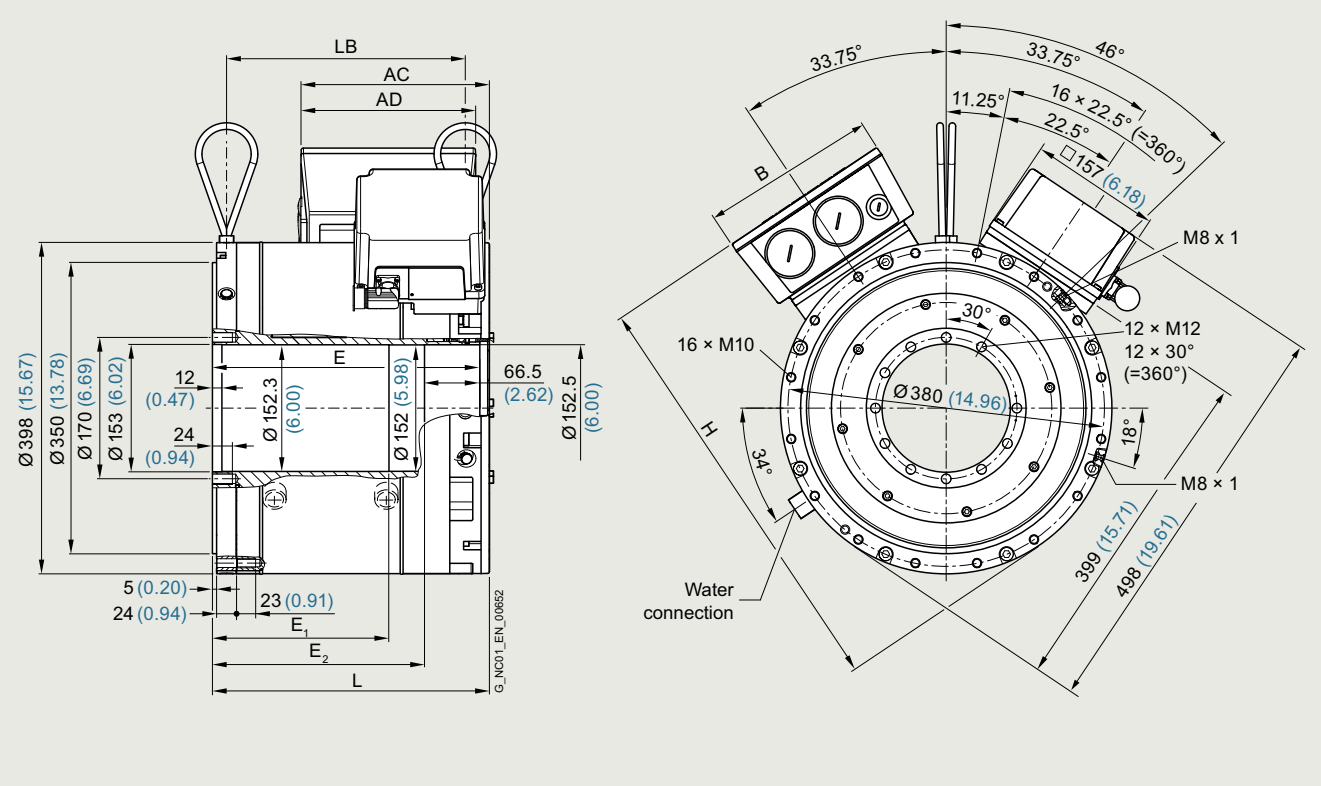


For motor		Dimensions in mm (inches)					
Shaft height	Type	IEC	L	LB	E	E_1	E_2
SIMOTICS T-1FW3 complete torque motors, type of construction IM B14, hollow shaft							
150	1FW3150		260.5 (10.26)	226 (8.90)	256 (10.08)	141 (5.55)	185 (7.28)
	1FW3152		317.5 (12.50)	283 (11.14)	313 (12.32)	198 (7.80)	242 (9.53)
	1FW3154		366.5 (14.43)	332 (13.07)	362 (14.52)	247 (9.72)	291 (11.46)
	1FW3155		418.5 (16.48)	384 (15.12)	414 (16.30)	299 (11.77)	343 (13.50)
	1FW3156		471.5 (18.56)	437 (17.20)	467 (18.39)	352 (13.86)	396 (15.59)

Terminal box type	H	AC	AD × B
gk 230	393 (15.47)	159.5 (6.28)	122 × 117 (4.80 × 4.61)
gk 420	410 (16.14)	177 (6.97)	162 × 162 (6.38 × 6.38)
gk 630	427 (16.81)	225.5 (8.88)	210 × 210 (8.27 × 8.27)

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Dimensional drawings

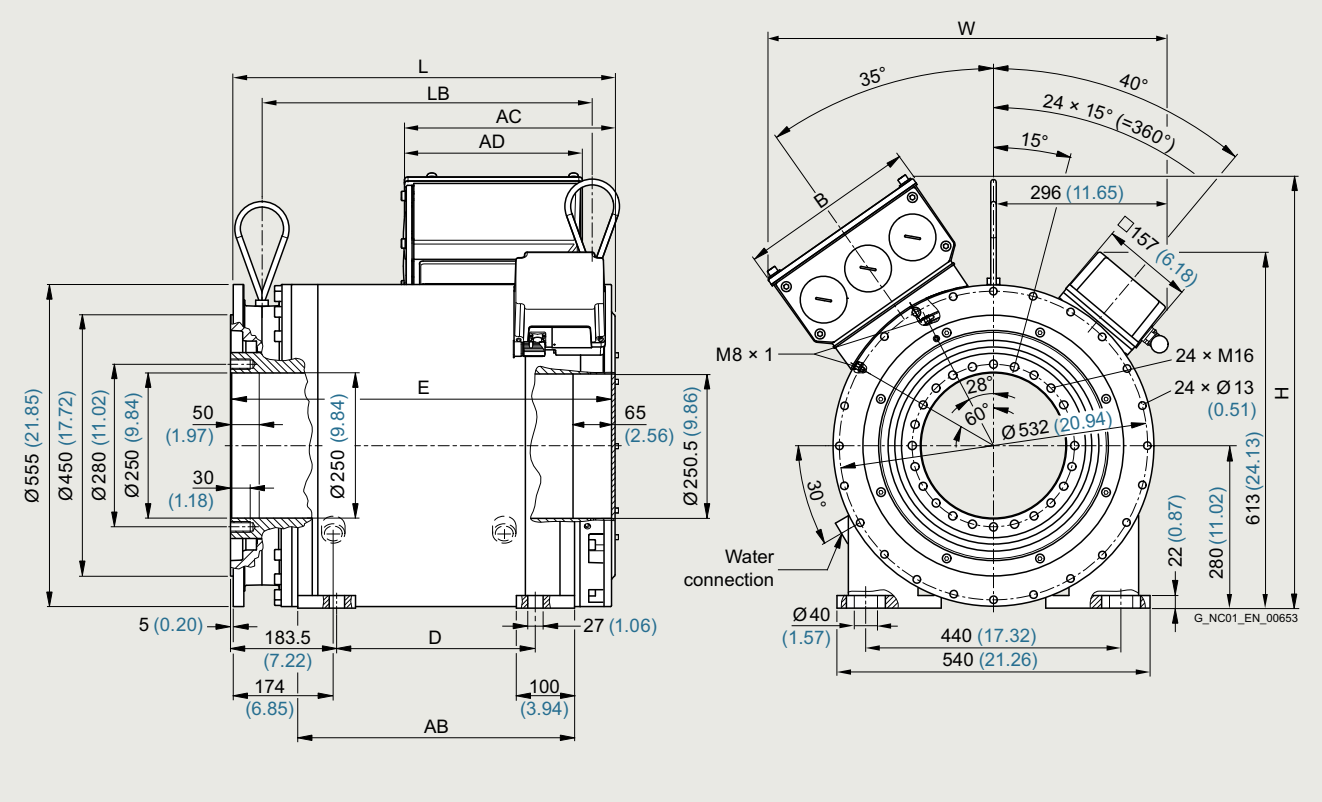


For motor			Dimensions in mm (inches)				
Shaft height	Type	IEC	L	LB	E	E_1	E_2
SIMOTICS T-1FW3 complete torque motors, type of construction IM B14, hollow shaft							
200	1FW3201		235.5 (9.27)	194.5 (7.66)	229 (9.02)	120 (4.72)	162.5 (6.40)
	1FW3202		281.5 (11.08)	240.5 (9.47)	275 (10.83)	166 (6.54)	208.5 (8.21)
	1FW3203		328 (12.91)	287 (11.30)	321.5 (12.66)	212 (8.35)	255 (10.04)
	1FW3204		397 (15.63)	356 (14.02)	390.5 (15.37)	281 (11.06)	324 (12.76)
	1FW3206		489.5 (19.27)	448.5 (17.66)	483 (19.02)	374 (14.72)	416.5 (16.40)
	1FW3208		604.5 (23.80)	563.5 (22.18)	598 (23.54)	489 (19.25)	531.5 (20.93)

Terminal box type	H	AC	AD × B
gk 230	475 (18.00)	158 (6.22)	122 × 117 (4.80 × 4.61)
gk 420	490 (19.29)	175 (6.89)	162 × 162 (6.38 × 6.38)
gk 630	508 (20.00)	226 (8.90)	210 × 210 (8.27 × 8.27)

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Dimensional drawings

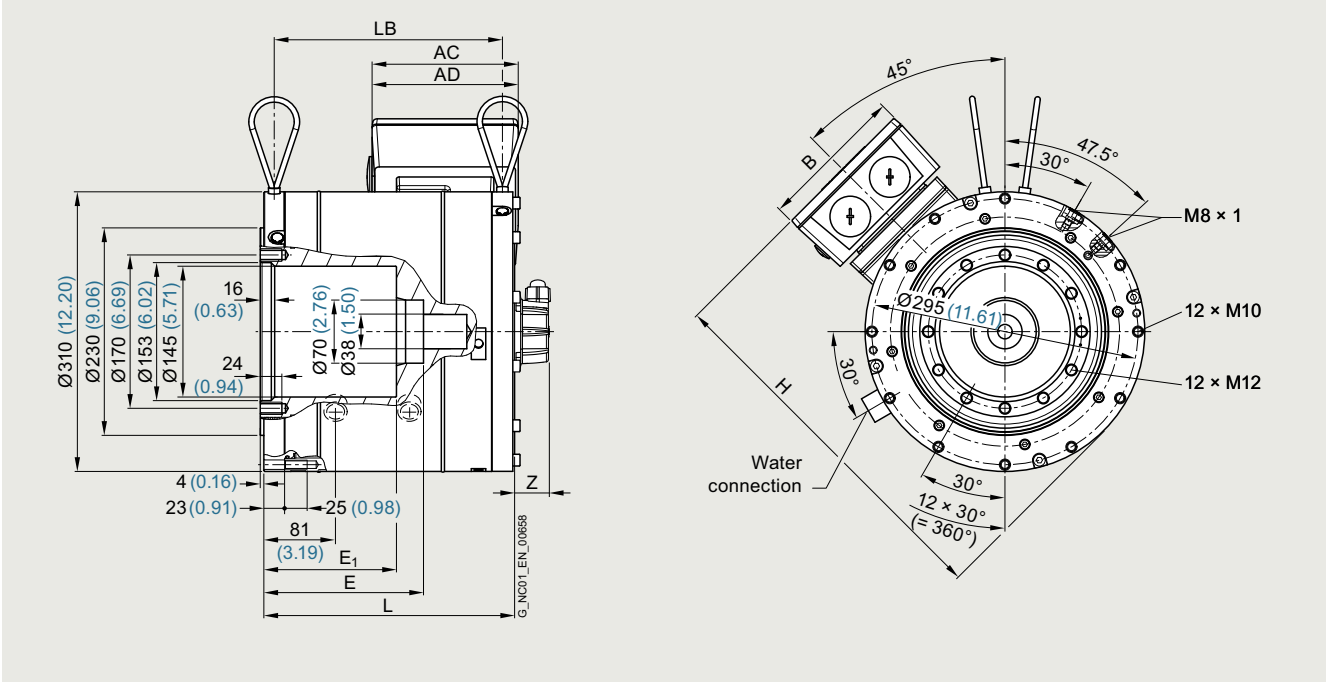


For motor		Dimensions in mm (inches)					
Shaft height	Type	IEC	L	LB	D	E	AB
SIMOTICS T-1FW3 complete torque motors, type of construction IM B35, hollow shaft							
280	1FW3281		574 (22.60)	483.5 (19.04)	258 (10.16)	571 (22.48)	393 (15.47)
	1FW3283		658.5 (26.99)	568 (22.36)	342.5 (13.48)	655.5 (25.81)	477.5 (18.80)
	1FW3285		784.5 (30.98)	694 (27.32)	468.5 (18.44)	781.5 (30.77)	603.5 (23.76)
	1FW3287		953 (37.52)	862.5 (33.96)	637 (25.08)	950 (37.40)	772 (30.39)

Terminal box type	H	W	AC	AD × B
1XB7700	743 (29.95)	684 (26.93)	363 (14.29)	306 × 306 (12.05 × 12.05)
1XB7712 (axial DE)	836 (32.91)	764 (30.08)	354 (13.94)	371 × 370 (14.61 × 14.57)
1XB7712 (axial NDE)	836 (32.91)	764 (30.08)	385 (15.16)	371 × 370 (14.61 × 14.57)
1XB7712 (radial left)	846 (33.31)	751 (29.57)	369 (14.53)	371 × 370 (14.61 × 14.57)
1XB7712 (radial right)	828 (32.60)	777 (30.59)	369 (14.53)	371 × 370 (14.61 × 14.57)

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Dimensional drawings



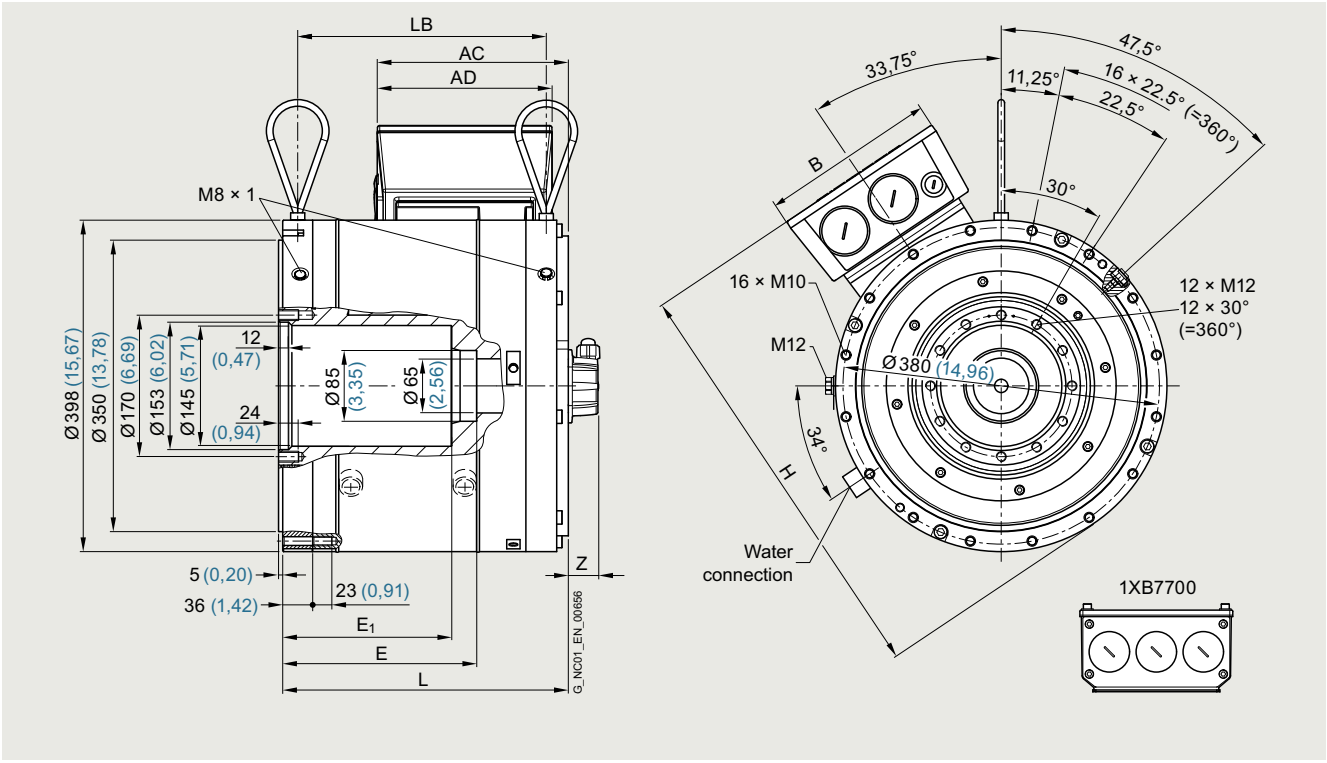
For motor		Dimensions in mm (inches)					
Shaft height	Type	IEC	L	LB	E	E_1	Z [1]
SIMOTICS T-1FW3 complete torque motors, plug-on mounting performed by the customer, plug-on shaft							
150	1FW3150		248.5 (9.78)	223.5 (8.80)	151.5 (5.96)	121.5 (4.78)	38 (1.50)
	1FW3152		305.5 (12.03)	280.5 (11.04)	204.5 (8.05)	174.5 (6.88)	
	1FW3154		354.5 (13.96)	329.5 (12.97)	255 (10.04)	225 (8.86)	
	1FW3155		406.5 (16.00)	381.5 (15.02)	307 (12.09)	277 (10.91)	
	1FW3156		459.5 (18.09)	434.5 (17.11)	360 (14.17)	330 (12.99)	

Terminal box type	H	AC	AD × B
gk 230	393 (15.47)	140.5 (5.53)	122 × 117 (4.80 × 4.61)
gk 420	409 (16.10)	158 (6.22)	162 × 162 (6.38 × 6.38)
gk 630	427 (16.81)	206.5 (8.13)	210 × 210 (8.27 × 8.27)

[1] Encoder without DRIVE-CLiQ: 43 mm (1.69 in).

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Dimensional drawings



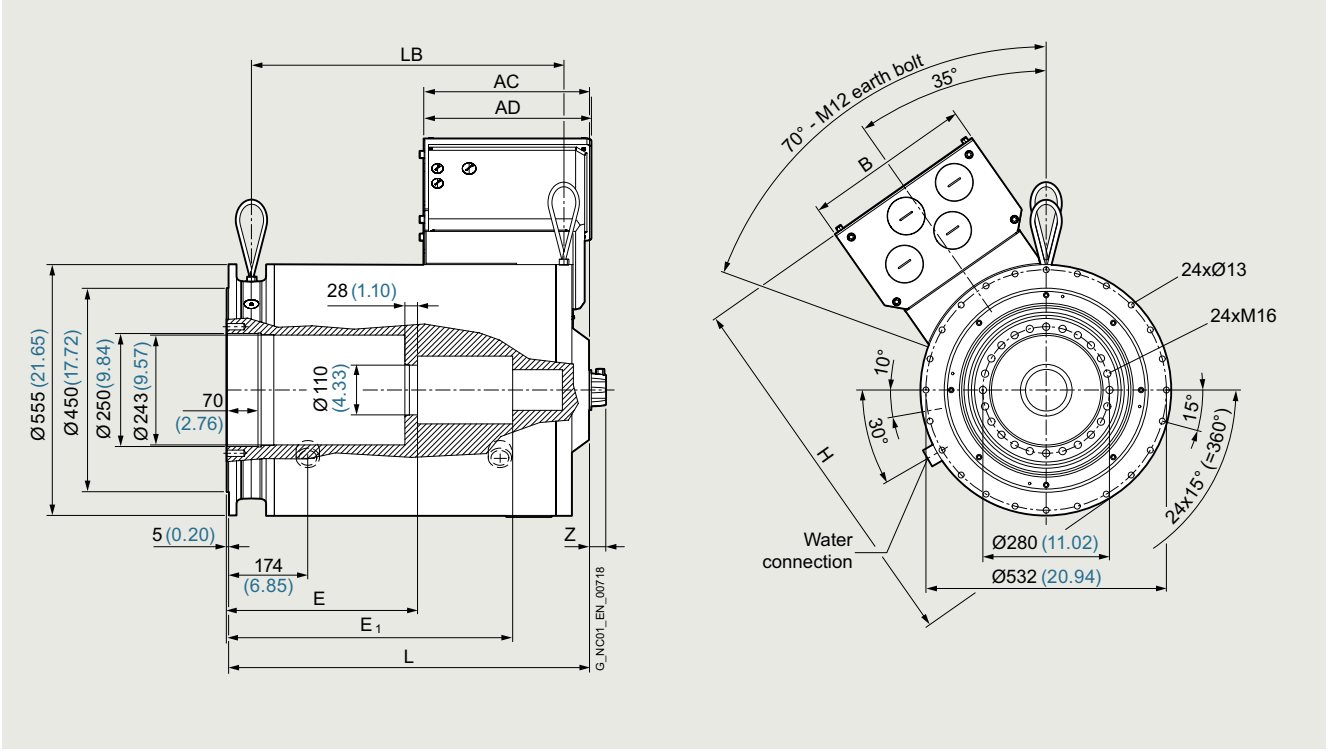
For motor		Dimensions in mm (inches)					
Shaft height	Type	IEC	L	LB	E	E_1	Z [1]
SIMOTICS T-1FW3 complete torque motors, plug-on mounting performed by the customer, plug-on shaft							
200	1FW3201		250.5 (9.86)	206 (8.11)	145.5 (5.53)	115.5 (4.35)	36 (1.42)
	1FW3202		296.5 (11.67)	252 (9.92)	192 (7.36)	162 (6.18)	
	1FW3203		343 (13.50)	298.5 (11.75)	238 (9.17)	208 (7.99)	
	1FW3204		412 (16.22)	367.5 (14.47)	307 (11.89)	277 (10.71)	
	1FW3206		504.5 (19.86)	460 (18.11)	400 (15.55)	370 (14.37)	
	1FW3208		619.5 (24.39)	575 (22.74)	514.5 (20.06)	484.5 (18.88)	

Terminal box type	H	AC	AD × B
gk 230	475 (18.70)	161 (6.34)	122 × 117 (4.80 × 4.61)
gk 420	491 (19.33)	178.5 (7.03)	162 × 162 (6.38 × 6.38)
gk 630	507 (19.96)	229.5 (9.04)	210 × 210 (8.27 × 8.27)
1XB7700	580 (22.83)	307 (12.09)	306 × 306 (12.05 × 12.05)

[1] Encoder without DRIVE-CLiQ: 41 mm (1.61 in).

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Dimensional drawings



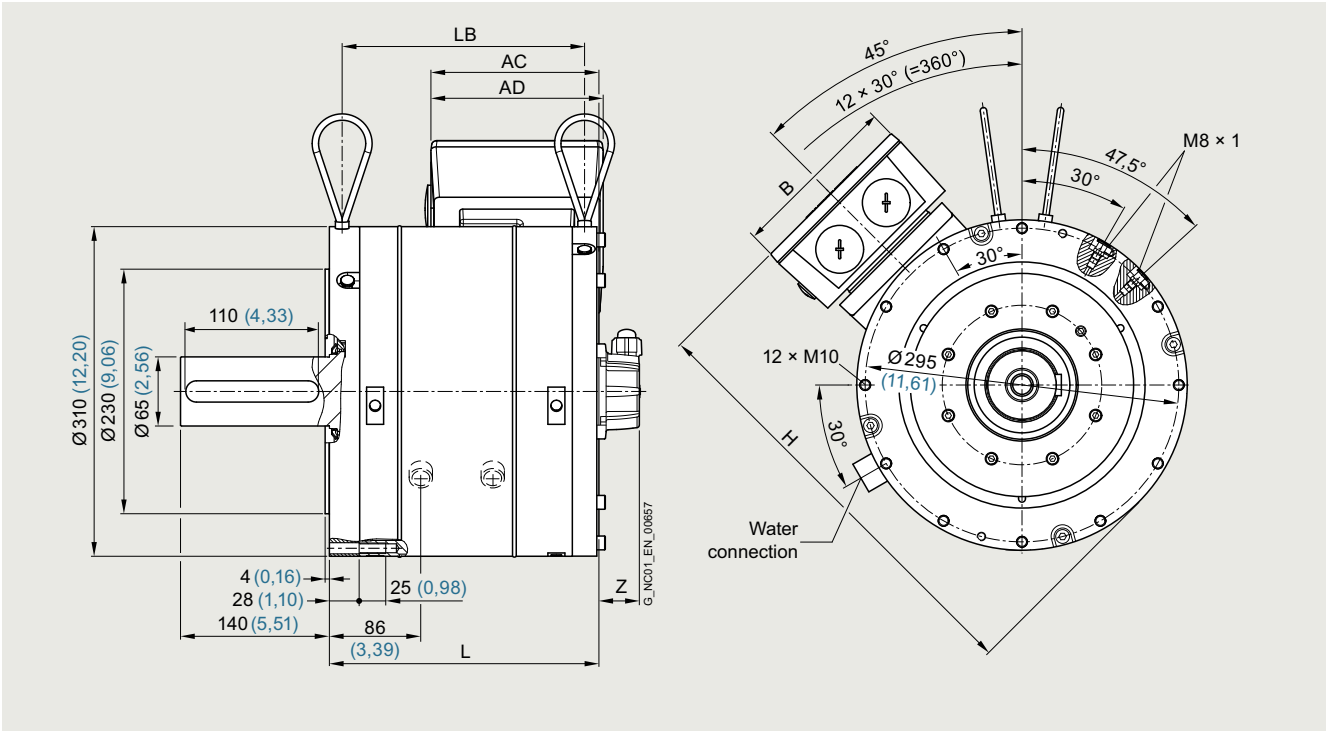
For motor		Dimensions in mm (inches)					
Shaft height	Type	IEC	L	LB	E	E_1	Z [1]
SIMOTICS T-1FW3 complete torque motors, plug-on mounting performed by the customer, plug-on shaft							
280	1FW3281		588 (23.50)	481 (18.94)	313 (12.32)	423 (16.65)	36 (1.42)
	1FW3283		672.5 (26.48)	565.5 (22.26)	358 (14.09)	507.5 (19.98)	
	1FW3285		798.5 (31.44)	691.5 (27.22)	423 (16.65)	633.5 (24.94)	
	1FW3287		967 (38.07)	860 (33.86)	508 (29.00)	802 (31.57)	

Terminal box type	H	AC	AD × B
1XB7700	737 (29.02)	413 (16.26)	306 × 306 (12.05 × 12.05)
1XB7712 (axial DE)	827 (32.56)	404 (15.91)	371 × 370 (14.61 × 14.57)
1XB7712 (axial NDE)	827 (32.56)	435 (17.17)	371 × 370 (14.61 × 14.57)
1XB7712 (radial left)	827 (32.56)	419 (16.50)	371 × 370 (14.61 × 14.57)
1XB7712 (radial right)	827 (32.56)	419 (16.50)	371 × 370 (14.61 × 14.57)

[1] Encoder without DRIVE-CLiQ: 41 mm (1.61 in).

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Dimensional drawings



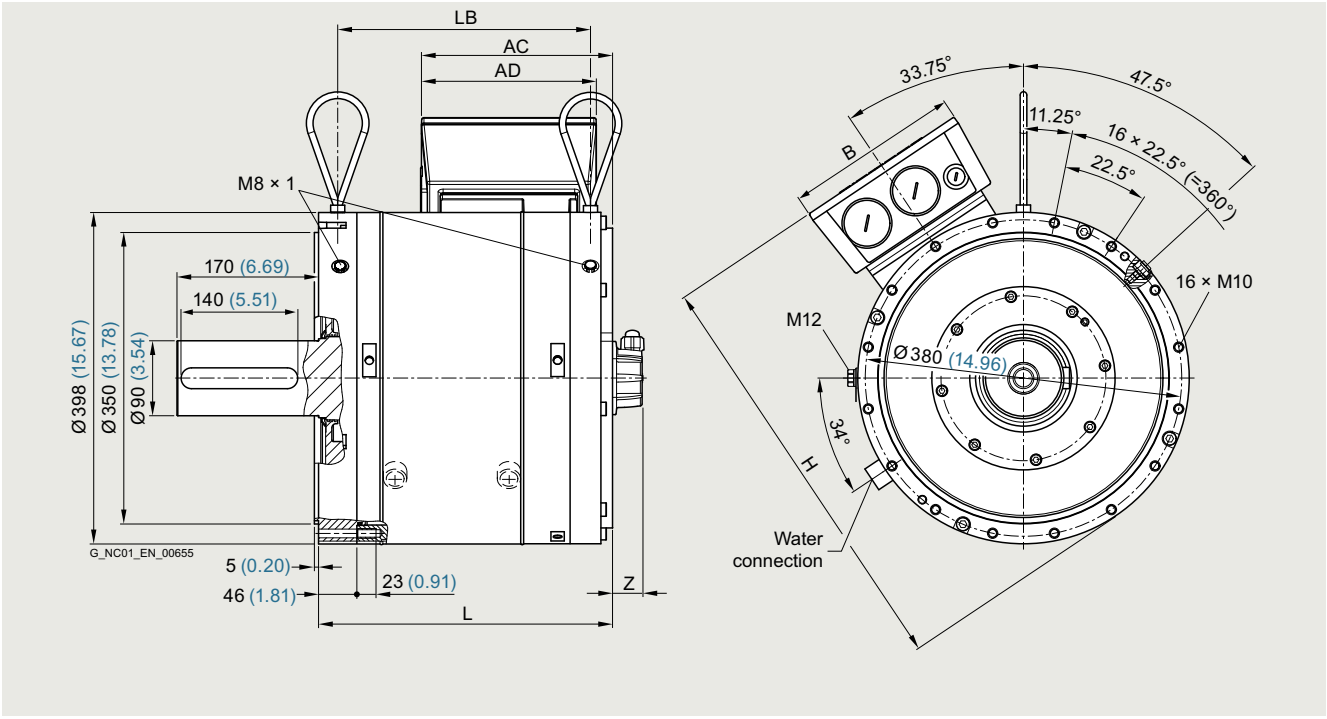
For motor		Dimensions in mm (inches)			
Shaft height	Type	IEC	L	LB	Z [1]
SIMOTICS T-1FW3 complete torque motors, type of construction IM B14, solid shaft with/without feather key					
150	1FW3150		253.5 (9.98)	228 (8.98)	38 (1.50)
	1FW3152		283 (11.14)	257.5 (10.14)	
	1FW3154		338 (13.31)	312.5 (12.30)	
	1FW3155		386.5 (15.22)	361 (14.21)	
	1FW3156		440.5 (17.34)	415 (16.34)	

Terminal box type	H	AC	AD × B
gk 230	393 (15.47)	140.5 (5.53)	122 × 117 (4.80 × 4.61)
gk 420	409 (16.10)	158 (6.22)	162 × 162 (6.38 × 6.38)
gk 630	427 (16.81)	206.5 (8.13)	210 × 210 (8.27 × 8.27)

[1] Encoder without DRIVE-CLiQ: 43 mm (1.69 in).

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Dimensional drawings



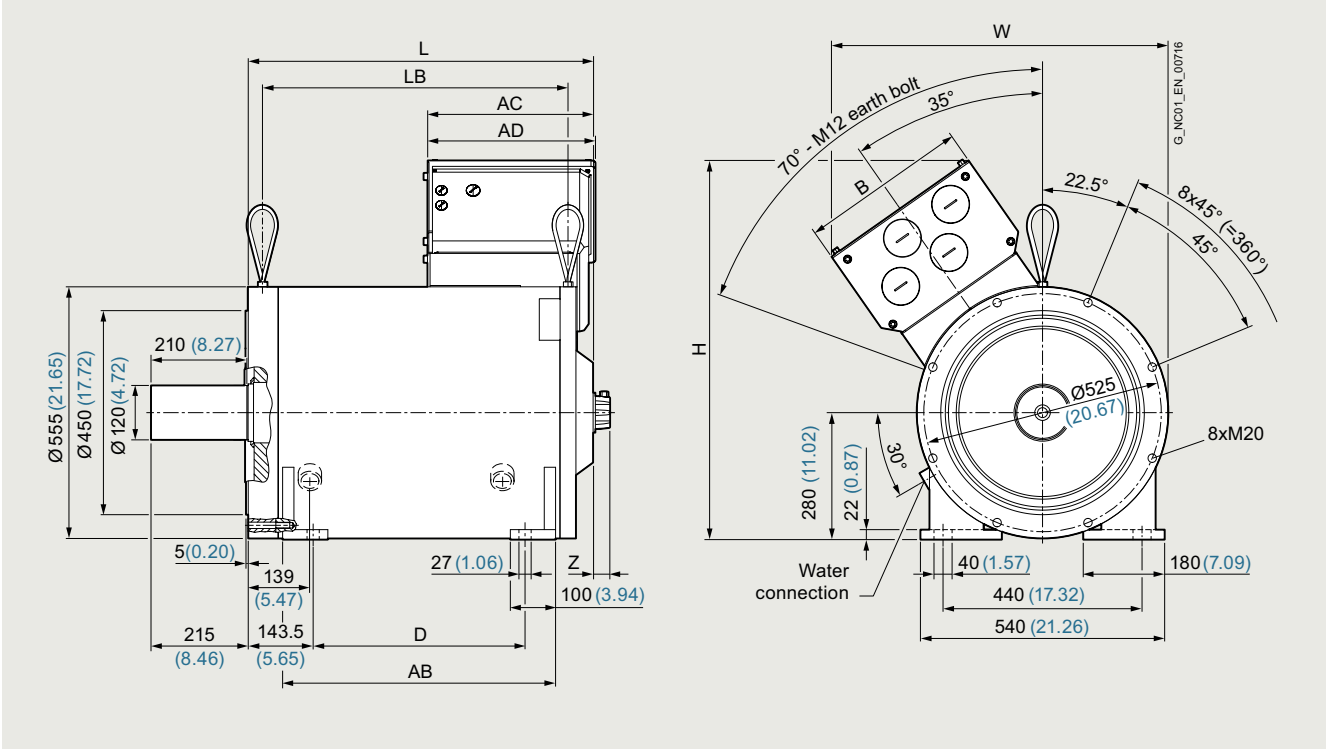
For motor		Dimensions in mm (inches)			
Shaft height	Type	IEC	L	LB	Z [1]
SIMOTICS T-1FW3 complete torque motors, type of construction IM B14, solid shaft with/without feather key					
200	1FW3201		260.5 (10.26)	211 (8.31)	36 (1.42)
	1FW3202		306.5 (12.07)	257 (10.12)	
	1FW3203		353 (13.90)	303.5 (11.95)	
	1FW3204		422 (16.61)	372.5 (14.67)	
	1FW3206		514.5 (20.26)	465 (18.31)	
	1FW3208		629.5 (24.78)	580 (22.83)	

Terminal box type	H	AC	AD × B
gk 230	475 (18.70)	167 (6.57)	122 × 117 (4.80 × 4.61)
gk 420	491 (19.33)	178.5 (7.03)	162 × 162 (6.38 × 6.38)
gk 630	507 (19.96)	229.5 (9.04)	210 × 210 (8.27 × 8.27)
1XB7700	580 (22.83)	307 (12.09)	306 × 306 (12.05 × 12.05)

[1] Encoder without DRIVE-CLiQ: 41 mm (1.61 in).

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Dimensional drawings



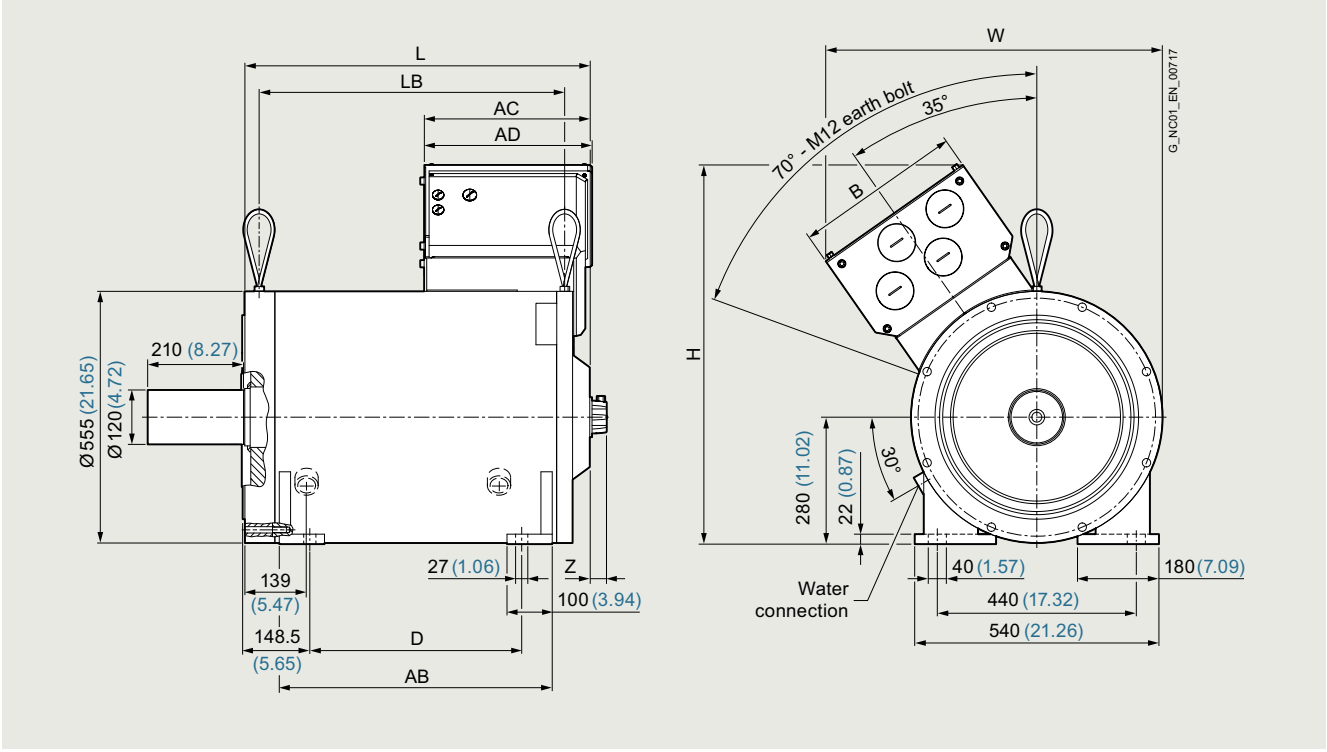
For motor		Dimensions in mm (inches)					
Shaft height	Type	IEC	L	LB	D	AB	Z [1]
SIMOTICS T-1FW3 complete torque motors, type of construction IM B34, solid shaft with/without feather key							
280	1FW3281		553 (21.77)	463.5 (18.25)	258 (10.16)	393 (15.47)	36 (1.42)
	1FW3283		637.5 (25.10)	548 (21.57)	342.5 (13.48)	477.5 (18.80)	
	1FW3285		763.5 (30.06)	674 (26.54)	468.5 (18.44)	603.5 (23.76)	
	1FW3287		932 (36.69)	842.5 (33.17)	637 (25.08)	772 (30.39)	

Terminal box type	H	W	AC	AD × B
1XB7700	742 (29.21)	665 (26.18)	377 (14.84)	306 × 306 (12.05 × 12.05)
1XB7712 (axial DE)	836 (32.91)	744 (29.29)	367 (14.45)	371 × 370 (14.61 × 14.57)
1XB7712 (axial NDE)	836 (32.91)	744 (29.29)	398 (15.67)	
1XB7712 (radial left)	846 (33.31)	732 (28.82)	382 (15.04)	
1XB7712 (radial right)	828 (32.60)	764 (30.08)	382 (15.04)	

[1] Encoder without DRIVE-CLiQ: 41 mm (1.61 in).

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Dimensional drawings



For motor		Dimensions in mm (inches)					
Shaft height	Type	IEC	L	LB	D	AB	Z [1]
SIMOTICS T-1FW3 complete torque motors, solid shaft, IM B3							
280	1FW3281		553 (21.77)	463.5 (18.25)	258 (10.16)	393 (15.47)	36 (1.42)
	1FW3283		637.5 (25.10)	548 (21.57)	342.5 (13.48)	477.5 (18.80)	
	1FW3285		763.5 (30.06)	674 (26.54)	468.5 (18.44)	603.5 (23.76)	
	1FW3287		932 (36.69)	842.5 (33.17)	637 (25.08)	772 (30.39)	

Terminal box type	H	W	AC	AD × B
1XB7700	742 (29.21)	665 (26.18)	377 (14.84)	306 × 306 (12.05 × 12.05)
1XB7712 (axial DE)	836 (32.91)	744 (29.29)	367 (14.45)	371 × 370 (14.61 × 14.57)
1XB7712 (axial NDE)	836 (32.91)	744 (29.29)	398 (15.67)	
1XB7712 (radial left)	846 (33.31)	732 (28.82)	382 (15.04)	
1XB7712 (radial right)	828 (32.60)	764 (30.08)	382 (15.04)	

[1] Encoder without DRIVE-CLiQ: 41 mm (1.61 in).

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9/2 **Built-on optoelectronic rotary encoders**
9/2 Introduction
9/4 Incremental encoders
9/7 Absolute encoders
9/13 Accessories

Chap. 12 **Siemens Product Configurator selection tool**
Product selection via selectors
www.siemens.com/spc

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Introduction

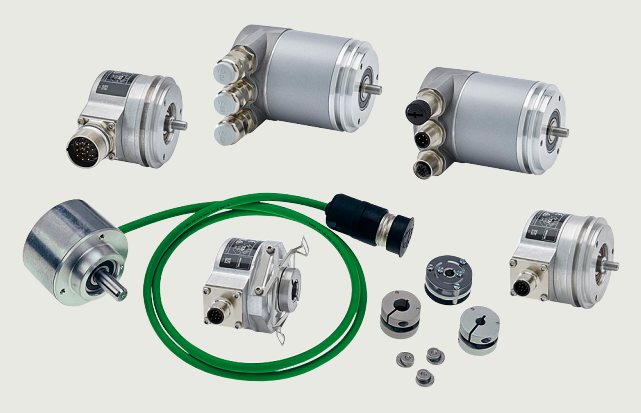
Overview

Motion control encoder	Interface	Built-on encoder usable for Safety Integrated[1)]	Resolution S/R = signals/revolution	Accuracy arcsec	Cable length m (ft)	Degree of protection at housing (at shaft input)
Incremental encoders						
	sin/cos 1 V_{pp}	No	1000 ... 2500 S/R	± 18 mech. × 3600/ PPR count *z*	150 (492)	IP67 (IP64)
	RS422 (TTL)	No	500 ... 5000 S/R	± 18 mech. × 3600/ PPR count *z*	100 (328)	IP67 (IP64)
	HTL	No	100 ... 2500 S/R	± 18 mech. × 3600/ PPR count *z*	300 (984)	IP67 (IP64)
Absolute encoders						
	DRIVE-CLiQ	Yes	Single-turn 24 bit Multi-turn 36 bit (2^{24} steps × 4096 revolutions)	± 20	100 (328)	IP67 (IP64)
	SSI	No	Single-turn 13 bit (8192 steps) Multi-turn 25 bit (8192 steps × 4096 revolutions)	± 60	100 (328)	IP67 (IP64)
	EnDat 2.1	Yes	Single-turn 13 bit (8192 steps) Multi-turn 25 bit (8192 steps × 4096 revolutions)	± 60 (incremental track)	150 (492)	IP67 (IP64)
	PROFIBUS DP-V2	No	Single-turn 13 bit (8192 steps) Multi-turn 27 bit (8192 steps × 16384 revolutions)	± 79	100 (328)	IP67 (IP64)
	PROFINET IO with RT/IRT	No	Single-turn 13 bit/16 bit (8192/65536 steps) Multi-turn 27 bit/30 bit (8192/65536 steps × 16384 revolutions)	± 79	100 (328)	IP67 (IP64)
Accessories for measuring systems						
Couplings Clamps Signal connectors as mating connectors MOTION-CONNECT DRIVE-CLiQ signal cables						

[1)] If you require information about the usability of motion control encoder measuring systems for Safety Integrated, please contact your local Siemens office.

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Overview



Incremental and absolute encoders with mounting accessories

Motion control encoders are optoelectronic built-on encoders that detect the traversing distances, angles of rotation, speeds or positions of machine axes. Motion control encoders are direct measuring systems that are built-on to shafts, axes or motors. They can be used in conjunction with numerical and programmable logic controllers, drives and position displays. Motion control encoders are system-tested, certified components that have been harmonized for use with the following systems:

- SINUMERIK CNCs
- SIMOTION Motion Control Systems
- SIMATIC programmable logic controllers
- SINAMICS drive systems

Application

Motion control encoders are used with machine tools and production machines as additional external measuring systems. They are available as incremental or absolute encoders.

Incremental encoders

In the case of incremental encoders, the machine must travel to a reference point after each power-off state, as the position is not usually stored in the controller. Movements of the machine while the power is off are not recorded.

Incremental encoders are suitable for use in simple machine concepts with mostly small dimensions.

Absolute encoders

Absolute encoders, on the other hand, also record movements while the power is off and return the actual position after power on. Travel to a reference point is not necessary.

Absolute encoders are suitable for complex machines or machines with large dimensions.

Design

All motion control encoders are available in Synchro flange and clamp flange versions. The absolute encoders are also available with a hollow shaft and torque arm.

The motion control encoders are driven via a plug-in coupling or spring disk coupling. Alternatively, pulleys can also be used.

The motor control encoder supply voltage is 5 V DC or alternatively 10 V to 30 V DC. The 10 V to 30 V DC version supports longer cable lengths. Most control systems supply the voltage directly at the measuring circuit connector. With SINAMICS, the measuring systems are provided with power via the Sensor Modules.

For motion control encoders with cables, the cable length including the connector is 1 m (3.28 ft).

The following bending radii must be observed for the cable to the built-on encoder:

- One-time bending: ≥ 20 mm (0.79 in)
- Continuous bending: ≥ 75 mm (2.95 in)

More information

Power supply

Absolute encoders with EnDat, SSI or DRIVE-CLiQ and incremental encoders with sin/cos 1 V_{pp}, HTL or TTL fulfill the requirements of IEC 61010-1 if power is supplied from a secondary circuit with limited energy (Low Voltage, Limited Energy) acc. to IEC 61010-1$^{3rd\ Ed.}$, Section 9.4 or from a Class 2 secondary circuit in accordance with UL 1310.

The corresponding sections of DIN EN 61010-1, EN 61010-1, UL 61010-1 and CAN/CSA-C22.2 No. 61010-1 can be used instead of IEC 61010-1$^{3rd\ Ed.}$, Section 9.4.

Absolute encoders with PROFIBUS DP and PROFINET IO fulfill the requirements of UL 508 and CAN/CSA-C22.2 No. 14 if power is supplied from a Class 2 secondary circuit as per National Electrical Code/Canadian Electrical Code.

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Function



Incremental encoder with sin/cos 1 V_{pp} and clamp flange incl. cable with connector as well as incremental encoder with RS422/HTL and Synchro flange

Incremental encoders detect relative movement and deliver a defined number of electrical pulses per revolution, which represent the measurement of the traveled distance or angle.

Incremental encoders operate on the principle of optoelectronic scanning of dividing discs with the transmitted light principle. The light source is a light emitting diode (LED). The light-dark modulation generated as the encoder shaft rotates is picked up by photoelectronic elements. With an appropriate arrangement of the line pattern on the dividing disk connected to the shaft and the fixed aperture, the photoelectronic elements provide two trace signals A and B at 90° to one another, as well as a reference signal R.

The encoder electronics amplify these signals and convert them to different output levels.

Signal levels

The following signal levels are available for the incremental encoders:

Signal level	Benefits
Analog signals sin/cos with level 1 V_{pp}	The analog signal allows the digitization of the trace signals. In order to obtain a fine resolution, the signals are interpolated in the higher-level controller.
RS422 differential signals (TTL)	The resolution can be quadrupled by means of edge evaluation.
HTL (High Voltage Transistor Logic)	Built-on encoders with an HTL interface are designed for applications with digital inputs with a 24 V level. The resolution can be quadrupled by means of edge evaluation.

Technical specifications

Article No.		6FX2001-3....	6FX2001-2....	6FX2001-4...0
Product name		Motion control encoder	Motion control encoder	Motion control encoder
Product designation		Incremental encoder with sin/cos 1 V_{pp}	Incremental encoder with RS422 (TTL)	Incremental encoder with HTL
Operating voltage DC V_p on encoder	V	5 ± 10 %	5 ± 10 % or 10 ... 30	10 ... 30
No-load current consumption, maximum	mA	150	150	150
Connection		Axial/radial flange outlet M23 or cable with connector M23	Axial/radial flange outlet M23 or cable with connector M23	Axial/radial flange outlet M23 or cable with connector M23
Limit frequency, typical	kHz	≥ 180 (- 3 dB) ≥ 450 (- 6 dB)	–	–
Scanning frequency, maximum	kHz	–	300	300
Resolution, maximum	S/R	2500	5000	2500
Signal level		Sinusoidal 1 V_{pp}	RS422 (TTL)	V_H ≥ 21 V with I_H = 20 mA at 24 V V_L ≤ 2.8 V with I_L = 20 mA at 24 V
Outputs protected against short-circuit to 0 V		Yes Briefly	Yes	Yes Briefly
Switching time (10 … 90 %) rise/fall time t_+/t_- (for 1 m (3.28 ft) cable and recommended input circuit)	ns	–	≤ 50	≤ 200
Phase angle, signal A to B Edge spacing	Degrees	90 ± 10	90	90
• At 300 kHz	µs	–	≥ 0.45	≥ 0.45
Cable length to downstream electronics, maximum [1]	m (ft)	150 (492)	100 (328) without fault signal 50 (164) with fault signal	300 (984)
Accuracy	arcsec	± 18 mech. × 3600/PPR count z	± 18 mech. × 3600/PPR count z	± 18 mech. × 3600/PPR count z
LED failure monitoring		–	High-resistance driver	High-resistance driver
Maximum mechanical speed	r/min	12000	12000	12000

S/R = signals/revolution

[1] With recommended cable and input circuitry of the downstream electronics, observe max. permissible cable length of module to be evaluated.

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Technical specifications

Article No.		6FX2001-3....	6FX2001-2....	6FX2001-4...0
Product name		Motion control encoder	Motion control encoder	Motion control encoder
Product designation		Incremental encoder with sin/cos 1 V_{pp}	Incremental encoder with RS422 (TTL)	Incremental encoder with HTL
Starting torque at 20 °C (68 °F)	Nm (lb_f-ft)	≤ 0.01 (0.01)	≤ 0.01 (0.01)	≤ 0.01 (0.01)
Shaft loading capacity				
• $n \leq$ 6000 r/min				
- Axial	N (lb_f)	40 (8.99)	40 (8.99)	40 (8.99)
- Radial at shaft end	N (lb_f)	60 (13.5)	60 (13.5)	60 (13.5)
• $n >$ 6000 r/min				
- Axial	N (lb_f)	10 (2.25)	10 (2.25)	10 (2.25)
- Radial at shaft end	N (lb_f)	20 (4.50)	20 (4.50)	20 (4.50)
Shaft diameter				
• Synchro flange	mm (in)	6 (0.24)	6 (0.24)	6 (0.24)
• Clamp flange	mm (in)	10 (0.39)	10 (0.39)	10 (0.39)
Shaft length				
• Synchro flange	mm (in)	10 (0.39)	10 (0.39)	10 (0.39)
• Clamp flange	mm (in)	20 (0.79)	20 (0.79)	20 (0.79)
Angular acceleration, maximum	rad/s^2	10^5	10^5	10^5
Moment of inertia of rotor	kgm^2 (lb_f-in-s^2)	≤ 2.9×10^{-6} (2.57×10^{-5})	≤ 2.9×10^{-6} (2.57×10^{-5})	≤ 2.9×10^{-6} (2.57×10^{-5})
Vibration (55 ... 2000 Hz) according to EN 60068-2-6	m/s^2 (ft/s^2)	≤ 300 (984)	≤ 300 (984)	≤ 300 (984)
Shock according to EN 60068-2-27				
• 6 ms	m/s^2 (ft/s^2)	≤ 2000 (6562)	≤ 2000 (6562)	≤ 2000 (6562)
Degree of protection				
• At housing		IP67	IP67	IP67
• At shaft input		IP64	IP64	IP64
Ambient temperature during				
Operation				
• Flange outlet or fixed cable				
- At V_p = 5 V ± 10 %	°C (°F)	-40 ... +100 (-40 ...+212)	-40 ... +100 (-40 ...+212)	-40 ... +100 (-40 ...+212)
- At V_p = 10 ... 30 V	°C (°F)	–	-40 ... +70 (-40 ... +158)	–
• Flexible cable				
- At V_p = 5 V ± 10 %	°C (°F)	-10 ... +100 (+14 ... +212)	-10 ... +100 (+14 ... +212)	-10 ... +100 (+14 ... +212)
- At V_p = 10 ... 30 V	°C (°F)	–	-10 ... +70 (+14 ... +158)	–
Net weight	kg (lb)	0.3 (0.66)	0.3 (0.66)	0.3 (0.66)
EMC		EMC Directive 2014/30/EC and regulations of EMC directives (applicable basic standards)		
Certificate of suitability		CE, CSA, UL, RCM, UKCA	CE, CSA, UL, RCM, UKCA	CE, CSA, UL, RCM, UKCA

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Selection and ordering data

Description	Article No.
Incremental encoder with sin/cos 1 V_{pp}	
5 V DC supply voltage	
• Synchro flange and connection via	
- Axial flange outlet	**6FX2001-3G■■■**
- Radial flange outlet	**6FX2001-3E■■■**
- Cable 1 m (3.28 ft) with connector[1)]	**6FX2001-3C■■■**
Resolution	
1000 S/R	**B00**
1024 S/R	**B02**
2500 S/R	**C50**
Incremental encoder with RS422 (TTL)	
5 V DC supply voltage	
• Synchro flange and connection via	
- Axial flange outlet	**6FX2001-2G■■■**
- Radial flange outlet	**6FX2001-2E■■■**
- Cable 1 m (3.28 ft) with connector [1)]	**6FX2001-2C■■■**
• Clamp flange and connection via	
- Axial flange outlet	**6FX2001-2R■■■**
- Radial flange outlet	**6FX2001-2P■■■**
- Cable 1 m (3.28 ft) with connector [1)]	**6FX2001-2M■■■**
10 ... 30 V DC supply voltage	
• Synchro flange and connection via	
- Axial flange outlet	**6FX2001-2H■■■**
- Radial flange outlet	**6FX2001-2F■■■**
- Cable 1 m (3.28 ft) with connector [1)]	**6FX2001-2D■■■**
• Clamp flange and connection via	
- Axial flange outlet	**6FX2001-2S■■■**
- Radial flange outlet	**6FX2001-2Q■■■**
- Cable 1 m (3.28 ft) with connector [1)]	**6FX2001-2N■■■**
Resolution	
500 S/R	**A50**
1000 S/R	**B00**
1024 S/R	**B02**
1250 S/R	**B25**
1500 S/R	**B50**
2000 S/R	**C00**
2048 S/R	**C04**
2500 S/R	**C50**
3600 S/R	**D60**
5000 S/R	**F00**

S/R = Signals/Revolution

Description	Article No.
Incremental encoder with HTL	
10 ... 30 V DC supply voltage	
• Synchro flange and connection via	
- Axial flange outlet	**6FX2001-4H■■0**
- Radial flange outlet	**6FX2001-4F■■0**
- Cable 1 m (3.28 ft) with connector[1)]	**6FX2001-4D■■0**
• Clamp flange and connection via	
- Axial flange outlet	**6FX2001-4S■■0**
- Radial flange outlet	**6FX2001-4Q■■0**
- Cable 1 m (3.28 ft) with connector[1)]	**6FX2001-4N■■0**
Resolution	
100 S/R	**A1**
500 S/R	**A5**
1000 S/R	**B0**
2500 S/R	**C5**

[1)] Universal integrated cable outlet for axial and radial outlet direction.

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Function



Absolute encoders with SSI/EnDat and PROFIBUS DP (top), and DRIVE-CLiQ and PROFINET IO (bottom)

Absolute encoders output an absolute angular position between 0° and 360°. They operate on the same scanning principle as incremental encoders, but have a greater number of tracks. For example, if there are 13 tracks, then 2^{13} = 8192 steps are coded in the case of single-turn encoders. The code used is a one-step code (gray code). This prevents any scanning errors from occurring. After switching on the machine, the position value is transferred immediately to the controller, travel to a reference point is not necessary.

All absolute encoders are available in single-turn and multi-turn versions.

Single-turn encoders

Single-turn encoders divide one rotation (360 degrees mechanical) into a specific number of steps, e.g. 8192. A unique code word is assigned to each position. After 360° the position values are repeated.

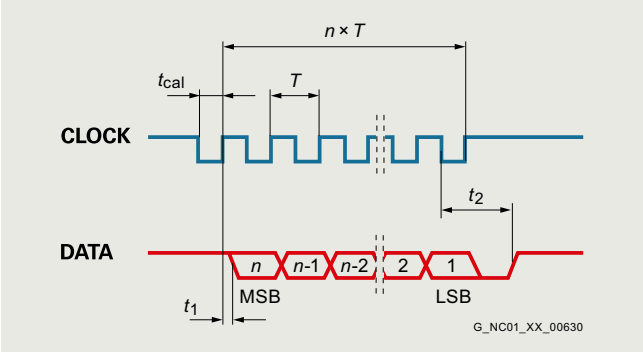
Multi-turn encoders

Multi-turn encoders record the number of revolutions in addition to the absolute position within one revolution. To do this, further code discs which are coupled via gear steps with the encoder shaft are scanned. When evaluating 12 additional tracks, this means that an additional 2^{12} = 4096 revolutions can be coded.

Interfaces

The following interfaces are supported by the absolute encoders:

Interface	Benefits
DRIVE-CLiQ	• Very high data transfer rates possible • Advantages in time-critical applications • Simple and quick automatic configuration using electronic rating plates • Fast and easy diagnostics with a single tool • One interface for connecting drives as well as indirect and direct measurement systems to the CNC.
SSI	• Advantages in time-critical applications
EnDat 2.1	• High data transfer rate, bidirectional • Advantages in time-critical applications • Incremental encoder sin/cos 1 V_{pp} • Connection via SINAMICS Sensor Modules SMC/SME
PROFIBUS DP-V2	• Parameterizable built-on encoder • Reduced wiring overhead in plants with a large number of encoders • Isochronous operation and direct data exchange
PROFINET IO	• Parameterizable built-on encoder • Reduced wiring overhead in plants with a large number of encoders • Supports conformity class C (IRT communication), B, A (RT communication) • IRT (isochronous mode) • 2 ports • Media redundancy with MRPD, MRP



Data transfer for absolute encoders with SSI interface

n = data word length (13 bits for single-turn and 25 bits for multi-turn)
T = 1 ... 10 µs
t_{cal} = ≤ 5 µs
t_1 = ≤ 0.4 µs (without cable)
t_2 = 17 ... 20 µs

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Technical specifications

Article No.		6FX2001-5.D..-1AA0	6FX2001-5.S..	6FX2001-5.E..
Product name		Motion control encoder	Motion control encoder	Motion control encoder
Product designation		Absolute encoder with DRIVE-CLiQ	Absolute encoder with SSI	Absolute encoder with EnDat 2.1
Operating voltage DC V_p on encoder	V	24 - 15 % + 20 %	4.75 ... 30	3.6 ... 14
Current consumption, approx.				
• Single-turn	mA	37	90	90
• Multi-turn	mA	43	120	120
Connection		Radial flange outlet M12	Axial/radial flange outlet M23	Axial/radial flange outlet M23
Interface		DRIVE-CLiQ	SSI	EnDat 2.1
Clock input		–	Differential cable receiver acc. to EIA standard RS 485	Differential cable receiver acc. to EIA standard RS 485
Data output		DRIVE-CLiQ	Differential cable driver acc. to EIA standard RS 485	Differential cable driver acc. to EIA standard RS 485
Short-circuit strength		Yes	Yes	Yes
Transfer rate	Mbps	100	–	–
Transfer rate	kHz	–	100 ... 1000	100 ... 2000
Maximum speed				
• Electrical	r/min	14000	–	–
- With ± 1 LSB accuracy	r/min	–	5000	5000
- With ± 12 LSB accuracy	r/min	12000	–	–
- With ± 100 LSB accuracy	r/min	–	12000	12000
• Mechanical				
- Single-turn	r/min	15000	15000	15000
- Multi-turn	r/min	12000	12000	12000
Cable length to downstream electronics, maximum [1]	m (ft)	100 (328)	–	–
• Up to 300 kHz cycle	m (ft)	–	100 (328)	150 (492)
• Up to 1 MHz cycle	m (ft)	–	50 (164)	50 (164)
• Up to 2 MHz cycle	m (ft)	–	–	10 (32.8)
Resolution				
• Single-turn	bit	24	13 (8192 steps)	13 (8192 steps)
• Multi-turn	bit	36 (2^{24} steps × 4096 revolutions)	25 (8192 steps × 4096 revolutions)	25 (8192 steps × 4096 revolutions)
Frame				
• Single-turn	bit	–	13 without parity	According to EnDat specification
• Multi-turn	bit	–	25 without parity	According to EnDat specification
Incremental track	S/R	2048, 1 V_{pp} (internal only)	–	512, 1 V_{pp}
Code type				
• Transfer		DRIVE-CLiQ	Gray, fir tree format	Dual
Parameterization capability				
• Preset		–	Set to zero	–
• Counting direction		–	Yes	–
Accuracy	arcsec	± 20	± 60 (with 8192 steps)	± 60 (incremental track)
Starting torque at 20 °C (68 °F)	Nm (lb_f-ft)	≤ 0.01 (0.01)	≤ 0.01 (0.01)	≤ 0.01 (0.01)

S/R = signals/revolution

[1] Observe the max. permissible cable length of the connected module.

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Technical specifications

Article No.		6FX2001-5.D..-1AA0	6FX2001-5.S..	6FX2001-5.E..
Product name		Motion control encoder	Motion control encoder	Motion control encoder
Product designation		Absolute encoder with DRIVE-CLiQ	Absolute encoder with SSI	Absolute encoder with EnDat 2.1
Solid shaft loading capacity				
• $n \leq$ 6000 r/min				
- Axial	N (lb_f)	40 (8.99)	40 (8.99)	40 (8.99)
- Radial at shaft end	N (lb_f)	60 (13.5)	60 (13.5)	60 (13.5)
• $n >$ 6000 r/min				
- Axial	N (lb_f)	10 (2.25)	10 (2.25)	10 (2.25)
- Radial at shaft end	N (lb_f)	20 (4.50)	20 (4.50)	20 (4.50)
Shaft diameter				
• Synchro flange	mm (in)	6 (0.24) with flat face	6 (0.24)	6 (0.24)
• Clamp flange	mm (in)	10 (0.39) with flat face	10 (0.39)	10 (0.39)
• Torque arm Hollow shaft	mm (in)	10 (0.39) or 12 (0.47)	–	–
Shaft length				
• Synchro flange	mm (in)	10 (0.39)	10 (0.39)	10 (0.39)
• Clamp flange	mm (in)	20 (0.79)	20 (0.79)	20 (0.79)
Angular acceleration, maximum	rad/s^2	10^5	10^5	10^5
Moment of inertia of rotor				
• Solid shaft	kgm^2 (lb_f-in-s^2)	2.9×10^{-6} (2.57×10^{-5})	2.9×10^{-6} (2.57×10^{-5})	2.9×10^{-6} (2.57×10^{-5})
• Hollow shaft	kgm^2 (lb_f-in-s^2)	4.6×10^{-6} (4.07×10^{-5})	–	–
Vibration (55 ... 2000 Hz) according to EN 60068-2-6				
• Solid shaft	m/s^2 (ft/s^2)	≤ 300 (984)	≤ 300 (984)	≤ 300 (984)
• Hollow shaft	m/s^2 (ft/s^2)	≤ 150 (492)	–	–
Shock according to EN 60068-2-27				
• 6 ms				
- Solid shaft	m/s^2 (ft/s^2)	≤ 2000 (6562)	≤ 2000 (6562)	≤ 2000 (6562)
- Hollow shaft	m/s^2 (ft/s^2)	≤ 1000 (3281)	–	–
Degree of protection				
• At housing		IP67	IP67	IP67
• At shaft input		IP64	IP64	IP64
Ambient temperature during				
• Operation	°C (°F)	-30 ... +100 (-22 ...+212)	-40 ... +100 (-40 ...+212)	-40 ... +100 (-40 ...+212)
Net weight				
• Single-turn	kg (lb)	0.35 (0.77)	0.35 (0.77)	0.35 (0.77)
• Multi-turn	kg (lb)	0.35 (0.77)	0.35 (0.77)	0.35 (0.77)
EMC		EMC Directive 2014/30/EC and regulations of EMC directives (applicable basic standards)		
Certificate of suitability		CE, CSA, UL, RCM, UKCA	CE, CSA, UL, RCM, UKCA	CE, CSA, UL, RCM, UKCA

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Technical specifications

Article No.		6FX2001-5.P..	6FX2001-5.N..
Product name		Motion control encoder	Motion control encoder
Product designation		Absolute encoder with PROFIBUS DP	Absolute encoder with PROFINET IO
Operating voltage DC V_p on encoder	V	10 ... 30	10 ... 30
Power consumption, max.	W	2.5	3
Connection		Terminal block with address selector switch and bus terminating resistor in removable cover with radial cable glands (3 units)	2 × M12 connectors, D-coded, 4-pole for PROFINET ports 1 × M12 connector, A-coded, 4-pole for operating voltage
• Cable diameter	mm (in)	6.5 ... 9 (0.26 ... 0.35) Removal of cover possible without interrupting bus	–
Interface		PROFIBUS DP-V2	PROFINET IO with RT/IRT
Clock input		Differential cable receiver acc. to EIA standard RS 485	2 ports IRT
Data output		Differential cable driver acc. to EIA standard RS 485	2 ports IRT
Short-circuit strength		Yes	Yes
Transfer rate	Mbps	12	100
LED for diagnostics		Green/red	Green/red/yellow/orange
Maximum speed			
• Electrical			
- With ± 1 LSB accuracy	r/min	5000	5000
• Mechanical			
- Single-turn	r/min	12000	12000
- Multi-turn	r/min	6000	6000
Cable length to downstream electronics, maximum [1]			
• Up to 93.75 Kbps	m (ft)	1200 (3937)	–
• Up to 1.5 Mbps	m (ft)	200 (656)	–
• Up to 12 Mbps	m (ft)	100 (328)	100 (328)
Number of nodes		99	–
Resolution			
• Single-turn	bit	13 (8192 steps)	13 with V4.1, 16 with V4.2 (8192/65536 steps)
• Multi-turn	bit	27 (8192 steps × 16384 revolutions)	27 with V4.1, 30 with V4.2 (8192/65536 steps × 16384 revolutions)
Frame		According to PNO encoder profile V4.1 Class 1, Class 2, Class 3, Class 4 Standard frame 81	According to PNO encoder profile V4.1 and V4.2 Class 1, Class 2, Class 3, Class 4 Standard frames 81/82/83/84/86/87/88/89 Siemens frame 860/862
Code type			
• Sampling		Gray	Gray
• Transfer		Binary, PROFIBUS	Binary, PROFINET
Bus load, approx.			
• At 12 Mbps per encoder	µs	20	–
Cycle time	ms	1	0.25 ... 100
Parameterization capability			
• Resolution per revolution		1 ... 8192	1 ... 8192/65536
• Total resolution		1 ... 134217728	1 ... 134217728/1073741824
• Preset		Yes	Yes
• Counting direction		Yes	Yes
• Velocity signal		Yes	Yes
• Limit switches		Yes, 2 units	No
• Isochronous mode		Yes	Yes
• Direct data exchange		Yes	No

[1] Observe the max. permissible cable length of the connected module.

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Technical specifications

Article No.		6FX2001-5.P..	6FX2001-5.N..
Product name		Motion control encoder	Motion control encoder
Product designation		Absolute encoder with PROFIBUS DP	Absolute encoder with PROFINET IO
Online parameterization		Yes	Yes
PNO certificate		Yes	Yes
Supported profiles		PNO encoder profile V4.1	PNO encoder profile V4.1 and V4.2
Accuracy	arcsec	± 79 (± 1 LSB with 8192 steps)	± 79 (± 1 LSB with 8192 steps) (± 2 LSB with 65536 steps)
Friction torque at 20 °C (68 °F)	Nm (lb_f-ft)	≤ 0.03 (0.02)	≤ 0.03 (0.02)
Starting torque at 20 °C (68 °F)	Nm (lb_f-ft)	≤ 0.03 (0.02)	≤ 0.03 (0.02)
Shaft loading capacity			
• $n \leq$ 6000 r/min			
- Axial	N (lb_f)	40 (8.99)	40 (8.99)
- Radial at shaft end	N (lb_f)	110 (24.7)	110 (24.7)
• $n >$ 6000 r/min			
- Axial	N (lb_f)	10 (2.25)	10 (2.25)
- Radial at shaft end	N (lb_f)	20 (4.50)	20 (4.50)
Shaft diameter			
• Synchro flange	mm (in)	6 (0.24)	6 (0.24)
• Clamp flange	mm (in)	10 (0.39)	10 (0.39)
Torque arm Hollow shaft [1]	mm (in)	15 (0.59)	15 (0.59)
Shaft length			
• Synchro flange	mm (in)	10 (0.39)	10 (0.39)
• Clamp flange	mm (in)	20 (0.79)	20 (0.79)
Angular acceleration, maximum	rad/s^2	10^5	10^5
Moment of inertia of rotor			
• Solid shaft	kgm^2 (lb_f-in-s^2)	1.90×10^{-6} (1.68×10^{-5})	1.90×10^{-6} (1.68×10^{-5})
• Hollow shaft	kgm^2 (lb_f-in-s^2)	2.80×10^{-6} (2.47×10^{-5})	2.80×10^{-6} (2.47×10^{-5})
Vibration (55 ... 2000 Hz) according to EN 60068-2-6	m/s^2 (ft/s^2)	≤ 100 (328)	≤ 100 (328)
Shock according to EN 60068-2-27			
• 6 ms	m/s^2 (ft/s^2)	≤ 1000 (3281)	≤ 1000 (3281)
Degree of protection			
• At housing		IP67	IP67
• At shaft input		IP64	IP64
Ambient temperature during			
• Operation	°C (°F)	-40 ... +85 (-40 ... +185)	-40 ... +85 (-40 ... +185)
Net weight			
• Single-turn	kg (lb)	0.4 (0.88)	0.4 (0.88)
• Multi-turn	kg (lb)	0.5 (1.1)	0.5 (1.1)
EMC		EMC Directive 2014/30/EC and regulations of EMC directives (applicable basic standards)	
Certificate of suitability		CE, CSA, UL, RCM, UKCA	CE, CSA, UL, RCM, UKCA

[1] Hollow shaft diameter 12 mm, 10 mm or 8 mm (0.47 in, 0.39 in or 0.31 in) possible using supplied reduction sleeves.

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Selection and ordering data

Description	Article No.
Absolute encoders with DRIVE-CLiQ	
24 V DC supply voltage	
• Radial connection	
- Synchro flange Solid shaft	**6FX2001-5FD■■-1AA0**
- Clamp flange Solid shaft	**6FX2001-5QD■■-1AA0**
- Torque arm Hollow shaft diameter 10 mm (0.39 in)	**6FX2001-5VD■■-1AA0**
- Torque arm Hollow shaft diameter 12 mm (0.47 in)	**6FX2001-5WD■■-1AA0**
Resolution	
• Single-turn 24 bit	**1 3**
• Multi-turn 36 bit	**2 5**
Absolute encoders with SSI	
4.75 ... 30 V DC supply voltage	
• Synchro flange and connection via	
- Axial flange outlet	**6FX2001-5HS■■**
- Radial flange outlet	**6FX2001-5FS■■**
• Clamp flange and connection via	
- Axial flange outlet	**6FX2001-5SS■■**
- Radial flange outlet	**6FX2001-5QS■■**
Resolution	
• Single-turn 8192 steps/revolution (13 bit)	**1 2**
• Multi-turn 8192 steps/revolution, 4096 revolutions (25 bit)	**2 4**
Absolute encoders with EnDat 2.1	
3.6 ... 14 V DC supply voltage	
• Synchro flange and connection via	
- Axial flange outlet	**6FX2001-5HE■■**
- Radial flange outlet	**6FX2001-5FE■■**
• Clamp flange and connection via	
- Axial flange outlet	**6FX2001-5SE■■**
- Radial flange outlet	**6FX2001-5QE■■**
Resolution	
• Single-turn 8192 steps/revolution (13 bit)	**1 3**
• Multi-turn 8192 steps/revolution, 4096 revolutions (25 bit)	**2 5**

Description	Article No.
Absolute encoders with PROFIBUS DP	
10 ... 30 V DC supply voltage	
• Radial connection	
- Synchro flange Solid shaft	**6FX2001-5FP■■**
- Clamp flange Solid shaft	**6FX2001-5QP■■**
- Torque arm Hollow shaft diameter 15 mm (0.59 in) [1]	**6FX2001-5WP■■**
Resolution	
• Single-turn 8192 steps/revolution (13 bit)	**1 2**
• Multi-turn 8192 steps/revolution, 16384 revolutions (27 bit)	**2 4**
Absolute encoders with PROFINET IO	
10 ... 30 V DC supply voltage	
• Radial connection	
- Synchro flange Solid shaft	**6FX2001-5FN■■**
- Clamp flange Solid shaft	**6FX2001-5QN■■**
- Torque arm Hollow shaft diameter 15 mm (0.59 in) [1]	**6FX2001-5WN■■**
Resolution	
• Single-turn 8192 steps/revolution (13 bit) 65536 steps/revolution (16 bit)	**1 3**
• Multi-turn 8192 steps/revolution, 16384 revolutions (27 bit) 65536 steps/revolution, 16384 revolutions (30 bit)	**2 5**

More information

Since the DRIVE-CLiQ interface has been disclosed, it is possible to use absolute encoders with integrated DRIVE-CLiQ interface from a range of different manufacturers.

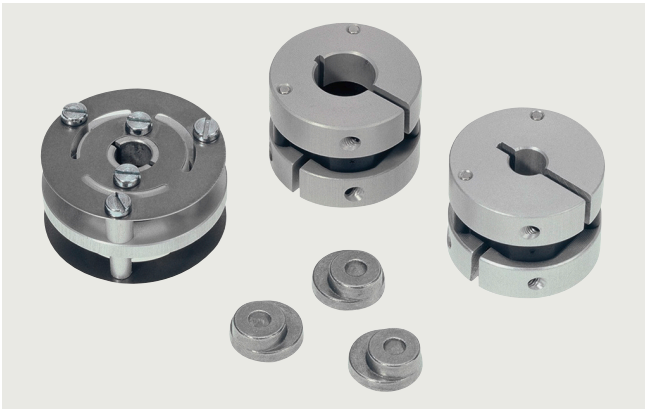
You can find additional information on the internet at:

https://support.industry.siemens.com/cs/document/65402168

[1] Hollow shaft diameter 12 mm, 10 mm or 8 mm (0.47 in, 0.39 in or 0.31 in) possible using supplied reduction sleeves.

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Overview



Couplings and clamps

Couplings

The motion control encoders are driven via a plug-in coupling or spring disk coupling. Alternatively, pulleys can also be used.

Clamps

Motion control encoders with Synchro flange can be axially mounted on the machine with screws or secured with 3 clamps.

Signal connectors as mating connectors

A signal connector is available as a mating connector for motion control encoders with flange outlet or with cable and connector.

The mating connector with 12 contacts is suitable for all incremental encoders.

The mating connector with 17 contacts is suitable for absolute encoders with EnDat.

Signal connector

A signal connector is available as a replacement for motion control encoders with cable and connector.

MOTION-CONNECT DRIVE-CLiQ signal cables

Pre-assembled MOTION-CONNECT DRIVE-CLiQ signal cables with M12 plug are available as basic cables and extensions for connecting motion control encoders with DRIVE-CLiQ interface.

For further information about the signal cables, refer to “MOTION-CONNECT connection systems”.

Technical specifications

Article No.		6FX2001-7KF06	6FX2001-7KF10	6FX2001-7KS06	6FX2001-7KS10
Product designation		Spring disk coupling	Spring disk coupling	Plug-in coupling	Plug-in coupling
Diameter					
• 1st shaft diameter	mm (in)	6 (0.24)	6 (0.24)	6 (0.24)	10 (0.39)
• 2nd shaft diameter	mm (in)	5 (0.20)	6 (0.24)	6 (0.24)	10 (0.39)
Transferable torque, maximum	Nm (lb_f-ft)	0.8 (0.59)	0.8 (0.59)	0.7 (0.52)	0.7 (0.52)
Maximum mechanical speed	r/min	12000	12000	12000	12000
Center offset of shafts, maximum	mm (in)	0.4 (0.02)	0.4 (0.02)	0.5 (0.02)	0.5 (0.02)
Axial displacement	mm (in)	0.4 (0.02)	0.4 (0.02)	0.5 (0.02)	0.5 (0.02)
Angular displacement of shafts, maximum	°	3	3	1	1
Rigidity					
• Radial	Nm/rad (lb_f-ft/rad)	150 (111)	150 (111)	31 (22.9)	31 (22.9)
• Axial	N/mm (lb_f/mm)	6 (1.35)	6 (1.35)	10 (2.25)	10 (2.25)
Moment of inertia	kgcm^2 (lb_f-in-s^2)	0.019 (1.68 × 10^{-5})	0.019 (1.68 × 10^{-5})	0.02 (1.77 × 10^{-5})	0.02 (1.77 × 10^{-5})
Ambient temperature during					
• Operation	°C (°F)	-40 ... +150 (-40 ... +302)	-40 ... +150 (-40 ... +302)	-40 ... +80 (-40 ... +176)	-40 ... +80 (-40 ... +176)
Outer diameter	mm (in)	30 (1.18)	30 (1.18)	25 (0.98)	25 (0.98)
Length	mm (in)	18.3 (0.72)	18.3 (0.72)	19 (0.75)	19 (0.75)
Net weight	g (oz)	16 (0.56)	16 (0.56)	20 (0.7)	20 (0.7)

Article No.		6FX2001-7KP01
Product designation		Clamp
Outer diameter		
• 1st clamp diameter	mm (in)	9 (0.35)
• 2nd clamp diameter	mm (in)	12 (0.47)
Clamp hole diameter	mm (in)	3.2 (0.13)
Height	mm (in)	5.5 (0.22)
Net weight	g (oz)	3 (0.1)

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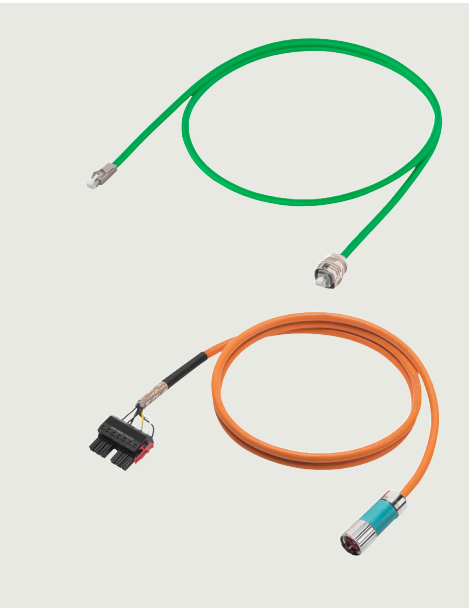
Selection and ordering data

Description	Article No.
Spring disk coupling	
For shaft diameter:	
• 6 mm/6 mm (0.24 in/0.24 in)	**6FX2001-7KF10**
• 6 mm/5 mm (0.24 in/0.20 in)	**6FX2001-7KF06**
Plug-in coupling	
For shaft diameter:	
• 6 mm/6 mm (0.24 in/0.24 in)	**6FX2001-7KS06**
• 10 mm/10 mm (0.39 in/0.39 in)	**6FX2001-7KS10**
Clamp (1 unit) For built-on encoder with Synchro flange (3 units are required.)	**6FX2001-7KP01**
Signal connector with cap nut (1 unit) Mating connector for incremental encoder with sin/cos 1 V_{pp}, RS422 (TTL) and HTL and absolute encoder with SSI 12-pole, insulator each with 12 socket contacts 0.08 ... 0.22 mm^2 and 0.20 ... 0.56 mm^2, 2 × cable clamping 6.5 ... 10 mm (0.26 ... 0.39 in) and 10.1 ... 13 mm (0.40 ... 0.51 in)	**6FX2003-0SU12**
Signal connector with cap nut (1 unit) Mating connector for absolute encoder with EnDat 17-pole, insulator with 17 socket contacts 0.20 ... 0.56 mm^2, 2 × cable clamping 6.5 ... 10 mm (0.26 ... 0.39 in) and 10.1 ... 13 mm (0.40 ... 0.51 in)	**6FX2003-0SU17**
Signal connector with external thread for encoders with cable (1 unit) Replacement connector for incremental encoders with sin/cos 1 V_{pp}, RS422 (TTL) and HTL 12-pole, insulator with 12 pin contacts 0.20 ... 0.56 mm^2, 2 × cable clamping 6.5 ... 10 mm (0.26 ... 0.39 in) and 10.1 ... 13 mm (0.40 ... 0.51 in)	**6FX2003-0SA12**

Description	Article No.
Power connecting cable Pre-assembled cable for power supply of the absolute encoders with PROFINET IO with M12 plug connector and M12 plug socket, A-coded, 4-pole	
• Length 2 m (6.56 ft)	**6XV1801-5DH20**
• Length 3 m (9.84 ft)	**6XV1801-5DH30**
• Length 5 m (16.4 ft)	**6XV1801-5DH50**
• Length 10 m (32.8 ft)	**6XV1801-5DN10**
• Length 15 m (49.2 ft)	**6XV1801-5DN15**
IE connecting cable Pre-assembled signal cable for absolute encoders PROFINET IO with M12 plug connector and RJ45, D-coded, 4-pole	
• Length 2 m (6.56 ft)	**6XV1871-5TH20**
• Length 3 m (9.84 ft)	**6XV1871-5TH30**
• Length 5 m (16.4 ft)	**6XV1871-5TH50**
• Length 10 m (32.8 ft)	**6XV1871-5TN10**
• Length 15 m (49.2 ft)	**6XV1871-5TN15**
IE FC RJ45 Plug 145 (1 unit) 2 × 2 RJ45 connector with rugged metal enclosure and FC connection technology, 145° cable outlet	**6GK1901-1BB30-0AA0**
IE FC M12 Plug PRO (1 unit) M12 connector with metal enclosure and FC connection technology, axial cable outlet, D-coded	**6GK1901-0DB20-6AA0**
IE POWER M12 CABLE CONNECTOR PRO (3 units) Connection socket for connecting SCALANCE W-700/X208pro for 24 V DC supply voltage, 4-pole, A-coded, including assembly instructions	**6GK1907-0DC10-6AA3**
IE FC TP Trailing Cable 2 × 2 (PROFINET Type C) 4-wire, shielded, PROFINET-compliant, TP installation cable for use in cable carriers, sold by the meter Max. length 2000 m (6562 ft) Minimum order 20 m (65.6 ft)	**6XV1840-3AH10**
MOTION-CONNECT DRIVE-CLiQ signal cable [1] For encoder systems with DRIVE-CLiQ and M12 connection	**6FX.002-2DC3.-1..0**

[1] For complete Article No. and length code, refer to "MOTION-CONNECT connection systems".

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10/2 Overview

10/5 Introduction

10/8 Power cables for SINAMICS S120/S220
Power cables for SIMOTICS S-1FT2/S-1FK2/S-1FT7/M-1PH8 motors
10/10 with SPEED-CONNECT connector
10/13 with full-thread connector
10/17 Extensions for power cables with SPEED-CONNECT connector or full-thread connector
Power cables for motors
10/18 SIMOTICS M-1PH8 with terminal box
10/21 SIMOTICS L-1FN3
10/23 SIMOTICS T-1FW3
10/24 SIMOTICS T-1FW6

10/25 Hybrid cables for SINAMICS S120M
10/25 Hybrid cables for SINAMICS S120M distributed servo drive

10/26 Connecting motors with One Cable Connection (OCC) technology to SINAMICS S120/S220
10/26 OCC adapter

10/27 Signal cables for SINAMICS S120/S220
DRIVE-CLiQ signal cables
10/31 without 24 V DC cores for SINAMICS S120
10/32 without 24 V DC cores for SINAMICS S220
10/33 MOTION CONNECT with 24 V DC cores
Signal cables for motors
10/36 with SPEED-CONNECT connector
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10/46 SINAMICS S120 Motor Modules
10/51 SINAMICS S120M distributed servo drive
10/52 SINAMICS S120 Power Modules
10/55 SINAMICS S120 Sensor Modules Cabinet-Mounted
10/57 SIMOTICS S-1FT2/-1FT7 motors with DRIVE-CLiQ interface
10/58 External measuring systems with DRIVE-CLiQ interface

10/59 Accessories for power and signal cables
10/59 Power and signal connectors
10/60 Mounting flange
10/61 DRIVE-CLiQ cabinet bushings
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Chap. 12 **Siemens Product Configurator selection tool**
Product selection via selectors
www.siemens.com/spc

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Power cables

Cable	For motor	MOTION-CONNECT 500	MOTION-CONNECT 800PLUS	Page
Dynamic requirements	SIMOTICS	Medium	High	
Environmental requirements		Medium	High	
UL/CSA		✔	✔	
Halogen-free		–	✔	
RoHS		✔	✔	
Power cables with SPEED-CONNECT connector				
	S-1FT2/S-1FK2	✔	✔	**10/10 ... 10/12**
	S-1FT7	✔	✔	**10/10 ... 10/12**
	M-1PH808 M-1PH810	✔	✔	**10/10**
Power cables with full-thread connector				
	S-1FT2/S-1FK2	✔	✔	**10/13 ... 10/16**
	S-1FT7	✔	✔	**10/13 ... 10/16**
	M-1PH808 M-1PH810 M-1PH813	✔	✔	**10/13, 10/16**
	L-1FN3	–	✔	**10/21**
	T-1FW6	–	✔	**10/24**
Extensions for power cables with SPEED-CONNECT or full-thread connector				
	S-1FT2/S-1FK2	✔	✔	**10/17**
	S-1FT7	✔	✔	**10/17**
	M-1PH808 M-1PH810 M-1PH813	✔	✔	**10/17**
	L-1FN3	–	✔	**10/21**
	T-1FW6	–	✔	**10/24**
Power cables for motors with terminal box				
	M-1PH8	✔ from 35 mm^2	✔ up to 16 mm^2	**10/18, 10/19**
	T-1FW3	✔	✔ up to 16 mm^2	**10/23**

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Hybrid cables for SINAMICS S120M distributed servo drive

Cable	For distributed servo drive	MOTION-CONNECT 800PLUS	Page
Dynamic requirements	SINAMICS S120M	High	
Environmental requirements		High	
UL/CSA		✔	
Halogen-free		✔	
RoHS		✔	
Hybrid cables			
	6FX8002-7HY	✔	**10/25**

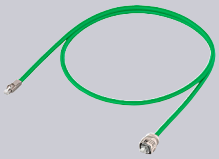
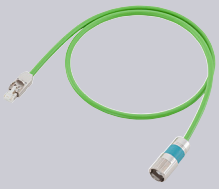
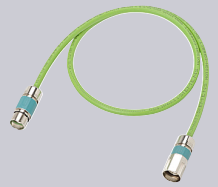
✔ = Possible
– = Not possible

One Cable Connection (OCC) technology for SINAMICS S120/S220

Adapter	For SINAMICS S120/S220		Page
For module	Motor Modules in booksize format		
OCC adapter			
	• For connecting motors with OCC to Single Motor Modules • For connecting motors with OCC to Double Motor Modules	6FX2003-2CC01 6FX2003-2CC02	**10/26**

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Signal cables

Cable	For motor	MOTION-CONNECT 500	MOTION-CONNECT 800PLUS	Page
Dynamic requirements	SIMOTICS	Medium	High	
Environmental requirements		Medium	High	
UL/CSA		✔	✔	
Halogen-free		–	✔	
RoHS		✔	✔	
MOTION-CONNECT DRIVE-CLiQ signal cables				
	S-1FT7	✔	✔	**10/33**
	M-1PH8	✔	✔	**10/33**
	L-1FN3	✔	✔	**10/33**
	T-1FW3	✔	✔	**10/33**
	T-1FW6	✔	✔	**10/33**
DRIVE-CLiQ signal cables and extensions for connecting non-Siemens direct measuring systems				
	Non-Siemens direct measuring systems with DRIVE-CLiQ interface	✔	✔	**10/34**
DRIVE-CLiQ signal cables with M17 connection				
	S-1FT2/S-1FK2	✔	✔	**10/35**
	S-1FT7	✔	✔	**10/35**
Signal cables with SPEED-CONNECT connector				
	S-1FT7	✔	✔	**10/36**
	M-1PH8	✔	✔	**10/36**
Signal cables with full-thread connector				
	M-1PH8	✔	✔	**10/37**
	L-1FN3	–	✔	**10/37**
	T-1FW3	✔	✔	**10/37**
	T-1FW6	–	✔	**10/37**
Extensions for signal cables with SPEED-CONNECT and full-thread connector				
		✔	✔	**10/36, 10/37**
Signal cables with full-thread connector				
	for temperature sensor	–	✔	**10/38**

✔ = Possible
– = Not possible

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Overview

MOTION-CONNECT cables are suitable for use with many different types of machine tools and production machinery.

The following variants of MOTION-CONNECT cable are available as fully-assembled power and signal cables or sold by the meter:

- **MOTION-CONNECT 500**
  - Cost-effective solution for predominantly fixed installation
  - Suitable for low mechanical loading
  - Tested for travel distances up to 5 m (16.4 ft)
- **MOTION-CONNECT 800PLUS**
  - Meets requirements for use in cable carriers
  - Suitable for high mechanical loading
  - Oil resistance
  - Tested for travel distances of up to 50 m (164 ft)

Benefits

Pre-assembled MOTION-CONNECT cables provide high quality and perfect, system-tested functionality.

SPEED-CONNECT

Fast, stable and reliable connections can be made with the new, pre-assembled cables with SPEED-CONNECT connectors. With a short rotation as far as the stop, the cap nut of the connector secures the connection.

The cables with SPEED-CONNECT connectors supplement the previous offering of MOTION-CONNECT cables with full-thread connectors.

Application

MOTION-CONNECT cables are intended for use in machines. They are not suitable for building technology applications or outdoor installation.

MOTION-CONNECT cables have been tested in a cable carrier with horizontal travel distance and have also been designed for this type of application. They are not self-supporting.

The pre-assembled cables can be ordered in length units of 10 cm (3.94 in) and can be extended, if necessary.

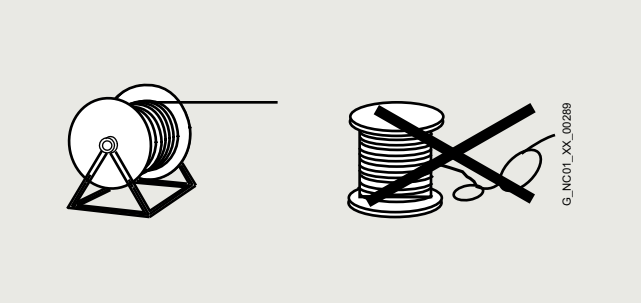
When cable lengths (basic cables and extensions) are determined for the systems and applications described in this catalog, the technically permissible maximum cable lengths (e.g., 25 m (82 ft)) specified in the catalog must be observed. Malfunctions can occur if longer cables are used.

Siemens assumes no liability for correct transmission of signals or power in this case.

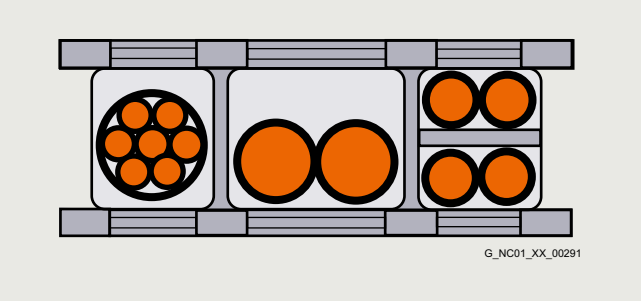
Compatibility between SPEED-CONNECT and full-thread connectors:

Connector on motor with external thread	Connector with cap nut on cable	Compatibility
SPEED-CONNECT	SPEED-CONNECT	✔
SPEED-CONNECT[1)]	Full-thread	✔
Full-thread	Full-thread	✔
Full-thread	SPEED-CONNECT	–

Function



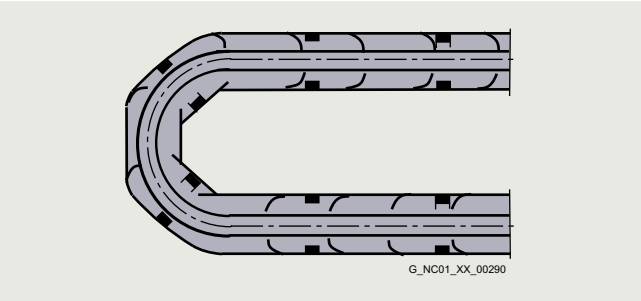
The cables must be removed from the drum without twisting, i.e., the cables must be unwound and must never be lifted over the drum flange in loops.



To maximize the service life of the cable carrier and cables, cables in the carrier made from different materials must be separated by spacers in the cable carrier. The spacers must be filled evenly to ensure that the position of the cables does not change during operation. The cables should be distributed as symmetrically as possible according to their weights and dimensions. Cables with very different outer diameters should also be separated by spacers.

When inserting pre-assembled cables into the cable carrier, do **not** pull at the connector, as this may damage the strain relief or cable clamping.

The cables must not be fixed in the cable carrier. They must be freely movable.



The cables must be able to be moved without applying force in particular in the bending radii of the carrier. The specified minimum bending radii must be adhered to.

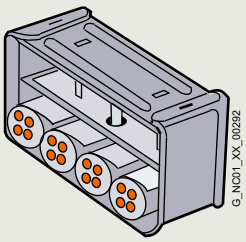
The cable fixings must be attached at both ends at an appropriate distance away from the end points of the moving parts in a dead zone.

[1)] In case of shocks and vibrations, an additional O-ring is recommended to prevent the connection from loosening.

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General information

Function



MOTION-CONNECT cables are tested in a cable carrier. The cables are attached at one end by means of strain relief to the moving ends of the cable carrier. Strain relief is applied over a wide area of the cable jacket surface without crimping the cable.

Cables must be installed in accordance with the instructions supplied by the cable carrier manufacturer.

Note:

If, for example, pre-assembled cables are installed in a cable carrier in such a way that the connector would inhibit assembly, pre-assembled cables without assembled connectors can also be supplied (power and signal cables [1]).
Depending on the version, the contacts of the cables are crimped and the connector is supplied separately. After installing the cables, the customer assembles the connector.

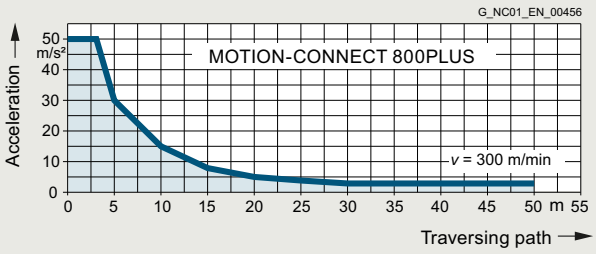
In case of vibration load and with horizontal or vertical cable entries, we recommend that the cable is additionally fixed if between the cable strain relief on the cable carrier and the terminal at the motor part of the cable is hanging loose or is not routed. To prevent machine vibrations being transmitted to the connectors, the cable should be fixed at the moving part where the motor is mounted.

Representation in connection overviews

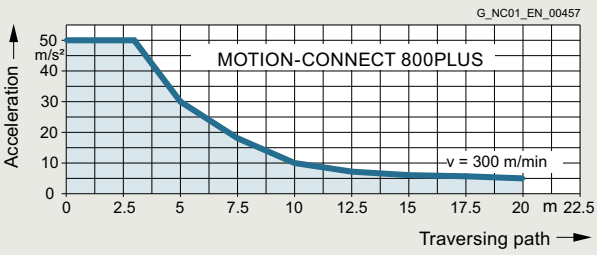
Symbol	Explanation
	Connector with pin contacts
	Connector with socket contacts
	Bare wire ends
	Cable must be supplied by the customer

Characteristic curves

The shaded area beneath the characteristic represents the potential range of use for the cables. The characteristics represent the tested operating points.



Acceleration for MOTION-CONNECT 800PLUS signal and power cables up to 16 mm^2



Permissible acceleration for MOTION-CONNECT 800PLUS cables of 25 mm^2, 35 mm^2, and 50 mm^2

[1] Not applicable to DRIVE-CLiQ signal cables.

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More information

Current carrying capacity for power and signal cables

The current carrying capacity of PVC/PUR-insulated copper cables is specified for installation types B1, B2, C, and E under continuous operating conditions in the table with reference to an ambient air temperature of 40 °C (104 °F). For other ambient temperatures, the values must be corrected by the derating factors from the table.

Cross-section	**Current carrying capacity** rms AC 50/60 Hz or DC in amps for installation type			
	B1 Single-core cables in conduits or installation ducts	**B2** Multi-core cables in conduits or cable ducts	**C** Multi-core cables, vertically or horizontally on walls/open, without conduits and installation ducts/with contact	**E** Multi-core cables, horizontally or vertically on perforated cable racks/ open, without conduits and installation ducts/with contact
mm^2				
Electronics [1]				
0.20	–	4.3	4.4	4.4
0.50	–	7.5	7.5	7.8
0.75	–	9	9.5	10
Power [2]				
0.75	8.6	8.5	9.8	10.4
1.00	10.3	10.1	11.7	12.4
1.50	13.5	13.1	15.2	16.1
2.50	18.3	17.4	21	22
4	24	23	28	30
6	31	30	36	37
10	44	40	50	52
16	59	54	66	70
25	77	70	84	88
35	96	86	104	110
50	117	103	125	133
70	149	130	160	171
95	180	165	194	207
120	208	179	225	240

Derating factors for power and signal cables

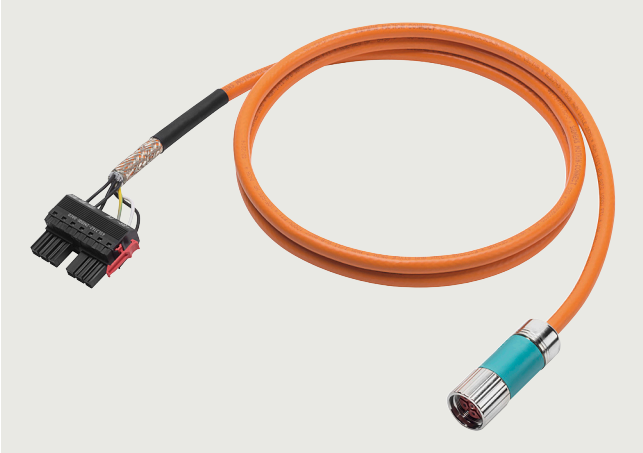
Ambient air temperature °C (°F)	**Derating factor** according to EN 60204-1, Table D.1
30 (86)	1.15
35 (95)	1.08
40 (104)	1.00
45 (113)	0.91
50 (122)	0.82
55 (131)	0.71
60 (140)	0.58

[1] One control circuit pair.

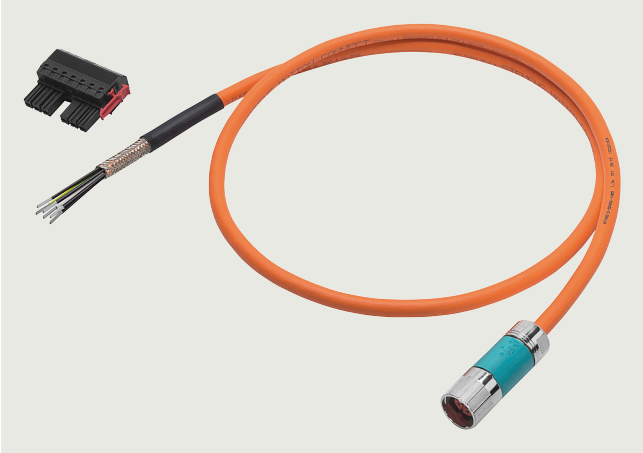
[2] One symmetrically loaded three-phase AC cable.

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Overview



Power cable for connecting a SIMOTICS motor to a SINAMICS S120 Motor Module, C/D type 3 A to 30 A.



Power cable with separately supplied connector for connecting a SIMOTICS motor to a SINAMICS S120 Motor Module, C/D type 3 A to 30 A.

Power cables

The synchronous and asynchronous motors are connected to the Motor Modules or Power Modules by means of MOTION-CONNECT power cables.

The pre-assembled MOTION-CONNECT power cables are of high quality and offer safety with problem-free functioning.

Depending on the design, the MOTION-CONNECT power cables are either pre-assembled at one end or at both ends.

If pre-assembled power cables are to be installed in a cable carrier in such a way that the connector would inhibit assembly, pre-assembled cables without assembled connector can also be supplied. In this case, the contacts of the cables are crimped and the connector is supplied separately. After installing the cables, the customer assembles the connector.

The 6FX.002-5....-.... power cables are available with crimped contacts and with the connector supplied separately as an option (not applicable to power cables with bare wire ends or cable lugs).

Power cables with separately supplied **module-end** connector: in this case, the 6th position of the Article No. must be changed from **0** to **1**: 6FX.0**1**2-5....-.... (not for power cables for SINAMICS S120 Power Modules or Motor Modules in booksize compact format).

Power cables without **module-end** connector:
in this case, the 6th position of the Article No. must be changed from **0** to **2**: 6FX.0**2**2-5....-....
The connector can be ordered separately (see page 10/59).

Power cables with separately supplied **motor-end** connector: in this case, the 6th position of the Article No. must be changed from **0** to **4**: 6FX.0**4**2-5....-.... (not for power cables with bare wire ends on the motor end).

Type of delivery for pre-assembled power cables

Pre-assembled power cables can be ordered in units of 10 cm (3.94 in) up to a maximum length of 299 m (981 ft).

The cables are supplied as reels up to 30 kg (66.1 lb) or 100 m (328 ft). Above 30 kg or 100 m (66.1 lb or 328 ft), cable drums are used instead of reels.

Type of delivery for power cables sold by the meter

Fixed lengths

Cross-section	Brake cores	MOTION-CONNECT 500 MOTION-CONNECT 800PLUS
1.5 mm^2	without/with	50 m (164 ft), 100 m (328 ft), 200 m (656 ft), 500 m (1641 ft)
2.5 mm^2	without/with	50 m (164 ft), 100 m (328 ft), 200 m (656 ft), 500 m (1641 ft)

Variable length, available in exact meter lengths

Cross-section	Brake cores	MOTION-CONNECT 500	MOTION-CONNECT 800PLUS
4 mm^2	without/with	≤ 500 m (1641 ft)	≤ 500 m (1641 ft)
6 mm^2	without/with	≤ 500 m (1641 ft)	≤ 500 m (1641 ft)
10 mm^2	without/with	≤ 500 m (1641 ft)	≤ 500 m (1641 ft)
16 mm^2	without/with	≤ 200 m (656 ft)	≤ 200 m (656 ft)
25 mm^2	without with	≤ 200 m (656 ft) ≤ 200 m (656 ft)	– ≤ 200 m (656 ft)
35 mm^2	without with	≤ 200 m (656 ft) ≤ 200 m (656 ft)	– ≤ 200 m (656 ft)
50 mm^2	without with	≤ 200 m (656 ft) ≤ 200 m (656 ft)	– ≤ 200 m (656 ft)
70 mm^2	without	≤ 100 m (328 ft)	–
95 mm^2	without	≤ 100 m (328 ft)	–
120 mm^2	without	≤ 100 m (328 ft)	–

The cables are supplied as reels up to 30 kg (66.1 lb) or 100 m (328 ft). Above 30 kg or 100 m (66.1 lb or 328 ft), cable drums are used instead of reels

Hybrid cables

Hybrid cables connect AM600 Adapter Modules to the distributed components Hybrid Cabinet Bushings, DRIVE-CLiQ Extension and SINAMICS S120M, as well as the distributed components to one another. Hybrid cables are only delivered pre-assembled.

Type of delivery for pre-assembled hybrid cables

The pre-assembled cables can be delivered in length units of 10 cm (3.94 in) up to 75 m (246 ft) to suit the system.

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Technical specifications

Power cables	MOTION-CONNECT 500 6FX50..-.....-....	MOTION-CONNECT 800PLUS 6FX80..-.....-....	MOTION-CONNECT 800PLUS [1] 6FX8002-7HY..-....
Certificate of suitability			
• CE	Yes	Yes	Yes
• cURus or UR/CSA[2]	UL 758, CSA-C22.2-N.210.2-M90	UL 758, CSA-C22.2-N.210.2-M90	UL 758, CSA-C22.2-N.210.2-M90
• RoHS conformity	Yes	Yes	Yes
Rated voltage U_0/U according to EN 50395			
• Power conductors	600 V/1000 V	600 V/1000 V	4 mm^2: 600 V/1000 V 2.5 mm^2: 48 V (EN), 1000 V (UL/CSA)
• Signal conductors	24 V (EN), 1000 V (UL/CSA)	24 V (EN), 1000 V (UL/CSA)	AWG22: 30 V (EN), 1000 V (UL/CSA)
Test voltage, rms			
• Power conductors	4 kV	4 kV	4 kV
• Signal conductors	2 kV	2 kV	4 kV
Operating temperature on the surface			
• Fixed installation	-20 … +80 °C (-4 ... +176 °F)	-50 … +80 °C (-58 ... +176 °F)	-50 … +80 °C (-58 ... +176 °F)
• Flexible installation	0 … 60 °C (32 ... 140 °F)	-20 … +60 °C (-4 ... +140 °F)	-20 … +60 °C (-4 ... +140 °F)
Tensile stress, max.			
• Fixed installation	50 N/mm^2 (7252 lb_f/in^2)	50 N/mm^2 (7252 lb_f/in^2)	50 N/mm^2 (7252 lb_f/in^2)
• Flexible installation	20 N/mm^2 (2901 lb_f/in^2)	20 N/mm^2 (2901 lb_f/in^2)	20 N/mm^2 (2901 lb_f/in^2)
Smallest bending radius			
• Fixed installation	5 × D_{max}	4 × D_{max}	4 × D_{max}
• Flexible installation	See selection and ordering data	See selection and ordering data	See selection and ordering data
Torsional stress	Absolute 30°/m	Absolute 30°/m	Absolute 30°/m
Bending	100000	10 million	10 million
Traversing velocity	30 m/min (98.4 ft/min)	Up to 300 m/min (984 ft/min)	Up to 300 m/min (984 ft/min)
Acceleration	2 m/s^2 (6.56 ft/s^2)	Up to 50 m/s^2 (164 ft/s^2), see characteristics on page 10/6	Up to 50 m/s^2 (164 ft/s^2), see characteristics on page 10/6
Insulation material, incl. jacket	CFC/silicone-free	CFC/halogen-free/silicon-free IEC 60754-1/DIN VDE 0472-815	CFC/halogen-free/silicon-free IEC 60754-1/DIN VDE 0472-815
Oil resistance	EN 60811-2-1 (mineral oil only)	EN 60811-2-1	EN 60811-2-1
Outer jacket	PVC DESINA color orange RAL 2003	PUR, HD22.10 S2 (VDE 0282, Part 10) DESINA color orange RAL 2003	PUR, HD22.10 S2 (VDE 0282, Part 10) DESINA color orange RAL 2003
Flame-retardant	EN 60332-1-1 to 1-3	EN 60332-1-1 to 1-3	EN 60332-1-1 to 1-3

Degree of protection of the pre-assembled power cables and their extensions when closed and inserted: IP67.

[1] Hybrid cables
[2] The File No. is printed on the cable jacket.

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Power cables for SIMOTICS S-1FT2/S-1FK2/S-1FT7/S-1FG1/M-1PH8 motors with SPEED-CONNECT connector

Selection and ordering data

For SIMOTICS S-1FT2/S-1FK2/S-1FT7/S-1FG1/M-1PH808/M-1PH810 motors without holding brake, with SPEED-CONNECT connector on SINAMICS S120/S220 Motor Modules in booksize format

Connection method, Motor Module end	No. of cores × cross-section	Connector size, motor end	**Pre-assembled cable without brake cores**	**Cable sold by the meter** [1] **without brake cores**	D_{max}		Weight (without connector)		Smallest bending radius [2]	
					6FX5	**6FX8**	**6FX5**	**6FX8**	**6FX5**	**6FX8**
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Connector [3]	4 × 1,5	M17 (0.5)	**6FX■0■2-5CN27-....**	**6FX■008-1BB11-....**	8.4 (0.33)	9.5 (0.37)	0.12 (0.08)	0.15 (0.10)	155 (6.10)	75 (2.95)
		M23 (1)	**6FX■0■2-5CN06-....**							
		M40 (1.5)	**6FX■0■2-5CN26-....**							
	4 × 2,5	M23 (1)	**6FX■0■2-5CN16-....**	**6FX■008-1BB21-....**	10.0 (0.39)	11.0 (0.43)	0.21 (0.14)	0.20 (0.13)	180 (7.09)	90 (3.54)
		M40 (1.5)	**6FX■0■2-5CN36-....**							
	4 × 4	M40 (1.5)	**6FX■0■2-5CN46-....**	**6FX■008-1BB31-....**	11.4 (0.45)	12.3 (0.48)	0.27 (0.18)	0.27 (0.18)	210 (8.27)	100 (3.94)
	4 × 6	M40 (1.5)	**6FX■0■2-5CN56-....**	**6FX■008-1BB41-....**	13.6 (0.54)	14.9 (0.59)	0.37 (0.25)	0.41 (0.28)	245 (9.65)	120 (4.72)
	4 × 10	M40 (1.5)	**6FX■0■2-5CN66-....**	**6FX■008-1BB51-....**	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)
Ring cable lugs [4]	4 × 6	M40 (1.5)	**6FX■002-5CN54-....**	**6FX■008-1BB41-....**	13.6 (0.54)	14.9 (0.59)	0.37 (0.25)	0.41 (0.28)	245 (9.65)	120 (4.72)
			6FX■042-5CN54-....							
	4 × 10	M40 (1.5)	**6FX■002-5CN64-....**	**6FX■008-1BB51-....**	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)
			6FX■042-5CN64-....							
	4 × 16	M40 (1.5)	**6FX■002-5CN24-....**	**6FX■008-1BB61-....**	24.2 (0.95)	22.3 (0.88)	1.10 (0.74)	1.01 (0.68)	440 (17.32)	170 (6.69)
			6FX■042-5CN24-....							
Bare wire ends [5]	4 × 10	M40 (1.5)	**6FX■002-5CG62-....**	**6FX■008-1BB51-....**	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)
			6FX■042-5CG62-....							
	4 × 16	M40 (1.5)	**6FX■002-5CG25-....**	**6FX■008-1BB61-....**	24.2 (0.95)	22.3 (0.88)	1.10 (0.74)	1.01 (0.68)	440 (17.32)	170 (6.69)
			6FX■042-5CG25-....							

MOTION-CONNECT 500	**5**									**5**										
MOTION-CONNECT 800PLUS	**8**									**8**										
Power cable																				
Pre-assembled		**0**																		
Connector at module end supplied separately		**1**																		
Connector at module end not supplied		**2**																		
Connector at motor end supplied separately		**4**																		
Length code							**....**										**....**			

[1] Note type of delivery.

[2] Valid for installation in a cable carrier.

[3] For Motor Modules in booksize format C/D type, 3 A to 30 A.

[4] For Motor Modules in booksize format C type, 45 A and 60 A.

[5] For Motor Modules in booksize format C type, 45 A and 60 A and booksize format from 85 A. Length of wire ends 250 mm (9.84 in). 5 M8 cable lugs and 5 M6 cable lugs are also included in the scope of supply of the cables.

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Power cables for SIMOTICS S-1FT2/S-1FK2/S-1FT7/S-1FG1/M-1PH8 motors with SPEED-CONNECT connector

Selection and ordering data

For SIMOTICS S-1FT2/S-1FK2/S-1FT7 motors with holding brake, with SPEED-CONNECT connector on SINAMICS S120/S220 Motor Modules in booksize format

Connection method, Motor Module end	No. of cores × cross-section	Connector size, motor end	**Pre-assembled cable with brake cores**	**Cable sold by the meter** [1] **with brake cores**	D_{max}		Weight (without connector)		Smallest bending radius [2]	
					6FX5	**6FX8**	**6FX5**	**6FX8**	**6FX5**	**6FX8**
	mm^2		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Connector [3]	4 × 1.5+2 × 1.5	M17 (0.5)	**6FX■0■2-5DN27-....**	**6FX■008-1BA11-....**	10.8 (0.43)	12.0 (0.47)	0.22 (0.15)	0.23 (0.11)	195 (7.68)	90 (3.54)
		M23 (1)	**6FX■0■2-5DN06-....**							
		M40 (1.5)	**6FX■0■2-5DN26-....**							
	4 × 2.5+2 × 1.5	M23 (1)	**6FX■0■2-5DN16-....**	**6FX■008-1BA21-....**	12.4 (0.49)	13.8 (0.54)	0.25 (0.17)	0.30 (0.20)	225 (8.86)	105 (4.13)
		M40 (1.5)	**6FX■0■2-5DN36-....**							
	4 × 4+2 × 1.5	M40 (1.5)	**6FX■0■2-5DN46-....**	**6FX■008-1BA31-....**	14.0 (0.55)	15.2 (0.60)	0.35 (0.24)	0.38 (0.26)	255 (10.04)	115 (4.53)
	4 × 6+2 × 1.5	M40 (1.5)	**6FX■0■2-5DN56-....**	**6FX■008-1BA41-....**	16.1 (0.63)	17.3 (0.68)	0.49 (0.33)	0.50 (0.34)	290 (11.42)	130 (5.12)
	4 × 10+2 × 1.5	M40 (1.5)	**6FX■0■2-5DN66-....**	**6FX■008-1BA51-....**	21.7 (0.85)	20.1 (0.79)	0.81 (0.54)	0.71 (0.48)	395 (15.55)	150 (5.91)
Ring cable lugs [4]	4 × 6+2 × 1.5	M40 (1.5)	**6FX■002-5DN54-....**	**6FX■008-1BA41-....**	16.1 (0.63)	17.3 (0.68)	0.49 (0.33)	0.50 (0.34)	290 (11.42)	130 (5.12)
			6FX■042-5DN54-....							
	4 × 10+2 × 1.5	M40 (1.5)	**6FX■002-5DN64-....**	**6FX■008-1BA51-....**	21.7 (0.85)	20.1 (0.79)	0.81 (0.54)	0.71 (0.48)	395 (15.55)	150 (5.91)
			6FX■042-5DN64-....							

MOTION-CONNECT 500	**5**				**5**		
MOTION-CONNECT 800PLUS	**8**				**8**		
Power cable							
Pre-assembled		**0**					
Connector at module end supplied separately		**1**					
Connector at module end not supplied		**2**					
Connector at motor end supplied separately		**4**					
Length code			**....**			**....**	

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.
[3] For Motor Modules in booksize format C/D type, 3 A to 30 A.
[4] For Motor Modules in booksize format C type, 45 A and 60 A.

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Power cables for SIMOTICS S-1FT2/S-1FK2/S-1FT7/S-1FG1/M-1PH8 motors with SPEED-CONNECT connector

Selection and ordering data

For SIMOTICS S-1FT2/S-1FK2/S-1FT7/M-1PH808/M-1PH810 motors without holding brake, with SPEED-CONNECT connector on SINAMICS S120/S220 Motor Modules in booksize compact format and Power Modules

Connection method, Power Module end	No. of cores × cross-section	Connector size, motor end	**Pre-assembled cable without brake cores**	**Cable sold by the meter** [1] **without brake cores**	D_{max}		Weight (without connector)		Smallest bending radius [2]	
					6FX5	**6FX8**	**6FX5**	**6FX8**	**6FX5**	**6FX8**
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Bare wire ends	4 × 1.5	M17 (0.5)	**use cable with brake cores**							
		M23 (1)	**6FX■0■2-5CG10-....**	**6FX■008-1BB11-....**	8.4 (0.33)	9.5 (0.37)	0.12 (0.08)	0.15 (0.10)	155 (6.10)	75 (2.95)
		M40 (1.5)	**6FX■0■2-5CG22-....**							
	4 × 2.5	M23 (1)	**6FX■0■2-5CG12-....**	**6FX■008-1BB21-....**	10.0 (0.39)	11.0 (0.43)	0.21 (0.69)	0.20 (0.13)	180 (7.09)	90 (3.54)
		M40 (1.5)	**6FX■0■2-5CG32-....**							
	4 × 4	M40 (1.5)	**6FX■0■2-5CG42-....**	**6FX■008-1BB31-....**	11.4 (0.45)	12.3 (0.48)	0.27 (0.18)	0.27 (0.18)	210 (8.27)	100 (3.94)
	4 × 6	M40 (1.5)	**6FX■0■2-5CG52-....**	**6FX■008-1BB41-....**	13.6 (0.54)	14.9 (0.59)	0.37 (0.25)	0.41 (0.28)	245 (9.65)	120 (4.72)
	4 × 10	M40 (1.5)	**6FX■0■2-5CG62-....**	**6FX■008-1BB51-....**	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)

MOTION-CONNECT 500	**5**			**5**						
MOTION-CONNECT 800PLUS	**8**			**8**						
Power cable										
Pre-assembled		**0**								
Connector at motor end supplied separately		**4**								
Length code			**....**							

For SIMOTICS S-1FT2/S-1FK2/S-1FT7 motors with holding brake, with SPEED-CONNECT connector on SINAMICS S120/S220 Motor Modules in booksize compact format and Power Modules

Connection method, Power Module end	No. of cores × cross-section	Connector size, motor end	**Pre-assembled cable with brake cores**	**Cable sold by the meter** [1] **with brake cores**	D_{max}		Weight (without connector)		Smallest bending radius [2]	
					6FX5	**6FX8**	**6FX5**	**6FX8**	**6FX5**	**6FX8**
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Bare wire ends	4 × 1.5+2 × 1.5	M17 (0.5)	**6FX■0■2-5DN30-....**	**6FX■008-1BA11-....**	10.8 (0.43)	12.0 (0.47)	0.22 (0.15)	0.23 (0.15)	195 (7.68)	90 (3.54)
		M23 (1)	**6FX■0■2-5DG10-....**							
		M40 (1.5)	**6FX■0■2-5DG22-....**							
	4 × 2.5+2 × 1.5	M23 (1)	**6FX■0■2-5DG12-....**	**6FX■008-1BA21-....**	12.4 (0.49)	13.8 (0.54)	0.25 (0.17)	0.30 (0.20)	225 (8.86)	105 (4.13)
		M40 (1.5)	**6FX■0■2-5DG32-....**							
	4 × 4+2 × 1.5	M40 (1.5)	**6FX■0■2-5DG42-....**	**6FX■008-1BA31-....**	14.0 (0.55)	15.2 (0.60)	0.35 (0.24)	0.38 (0.26)	255 (10.04)	115 (4.53)
	4 × 6+2 × 1.5	M40 (1.5)	**6FX■0■2-5DG52-....**	**6FX■008-1BA41-....**	16.1 (0.63)	17.3 (0.68)	0.49 (0.33)	0.50	290 (11.42)	130 (5.12)
	4 × 10+2 × 1.5	M40 (1.5)	**6FX■0■2-5DG62-....**	**6FX■008-1BA51-....**	21.7 (0.85)	20.1 (0.79)	0.81 (0.54)	0.71 (0.48)	395 (15.55)	150 (5.91)

MOTION-CONNECT 500	**5**			**5**						
MOTION-CONNECT 800PLUS	**8**			**8**						
Power cable										
Pre-assembled		**0**								
Connector at motor end supplied separately		**4**								
Length code			**....**							

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.

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Power cables for SIMOTICS S-1FT2/S-1FK2/S-1FT7/M-1PH8 motors with full-thread connector

Selection and ordering data

For SIMOTICS S-1FT2/S-1FK2/S-1FT7/M-1PH808/M-1PH810/M-1PH813 motors without holding brake, with full-thread connector on SINAMICS S120/S220 Motor Modules in booksize format

Connection method, Motor Module end	No. of cores × cross-section	Connector size, motor end	Pre-assembled cable without brake cores	Cable sold by the meter [1] without brake cores	D_{max}		Weight (without connector)		Smallest bending radius [2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Connector [3]	4 × 1.5	M23 (1)	6FX■0■2-5CS06-....	6FX■008-1BB11-....	8.4 (0.33)	9.5 (0.37)	0.12 (0.08)	0.15 (0.10)	155 (6.10)	75 (2.95)
		M40 (1.5)	6FX■0■2-5CS26-....							
		e. c. [4]	6FX5002-5CW02-....							
			6FX5012-5CW02-....							
			6FX5022-5CW02-....							
	4 × 2.5	M23 (1)	6FX■0■2-5CS16-....	6FX■008-1BB21-....	10.0 (0.39)	11.0 (0.43)	0.21 (0.69)	0.20 (0.13)	180 (7.09)	90 (3.54)
		M40 (1.5)	6FX■0■2-5CS36-....							
		e. c. [4]	6FX5002-5CW12-....							
			6FX5012-5CW12-....							
			6FX5022-5CW12-....							
	4 × 4	M40 (1.5)	6FX■0■2-5CS46-....	6FX■008-1BB31-....	11.4 (0.45)	12.3 (0.48)	0.27 (0.18)	0.27 (0.18)	210 (8.27)	100 (3.94)
		e. c. [4]	6FX5002-5CW42-....							
			6FX5012-5CW42-....							
			6FX5022-5CW42-....							
	4 × 6	M40 (1.5)	6FX■0■2-5CS56-....	6FX■008-1BB41-....	13.6 (0.54)	14.9 (0.59)	0.37 (0.25)	0.41 (0.28)	245 (9.65)	120 (4.72)
		e. c. [4]	6FX5002-5CW52-....							
			6FX5012-5CW52-....							
			6FX5022-5CW52-....							
	4 × 10	M40 (1.5)	6FX■0■2-5CS66-....	6FX■008-1BB51-....	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)
		M58 (3)	6FX■0■2-5CS17-....							
		e. c. [4]	6FX5002-5CW62-....							
			6FX5012-5CW62-....							
			6FX5022-5CW62-....							
Ring cable lugs [5]	4 × 6	M40 (1.5)	6FX■002-5CS54-....	6FX■008-1BB41-....	13.6 (0.54)	14.9 (0.59)	0.37 (0.25)	0.41 (0.28)	245 (9.65)	120 (4.72)
			6FX■042-5CS54-....							
	4 × 10	M40 (1.5)	6FX■002-5CS64-....	6FX■008-1BB51-....	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)
			6FX■042-5CS64-....							
		M58 (3)	6FX■002-5CS14-....							
			6FX■042-5CS14-....							
	4 × 16	M40 (1.5)	6FX8002-5CS24-....	6FX■008-1BB61-....	24.2 (0.95)	22.3 (0.88)	1.10 (0.74)	1.01 (0.68)	440 (17.32)	170 (6.69)
			6FX8042-5CS24-....							
		M58 (3)	6FX■002-5CS23-....							
			6FX■042-5CS23-....							

MOTION-CONNECT 500	**5**				**5**	
MOTION-CONNECT 800PLUS	**8**				**8**	
Power cable						
Pre-assembled		**0**				
Connector at module end supplied separately		**1**				
Connector at module end not supplied		**2**				
Connector at motor end supplied separately		**4**				
Length code			**....**			**....**

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.
[3] For Motor Modules in booksize format C/D type, 3 A to 30 A
[4] e. c. = bare wire ends; suitable for motors with terminal box.
[5] For Motor Modules in booksize format C type, 45 A and 60 A.

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Power cables for SIMOTICS S-1FT2/S-1FK2/S-1FT7/M-1PH8 motors with full-thread connector

Selection and ordering data

For SIMOTICS S-1FT2/S-1FK2/S-1FT7/M-1PH808/M-1PH810/M-1PH813 motors without holding brake, with full-thread connector on SINAMICS S120/S220 Motor Modules in booksize format

Connection method, Motor Module end	No. of cores × cross-section	Connector size, motor end	Pre-assembled cable without brake cores	Cable sold by the meter[1] without brake cores	D_{max}		Weight (without connector)		Smallest bending radius[2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Bare wire ends[3]	4 × 10	M40 (1.5)	6FX■002-5CG61-....	6FX■008-1BB51-....	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)
			6FX■042-5CG61-....							
		M58 (3)	6FX■002-5CG13-....							
			6FX■042-5CG13-....							
	4 × 16	M40 (1.5)	6FX■002-5CG24-....	6FX■008-1BB61-....	24.2 (0.95)	22.3 (0.88)	1.10 (0.74)	1.01 (0.68)	440 (17.32)	170 (6.69)
			6FX■042-5CG24-....							
		M58 (3)	6FX■002-5CG23-....							
			6FX■042-5CG23-....							

MOTION-CONNECT 500	**5**					**5**				
MOTION-CONNECT 800PLUS	**8**					**8**				
Power cable										
Pre-assembled		**0**								
Connector at module end supplied separately		**1**								
Connector at module end not supplied		**2**								
Connector at motor end supplied separately		**4**								
Length code			**....**						**....**	

[1] Note type of delivery.

[2] Valid for installation in a cable carrier.

[3] For Motor Modules in booksize format C type, 45 A and 60 A and booksize format from 85 A. Length of wire ends 250 mm (9.84 in). 5 M8 cable lugs and 5 M6 cable lugs are also included in the scope of supply of the cables.

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Power cables for SIMOTICS S-1FT2/S-1FK2/S-1FT7/M-1PH8 motors with full-thread connector

Selection and ordering data

For SIMOTICS S-1FT2/S-1FT7 motors with holding brake, with full-thread connector on SINAMICS S120/S220 Motor Modules in booksize format

Connection method, Motor Module end	No. of cores × cross-section	Connector size, motor end	**Pre-assembled cable with brake cores**	**Cable sold by the meter** [1] **with brake cores**	D_{max}		Weight (without connector)		Smallest bending radius [2]	
					6FX5	**6FX8**	**6FX5**	**6FX8**	**6FX5**	**6FX8**
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Connector [3]	4 × 1.5+2 × 1.5	M17 (0.5)	**6FX■0■2-5DS27-....**	**6FX5008-1BA11-....**	10.8 (0.43)	–	0.22 (0.15)	–	195 (7.68)	–
		M23 (1)	**6FX■0■2-5DS06-....**	**6FX■008-1BA11-....**	10.8 (0.43)	12.0 (0.47)	0.22 (0.15)	0.23 (0.15)	195 (7.68)	90 (3.54)
		M40 (1.5)	**6FX■0■2-5DS26-....**							
	4 × 2.5+2 × 1.5	M23 (1)	**6FX■0■2-5DS16-....**	**6FX■008-1BA21-....**	12.4 (0.49)	13.8 (0.54)	0.25 (0.17)	0.30 (0.20)	225 (8.86)	105 (4.13)
		M40 (1.5)	**6FX■0■2-5DS36-....**							
	4 × 4+2 × 1.5	M40 (1.5)	**6FX■0■2-5DS46-....**	**6FX■008-1BA31-....**	14.0 (0.55)	15.2 (0.60)	0.35 (0.24)	0.38 (0.26)	255 (10.04)	115 (4.53)
	4 × 6+2 × 1.5	M40 (1.5)	**6FX■0■2-5DS56-....**	**6FX■008-1BA41-....**	16.1 (0.63)	17.3 (0.68)	0.49 (0.33)	0.50 (0.34)	290 (11.42)	130 (5.12)
	4 × 10+2 × 1.5	M40 (1.5)	**6FX■0■2-5DS66-....**	**6FX■008-1BA51-....**	21.7 (0.85)	20.1 (0.79)	0.81 (0.54)	0.71 (0.48)	395 (15.55)	150 (5.91)
		M58 (3)	**6FX■0■2-5DS17-....**							
Ring cable lugs [4]	4 × 6+2 × 1.5	M40 (1.5)	**6FX■002-5DS54-....**	**6FX■008-1BA41-....**	16.1 (0.63)	17.3 (0.68)	0.49 (0.33)	0.50 (0.34)	290 (11.42)	130 (5.12)
			6FX■042-5DS54-....							
	4 × 10+2 × 1.5	M40 (1.5)	**6FX■002-5DS64-....**	**6FX■008-1BA51-....**	21.7 (0.85)	20.1 (0.79)	0.81 (0.54)	0.71 (0.48)	395 (15.55)	150 (5.91)
			6FX■042-5DS64-....							
		M58 (3)	**6FX■002-5DS14-....**							
			6FX■042-5DS14-....							
	4 × 16+2 × 1.5	M58 (3)	**6FX■002-5DS23-....**	**6FX■008-1BA61-....**	25.0 (0.98)	23.8 (0.94)	1.12 (0.75)	1.03 (0.69)	450 (17.72)	180 (7.09)
			6FX■042-5DS23-....							
Bare wire ends [5]	4 × 16+2 × 1.5	M58 (3)	**6FX■002-5DG23-....**	**6FX■008-1BA61-....**	25.0 (0.98)	23.8 (0.94)	1.12 (0.75)	1.03 (0.69)	450 (17.72)	180 (7.09)
			6FX■042-5DG23-....							
	4 × 25+2 × 1.5	M58 (3)	**6FX■002-5DG33-....**	**6FX■008-1BA25-....**	29.4 (1.16)	27.6 (1.09)	1.62 (1.09)	1.47 (0.99)	530 (20.87)	280 (11.02)
			6FX■042-5DG33-....							
	4 × 35+2 × 1.5	M58 (3)	**6FX■002-5DG43-....**	**6FX■008-1BA35-....**	32.6 (1.28)	31.9 (1.26)	2.06 (1.38)	1.92 (1.29)	590 (23.23)	320 (12.60)
			6FX■042-5DG43-....							
	4 × 50+2 × 1.5	M58 (3)	**6FX■002-5DG53-....**	**6FX■008-1BA50-....**	38.0 (1.50)	35.0 (1.38)	3.04 (2.04)	2.56 (1.72)	685 (26.97)	350 (13.78)
			6FX■042-5DG53-....							

MOTION-CONNECT 500	**5**			**5**	
MOTION-CONNECT 800PLUS	**8**			**8**	
Power cable					
Pre-assembled		**0**			
Connector at module end supplied separately		**1**			
Connector at module end not supplied		**2**			
Connector at motor end supplied separately		**4**			
Length code			**....**		**....**

[1] Note type of delivery.

[2] Valid for installation in a cable carrier.

[3] For Motor Modules in booksize format C/D type, 3 A to 30 A.

[4] For Motor Modules in booksize format C type, 45 A and 60 A.

[5] For Motor Modules in booksize format C type, 45 A and 60 A and booksize format from 85 A. Length of wire ends 250 mm (9.84 in) for 4 × 16 mm² and 300 mm (11.81 in) for 4 × 25 mm² to 4 × 50 mm². 5 M8 cable lugs, 5 M6 cable lugs, and 1 spring-type terminal are also included in the scope of supply of the cables.

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Power cables for SIMOTICS S-1FT2/S-1FK2/S-1FT7/M-1PH8 motors with full-thread connector

Selection and ordering data

For SIMOTICS S-1FT2/S-1FK2/S-1FT7/M-1PH808/M-1PH810/M-1PH813 motors without holding brake, with full-thread connector on SINAMICS S120/S220 Motor Modules in booksize compact format and Power Modules

Connection method, Power Module end	No. of cores × cross-section	Connector size, motor end	Pre-assembled cable without brake cores	Cable sold by the meter [1] without brake cores	D_{max}		Weight (without connector)		Smallest bending radius [2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Bare wire ends	4 × 1.5	M23 (1)	6FX■0■2-5CG01-....	6FX■008-1BB11-....	8.4 (0.33)	9.5 (0.37)	0.12 (0.08)	0.15 (0.10)	155 (6.10)	75 (2.95)
		M40 (1.5)	6FX■0■2-5CG21-....							
	4 × 2.5	M23 (1)	6FX■0■2-5CG11-....	6FX■008-1BB21-....	10.0 (0.39)	11.0 (0.43)	0.21 (0.14)	0.20 (0.13)	180 (7.09)	90 (3.54)
		M40 (1.5)	6FX■0■2-5CG31-....							
	4 × 4	M40 (1.5)	6FX■0■2-5CG41-....	6FX■008-1BB31-....	11.4 (0.45)	12.3 (0.48)	0.27 (0.18)	0.27 (0.18)	210 (8.27)	100 (3.94)
	4 × 6	M40 (1.5)	6FX■0■2-5CG51-....	6FX■008-1BB41-....	13.6 (0.54)	14.9 (0.59)	0.37 (0.25)	0.41 (0.28)	245 (9.65)	120 (4.72)
	4 × 10	M40 (1.5)	6FX■0■2-5CG61-....	6FX■008-1BB51-....	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)
		M58 (3)	6FX■0■2-5CG13-....							
	4 × 16	M58 (3)	6FX■0■2-5CG23-....	6FX■008-1BB61-....	24.2 (0.95)	22.3 (0.88)	1.10 (0.74)	1.01 (0.68)	440 (17.32)	170 (6.69)

MOTION-CONNECT 500	**5**				**5**					
MOTION-CONNECT 800PLUS	**8**				**8**					
Power cable										
Pre-assembled		**0**								
Connector at motor end supplied separately		**4**								
Length code			....			....				

For SIMOTICS S-1FT2/S-1FK2/S-1FT7 motors with holding brake, with full-thread connector on SINAMICS S120/S220 Motor Modules in booksize compact format and Power Modules

Connection method, Power Module end	No. of cores × cross-section	Connector size, motor end	Pre-assembled cable with brake cores	Cable sold by the meter [1] with brake cores	D_{max}		Weight (without connector)		Smallest bending radius [2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Bare wire ends	4 × 1.5+2 × 1.5	M17 (0.5)	6FX■0■2-5DA30-....	6FX■008-1BA11-....	10.8 (0.43)	12.0 (0.47)	0.22 (0.15)	0.23 (0.15)	195 (7.68)	90 (3.54)
		M23 (1)	6FX■0■2-5DG01-....							
		M40 (1.5)	6FX■0■2-5DG21-....							
	4 × 2.5+2 × 1.5	M23 (1)	6FX■0■2-5DG11-....	6FX■008-1BA21-....	12.4 (0.49)	13.8 (0.54)	0.25 (0.17)	0.30 (0.20)	225 (8.86)	105 (4.13)
		M40 (1.5)	6FX■0■2-5DG31-....							
	4 × 4+2 × 1.5	M40 (1.5)	6FX■0■2-5DG41-....	6FX■008-1BA31-....	14.0 (0.55)	15.2 (0.60)	0.35 (0.24)	0.38 (0.26)	255 (10.04)	115 (4.53)
	4 × 6+2 × 1.5	M40 (1.5)	6FX■0■2-5DG51-....	6FX■008-1BA41-....	16.1 (0.63)	17.3 (0.68)	0.49 (0.33)	0.50	290 (11.42)	130 (5.12)
	4 × 10+2 × 1.5	M40 (1.5)	6FX■0■2-5DG61-....	6FX■008-1BA51-....	21.7 (0.85)	20.1 (0.79)	0.81 (0.54)	0.71 (0.48)	395 (15.55)	150 (5.91)
		M58 (3)	6FX■0■2-5DG13-....							
	4 × 16+2 × 1.5	M58 (3)	6FX■0■2-5DG23-....	6FX■008-1BA61-....	25.0 (0.98)	23.8 (0.94)	1.12 (0.75)	1.03 (0.69)	450 (17.72)	180 (7.09)
	4 × 25+2 × 1.5	M58 (3)	6FX■0■2-5DG33-....	6FX■008-1BA25-....	29.4 (1.16)	27.6 (1.09)	1.62 (1.09)	1.47 (0.99)	530 (20.87)	280 (11.02)
	4 × 35+2 × 1.5	M58 (3)	6FX■0■2-5DG43-....	6FX■008-1BA35-....	32.6 (1.28)	31.9 (1.26)	2.06 (1.38)	1.92 (1.29)	590 (23.23)	320 (12.60)
	4 × 50+2 × 1.5	M58 (3)	6FX■0■2-5DG53-....	6FX■008-1BA50-....	38.0 (1.50)	35.0 (1.38)	3.04 (2.04)	2.56 (1.72)	685 (26.97)	350 (13.78)

MOTION-CONNECT 500	**5**				**5**					
MOTION-CONNECT 800PLUS	**8**				**8**					
Power cable										
Pre-assembled		**0**								
Connector at motor end supplied separately		**4**								
Length code			....			....				

[1] Note type of delivery.

[2] Valid for installation in a cable carrier.

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Accessories

Extensions for power cables with SPEED-CONNECT or full-thread connector

No. of cores × cross-section		Connector size, motor end	Basic cable for motors on SINAMICS S120/S220		**Extension**
without brake cores	with brake cores		Motor Modules booksize format	Power Modules Motor Modules booksize compact format	
mm^2	mm^2		Type	Type	Article No.
4 × 1.5	4 × 1.5+2 × 1.5	0.5	6FX . 002-5DS27-....	6FX . 002-5DA30-....	**6FX■002-5ME05-....**
			6FX . 002-5 . N27-....	6FX . 002-5DN30-....	**6FX■002-5MN05-....**
4 × 1.5	4 × 1.5+2 × 1.5	1	6FX . 002-5 . S06-....	6FX . 002-5 . G01-....	**6FX■002-5■A05-....**
			6FX . 002-5 . N06-....	6FX . 002-5 . G10-....	**6FX■002-5■N05-....**
		1.5	6FX . 002-5 . S26-....	6FX . 002-5 . G21-....	**6FX■002-5■A28-....**
			6FX . 002-5 . N26-....	6FX . 002-5 . G22-....	**6FX■002-5■Q28-....**
4 × 2.5	4 × 2.5+2 × 1.5	1	6FX . 002-5 . S16-....	6FX . 002-5 . G11-....	**6FX■002-5■A15-....**
			6FX . 002-5 . N16-....	6FX . 002-5 . G12-....	**6FX■002-5■Q15-....**
		1.5	6FX . 002-5 . S36-....	6FX . 002-5 . G31-....	**6FX■002-5■A38-....**
			6FX . 002-5 . N36-....	6FX . 002-5 . G32-....	**6FX■002-5■Q38-....**
4 × 4	4 × 4+2 × 1.5	1.5	6FX . 002-5 . S46-....	6FX . 002-5 . G41-....	**6FX■002-5■A48-....**
			6FX . 002-5 . N46-....	6FX . 002-5 . G42-....	**6FX■002-5■Q48-....**
4 × 6	4 × 6+2 × 1.5	1.5	6FX . 002-5 . S56-....	6FX . 002-5 . G51-....	**6FX■002-5■A58-....**
			6FX . 002-5 . S54-....	–	**6FX■002-5■A58-....**
			6FX . 002-5 . N56-....	6FX . 002-5 . G52-....	**6FX■002-5■Q58-....**
			6FX . 002-5 . N54-....	–	**6FX■002-5■Q58-....**
4 × 10	4 × 10+2 × 1.5	1.5	6FX . 002-5 . S66-....	6FX . 002-5 . G61-....	**6FX■002-5■A68-....**
			6FX . 002-5 . S64-....	–	**6FX■002-5■A68-....**
			6FX . 002-5 . N66-....	6FX . 002-5 . G62-....	**6FX■002-5■Q68-....**
			6FX . 002-5 . N64-....	–	**6FX■002-5■Q68-....**
		3 [1]	6FX . 002-5 . S17-....	6FX . 002-5 . G13-....	**6FX■002-5■X18-....**
			6FX . 002-5 . S14-....	–	**6FX■002-5■X18-....**
4 × 16	4 × 16+2 × 1.5	1.5	6FX8002-5CS24-....	6FX . 002-5CG24-....	**6FX8002-5YW12-....**
			6FX . 002-5CN24-....	6FX . 002-5CG25-....	**6FX8002-5YW12-....** [1)2)]
		3 [1]	6FX . 002-5 . S23-....	6FX . 002-5 . G23-....	**6FX■002-5■X28-....**
			6FX . 002-5 . G23-....	–	**6FX■002-5■X28-....**
–	4 × 25+2 × 1.5	3 [1]	6FX . 002-5DG33-....	6FX . 002-5DG33-....	**6FX■002-5DX38-....**
–	4 × 35+2 × 1.5	3 [1]	6FX . 002-5DG43-....	6FX . 002-5DG43-....	**6FX■002-5DX48-....**
–	4 × 50+2 × 1.5	3 [1]	6FX . 002-5DG53-....	6FX . 002-5DG53-....	**6FX■002-5DX58-....**

MOTION-CONNECT 500	**5**	
MOTION-CONNECT 800PLUS	**8**	
Without brake cores		**C**
With brake cores		**D**
Length code		**....**

The maximum specified cable length (basic cable and extensions) must not be exceeded. The total maximum length of power cables with brake cores is reduced by 2 m (6.56 ft) for each interruption point.

[1] Motor-end connector with full thread only.

[2] Module-end connector compatible with SPEED-CONNECT.

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Power cables for SIMOTICS M-1PH8 motors with terminal box

Selection and ordering data

For SIMOTICS M-1PH808/M-1PH810/M-1PH813/M-1PH816 motors with terminal box on SINAMICS S120/S220 Motor Modules

Motor	Thread	No. of cores × cross-section	Connection method Motor Module end	**Pre-assembled cable**	**Cable sold by the meter** [1]	D_{max}	Weight (without gland)	Smallest bending radius [2]
SIMOTICS		mm^2		Article No.	Article No.	mm (in)	kg/m (lb/ft)	mm (in)
M-1PH808	M25	4 × 2.5	Connector [3]	**6FX80■2-5CP17-....**	**6FX8008-1BB21-....**	11.0 (0.43)	0.20 (0.13)	90 (3.54)
		4 × 4		**6FX80■2-5CP27-....**	**6FX8008-1BB31-....**	12.3 (0.48)	0.27 (0.18)	100 (3.94)
M-1PH810	M32	4 × 2.5	Connector [3]	**6FX80■2-5CP16-....**	**6FX8008-1BB21-....**	11.0 (0.43)	0.20 (0.13)	90 (3.54)
		4 × 4		**6FX80■2-5CP26-....**	**6FX8008-1BB31-....**	12.3 (0.48)	0.27 (0.18)	100 (3.94)
		4 × 10		**6FX80■2-5CP46-....**	**6FX8008-1BB51-....**	18.2 (0.72)	0.62 (0.42)	140 (5.51)
		4 × 10	Bare wire ends [4]	**6FX8002-5CR41-....**				
M-1PH813	M40	4 × 10	Connector [3]	**6FX80■2-5CP47-....**	**6FX8008-1BB51-....**	18.2 (0.72)	0.62 (0.42)	140 (5.51)
			Bare wire ends [4]	**6FX8002-5CR42-....**				
	M50	4 × 10	Connector [3]	**6FX80■2-5CP45-....**				
			Bare wire ends [4]	**6FX8002-5CR43-....**				
	M40	4 × 16	Bare wire ends [4]	**6FX8002-5CR52-....**	**6FX8008-1BB61-....**	22.3 (0.88)	1.01 (0.68)	170 (6.69)
	M50	4 × 16		**6FX8002-5CR53-....**				
		4 × 35		**6FX5002-5CR73-....**	**6FX5008-1BB35-....**	31.5 (1.24)	1.93 (1.30)	570 (22.44)
		4 × 50		**6FX5002-5CR83-....**	**6FX5008-1BB50-....**	38.0 (1.50)	3.04 (2.04)	685 (26.97)
M-1PH816	M50	4 × 16	Bare wire ends [3]	**6FX8002-5CR53-....**	**6FX8008-1BB61-....**	22.3 (0.88)	1.01 (0.68)	170 (6.69)
				–	**6FX5008-1BB61-....**	24.2 (0.95)	1.10 (0.74)	440 (17.32)
		4 × 35		**6FX5002-5CR73-....**	**6FX5008-1BB35-....**	31.5 (1.24)	1.93 (1.30)	570 (22.44)
				–	**6FX8008-1BA35-....**	29.6 (1.17)	2.00 (1.34)	300 (11.81)
		4 × 50		**6FX5002-5CR83-....**	**6FX5008-1BB50-....**	38.0 (1.50)	3.04 (2.04)	685 (26.97)
				–	**6FX8008-1BA50-....**	34.4 (1.35)	2.66 (1.79)	345 (13.58)
	M63	4 × 25		–	**6FX5008-1BB25-....**	28.0 (1.10)	1.62 (1.09)	505 (19.88)
					6FX8008-1BA25-....	27.6 (1.09)	1.51 (1.01)	280 (11.02)
		4 × 35		–	**6FX5008-1BB35-....**	31.5(1.24)	1.93 (1.30)	570 (22.44)
					6FX8008-1BA35-....	29.6 (1.17)	2.00 (1.34)	300 (11.81)
		4 × 50		–	**6FX5008-1BB50-....**	38.0 (1.50)	3.04 (2.04)	685 (26.97)
					6FX8008-1BA50-....	35 (1.38)	2.56 (1.72)	350 (13.8)
		4 × 70		–	**6FX5008-1BB70-....**	42.6 (1.68)	3.96 (2.66)	770 (30.31)

MOTION-CONNECT 500	**5**				**5**	
MOTION-CONNECT 800PLUS	**8**				**8**	
Power cable						
Pre-assembled		**0**				
Connector at module end supplied separately		**1**				
Connector at module end not supplied		**2**				
Length code			**....**			**....**

[1] Note type of delivery.

[2] Valid for installation in a cable carrier.

[3] For Motor Modules in booksize format C/D type, 3 A to 30 A.

[4] For Motor Modules in booksize format C type, 45 A and 60 A and booksize format from 85 A. Length of wire ends 300 mm (11.81 in). 5 M8 cable lugs and 5 M6 cable lugs are also included in the scope of supply of the cables.

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Selection and ordering data

For SIMOTICS M-1PH808/M-1PH810/M-1PH813/M-1PH816 motors with terminal box on SINAMICS S120 Power Modules

Motor	Thread	No. of cores × cross-section	Connection method Power Module end	**Pre-assembled cable**	**Cable sold by the meter** [1]	D_{max}	Weight (without gland)	Smallest bending radius [2]
SIMOTICS		mm^2		Article No.	Article No.	mm (in)	kg/m (lb/ft)	mm (in)
M-1PH808	M25	4 × 2.5	Bare wire ends [3]	**6FX8002-5CR10-....** –	**6FX8008-1BB21-....** **6FX5008-1BB21-....**	11.0 (0.43) 10.0 (0.39)	0.20 (0.13) 0.21 (0.69)	90 (3.54) 180 (7.09)
		4 × 4		**6FX8002-5CR20-....** –	**6FX8008-1BB31-....** **6FX5008-1BB31-....**	12.3 (0.48) 11.4 (0.45)	0.27 (0.18) 0.27 (0.18)	100 (3.94) 210 (8.27)
M-1PH810	M32	4 × 2.5	Bare wire ends [3]	**6FX8002-5CR11-....** –	**6FX8008-1BB21-....** **6FX5008-1BB21-....**	11.0 (0.43) 10.0 (0.39)	0.20 (0.13) 0.21 (0.69)	90 (3.54) 180 (7.09)
		4 × 4		**6FX8002-5CR21-....** –	**6FX8008-1BB31-....** **6FX5008-1BB31-....**	12.3 (0.48) 11.4 (0.45)	0.27 (0.18) 0.27 (0.18)	100 (3.94) 210 (8.27)
		4 × 10		**6FX8002-5CR41-....** –	**6FX8008-1BB51-....** **6FX5008-1BB51-....**	18.2 (0.72) 20.0 (0.79)	0.62 (0.42) 0.73 (0.49)	140 (5.51) 360 (14.17)
M-1PH813	M40	4 × 10	Bare wire ends [3]	**6FX8002-5CR42-....** –	**6FX8008-1BB51-....** **6FX5008-1BB51-....**	18.2 (0.72) 20.0 (0.79)	0.62 (0.42) 0.73 (0.49)	140 (5.51) 360 (14.17)
	M50			**6FX8002-5CR43-....** –				
	M40	4 × 16		**6FX8002-5CR52-....** –	**6FX8008-1BB61-....** **6FX5008-1BB61-....**	22.3 (0.88) 24.2 (0.95)	1.01 (0.68) 1.10 (0.74)	170 (6.69) 440 (17.32)
	M50			**6FX8002-5CR53-....** –				
	M40	4 × 35		**6FX5002-5CR72-....**	**6FX5008-1BB35-....**	31.5 (1.24)	1.93 (1.30)	570 (22.44)
	M50			**6FX5002-5CR73-....**	**6FX8008-1BA35-....**	29.6 (1.17)	2.00 (1.34)	300 (11.81)
	M50	4 × 50		**6FX5002-5CR83-....**	**6FX5008-1BB50-....** **6FX8008-1BA50-....**	38.0 (1.50) 34.4 (1.35)	3.04 (2.04) 2.66 (1.79)	685 (26.97) 345 (13.58)
M-1PH816	M50	4 × 16	Bare wire ends [3]	**6FX8002-5CR53-....** –	**6FX8008-1BB61-....** **6FX5008-1BB61-....**	22.3 (0.88) 24.2 (0.95)	1.01 (0.68) 1.10 (0.74)	170 (6.69) 440 (17.32)
		4 × 35		**6FX5002-5CR73-....**	**6FX5008-1BB35-....** **6FX8008-1BA35-....**	31.5 (1.24) 29.6 (1.17)	1.93 (1.30) 2.00 (1.34)	570 (22.44) 300 (11.81)
		4 × 50		**6FX5002-5CR83-....**	**6FX5008-1BB50-....** **6FX8008-1BA50-....**	38.0 (1.50) 34.4 (1.35)	3.04 (2.04) 2.66 (1.79)	685 (26.97) 345 (13.58)
	M63	4 × 25		–	**6FX5008-1BB25-....** **6FX8008-1BA25-....**	28.0 (1.10) 27.6 (1.09)	1.62 (1.09) 1.51 (1.01)	505 (19.88) 280 (11.02)
		4 × 35		–	**6FX5008-1BB35-....** **6FX8008-1BA35-....**	31.5 (1.24) 29.6 (1.17)	1.93 (1.30) 2.00 (1.34)	570 (22.44) 300 (11.81)
		4 × 50		–	**6FX5008-1BB50-....** **6FX8008-1BA50-....**	38.0 (1.50) 34.4 (1.35)	3.04 (2.04) 2.66 (1.79)	685 (26.97) 345 (13.58)
		4 × 70		–	**6FX5008-1BB70-....**	42.6 (1.68)	3.96 (2.66)	770 (30.31)

MOTION-CONNECT 500	**5**			**5**	
MOTION-CONNECT 800PLUS	**8**			**8**	
Length code		**....**			**....**

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.
[3] Length of wire ends: 300 mm (11.81). 4 M8 cable lugs and 4 M6 cable lugs are also included in the scope of supply of the cables.

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Power cables for SIMOTICS M-1PH8 motors with terminal box

Selection and ordering data

For SIMOTICS M-1PH808/M-1PH810 motors with terminal box on SINAMICS S120 Motor Modules in booksize compact format

Motor	Thread	No. of cores × cross-section	Connection method Power Module end	**Pre-assembled cable**	**Cable sold by the meter** [1]	D_{max}	Weight (without gland)	Smallest bending radius [2]
SIMOTICS		mm²		Article No.	Article No.	mm (in)	kg/m (lb/ft)	mm (in)
M-1PH808	M25	4 × 2.5	Bare wire ends [3]	**6FX8002-5CR10-....**	**6FX8008-1BB21-....**	11.0 (0.43)	0.20 (0.13)	90 (3.54)
M-1PH810	M32	4 × 2.5	Bare wire ends [3]	**6FX8002-5CR11-....**	**6FX8008-1BB21-....**	11.0 (0.43)	0.20 (0.13)	90 (3.54)
MOTION-CONNECT 500				**5**	**5**			
MOTION-CONNECT 800PLUS				**8**	**8**			
Length code				**....**	**....**			

Other cables sold by the meter for SIMOTICS M-1PH818/M-1PH822 motors with terminal box

	No. of cores × Cross-section	Connection method Motor Module end	**Pre-assembled cable**	**Cable sold by the meter** [1]	D_{max}	Weight (without gland)	Smallest bending radius [2]
	mm²		Article No.	Article No.	mm (in)	kg/m (lb/ft)	mm (in)
	4 × 95		–	**6FX5008-1BB05-....**	51.7 (2.04)	5.55 (3.73)	935 (36.81)
	4 × 120		–	**6FX5008-1BB12-....**	56 (2.20)	6.60 (4.43)	1010 (39.76)
MOTION-CONNECT 500				**5**			
Length code				**....**			

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.
[3] Length of wire ends: 300 mm (11.81). 4 M8 cable lugs and 4 M6 cable lugs are also included in the scope of supply of the cables.

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Selection and ordering data

For water-cooled SIMOTICS L-1FN3 linear motors, peak/continuous load versions, connection to SINAMICS S120/S220 through adapter cable with full-thread connector

No. of cores × cross-section	Thread	**Pre-assembled adapter cable**	Connector size Interface	**Pre-assembled basic cable to the drive system**	**Cable sold by the meter** [1] **for pre-assembled adapter cable**	D_{max}	Weight (without connector)	Smallest bending radius [2]
mm^2		Article No. [3]		Article No.	Article No.	mm (in)	kg/m (lb/ft)	mm (in)
4 × 2.5	M20	**6FX7002-5LM42-....** [4]	1	**6FX80■2-5CS16-....**	**6FX8008-1BB21-....**	11.0 (0.43)	0.20 (0.13)	90 (3.54)
4 × 2.5	M20	**6FX7002-5LM62-....** [5]	1	**6FX80■2-5CS16-....**	**6FX8008-1BB21-....**	11.0 (0.43)	0.20 (0.13)	90 (3.54)
4 × 4	M32	**6FX7002-5LM72-....**	1.5	**6FX80■2-5CS46-....** [6]	**6FX8008-1BB31-....**	12.3 (0.48)	0.27 (0.18)	100 (3.94)
4 × 6	M32	**6FX7002-5LM82-....**	1.5	**6FX8002-5CS54-....**	**6FX8008-1BB41-....**	14.9 (0.59)	0.41 (0.28)	120 (4.72)
4 × 10	M32	**6FX7002-5LM32-....**	1.5	**6FX8002-5CS64-....**	**6FX8008-1BB51-....**	18.2 (0.72)	0.62 (0.42)	140 (5.51)
4 × 16	M32	**6FX7002-5LM02-....**	1.5	**6FX8002-5CS24-....**	**6FX8008-1BB61-....**	22.3 (0.88)	1.01 (0.68)	170 (6.69)

MOTION-CONNECT 700	**7**										
MOTION-CONNECT 800PLUS					**8**				**8**		
Power cable											
Pre-assembled						**0**					
Connector at module end supplied separately						**1**					
Connector at module end not supplied						**2**					
Connector at motor end supplied separately						**4**					
Length code		**....**					**....**			**....**	

Accessories

Power cable extensions for water-cooled SIMOTICS L-1FN3 linear motors, peak/continuous load versions with full-thread connector

No. of cores × cross-section	Connector size	Pre-assembled basic cable to the drive system	**Extension**
mm^2		Type	Article No.
4 × 2.5	1	6FX8002-5CS16-....	**6FX8002-5CA15-....**
4 × 4	1.5	6FX8002-5CS46-.... [6]	**6FX8002-5CA48-....**
4 × 6	1.5	6FX8002-5CS54-....	**6FX8002-5CA58-....**
4 × 10	1.5	6FX8002-5CS64-....	**6FX8002-5CA68-....**
4 × 16	1.5	6FX8002-5CS24-....	**6FX8002-5YW12-....**

MOTION-CONNECT 800PLUS	**8**	
Length code		**....**

The combinations of power cable extensions shown are only provided by way of example.

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.
[3] The 6FX7002-5LM.. cables comprise MOTION-CONNECT 800PLUS cables which are sold by the meter.
[4] For SIMOTICS L-1FN30/-1FN31 motors only.
[5] For SIMOTICS L-1FN33/-1FN34/-1FN36/-1FN39 motors only.
[6] For SIMOTICS L-1FN3 linear motors in the peak load version, the pre-assembled basic cable 6FX8002-5CS54-.... (4 × 6 mm^2) to the SINAMICS S120/S220 drive system must be used.

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Power cables for SIMOTICS L-1FN3 motors – Natural cooling

Selection and ordering data

For naturally cooled SIMOTICS L-1FN3 linear motors for connection to SINAMICS S120/S220 via EMC-safe terminal strip

No. of cores × cross-section	**Cable sold by the meter** [1]	D_{max}	Weight (without connector)	Smallest bending radius [2]
		6FX8	**6FX8**	**6FX8**
mm^2	Article No.	mm (in)	kg/m (lb/ft)	mm (in)
4 × 1.5 + 4 × 0.5	**6FX7008-1BC11-....**	13.6 (0.54)	0.19 (0.13)	100 (3.94)
4 × 1.5	**6FX8008-1BB11-....**	9.5 (0.37)	0.15 (0.10)	75 (2.95)

MOTION-CONNECT 500	**7**		
MOTION-CONNECT 800PLUS	**8**		
Length code		**....**	

Accessories

Description	Article No.
Power connector with screw terminal For 3 ... 30 A Motor Modules SINAMICS S120/S220 booksize, C/D type with screw terminal for cable cross-sections up to 6 mm^2	**6SL3162-2MA00-0AC0**
Power connector with Push-In connection For 3 ... 30 A Motor Modules SINAMICS S120/S220 booksize, C/D type Push-In connection with snap-in actuators for cable cross-sections up to 6 mm^2	**6SL3162-2MB00-0AC0**

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[1] Note type of delivery.
[2] Valid for installation in a cable carrier.

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Selection and ordering data

For SIMOTICS T-1FW3 complete torque motors with terminal box

No. of cores × cross-section	**Cable sold by the meter** [1]	D_{max}		Weight (without connector)		Smallest bending radius [2]	
		6FX5	**6FX8**	**6FX5**	**6FX8**	**6FX5**	**6FX8**
mm^2	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
4 × 1.5	**6FX■008-1BB11-....**	8.4 (0.33)	9.5 (0.37)	0.12 (0.08)	0.15 (0.10)	155 (6.10)	75 (2.95)
4 × 2.5	**6FX■008-1BB21-....**	10.0 (0.39)	11.0 (0.43)	0.21 (0.69)	0.20 (0.13)	180 (7.09)	90 (3.54)
4 × 4	**6FX■008-1BB31-....**	11.4 (0.45)	12.3 (0.48)	0.27 (0.18)	0.27 (0.18)	210 (8.27)	100 (3.94)
4 × 6	**6FX■008-1BB41-....**	13.6 (0.54)	14.9 (0.59)	0.37 (0.25)	0.41 (0.28)	245 (9.65)	120 (4.72)
4 × 10	**6FX■008-1BB51-....**	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)
4 × 16	**6FX■008-1BB61-....**	24.2 (0.95)	22.3 (0.88)	1.10 (0.74)	1.01 (0.68)	440 (17.32)	170 (6.69)
4 × 25	**6FX5008-1BB25-....**	28.0 (1.10)	–	1.62 (1.09)	–	505 (19.88)	–
4 × 35	**6FX5008-1BB35-....**	31.5 (1.24)	–	1.93 (1.30)	–	570 (22.44)	–
4 × 50	**6FX5008-1BB50-....**	38.0 (1.50)	–	3.04 (2.04)	–	685 (26.97)	–
4 × 70	**6FX5008-1BB70-....**	42.6 (1.68)	–	3.96 (2.66)	–	770 (30.31)	–
4 × 95	**6FX5008-1BB05-....**	51.7 (2.04)	–	5.55 (3.73)	–	935 (36.81)	–
4 × 120	**6FX5008-1BB12-....**	56.0 (2.20)	–	6.60 (4.43)	–	1010 (39.76)	–

MOTION-CONNECT 500	**5**		
MOTION-CONNECT 800PLUS	**8**		
Length code		**....**	

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.

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Power cables for SIMOTICS T-1FW6 motors

Selection and ordering data

For SIMOTICS T-1FW6 built-in torque motors with connection via adapter cable with full-thread connector

No. of cores × Cross-section	Connector size, Motor end	**Pre-assembled cable to the drive system**	**Cable sold by the meter** [1]	D_{max}	Weight (without connector)	Smallest bending radius [2]
mm²		Article No.	Article No.	mm (in)	kg/m (lb/ft)	mm (in)
4 × 2.5	1	**6FX80■2-5CS16-....**	**6FX8008-1BB21-....**	11.0 (0.43)	0.20 (0.13)	90 (3.54)
4 × 4	1.5	**6FX80■2-5CS46-....**	**6FX8008-1BB31-....**	12.3 (0.48)	0.27 (0.18)	100 (3.94)
4 × 6	1.5	**6FX8002-5CS54-....**	**6FX8008-1BB41-....**	14.9 (0.59)	0.41 (0.28)	120 (4.72)
		6FX8042-5CS54-....				
4 × 10	1.5	**6FX8002-5CS64-....**	**6FX8008-1BB51-....**	18.2 (0.72)	0.62 (0.42)	140 (5.51)
		6FX8042-5CS64-....				
4 × 16	1.5	**6FX8002-5CS24-....**	**6FX8008-1BB61-....**	22.3 (0.88)	1.01 (0.68)	170 (6.69)
		6FX8042-5CS24-....				

MOTION-CONNECT 800PLUS	**8**			**8**	
Power cable					
Pre-assembled	**0**				
Connector at module end supplied separately	**1**				
Connector at module end not supplied	**2**				
Connector at motor end supplied separately	**4**				
Length code		**....**			**....**

Accessories

Power cable extensions for SIMOTICS T-1FW6 built-in torque motors with full-thread connector

No. of cores × cross-section	Connector size	Pre-assembled cable to the drive system	**Extension**
mm²		Type	Article No.
4 × 2.5	1	6FX8002-5CS16-....	**6FX8002-5CA15-....**
4 × 4	1.5	6FX8002-5CS46-....	**6FX8002-5CA48-....**
4 × 6	1.5	6FX8002-5CS54-....	**6FX8002-5CA58-....**
4 × 10	1.5	6FX8002-5CS64-....	**6FX8002-5CA68-....**
4 × 16	1.5	6FX8002-5CS24-....	**6FX8002-5YW12-....**

MOTION-CONNECT 800PLUS	**8**	
Length code		**....**

The combinations of power cable extensions shown are only provided by way of example.

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.

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Selection and ordering data

For SINAMICS S120M distributed servo drive with AM600 adapter module

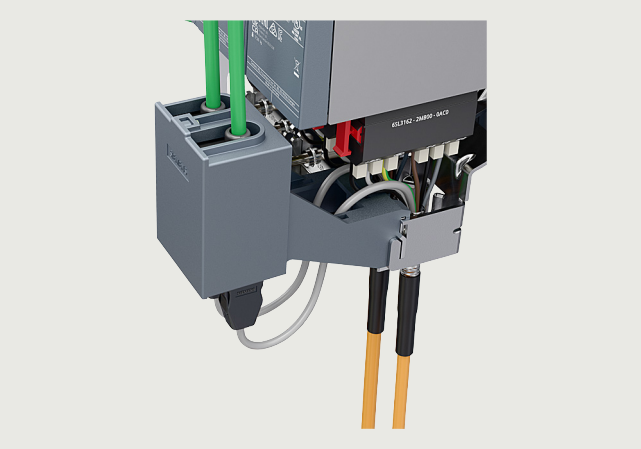
Connection method SINAMICS S120M	No. of cores × cross-section mm^2/AWG	for outgoing directions	**Pre-assembled cable** Article No.	D_{max} mm (in)	Weight (without connector) kg/m (lb/ft)	Smallest bending radius [1] mm (in)
Connector	4 × 2.5+ 3 × 4+ 4 × AWG22	Non-drive end (rear)/ non-drive end (rear)	**6FX8002-7HY00-....**	15 (0.59)	0.35 (0.24)	112.5 (4.43)
		Non-drive end (rear)/ drive end (front)	**6FX8002-7HY11-....**			
		Drive end (front)/ drive end (front)	**6FX8002-7HY22-....**			
MOTION-CONNECT 800PLUS			**8**			
Length code			**....**			

[1] Valid for installation in a cable carrier.

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OCC adapter

Overview



Example: OCC adapter in two-axis design for SINAMICS S220 Motor Modules booksize format

The OCC adapter enables the direct and easy connection of motors with One Cable Connection (OCC) technology to SINAMICS S120/S220 Motor Modules in booksize format. This allows quick and easy integration into the SINAMICS S120/S220 drive system.

The adapter unit is already equipped with a connecting cable for connecting to the DRIVE-CLiQ ports X200 and X201 of the SINAMICS Motor Modules. The OCC adapter is available in single-axis and two-axis designs suitable for Single Motor Modules and Double Motor Modules.

Installation at the shield terminal does not require any tools. The connection is realized via a Siemens IX signal connector and the SINAMICS motor connector. Please note that the OCC adapter protrudes about 47 mm over the front of the Motor Modules.

More information is available on the internet at:

support.industry.siemens.com/cs/document/110004030

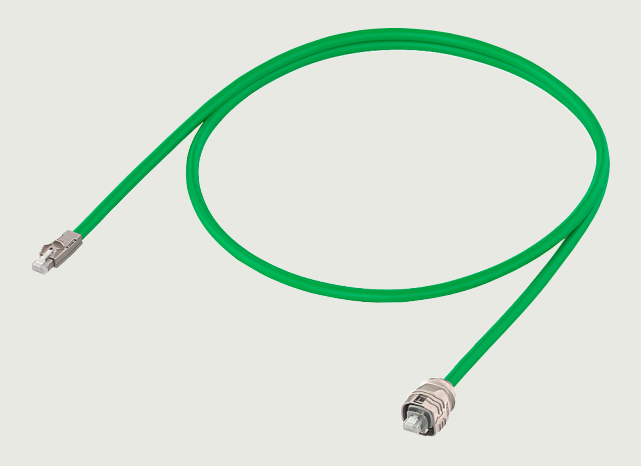
Selection and ordering data

Description	Article No.
OCC adapter	
for connecting motors with One Cable Connection (OCC) to SINAMICS S120/S220 Motor Modules in booksize format	
• Single-axis design for Single Motor Modules	**6FX2003-2CC01**
• Two-axis design for Double Motor Modules	**6FX2003-2CC02**

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Overview



MOTION-CONNECT DRIVE-CLiQ signal cable with IP20/IP67 connector

Signal cables are pre-assembled and are sold by the meter for connecting a variety of components.

The following different types of cable are available:

- DRIVE-CLiQ signal cables
- MOTION-CONNECT DRIVE-CLiQ signal cables
- MOTION-CONNECT pre-assembled signal cables

Type of delivery for pre-assembled signal cables

Pre-assembled signal cables are available in units of 10 cm (3.94 in).

The cables are supplied as reels up to 30 kg or 100 m (66.2 lb or 328 ft). Above 30 kg or 100 m (66.2 lb or 328 ft), cable drums are used instead of reels.

Usage	Connection Module end/Motor end	24 V cores	MOTION-CONNECT 200 6FX2...	MOTION-CONNECT 500 6FX5...	MOTION-CONNECT 800PLUS 6FX8...	Length steps
DRIVE-CLiQ signal cables						
Components with DRIVE-CLiQ interface, with internal or external 24 V DC power supply in the control cabinet	RJ45 IP20/RJ45 IP20	Without	≤ 70 m (230 ft)	–	–	To the decimeter
Components with DRIVE-CLiQ interface in the control cabinet	RJ45 IP20/RJ45 IP20	With	–	≤ 100 m (328 ft)	≤ 75 m (246 ft)	To the decimeter
For built-in or built-on encoder systems with DRIVE-CLiQ interface.	RJ45 IP20/RJ45 IP67	With				
	RJ45 IP67/RJ45 IP67					
Basic cable	RJ45 IP20/M17	With				
Extension	M17/M17					
Adapter cable	RJ45 IP67/M17					
	M17/RJ45 IP67					
Basic cable	RJ45 IP20/M12	With	–	≤ 100 m (328 ft)	≤ 75 m (246 ft)	To the meter up to 20 m (65.6 ft), beyond that in steps of 5 m (16.4 ft)
Extension	M12/M12			≤ 30 m (98.4 ft)	≤ 30 m (98.4 ft)	
Adapter cable	RJ45 IP67/M12			≤ 100 m (328 ft)	≤ 75 m (246 ft)	
	M12/RJ45 IP67			≤ 30 m (98.4 ft)	≤ 30 m (98.4 ft)	
	M17/M12			≤ 100 m (328 ft)	≤ 75 m (246 ft)	

[1] Valid for installation in a cable carrier.

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Application

DRIVE-CLiQ signal cables without 24 V DC cores – available in gigabit and megabit communication

DRIVE-CLiQ signal cables without 24 V DC cores are used to connect components with DRIVE-CLiQ connections which have a separate or external 24 V DC power supply.

MOTION-CONNECT DRIVE-CLiQ signal cables with 24 V DC cores

MOTION-CONNECT DRIVE-CLiQ signal cables with 24 V DC cores are used whenever components with DRIVE-CLiQ connections must meet high requirements such as mechanical stress and oil resistance, e.g., where a connection is made outside the cabinet between:

- Motor Modules and Sensor Modules
- Motor Modules and motors with DRIVE-CLiQ interface
- Motor Modules and direct measuring system with DRIVE-CLiQ interface of third parties.

MOTION-CONNECT pre-assembled signal cables

MOTION-CONNECT pre-assembled signal cables are used whenever motor encoders on motors without DRIVE-CLiQ interface need to be connected to Sensor Modules.

Design

If pre-assembled signal cables are to be installed in a cable carrier in such a way that the connector would inhibit assembly, pre-assembled cables without assembled connector can also be supplied. In this case, the contacts of the cables are crimped and the connector enclosure is supplied separately. After installing the cables, the customer assembles the connector enclosure.

The 6FX.002-2....-.... signal cables are available with crimped contacts and with the connector enclosure supplied separately (not in the case of DRIVE-CLiQ signal cables and signal cables with bare wire ends).

Signal cables with separately supplied **module-end** connector: in this case, the 6th position of the Article No. must be changed from **0** to **1**:
6FX.0**1**2-2C...-.... (not for signal cables for connecting via terminals or 6FX.002-2AH00-...., 6FX.002-2CA12-....).

Signal cables with separately supplied **motor-end** connector: in this case, the 6th position of the Article No. must be changed from **0** to **4**:
6FX.0**4**2-2C...-.... (not for signal cables for connecting via terminals or 6FX8002-2BA20-...., 6FX8002-2BA21-....).

Note:

Once the contacts have latched into the insulator, they can no longer be removed.

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Technical specifications

DRIVE-CLiQ signal cables	DRIVE-CLiQ	DRIVE-CLiQ MOTION-CONNECT 500		DRIVE-CLiQ MOTION-CONNECT 800PLUS	
	6FX2...-1DC..-....	6FX5...-.DC..-....	6FX5...-.DG..-....	6FX8...-.DC..-....	6FX8...-.DG..-....
Certificate of suitability					
• CE	Yes	Yes	Yes	Yes	Yes
• cURus or UR/CSA[1)]	UL STYLE 2502/CSA-N.210.2-M90	UL STYLE 2502/ CSA-N.210.2-M90	UL STYLE 2570/ CSA C22.2 No. 210.2	UL STYLE 2502/ CSA-N.210.2-M90	UL STYLE 21223/ CSA C22.2 No. 210.2
• RoHS conformity	Yes	Yes	Yes	Yes	Yes
Rated voltage according to EN 50395	30 V	30 V	600 V	30 V	600 V
Test voltage, rms	500 V	750 V	2000 V	500 V	2000 V
Operating temperature on the surface					
• Fixed installation	-20 … +80 °C (-4 ... +176 °F)	-20 … +80 °C (-4 ... +176 °F)		-20 … +80 °C (-4 ... +176 °F)	-20 … +90 °C (-4 ... +194 °F)
• Flexible installation	–	0 … 60 °C (32 ... 140 °F)		-20 … +60 °C (-4 ... +140 °F)	0 … 90 °C (32 ... 194 °F)
Tensile stress, max.					
• Fixed installation	45 N/mm^2 (6526 lb/in^2)	80 N/mm^2 (11603 lb/in^2)		50 N/mm^2 (7252 lb/in^2)	80 N/mm^2 (11603 lb/in^2)
• Flexible installation	–	30 N/mm^2 (4351 lb/in^2)		20 N/mm^2 (2901 lb/in^2)	30 N/mm^2 (4351 lb/in^2)
Smallest bending radius					
• Fixed installation	50 mm (1.97 in)	35 mm (1.38 in)		35 mm (1.38 in)	
• Flexible installation	–	125 mm (4.92 in)		75 mm (2.95 in)	
Torsional stress	–	Absolute 30°/m		Absolute 30°/m	
Bending	–	100000		10 million	
Traversing velocity	–	30 m/min (98.4 ft/min)		300 m/min (984 ft/min)	
Acceleration	–	2 m/s^2 (6.56 ft/s^2)		Up to 50 m/s^2 (164 ft/s^2), see characteristics on page 10/6	
Insulation material, incl. jacket	CFC/silicone-free	CFC/silicone-free		CFC/halogen-free/silicon-free IEC 60754-1/DIN VDE 0472-815	
Oil resistance	EN 60811-2-1	EN 60811-2-1 (mineral oil only)		EN 60811-2-1	
Outer jacket	PVC	PVC		PUR, HD22.10 S2 (VDE 0282, Part 10)	
	Gray RAL 7032	DESINA color green RAL 6018		DESINA color green RAL 6018	
Flame-retardant	EN 60332-1-1 to 1-3	EN 60332-1-1 to 1-3		EN 60332-1-1 to 1-3	

Degree of protection of the pre-assembled signal cables and their extensions when closed and inserted: IP67.

[1)] The File No. is printed on the cable jacket.

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Technical specifications

Signal cables	MOTION-CONNECT 500 6FX50..-.....-....	MOTION-CONNECT 800PLUS 6FX80..-.....-....
Certificate of suitability		
• CE	Yes	Yes
• cURus or UR/CSA [1]	UL758-CSA-C22.2-N.210.2-M90	UL758-CSA-C22.2-N.210.2-M90
• RoHS conformity	Yes	Yes
Rated voltage according to EN 50395	30 V	30 V
Test voltage, rms	500 V	500 V
Operating temperature on the surface		
• Fixed installation	-20 … +80 °C (-4 ... +176 °F)	-50 … +80 °C (-58 ... +176 °F)
• Flexible installation	0 … 60 °C (32 ... 140 °F)	-20 … +60 °C (-4 ... +140 °F)
Tensile stress, max.		
• Fixed installation	50 N/mm^2 (7252 lb/in^2)	50 N/mm^2 (7252 lb/in^2)
• Flexible installation	20 N/mm^2 (2901 lb/in^2)	20 N/mm^2 (2901 lb/in^2)
Smallest bending radius		
• Fixed installation	60 mm (2.36 in)	4 × D_{max}
• Flexible installation	100 mm (3.94 in)	70 mm [2] (2.75 in)
Torsional stress	Absolute 30°/m	Absolute 30°/m
Bending	2 million	10 million
Traversing velocity	180 m/min (591 ft/min)	Up to 300 m/min (984 ft/min)
Acceleration	5 m/s^2 (16.41 ft/s^2)	Up to 50 m/s^2 (164 ft/s^2), see characteristics on page 10/6
Insulation material, incl. jacket	CFC/silicone-free	CFC/halogen-free/silicon-free IEC 60754-1/DIN VDE 0472-815
Oil resistance	EN 60811-2-1 (mineral oil only)	EN 60811-2-1
Outer jacket	PVC DESINA color green RAL 6018	PUR, HD22.10 S2 (VDE 0282, Part 10) DESINA color green RAL 6018
Flame-retardant	EN 60332-1-1 to 1-3	EN 60332-1-1 to 1-3

Degree of protection of the pre-assembled signal cables and their extensions when closed and inserted: IP67.

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[1] The File No. is printed on the cable jacket.

[2] Exception: 6FX8002-2SL..-....; smallest bending radius (flexible): 85 mm (3.35 in).

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Selection and ordering data

Pre-assembled DRIVE-CLiQ signal cables without 24 V DC cores for SINAMICS S120

Version	Length	D_{max}	Connector/degree of protection, module-end	Connector/degree of protection, motor-end	**DRIVE-CLiQ signal cable** without 24 V DC cores
	m (ft)	mm (in)			Article No.
Fixed lengths 	0.11 (0.36)		RJ45/IP20	RJ45/IP20	**6SL3060-4AB00-0AA0**
	0.16 (0.52)				**6SL3060-4AD00-0AA0**
	0.21 (0.69)				**6SL3060-4AF00-0AA0**
	0.26 (0.85)				**6SL3060-4AH00-0AA0**
	0.31 (1.02)				**6SL3060-4AK00-0AA0**
	0.36 (1.18)				**6SL3060-4AM00-0AA0**
	0.41 (1.35)				**6SL3060-4AP00-0AA0**
	0.60 (1.97)				**6SL3060-4AU00-0AA0**
	0.95 (3.12)				**6SL3060-4AA10-0AA0**
	1.20 (3.94)				**6SL3060-4AW00-0AA0**
	1.45 (4.76)				**6SL3060-4AF10-0AA0**
	2.10 (6.89)				**6SL3060-4AB20-0AA0**
	2.40 (7.87)				**6SL3060-4AE20-0AA0**
	2.80 (9.19)				**6SL3060-4AJ20-0AA0**
	5.00 (16.4)				**6SL3060-4AA50-0AA0**
To the decimeter 	Max. 70 (230)	7.0 (0.28)	RJ45/IP20	RJ45/IP20	**6FX2002-1DC00-....**
To the decimeter 	Max. 70 (230)	7.0 (0.28)	RJ45/IP67	RJ45/IP67	**6FX2002-1DC20-....**
Length code					**....**

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DRIVE-CLiQ signal cables without 24 V DC cores

Selection and ordering data

Pre-assembled DRIVE-CLiQ signal cables without 24 V DC cores for SINAMICS S220

Version	Length	D_{max}	Connector/degree of protection, module-end	Connector/degree of protection, motor-end	**DRIVE-CLiQ signal cable** without 24 V DC cores
	m (ft)	mm (in)			Article No.
Fixed lengths	0.11 (0.36) 0.16 (0.52) 0.21 (0.69)		RJ45/IP20	RJ45/IP20	**6SL5060-4AB00-0AA0** **6SL5060-4AD00-0AA0** **6SL5060-4AF00-0AA0**
	0.26 (0.85) 0.31 (1.02) 0.36 (1.18)				**6SL5060-4AH00-0AA0** **6SL5060-4AK00-0AA0** **6SL5060-4AM00-0AA0**
	0.41 (1.35) 0.60 (1.97) 0.95 (3.12)				**6SL5060-4AP00-0AA0** **6SL5060-4AU00-0AA0** **6SL5060-4AA10-0AA0**
	1.20 (3.94) 1.45 (4.76) 1.60 (5.25) 2.10 (6.89)				**6SL5060-4AW00-0AA0** **6SL5060-4AF10-0AA0** **6SL5060-4AG10-0AA0** **6SL5060-4AB20-0AA0**
	2.40 (7.87) 2.80 (9.19) 5.00 (16.4)				**6SL5060-4AE20-0AA0** **6SL5060-4AJ20-0AA0** **6SL5060-4AA50-0AA0**
To the decimeter	Max. 70 (230)		RJ45/IP20	RJ45/IP20	**6FX5002-1DG00-....** **6FX5002-1DG30-....** **6FX5002-1DG32-....** **6FX5002-1DH30-....** **6FX5002-1DH32-....**
To the decimeter	Max. 70 (230)		RJ45/IP67	RJ45/IP67	**6FX5002-1DG34-....** **6FX5002-1DG35-....** **6FX8002-1DG34-....** **6FX8002-1DG35-....** **6FX5002-1DH34-....** **6FX5002-1DH35-....** **6FX8002-1DH34-....** **6FX8002-1DH35-....**

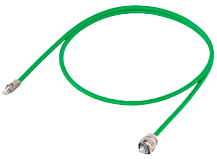
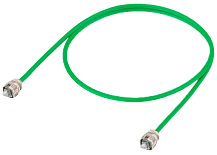
MOTION-CONNECT 500	**5**	
MOTION-CONNECT 800PLUS	**8**	
Length code		**....**

10

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Selection and ordering data

Pre-assembled MOTION-CONNECT DRIVE-CLiQ signal cables for SINAMICS S120 and motors with 24 V DC cores

Version	Usage	Length, max.	D_{max}	Connector/ degree of protection, module-end	Connector/ degree of protection, motor-end	**MOTION-CONNECT DRIVE-CLiQ signal cable** with 24 V DC cores
		m (ft)	mm (in)			Article No.
To the decimeter 	For components with DRIVE-CLiQ interface in the control cabinet.	100 (328)	7.1 (0.28)	RJ45/IP20	RJ45/IP20	**6FX5002-2DC00-....**
	For example, for making the connection between SINAMICS S120 Motor Modules or Power Modules and the DRIVE-CLiQ cabinet bushing.	75 (246)	7.1 (0.28)	RJ45/IP20	RJ45/IP20	**6FX8002-2DC00-....**
To the decimeter 	For built-in or built-on encoder systems with DRIVE-CLiQ interface.	100 (3.28)	7.1 (0.28)	RJ45/IP20	RJ45/IP67	**6FX5002-2DC10-....**
	For example, for making the connection between SIMOTICS S-1FT7/SIMOTICS M-1PH8/ SIMOTICS T-1FW3 motors and SINAMICS S120 Motor Modules or Power Modules.	75 (246)	7.1 (0.28)	RJ45/IP20	RJ45/IP67	**6FX8002-2DC10-....**
To the decimeter 	For built-in or built-on encoder systems with DRIVE-CLiQ interface.	100 (328)	7.1 (0.28)	RJ45/IP67	RJ45/IP67	**6FX5002-2DC20-....**
	For example, for making the connection between SIMOTICS S-1FT7/SIMOTICS M-1PH8/ SIMOTICS T-1FW3 motors and SINAMICS S120 via DRIVE-CLiQ cabinet bushings, couplings or DME20, or 2 couplings or DME20.	75 (246)	7.1 (0.28)	RJ45/IP67	RJ45/IP67	**6FX8002-2DC20-....**

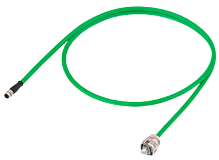
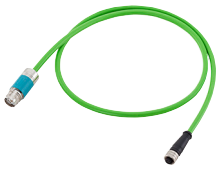
MOTION-CONNECT 500	**5**
MOTION-CONNECT 800PLUS	**8**
Length code	**....**

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MOTION-CONNECT DRIVE-CLiQ signal cables with 24 V DC cores

Selection and ordering data

Pre-assembled MOTION-CONNECT DRIVE-CLiQ signal cables with 24 V DC cores for SINAMICS S120 and direct measuring systems with M12 connection or SIMOTICS motors with M12 connection at disconnection point

Version	SIMOTICS motor/ encoder Usage	Length, max. m (ft)	D_{max} mm (in)	Module-end connector/ degree of protection	Encoder/ motor-end connector/ degree of protection	**Basic cable** Article No.	**Extension** Article No.
Basic cable between encoder and SINAMICS S120 Motor Module or Power Module							
To the meter [1] 	Absolute encoders with DRIVE-CLiQ interface and M12 connection Non-Siemens direct measuring systems with DRIVE-CLiQ interface and M12 connection	100 (328) 75 (246)	7.1 (0.28) 7.1 (0.28)	RJ45/IP20 RJ45/IP20	M12/IP67 [2] M12/IP67 [2]	**6FX5002-2DC30-....** **6FX8002-2DC30-....**	**6FX5002-2DC34-....** **6FX8002-2DC34-....**
Extension for all cables with M12 connection							
To the meter [1] 		30 (98.4) 30 (98.4)	7.1 (0.28) 7.1 (0.28)	M12/IP67 [2] M12/IP67 [2]	M12/IP67 [2] M12/IP67 [2]	**6FX5002-2DC34-....** **6FX8002-2DC34-....**	**6FX5002-2DC34-....** **6FX8002-2DC34-....**
Adapter cable between SIMOTICS motor with DRIVE-CLiQ RJ45 interface and disconnection point with M12 connection							
To the meter [1] 	S-1FT7 M-1PH8	30 (98.4)	7.1 (0.28)	M12/IP67 [2]	RJ45/IP67 [3]	**6FX8002-2DC38-....**	**6FX8002-2DC34-....**
Adapter cable between encoder with DRIVE-CLiQ M12 interface and disconnection point with M17 connection							
To the meter [1] 		100 (328) 75 (246)	7.1 (0.28) 7.1 (0.28)	M17/IP67 [2] M17/IP67 [2]	M12/IP67 [2] M12/IP67 [2]	**6FX5002-2DC46-....** **6FX8002-2DC46-....**	**6FX5002-2DC34-....** **6FX8002-2DC34-....**
Adapter cable between encoder with DRIVE-CLiQ M12 interface and disconnection point with RJ45/IP67 connection							
To the meter [1] 	DRIVE-CLiQ coupler, DME20, cabinet bushing with RJ45 connection	100 (328) 75 (246)	7.1 (0.28) 7.1 (0.28)	RJ45/IP67 [3] RJ45/IP67 [3]	M12/IP67 [2] M12/IP67 [2]	**6FX5002-2DC36-....** **6FX8002-2DC36-....**	**6FX5002-2DC34-....** **6FX8002-2DC34-....**

MOTION-CONNECT 500								**5**					**5**		
MOTION-CONNECT 800PLUS								**8**					**8**		
Length code											**....**				**....**

The combinations of signal cable extensions shown are only provided by way of example.
The maximum length of a DRIVE-CLiQ line (basic cable plus extensions and/or adapter cable) must be observed.

[1] To the meter up to 20 m (65.6 ft), beyond that in steps of 5 m (16.4 ft) up to the maximum length.

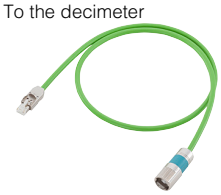
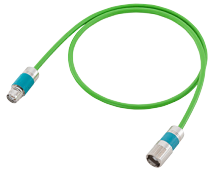
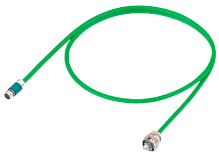
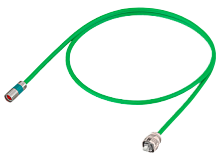
[2] Max. 3 M12 disconnection points or 4 M17 disconnection points permissible without reduction in maximum total length. With a combination of M17 and M12, a maximum number of 3 disconnection points is possible without shortening the maximum length.

[3] DRIVE-CLiQ coupler 6SL3066-2DA00-0AB0 required at disconnection point or between 2 cables with RJ45 connection. The total maximum length is reduced by 5 m (16.4 ft) for each coupler.

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Selection and ordering data

Pre-assembled MOTION-CONNECT DRIVE-CLiQ signal cables with 24 V DC cores for SINAMICS S120 and for SIMOTICS S-1FT2/S-1FK2/S-1FT7 motors with M17 connection or direct measuring systems with M17 connection at disconnection point

Version	SIMOTICS motor/ encoder Usage	Length, max. m (ft)	D_{max} mm (in)	Module-end connector/ degree of protection	Motor-end connector/ degree of protection	**Basic cable** Article No.	**Extension** Article No.
Basic cable							
To the decimeter 	S-1FT2/S-1FK2/-1FT7 [1]	100 (328)	7.1 (0.28)	RJ45/IP20	M17/IP67 [2]	**6FX5002-2D■40-....**	**6FX5002-2D■44-....**
	S-1FT2/S-1FK2/-1FT7 [1]	75 (246)	7.1 (0.28)	RJ45/IP20	M17/IP67 [2]	**6FX8002-2D■40-....**	**6FX8002-2D■44-....**
Extension for all cables with M17 connection							
To the decimeter 	S-1FT2/S-1FK2/-1FT7 [1]	100 (328)	7.1 (0.28)	M17/IP67 [2]	M17/IP67 [2]	**6FX5002-2D■44-....**	**6FX5002-2D■44-....**
	S-1FT2/S-1FK2/-1FT7 [1]	75 (246)	7.1 (0.28)	M17/IP67 [2]	M17/IP67 [2]	**6FX8002-2D■44-....**	**6FX8002-2D■44-....**
Adapter cable between SIMOTICS motor with DRIVE-CLiQ RJ45 interface and disconnection point with M17 connection							
To the decimeter 	S-1FT2/S-1FK2/-1FT7 [1]	100 (328)	7.1 (0.28)	M17/IP67 [2]	RJ45/IP67 [3]	**6FX5002-2DC42-....**	**6FX5002-2D■44-....**
	S-1FT2/S-1FK2/-1FT7 [1]	75 (246)	7.1 (0.28)	M17/IP67 [2]	RJ45/IP67 [3]	**6FX8002-2DC42-....**	**6FX8002-2D■44-....**
Adapter cable between encoder with DRIVE-CLiQ M12 interface and disconnection point with M17 connection							
To the meter up to 20 m (65.6 ft), beyond that in steps of 5 m (16.4 ft) 		100 (328)	7.1 (0.28)	M17/IP67 [2]	M12/IP67 [2]	**6FX5002-2DC46-....**	**6FX5002-2D■44-....**
		75 (246)	7.1 (0.28)	M17/IP67 [2]	M12/IP67 [2]	**6FX8002-2DC46-....**	**6FX8002-2D■44-....**
Adapter cable between SIMOTICS motor with DRIVE-CLiQ M17 interface and disconnection point with RJ45/IP67 connection							
To the decimeter 	S-1FT2/S-1FK2/-1FT7 [1]	100 (328)	7.1 (0.28)	RJ45/IP67 [3]	M17/IP67 [2]	**6FX5002-2D■48-....**	**6FX5002-2D■44-....**
	S-1FT2/S-1FK2/-1FT7 [1] (e.g. for DRIVE-CLiQ coupler, DME20, cabinet bushing with RJ45 connection)	75 (246)	7.1 (0.28)	RJ45/IP67 [3]	M17/IP67 [2]	**6FX8002-2D■48-....**	**6FX8002-2D■44-....**

MOTION-CONNECT 500																			
MOTION-CONNECT 800PLUS																			
		6	**F**	**X**	**5**	**0**	**0**	**2**	**-**					**5**	**0**	**0**	**2**	**-**	
		8	**F**	**X**	**8**	**0**	**0**	**2**	**-**					**8**	**0**	**0**	**2**	**-**	
Connector, type:	**SPEED-CONNECT**									**C**								**C**	
Connector, type:	**Full thread**									**D**								**D**	
Length code											**....**								**....**

The combinations of signal cable extensions shown are only provided by way of example.
The maximum specified cable length (basic cable and extensions) must not be exceeded.

[1] For SIMOTICS S-1FT7 (1FT7...-.....-.K.. or 1FT7...-.....-.L.).

[2] Max. 3 M12 disconnection points or 4 M17 disconnection points permissible without reduction in maximum total length. With a combination of M17 and M12, a maximum number of 3 disconnection points is possible without shortening the maximum length.

[3] DRIVE-CLiQ coupler 6SL3066-2DA00-0AB0 required at disconnection point or between 2 cables with RJ45 connection. The total maximum length is reduced by 5 m (16.4 ft) for each coupler.

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Signal cables for motors with SPEED-CONNECT connector

Selection and ordering data

Pre-assembled MOTION-CONNECT signal cables for motors with SPEED-CONNECT connector

Encoder system	Motor	Connection via	Length, max.	D_{max}	Degree of protection Connector [1]	Basic cable	Extension
	SIMOTICS	SINAMICS	m (ft)	mm (in)		Article No.	Article No.
Absolute encoder with EnDat 2.1	S-1FT7/ M-1PH8 [2]	SMC20	100 (328)	9.8 (0.39)	IP20/IP67	**6FX■0■2-2EQ31-....**	**6FX■002-2EQ34-....**
Incremental encoder sin/cos 1 V_{pp} 2048 S/R, with C and D tracks	S-1FT7/ M-1PH8 [2]	SMC20	100 (328)	9.8 (0.39)	IP20/IP67	**6FX■0■2-2CQ31-....**	**6FX■002-2CQ34-....**
Incremental encoder sin/cos 1 V_{pp} 256 and 512 S/R, without C and D tracks	M-1PH8 [2]	SMC20	50 (164)	9.2 (0.36)	IP20/IP67	**6FX80■2-2CQ80-....**	**6FX■002-2CQ34-....**

MOTION-CONNECT 500	**5**				**5**
MOTION-CONNECT 800PLUS	**8**				**8**
Signal cable					
Pre-assembled		**0**			
Connector at module end supplied separately		**1**			
Connector at motor end supplied separately		**4**			
Length code			**....**		**....**

[1] The specification for the degree of protection refers to the basic cable.

[2] For SIMOTICS M-1PH808/-1PH810/-1PH813/-1PH816 motors.

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Selection and ordering data

Pre-assembled signal cables for motors with full-thread connector

Encoder system	Motor	Connection via	Length, max.	D_{max}	Degree of protection Connector [1]	Basic cable	Extension
	SIMOTICS	SINAMICS	m (ft)	mm (in)		Article No.	Article No.
Absolute encoder with EnDat 2.1	M-1PH8/T-1FW3	SMC20	100 (328)	9.8 (0.39)	IP20/IP67	**6FX■0■2-2EQ10-....**	**6FX■002-2EQ14-....**
Absolute encoder with EnDat 2.1 5 V DC		SME25	3 [2] (9.84)	9.2 (0.36)	IP67/IP67	**6FX■0■2-2AD04-....**	**–**
Absolute encoder with EnDat 2.1	L-1FN3/T-1FW6	SME125	3 [2] (9.84)	9.2 (0.36)	IP67/IP67	**6FX80■2-2AD04-....**	**–**
Absolute encoder with EnDat 2.1							
• 6FX2001-5.E..		SMC20	100 (328)	9.2 (0.36)	IP20/IP67	**6FX■0■2-2CH00-....**	**6FX■002-2AD04-....**
• 1XP8014-10/1XP8024-10		SMC20	100 (328)	9.2 (0.36)	IP20/IP67	**6FX■0■2-2CH00-....**	**6FX■002-2AD04-....**
Absolute encoder with SSI 5 V DC		SME25	3 (9.84)	9.2 (0.36)	IP67/IP67	**6FX■0■2-2AD04-....**	**–**
Absolute encoder with SSI 24 V DC							
• 6FX2001-5.S.. Clock-pulse rate 100 ... 250 kHz		SMC30	100 (328)	9.3 (0.37)	IP20/IP67	**6FX■002-2CC11-....**	**6FX■002-2CB54-....**
• 1XP8014-20/1XP8024-20/-21		SMC30	100 (328)	9.3 (0.37)	IP20/IP67	**6FX■0■2-2CC06-....**	**–**
Incremental encoder sin/cos 1 V_{pp} 2048 S/R, with C and D tracks	M-1PH8/ T-1FW3	SMC20	100 (328)	9.8 (0.39)	IP20/IP67	**6FX■0■2-2CA31-....**	**6FX■002-2CA34-....**
Incremental encoder sin/cos 1 V_{pp} 256 and 512 S/R, without C and D tracks	M-1PH8	SMC20	50 (164)	9.2 (0.36)	IP20/IP67	**6FX80■2-2CA80-....**	**6FX■002-2CA34-....**
HTL Incremental encoder	M-1PH8	SMC30	300 [3] (984)	9.3 (0.37)	–/IP67	**6FX■002-2AH00-....** **6FX■042-2AH00-....**	**6FX■002-2AH04-....**
		SMC30	300 [3] (984)	9.3 (0.37)	IP20/IP67	**6FX■0■2-2AH11-....**	**6FX■002-2AH04-....**
HTL Incremental encoder	M-1PH8	CU310-2/ D410-2	100 (328)	9.3 (0.37)	IP20/IP67	**6FX■0■2-2AH11-....**	**–**
Incremental encoder sin/cos 1 V_{pp} without C and D tracks 6FX2001-3		SMC20	50 (164)	9.3 (0.37)	IP20/IP67	**6FX■0■2-2CG00-....**	**6FX■002-2CB54-....**
HTL Incremental encoder, 24 V DC							
• 6FX2001-4		SMC30	100 (328)	9.3 (0.37)	–/IP67	**6FX5002-2CA12-....** **6FX5042-2CA12-....**	**6FX■002-2CB54-....**
• 1XP8012-10/-11, 1XP8032-10/-11/ -12		SMC30	100 (328)	9.3 (0.37)	–/IP67	**6FX5002-2CA12-....** **6FX5042-2CA12-....**	**6FX■002-2CB54-....**
TTL incremental encoder, RS422							
• 6FX2001-2, 5 V DC		SMC30	100 (328)	9.3 (0.37)	IP20/IP67	**6FX■0■2-2CR00-....**	**6FX■002-2CB54-....**
• 1XP8012-20/-21/-22, 1XP8032-20/ -21/-22, 5 V DC		SMC30	100 (328)	9.3 (0.37)	IP20/IP67	**6FX■0■2-2CR00-....**	**6FX■002-2CB54-....**
• 6FX2001-2, 24 V DC		SMC30	100 (328)	9.3 (0.37)	IP20/IP67	**6FX■0■2-2CD24-....**	**6FX■002-2CB54-....**
Incremental encoder sin/cos 1 V_{pp} 5 V DC, without C and D tracks		SME20	3 [2] (9.84)	9.3 (0.37)	IP67/IP67	**6FX■0■2-2CB54-....**	**–**
Direct incremental encoder sin/cos 1 V_{pp}	L-1FN3/T-1FW6	SME120	3 [2] (9.84)	9.3 (0.37)	IP67/IP67	**6FX80■2-2CB54-....**	**–**
Resolver	T-1FW3	SMC10	130 (426)	9.2 (0.36)	IP20/IP67	**6FX■0■2-2CF02-....**	**6FX■002-2CF04-....**
Resolver 1XP8013-10/-11/ 1XP8023-10/-11		SMC10	130 (426)	9.2 (0.36)	IP20/IP67	**6FX■0■2-2CF06-....**	**–**

MOTION-CONNECT 500							**5**				**5**	
MOTION-CONNECT 800PLUS							**8**				**8**	
Signal cable												
Pre-assembled								**0**				
Connector at module end supplied separately								**1**				
Connector at motor end supplied separately								**4**				
Length code									**....**			**....**

The combinations of signal cable extensions shown are only provided by way of example.

The maximum specified cable length (basic cable and extensions) must not be exceeded. The total maximum length is reduced by 2 m (6.56 ft) for each interruption point.

[1] The specification for the degree of protection refers to the basic cable.

[2] Up to 10 m (32.8 ft) possible, depending on the current consumption of the 5 V encoder. Up to 30 m (98.4 ft) possible for encoders with 3.6 V operating voltage..

[3] With evaluation of difference signals A*, A, B*, B, otherwise ≤ 100 m (328 ft).

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Signal cables for motors with full-thread connector

Selection and ordering data

Signal cables for temperature sensors with full-thread connector

Temperature sensor	Motor	Connection via	Length, max.	D_{max}	Degree of protection Connector [1]	**Basic cable/ extension** [2]	**Adapter cable** [2]
	SIMOTICS	SINAMICS	m (ft)	mm (in)		Article No.	Article No.
Temperature sensor	L-1FN3100/L-1FN3150 [3]	SME120/SME125	10 (32.8)	11.0 (0.43)	IP67/IP67	**6FX8002-2SL10-....**	**6FX8002-2SL01-....**
Temperature sensor	L-1FN3300 ... L-1FN3900 [3]	SME120/SME125	10 (32.8)	11.0 (0.43)	IP67/IP67	**6FX8002-2SL10-....**	**6FX8002-2SL02-....**
Temperature sensor	T-1FW6	SME120/SME125	10 (32.8)	11.0 (0.43)	IP67/IP67	**6FX8002-2SL10-....**	**–**
Temperature sensor	L-1FN3100/L-1FN3150 [3]	TM120	100 (328)	11.0 (0.43)	–/IP67	**6FX8002-2SL20-....**	**6FX8002-2SL01-....**
Temperature sensor	L-1FN3300 ... L-1FN3900 [3]	TM120	100 (328)	11.0 (0.43)	–/IP67	**6FX8002-2SL20-....**	**6FX8002-2SL02-....**
Temperature sensor	T-1FW6	TM120	100 (328)	11.0 (0.43)	–/IP67	**6FX8002-2SL20-....**	**–**
MOTION-CONNECT 800PLUS						**8**	**8**
Length code						**....**	**....**

The combinations of signal cable extensions shown are only provided by way of example.

The maximum specified cable length (basic cable and extensions) must not be exceeded.
The total maximum length is reduced by 2 m (6.56 ft) for each interruption point.

[1] The specification for the degree of protection refers to the basic cable.

[2] The smallest bending radius (flexible) for signal cables 6FX8002-2SL..-.... is 85 mm (3.35 in).

[3] Continuous load version.

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Overview

Power cables, pre-assembled

Data position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16
MOTION-CONNECT 500	**6**	**F**	**X**	**5**	**0**	■	**2**	**–**	**5**	■	■	■	■	**–**	.	.	.	.
MOTION-CONNECT 800PLUS	**6**	**F**	**X**	**8**	**0**	■	**2**	**–**	**5**	■	■	■	■	**–**	.	.	.	.
Pre-assembled at motor and module ends						**0**												
Pre-assembled at motor end, connector at module end supplied separately						**1**												
Pre-assembled at motor end, connector at module end not supplied						**2**												
Connector at motor end supplied separately, pre-assembled at module end						**4**												
Without brake cores										**C**								
With brake cores										**D**								
Basic cable between	and																	
SINAMICS S120/S220 Motor Module C/D type, booksize format, up to 30 A	Motor connector, full-thread, size 0.5									**D**	**A**	**2**	**7**					
	Motor connector, full-thread, size 1 or 1.5										**S**		**6**					
	Motor connector, full-thread, size 3										**S**	**1**	**7**					
	Motor with terminal box (exposed core ends)										**W**		**2**					
	Motor connector, SPEED-CONNECT, size 0.5									**D**	**N**	**2**	**7**					
	Motor connector, SPEED-CONNECT, size 1 or 1.5										**N**		**6**					
SINAMICS S120/S220 Motor Module, booksize format, 45 A or higher	Motor connector, full-thread, size 1.5										**S**		**4**					
	Motor connector, full-thread, size 3										**S**	**2**	**3**					
	Motor connector, SPEED-CONNECT, size 1.5										**N**		**4**					
SINAMICS S120 Power Module/ Motor Module, booksize compact format	Motor connector, full-thread, size 0.5									**D**	**A**	**3**	**0**					
	Motor connector, full-thread, size 1 or 1.5										**G**		**1**					
	Motor connector, full-thread, size 3										**G**		**3**					
	Motor connector, SPEED-CONNECT, size 0.5									**D**	**N**	**3**	**0**					
	Motor connector, SPEED-CONNECT, size 1										**G**[2)]	**1**	**0**					
	Motor connector, SPEED-CONNECT, size 1										**G**[3)]	**1**	**2**					
	Motor connector, SPEED-CONNECT, size 1.5										**G**		**2**					
SINAMICS S120 Combi Power Module[1)]	Motor connector, SPEED-CONNECT, size 1 or 1.5										**F**							
SINAMICS S120/S220 Motor Module booksize format, up to 30 A	SIMOTICS M-1PH8 with terminal box									**C**	**P**							
SINAMICS S120 Power Module/ Motor Module, booksize format, 45 A or higher	SIMOTICS M-1PH8 with terminal box									**C**	**R**							
SINAMICS S120 Combi Power Module[1)]	SIMOTICS M-1PH8 with terminal box									**C**	**E**							
Extension between basic cable with connector	and motor connector																	
Full-thread, size 0.5	Full-thread, size 0.5									**M**	**E**	**0**	**5**					
Full-thread, size 1	Full-thread, size 1										**A**		**5**					
Full-thread, size 1.5	Full-thread, size 1.5										**A**		**8**					
Full-thread, size 3	Full-thread, size 3										**X**		**8**					
SPEED-CONNECT, size 0.5	SPEED-CONNECT, size 0.5									**M**	**N**	**0**	**5**					
SPEED-CONNECT, size 1	SPEED-CONNECT, size 1										**N**[2)]		**5**					
SPEED-CONNECT, size 1	SPEED-CONNECT, size 1										**Q**[3)]		**5**					
SPEED-CONNECT, size 1.5	SPEED-CONNECT, size 1.5										**Q**		**8**					
Adapter cable for SIMOTICS L-1FN3		**6**	**F**	**X**	**7**	**0**	**0**	**2**	**–**	**5**	**L**	**M**	.	.	**–**	.	.	.	.
Cross-section													.	.				
Length code																		
Units of 10 cm (3.94 in) or 1 meter (3.28 ft) or in fixed lengths															.	.	.	.

[1)] See SiePortal for MOTION-CONNECT connection system for SINAMICS S120 Combi.

[2)] Cable cross-section 1.5 mm^2

[1)] Cable cross-section 2.5 mm^2

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Power cables

Overview

Power cables, sold by the meter

Data position in Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16
MOTION-CONNECT 500	**6**	**F**	**X**	**5**	**0**	**0**	**8**	**–**	**1**	**B**	■	.	.	–	.	.	.	.
MOTION-CONNECT 800PLUS	**6**	**F**	**X**	**8**	**0**	**0**	**8**	**–**	**1**	**B**	■	.	.	–	.	.	.	.

Power cable with brake cores, sold by the meter	**A**
Power cable without brake cores, sold by the meter	**B**

No. of cores and cross-sections	. .

Length code

Units of 10 cm (3.94 in) or 1 meter (3.28 ft) or in fixed lengths	. . . .

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Overview

Data position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16
MOTION-CONNECT 500	**6**	**F**	**X**	**5**	**0**	■	**2**	**–**	**2**	■	■	■	■	**–**	.	.	.	.
MOTION-CONNECT 800PLUS	**6**	**F**	**X**	**8**	**0**	■	**2**	**–**	**2**	■	■	■	■	**–**	.	.	.	.
6FX2 cables	**6**	**F**	**X**	**2**	**0**	**0**	**2**	**–**	**1**	**D**	**C**	■	**0**	**–**	.	.	.	.
Pre-assembled at motor and module ends						**0**												
Pre-assembled at motor end, connector at module end supplied separately[1]						**1**												
Connector at motor end supplied separately, pre-assembled at module end[1]						**4**												
Variant: Signal cables for integrated encoder																		
DRIVE-CLiQ basic cable between	and																	
Power Module/Motor Module/SMC with IP20 connector	Power Module/Motor Module/SMC with IP20 connector									**D**	**C**	**0**	**0**					
Power Module/Motor Module/SMC with RJ45/IP20 connector	Motor/encoder/SME RJ45/IP67 connector[2]									**D**	**C**	**1**	**0**					
Power Module/Motor Module/SMC with RJ45/IP20 connector	M12 encoder connector									**D**	**C**	**3**	**0**					
Power Module/Motor Module/SMC with RJ45/IP20 connector	M17 motor connector									**D**	**C**	**4**	**0**					
DME20/cabinet bushing/coupler RJ45	Motor/encoder/SME RJ45/IP67 connector									**D**	**C**	**2**	**0**					
Extension between DRIVE-CLiQ cable with connector	and																	
RJ45	Motor/encoder/SME RJ45/IP67 connector									**D**	**C**	**2**	**0**					
M12	M12 encoder connector									**D**	**C**	**3**	**4**					
M17	M17 motor connector									**D**	**C**	**4**	**4**					
DRIVE-CLiQ adapter cable between	and																	
M12	RJ45 motor connector									**D**	**C**	**3**	**8**					
M17	RJ45 motor connector									**D**	**C**	**4**	**2**					
RJ45/IP67	M12 motor connector									**D**	**C**	**3**	**6**					
RJ45/IP67	M17 encoder connector									**D**	**C**	**4**	**8**					
M17	M12 encoder connector									**D**	**C**	**4**	**6**					
Basic cable between	and motor with																	
SMC20	Incremental encoder (sin/cos 1 V_{pp}), full-thread connector, M23									**C**	**A**	**3**	**1**					
SMC30	Incremental encoder (HTL), full-thread connector, M23									**A**	**H**	**0**	**0**					
CU310-2	Incremental encoder (HTL), full-thread connector, M23									**A**	**H**	**1**	**1**					
SMC20	Absolute encoder, full-thread connector, M23									**E**	**Q**	**1**	**0**					
SMC10	Resolver, full-thread connector, M23									**C**	**F**	**0**	**2**					
SMC20	Incremental encoder (sin/cos 1 V_{pp}), SPEED-CONNECT connector, M23									**C**	**Q**	**3**	**1**					
SMC20	Incremental encoder, SPEED-CONNECT connector, M17									**C**	**N**	**2**	**0**					
SMC20	Absolute encoder, SPEED-CONNECT connector, M23									**E**	**Q**	**3**	**1**					
SMC20	Absolute encoder, SPEED-CONNECT connector, M17									**E**	**N**	**2**	**0**					
SMC10	Resolver, SPEED-CONNECT connector, M17									**F**	**N**	**2**	**0**					
Extension between basic cable with connector	and motor connector																	
Full-thread or SPEED-CONNECT	Full-thread or SPEED-CONNECT												**4**					
Length code																		
Units of 10 cm (3.94 in) or 1 meter (3.28 ft) or in fixed lengths															.	.	.	.

[1] Not with DRIVE-CLiQ.
[2] Not available as 6FX2002-1... cable.

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Signal cables

Overview

Data position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16
MOTION-CONNECT 500	**6**	**F**	**X**	**5**	**0**	■	**2**	**–**	**2**	■	■	■	■	**–**	.	.	.	.
MOTION-CONNECT 800PLUS	**6**	**F**	**X**	**8**	**0**	■	**2**	**–**	**2**	■	■	■	■	**–**	.	.	.	.
6FX2 cables	**6**	**F**	**X**	**2**	**0**	**0**	**2**	**–**	**1**	**D**	**C**	■	**0**	**–**	.	.	.	.

Pre-assembled at motor and module ends	**0**
Pre-assembled at motor end, connector at module end supplied separately	**1**
Connector at motor end supplied separately, pre-assembled at module end	**4**

Variant: Signal cables for external encoder

Basic cable between	and				
SMC30	Incremental encoder 6FX2001-2 (TTL/supply 5 V), full-thread connector	**C**	**R**	**0**	**0**
SMC30	Incremental encoder 1XP8012-2./1XP8032-2. (TTL/supply 24 V), full-thread connector	**C**	**D**	**2**	**4**
SMC20	Incremental encoder 6FX2001-3 (sin/cos 1 V_{pp}), full-thread connector	**C**	**G**	**0**	**0**
SMC30	Incremental encoder 6FX2001-4 (HTL), full-thread connector	**C**	**A**	**1**	**2**
SMC30	Incremental encoder 1XP8012-1./1XP8032-1. (HTL), full-thread connector	**C**	**A**	**1**	**2**
SMC30	Absolute encoder with SSI 1XP8014-2./1XP8024-2., full-thread connector	**C**	**C**	**0**	**6**
SMC30	Absolute encoder 6FX2001-5.S (SSI), full-thread connector	**C**	**C**	**1**	**1**
SMC20	Absolute encoder 6FX2001-5.E (EnDat 2.1), full-thread connector	**C**	**H**	**0**	**0**
SMC20	Absolute encoder 1XP8014-10/1XP8024-10 (EnDat 2.1), full-thread connector	**C**	**H**	**0**	**0**
SMC10	Resolver 1XP8013-1./1XP8023-1., full-thread connector	**C**	**F**	**0**	**6**
Extension between basic cable with connector	and motor connector				
Full thread	Full thread				**4**

Variant: Signal cables for temperature sensor	**6**	**F**	**X**	**8**	**0**	**0**	**2**	**–**	**2**	**S**	**L**	■	■	**–**	.	.	.	.
Adapter cable with M17 socket on SIMOTICS T-1FW6 terminals												**0**	**0**					
Adapter cable with M17 socket on SIMOTICS L-1FN3100/L-1FN3150												**0**	**1**					
Adapter cable with M17 socket on SIMOTICS L-1FN3300 ... L-1FN3900												**0**	**2**					
Extension to basic cable between SME12x and SIMOTICS L-1FN3[1)]/SIMOTICS T-1FW6												**1**	**0**					
Basic cable between TM120 and SIMOTICS L-1FN3/SIMOTICS T-1FW6												**2**	**0**					

Length code

Units of 10 cm (3.94 in) or 1 meter (3.28 ft) or in fixed lengths	. . . .

[1)] Adapter cable required for connecting to SIMOTICS L-1FN3.

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Overview

Description	Article No. supplement			
Length code for pre-assembled cables				
	6FX.0.2-.....-	■	■	■	■
0 m 100 m (328 ft) 200 m (656 ft)	**1** **2** **3**			
0 m 10 m (32.81 ft) 20 m (65.6 ft) 30 m (98.4 ft) 40 m (131 ft) 50 m (164 ft) 60 m (197 ft) 70 m (230 ft) 80 m (262 ft) 90 m (295 ft)		**A** **B** **C** **D** **E** **F** **G** **H** **J** **K**		
0 m 1 m (3.28 ft) 2 m (6.56 ft) 3 m (9.84 ft) 4 m (13.1 ft) 5 m (16.4 ft) 6 m (19.7 ft) 7 m (23.0 ft) 8 m (26.2 ft) 9 m (29.5 ft)			**A** **B** **C** **D** **E** **F** **G** **H** **J** **K**	
0 m 0.1 m (3.94 in) 0.2 m (7.87 in) 0.3 m (11.81 in) 0.4 m (15.75 in) 0.5 m (19.96 in) 0.6 m (23.62 in) 0.7 m (27.56 in) 0.8 m (31.5 in)				**0** **1** **2** **3** **4** **5** **6** **7** **8**
Examples:	1.0 m (3.28 ft):	1	A	B	0
	2.2 m (7.22 ft):	1	A	C	2
	8.0 m (26.3 ft):	1	A	J	0
	299.0 m (981 ft):	3	K	K	0

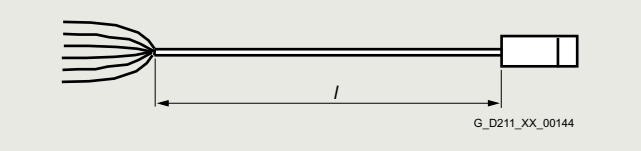
Note:

Pre-assembled cables with a length of 0 m (...-1AA0) can **not** be ordered!

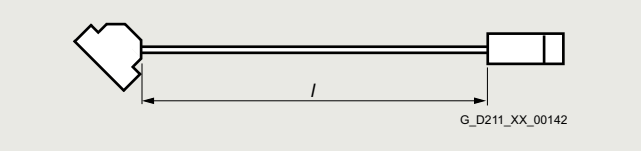
Description	Article No. supplement			
Length code for cables sold by the meter [1]				
	6FX.008-.....-	■	■	**A**	**0**
50 m (164 ft)	**1**	**F**		
100 m (328 ft)	**2**	**A**		
200 m (656 ft)	**3**	**A**		
500 m (1641 ft)	**6**	**A**		

More information

Definition of lengths for pre-assembled cables



Cable with exposed core ends and pre-assembled connector



Cable with pre-assembled connectors at both ends

Tolerance:

- Cable lengths up to 10 m (32.8 ft): ± 2%
- Cable lengths of 10 m (32.8 ft) and longer: ± 1%

[1] Note type of delivery. Cables with core cross-section 4 × 4 mm² or 4 × 4 mm² with brake cores can be delivered at exact length in meters. Length code as for pre-assembled cables.

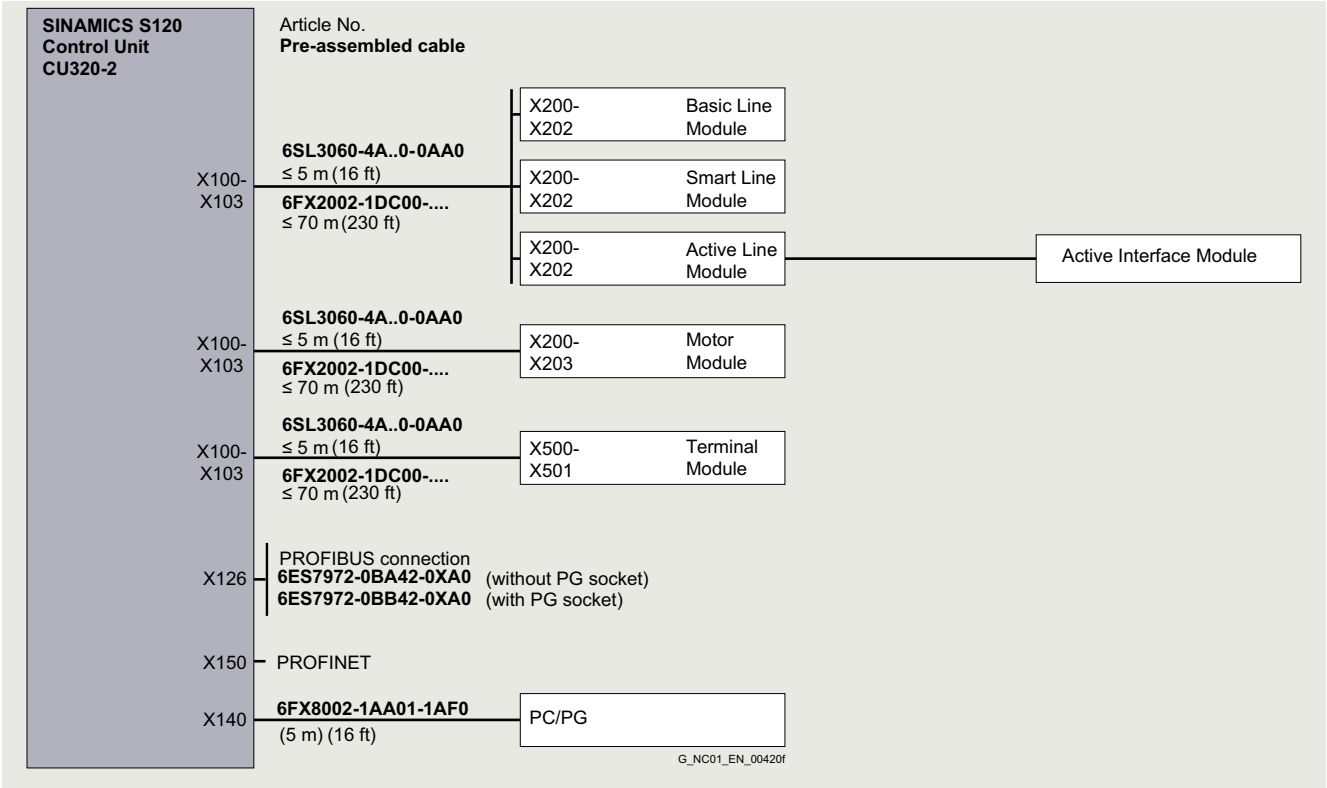
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SINAMICS S120 CU320-2 Control Unit

Integration

The DRIVE-CLiQ signal cables of type 6SL3060-4A..0-0AA0 required for the standard configuration are part of the scope of supply of the Line Modules and Motor Modules. In this case, the modules must be mounted directly adjacent to one another in a row.

Connection overview of CU320-2 Control Unit with SINAMICS S120 in booksize compact and booksize formats



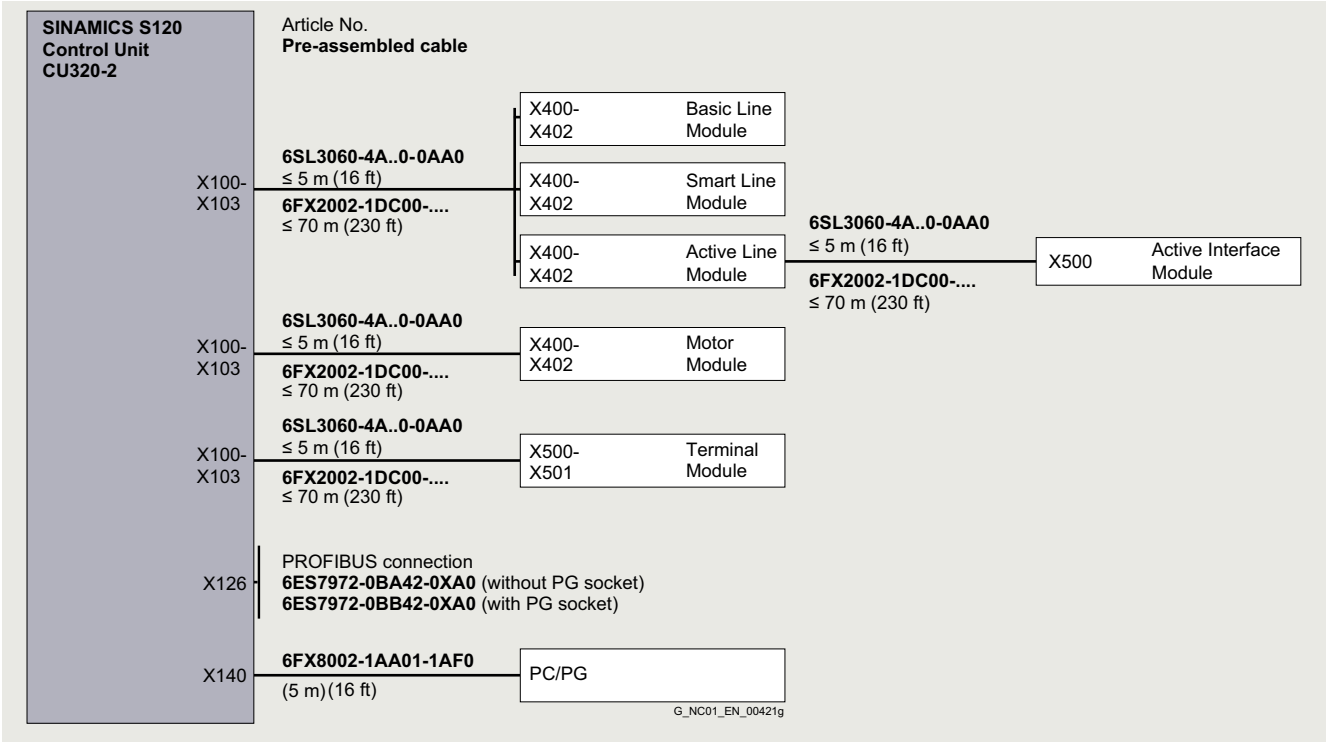
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Integration

The DRIVE-CLiQ signal cables of type 6SL3060-4A..0-0AA0 required for the standard configuration are part of the scope of supply of the Line Modules and Motor Modules. In this case, the modules must be mounted directly adjacent to one another in a row.

Connection overview of CU320-2 Control Unit with SINAMICS S120 in chassis format



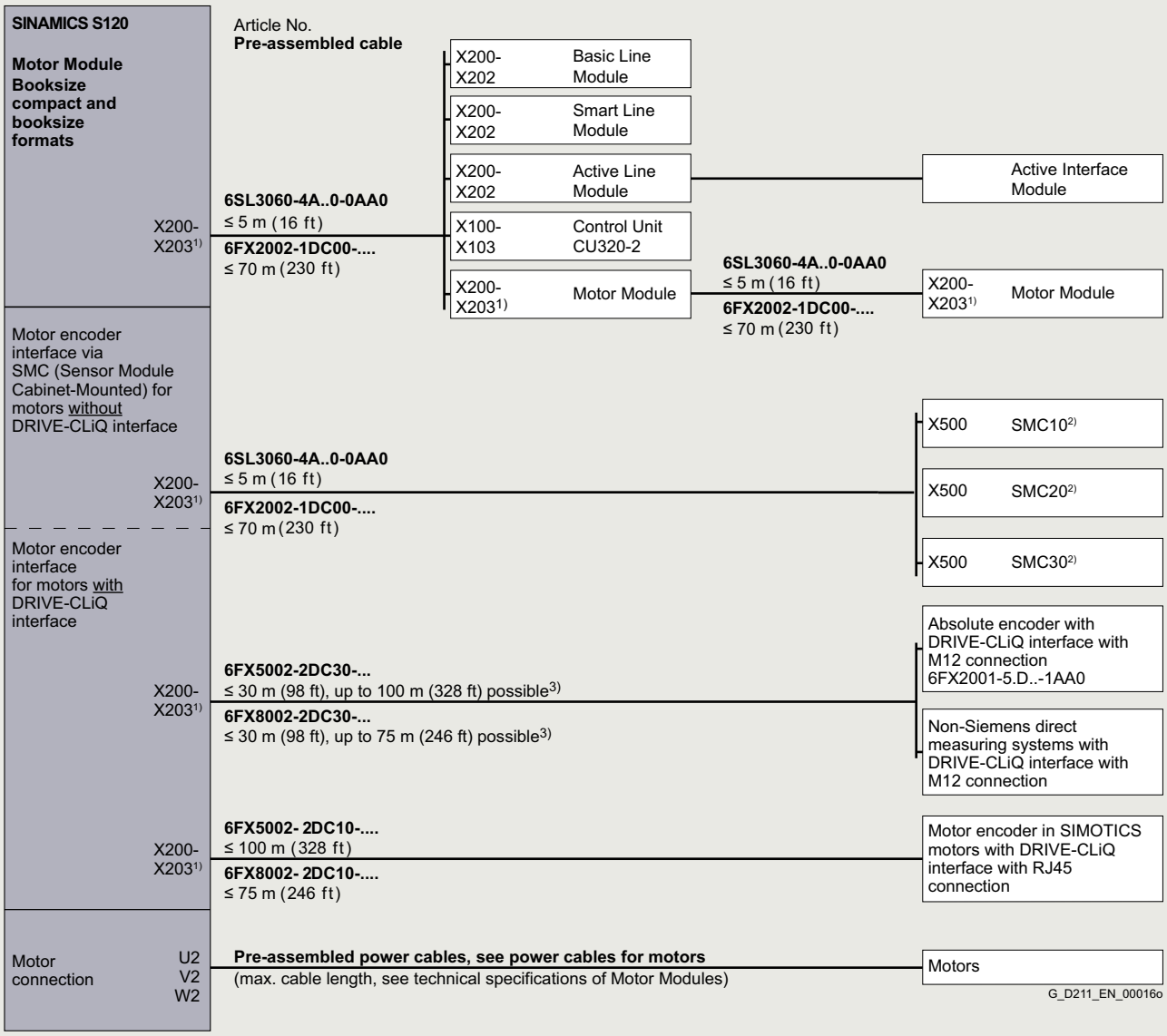
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SINAMICS S120 Motor Modules in booksize format

Integration

Connection overview of SINAMICS S120 Motor Modules in booksize compact and booksize formats for SIMOTICS motors with/without DRIVE-CLiQ interface

The DRIVE-CLiQ signal cables of type 6SL3060-4A..0-0AA0 required for the standard configuration are part of the scope of supply of the Line Modules and Motor Modules. In this case, the modules must be mounted directly adjacent to one another in a row.



1) For Single Motor Module: X200-X202.
For Double Motor Module: X200-X203.

2) See connection overviews of SMC10/SMC20/SMC30.

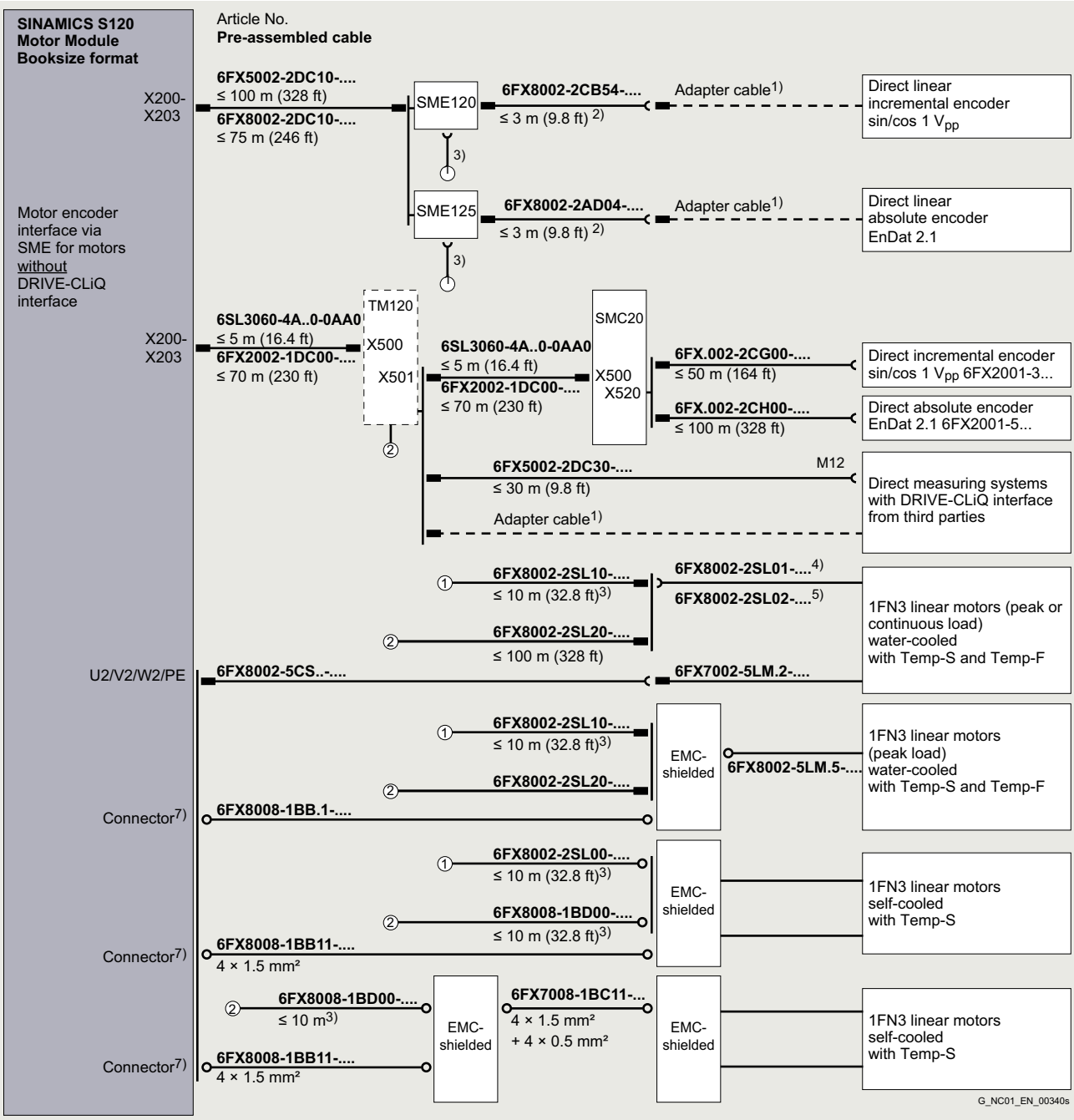
3) Longer cable lengths possible when using disconnection points with M17 or RJ45, see connection overview "External measuring systems with DRIVE-CLiQ interface".

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Integration

Connection overview of SINAMICS S120 Motor Modules in booksize format with SME120/SME125 or TM120 with/without SMC20 and SIMOTICS L-1FN3 linear motors



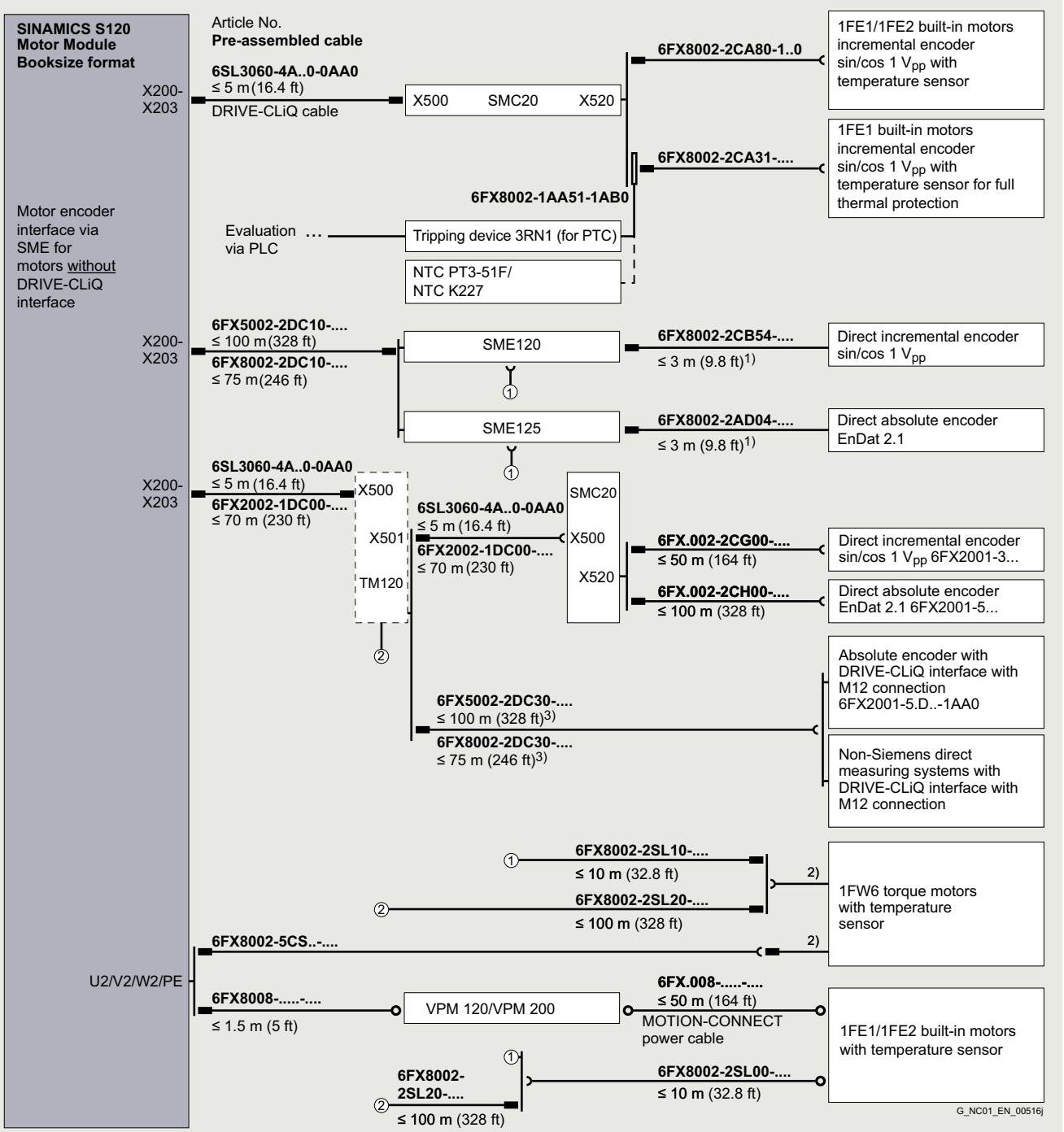
1) Adapter cable available from measuring system manufacturer.
2) Up to 10 m (32.8 ft) possible, depending on current consumption of the 5 V encoder. Up to 30 m (98.4 ft) possible for encoders with 3.6 V operating voltage.
3) The total cable length between SME120/SME125 and 1FN3 must not exceed 10 m (32.8 ft).
4) Adapter cable for 1FN3100/1FN3150 motors.
5) Adapter cable for 1FN3300 to 1FN3900 motors.
6) For further connection possibilities, refer to connection overview "SIMOTICS motors with RJ45 or M17 connection and external measuring systems with M12 connection".
7) Retrofitted connector 6SL3162-2MA00-0AC00 /6SL3162-2MA00-0AB00

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SINAMICS S120 Motor Modules in booksize format

Integration

Connection overview of SINAMICS S120 Motor Modules in booksize format with SME120/SME125 or TM120 with/without SMC20 and SIMOTICS T-1FW6 torque motors/SIMOTICS M-1FE1/-1FE2 built-in motors



1) Up to 10 m (32.8 ft) possible, depending on current consumption of the 5 V encoder.
Up to 30 m (98.4 ft) possible for encoders with 3.6 V operating voltage.

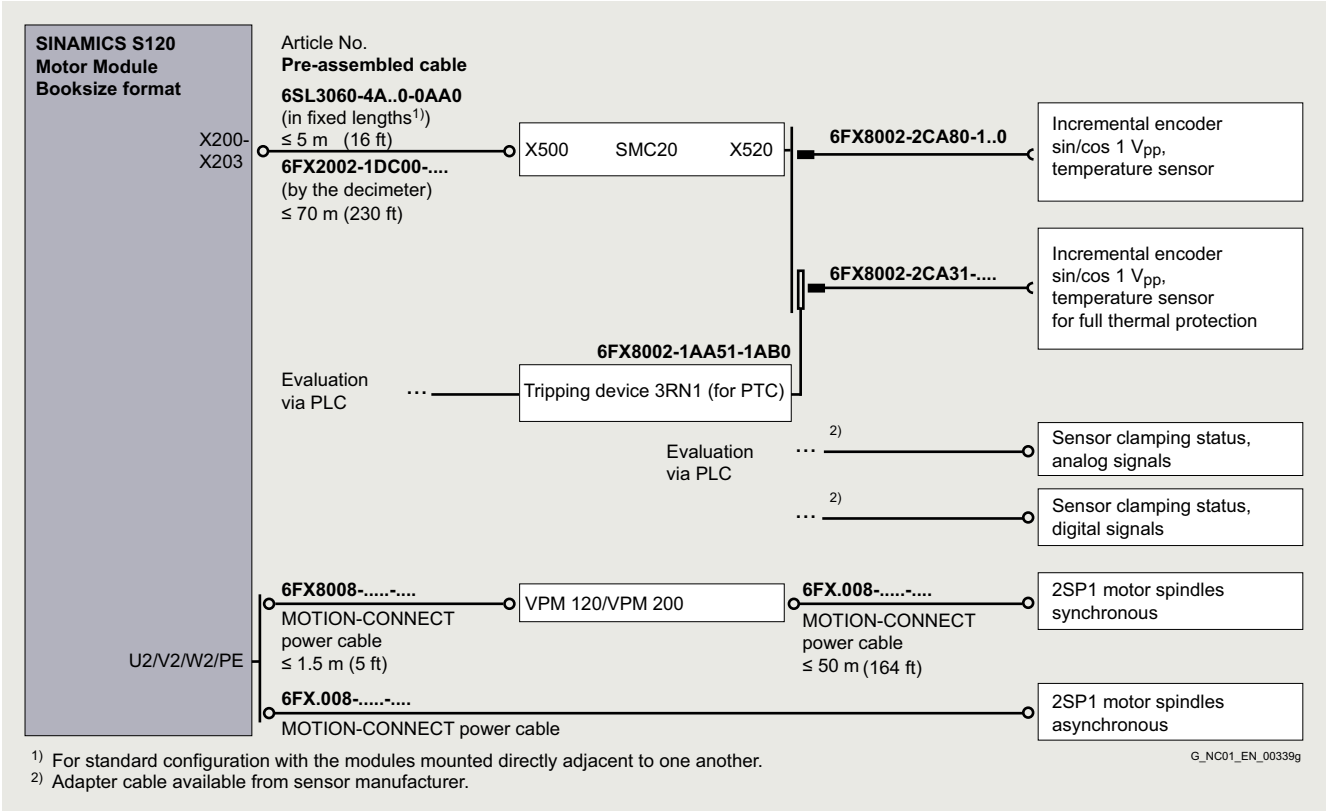
2) For type of connection with bare wire ends, power and signal connectors are not included in the scope of supply of the motor, they must be ordered separately (see Accessories for power and signal cables).

3) For further connection possibilities, refer to connection overview "SIMOTICS motors with RJ45 or M17 connection and external measuring systems with M12 connection".

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Integration

Connection overview of SINAMICS S120 Motor Modules in booksize format and SIMOTICS 2SP1 main spindle motors



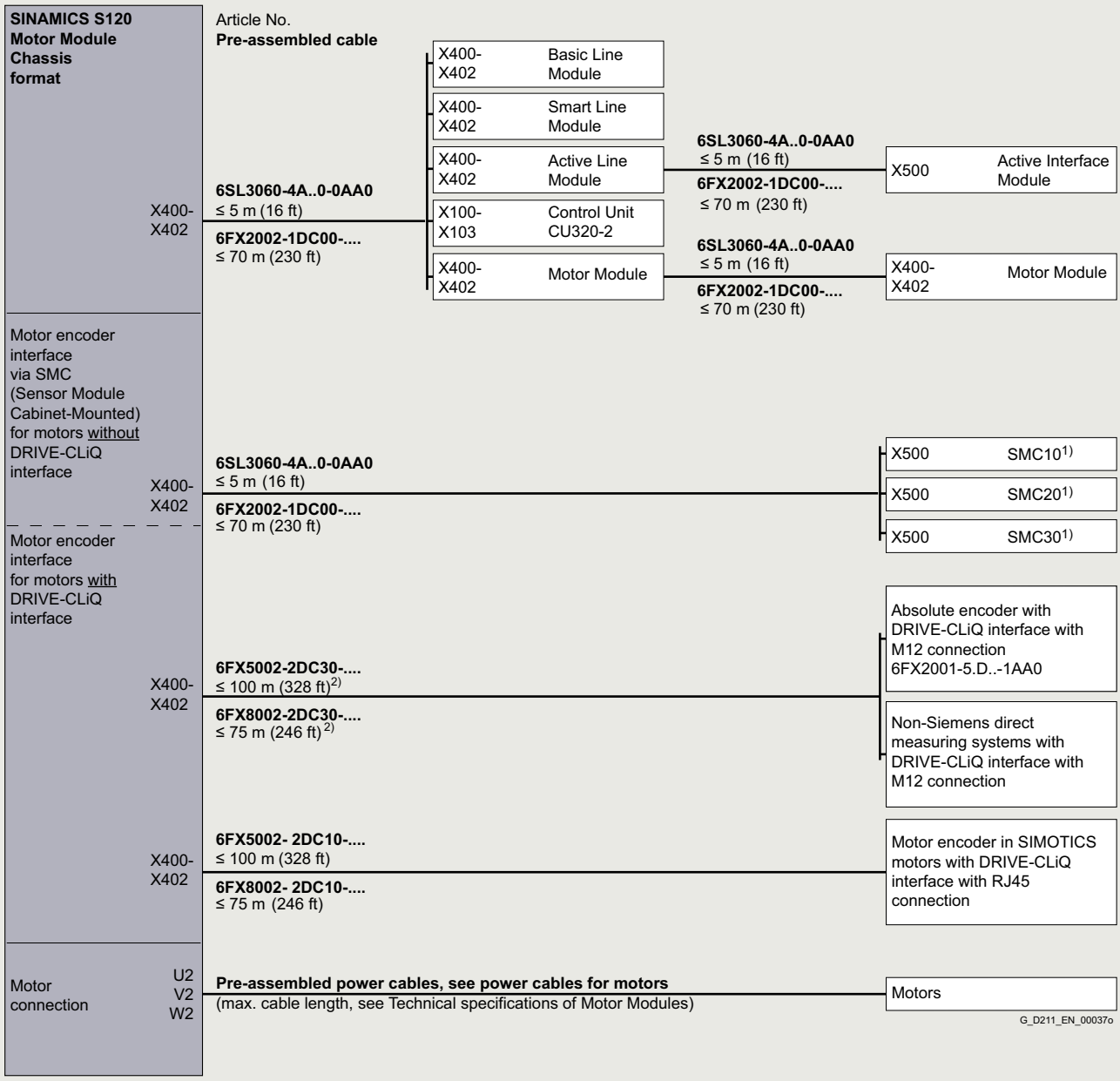
1) For standard configuration with the modules mounted directly adjacent to one another.
2) Adapter cable available from sensor manufacturer.

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SINAMICS S120 Motor Modules in chassis format

Integration

Connection overview of SINAMICS S120 Motor Modules and Line Modules in chassis format for SIMOTICS motors with/without DRIVE-CLiQ interface



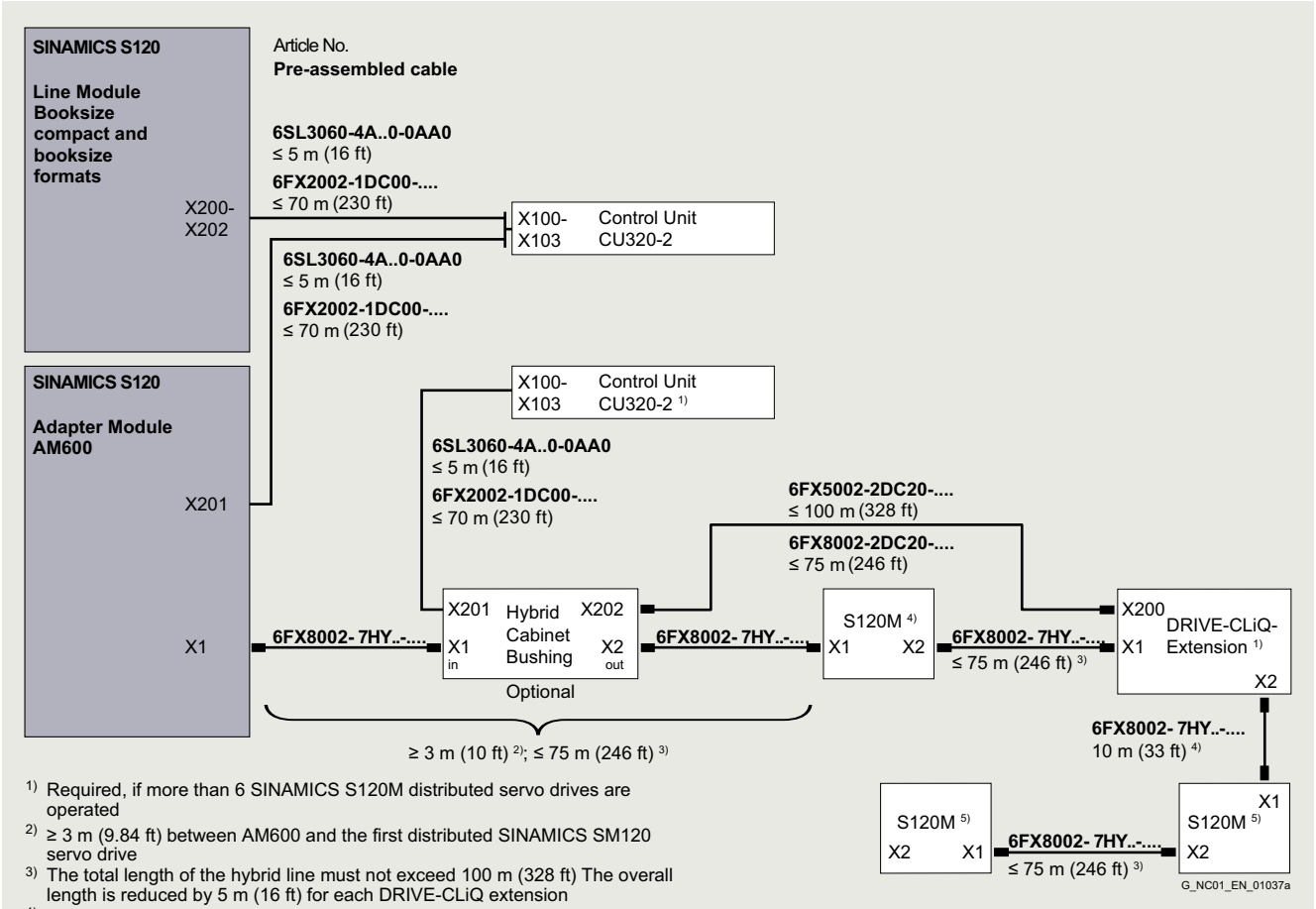
1) See connection overviews of SMC10/SMC20/SMC30.
2) See connection overview "SIMOTICS motors with RJ45 or M17 connection and external measuring systems with M12 connections" for further connection possibilities.

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Integration

Connection overview of SINAMICS S120M distributed servo drive



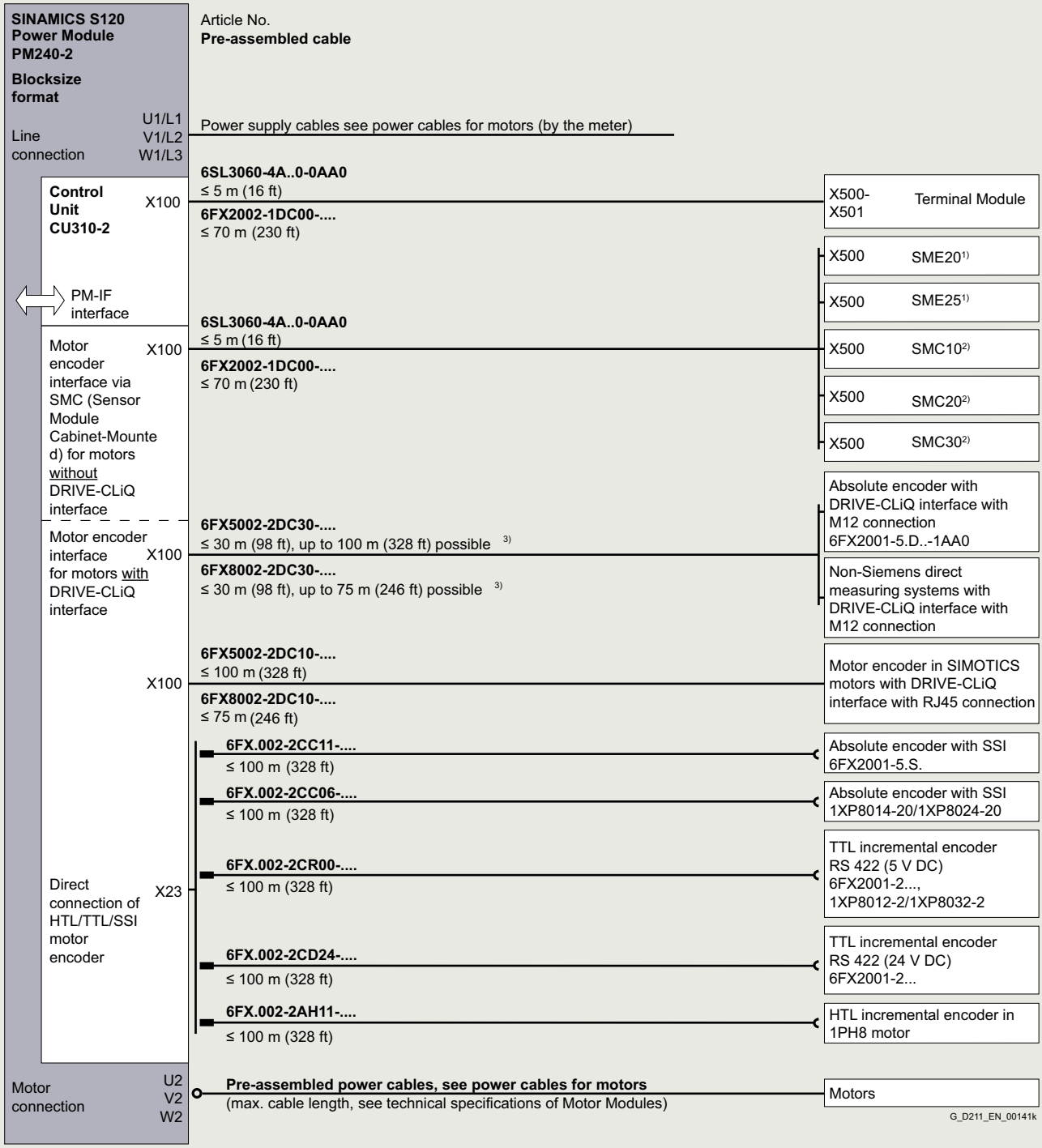
1) Required, if more than 6 SINAMICS S120M distributed servo drives are operated
2) ≥ 3 m (9.84 ft) between AM600 and the first distributed SINAMICS SM120 servo drive
3) The total length of the hybrid line must not exceed 100 m (328 ft) The overall length is reduced by 5 m (16 ft) for each DRIVE-CLiQ extension
4) A maximum of 6 SINAMICS S120M distributed servo drives per Control Unit is permissible
5) The maximum permissible number of SINAMICS S120M servo drives that can be connected to an AM600 Adapter Module depends on the power

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SINAMICS S120 Power Modules in blocksize format

Integration

Connection overview of SINAMICS S120 Power Modules in blocksize format with CU310-2 for SIMOTICS motors with/without DRIVE-CLiQ interface



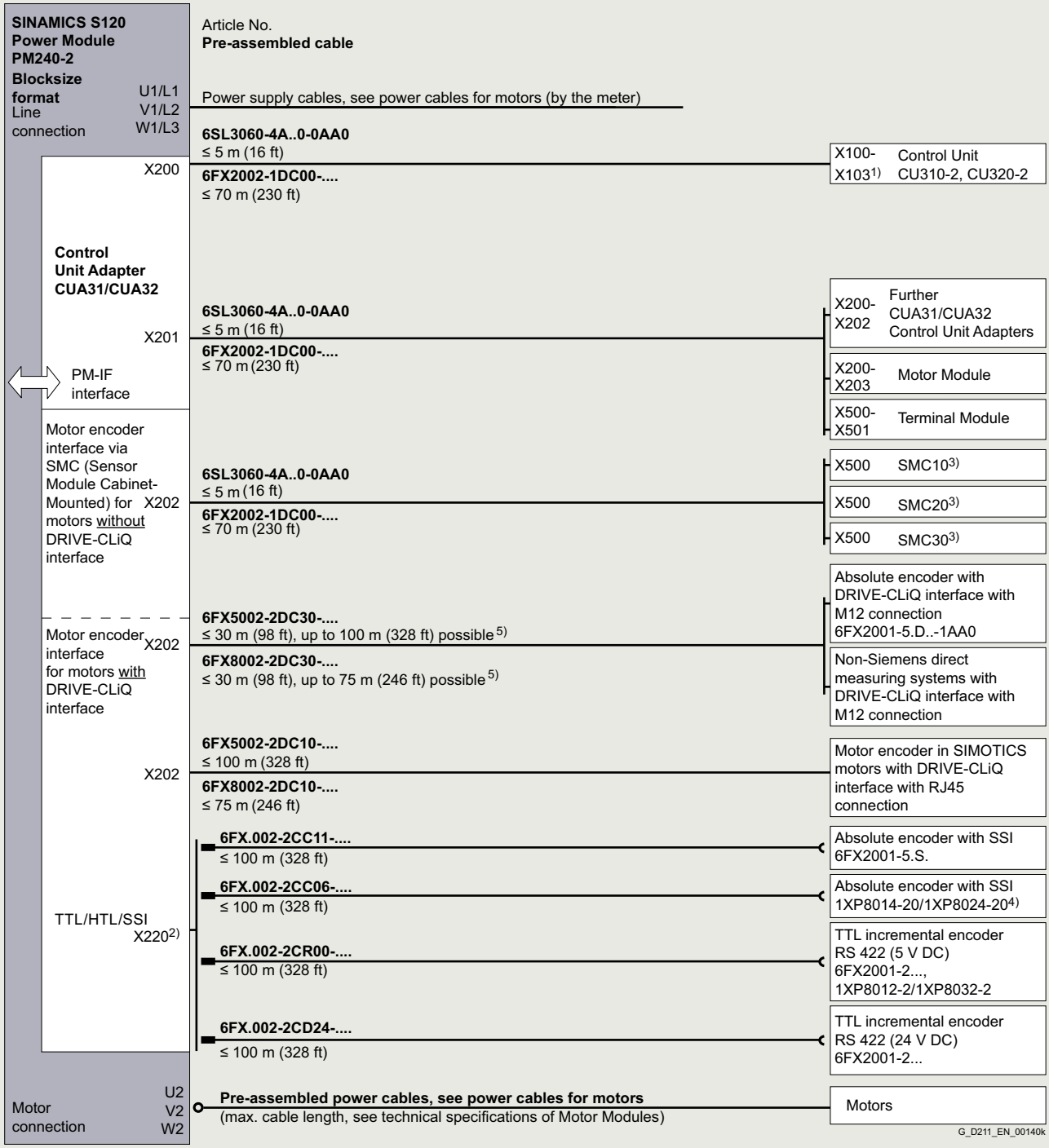
1) See connection overview for connection of a machine encoder.
2) See connection overviews of SMC10/SMC20/SMC30.
3) Longer cable lengths possible when using disconnection points with M17 or RJ45, see connection overview "External measuring systems with DRIVE-CLiQ interface".

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Integration

Connection overview of SINAMICS S120 Power Modules in blocksize format with CUA31/CUA32 Control Unit Adapter for SIMOTICS motors with/without DRIVE-CLiQ interface



1) For Control Unit CU310-2: X100.
For Control Unit CU320-2: X100-X103.

2) Only for CUA32 Control Unit Adapter.

3) See connection overviews of SMC10/SMC20/SMC30.

4) Only for position control.

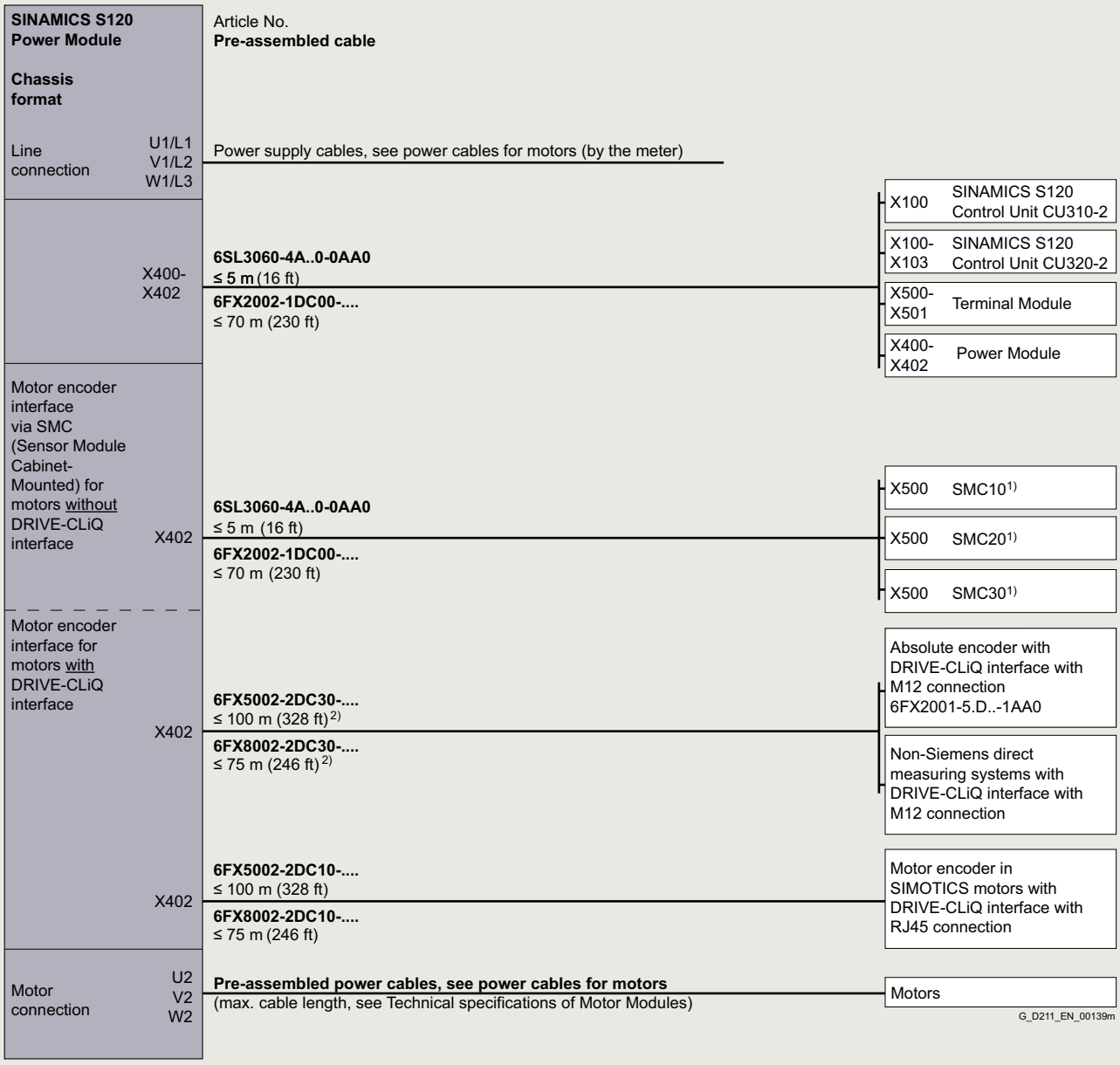
5) Longer cable lengths possible when using disconnection points with M17 or RJ45, see connection overview "External measuring systems with DRIVE-CLiQ interface".

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Integration

Connection overview of SINAMICS S120 Power Modules in chassis format for SIMOTICS motors with/without DRIVE-CLiQ interface

A DRIVE-CLiQ signal cable of type 6SL3060-4A..0-0AA0 for connection to the chassis-mounted CU310-2 Control Unit is already included in the scope of supply.

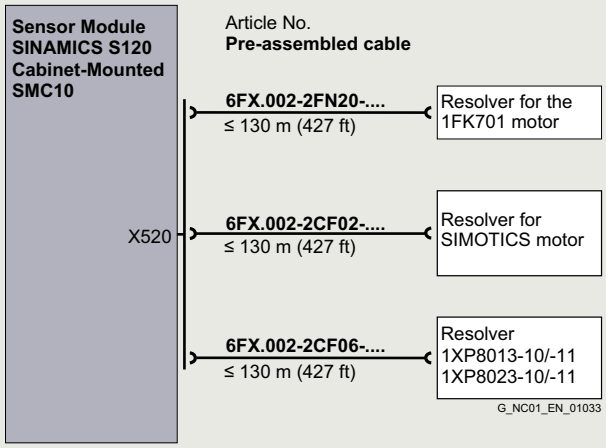


1) See connection overviews SMC10/SMC20/SMC30.
2) See connection overview "SIMOTICS motors with RJ45 or M17 connection and external measuring systems with M12 connections" for further connection possibilities.

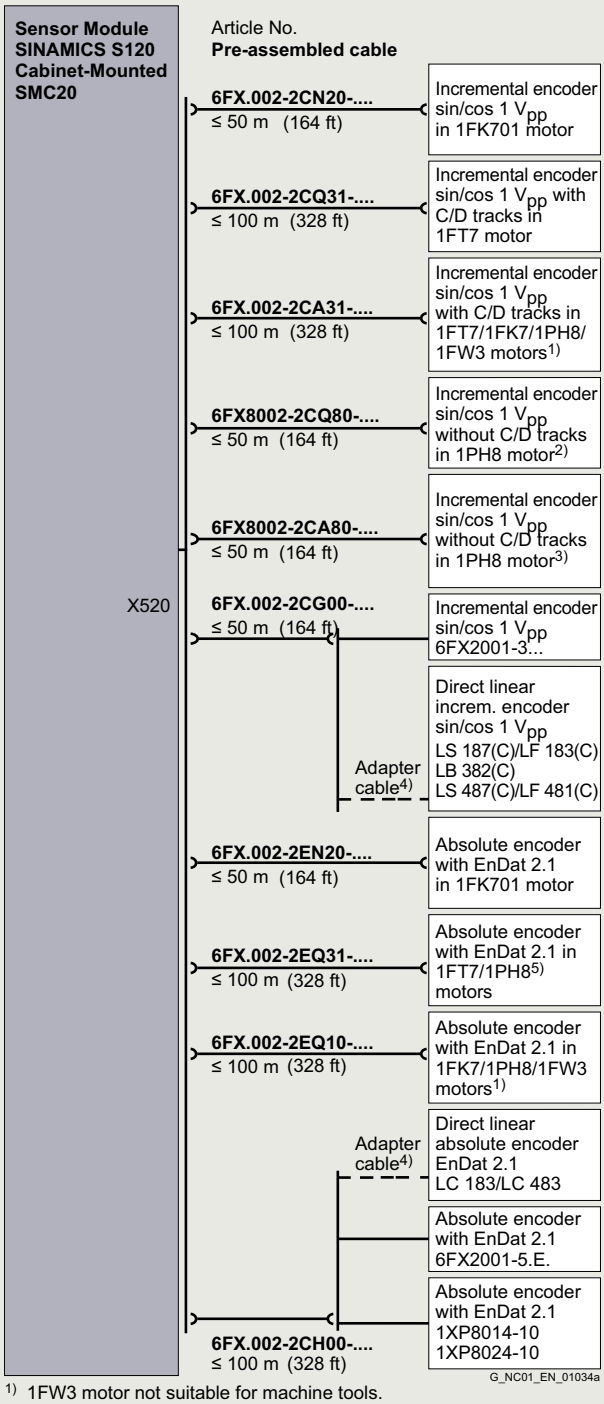
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Integration

Connection overview of SINAMICS S120 Sensor Module Cabinet-Mounted SMC10



Connection overview of SINAMICS S120 Sensor Module Cabinet-Mounted SMC20

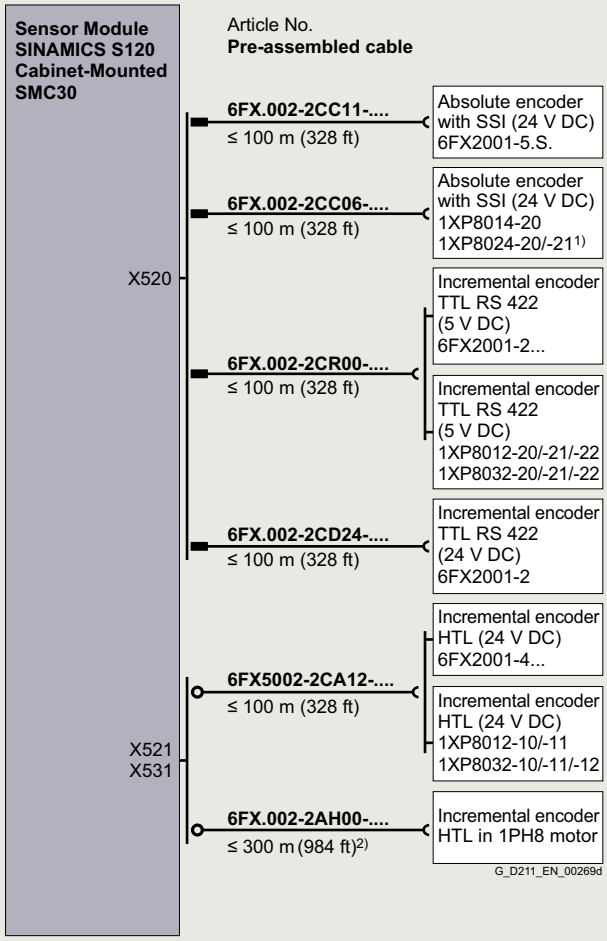


1) 1FW3 motor not suitable for machine tools.
2) Possible for 1PH808/1PH810/1PH813/1PH816 motors for encoders with 512 S/R and 256 S/R (for SPEED-CONNECT).
3) Possible for 1PH8 motors for encoders with 512 S/R and 256 S/R (for full thread).
4) Adapter cable available from measuring system manufacturer.
5) Possible for 1PH808/1PH810/1PH813/1PH816 motors.

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Integration

Connection overview of SINAMICS S120 Sensor Module Cabinet-Mounted SMC30



1) For position control only.

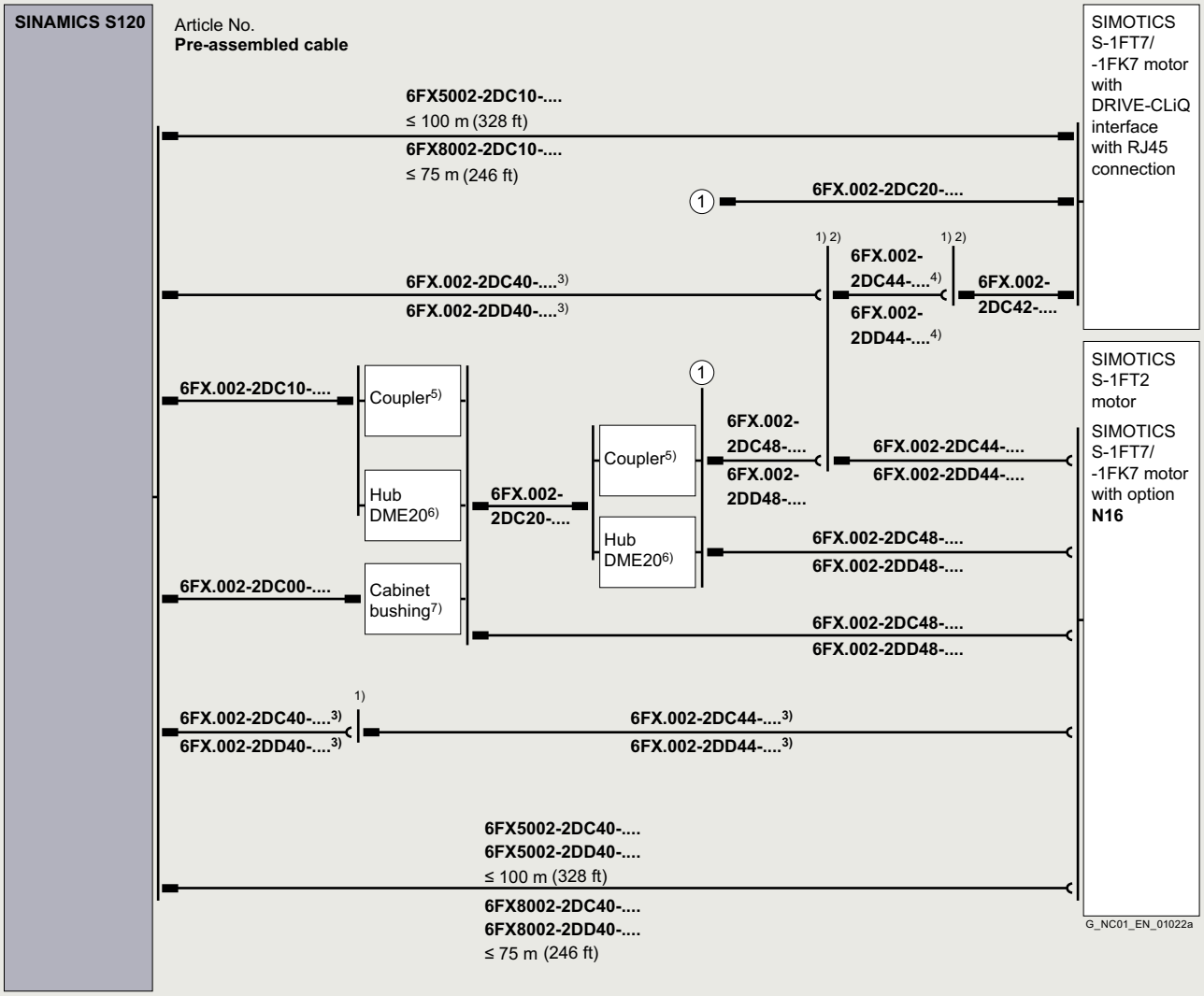
2) Applies to HTL encoders with bipolar signal evaluation or for evaluation of difference signals A*, A and B*, B; for HTL encoders with unipolar signal evaluation the permissible cable length is reduced to 100 m (328 ft).

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Integration

Connection overview of SINAMICS S120 for SIMOTICS S-1FT2, SIMOTICS S-1FT7/-1FK7 motors with RJ45 connection or option N16



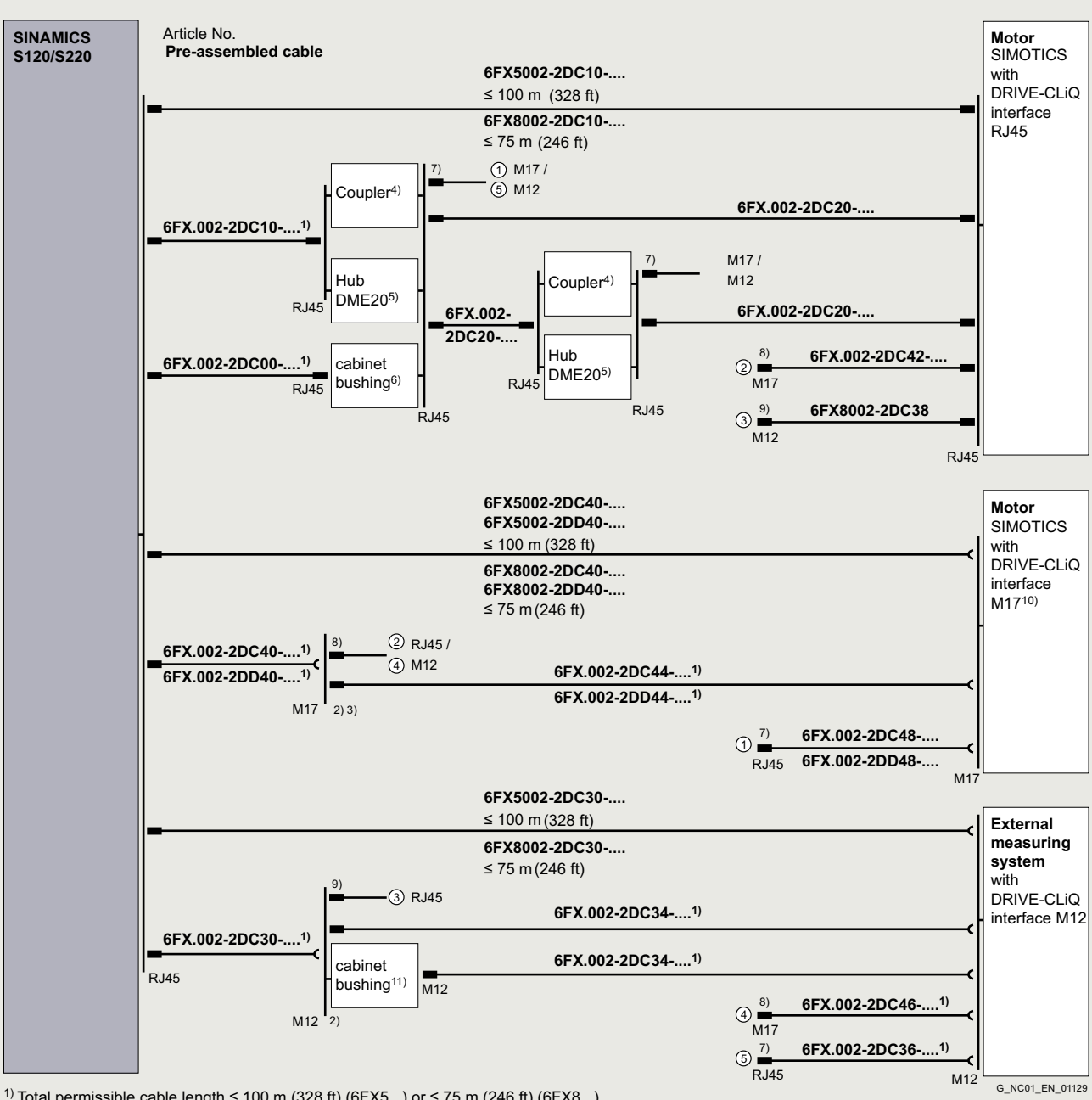
1) Max. 4 M17 disconnection points permissible without derating.
2) Optional mounting flange (6FX2003-7HX00).
3) Total permissible cable length ≤ 100 m (328 ft) (6FX5...) or ≤ 75 m (246 ft) (6FX8...).
4) Optional DRIVE-CLiQ cable 6FX.002-2DC44-.....
5) Optional DRIVE-CLiQ RJ45/IP67 coupler (6SL3066-2DA00-0AB0), max. 3 couplers permissible with derating (total permissible cable length ≤ 100 m (328 ft) (6FX5...) or ≤ 75 m (246 ft) (6FX8...) - 5 m (16.4 ft) per coupler).
6) Optional DME20 DRIVE-CLiQ Hub Module RJ45/IP67 (6SL3055-0AA00-6AB0), max. 2 DME20 Hub Modules possible.
7) Optional DRIVE-CLiQ RJ45/IP67, RJ45/IP20 cabinet bushing (6SL3066-2DA00-0AA0).

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External measuring systems with DRIVE-CLiQ interface

Integration

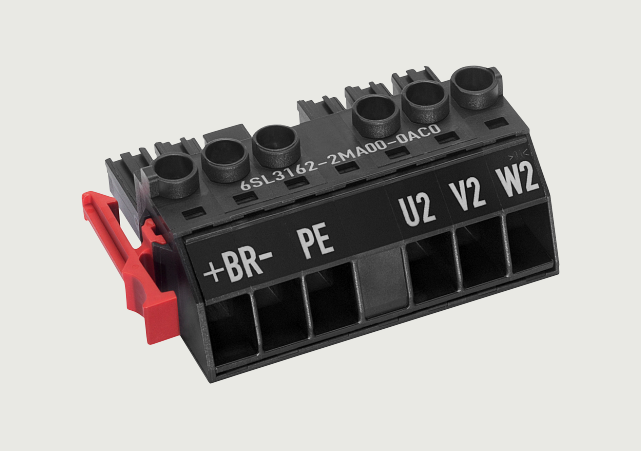
Connection overview of SINAMICS S120 for external measuring systems with M12 connection or RJ45 connection



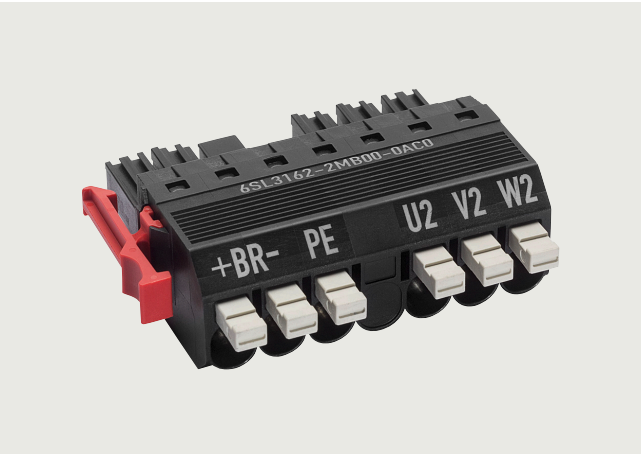
[1] Total permissible cable length ≤ 100 m (328 ft) (6FX5...) or ≤ 75 m (246 ft) (6FX8...).
[2] Max. 3 M12 disconnection points (max. 2, if more than 1 cable in the line is < 6 m) or 4 M17 disconnection points permissible without derating.
[3] Optional mounting flange (6FX2003-7HX00).
[4] Optional DRIVE-CLiQ RJ45/IP67 coupler (6SL3066-2DA00-0AB0), max. 3 couplers permissible with derating (5 m (16 ft per coupler).
[5] Optional DME20 DRIVE-CLiQ Hub Module RJ45/IP67 (6SL3055-0AA00-6AB0), max. 2 DME20 Hub Modules possible.
[6] Optional DRIVE-CLiQ RJ45/IP67, RJ45/IP20 cabinet bushing (6SL3066-2DA00-0AA0).
[7] Disconnection point with RJ45 connection
[8] Disconnection point with M17 connection
[9] Disconnection point with M12 connection
[10] For SIMOTICS S-1FT2, S-1FK2, S-1FT7...-.....-.K.. or 1FT7...-.....-.L.. and S-1FK7 with N16 option.
[11] Optional DRIVE-CLiQ M12/IP67 cabinet bushing (6FX2003-0DT67).

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Overview



Power connector with screw terminal for Motor Modules, C/D type



Power connector with push-in connection with snap-in actuators for Motor Modules, C/D type

Power connectors can also be ordered separately, e.g. for applications where installation of the motor cable would be difficult if a power connector were attached.

Selection and ordering data

Description	Article No.
Power connector with screw terminal For 3 ... 30 A Motor Modules SINAMICS S120/S220 booksize, C/D type with screw terminal for cable cross-sections up to 6 mm^2	**6SL3162-2MA00-0AC0**
Power connector with push-in connection For 3 ... 30 A Motor Modules SINAMICS S120/S220 booksize, C/D type push-in connection with snap-in actuators for cable cross-sections up to 6 mm^2	**6SL3162-2MB00-0AC0**
Signal connector For DRIVE CLiQ Gigabit communication M12 X-coded External thread connector kit	**6FX2003-1XM00**
Signal connector For DRIVE CLiQ Gigabit communication M12 X-coded Internal thread connector kit	**6FX2003-1XF00**
Signal connector For DRIVE CLiQ Gigabit communication RJ45 connector kit	**6FX2003-2DG20**

Overview



Power and signal connectors for SIMOTICS T-1FW6 built-in torque motors

Power and signal connectors 6FX2003 are designed to ensure optimum connection of SIMOTICS T-1FW6 built-in torque motors to the drive system.

Selection and ordering data

Description	Article No.
Power connector for SIMOTICS T-1FW6 built-in torque motors	
• Size 1 for 4 × 2.5 mm^2 Connector with pins and full external thread	**6FX2003-0LA00**
• Size 1.5 for 4 × 4 mm^2/4 × 6 mm^2/ 4 × 10 mm^2/4 × 16 mm^2 Connector with pins and full external thread	**6FX2003-0LA10**
Signal connector for SIMOTICS T-1FW6 built-in torque motors	
• M17 for 5 × 0.5 mm^2 + 1 × 1.0 mm^2 Connector with sockets and full-thread cap nut	**6FX2003-0SU07**

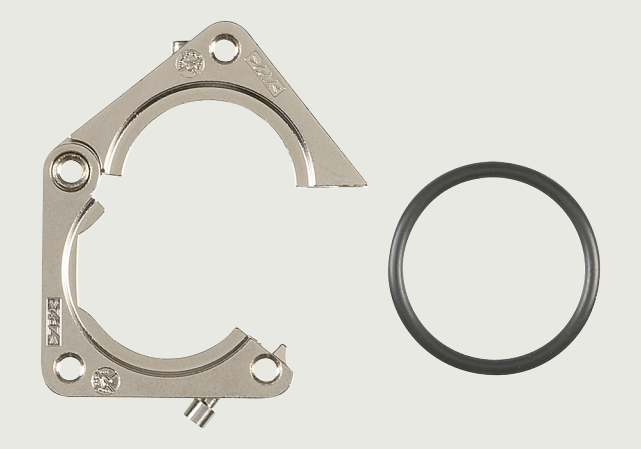
More information

A special tool is needed to crimp the contacts. For further information, go to:
www.intercontec.biz

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Mounting flange for cabinet bushing

Overview



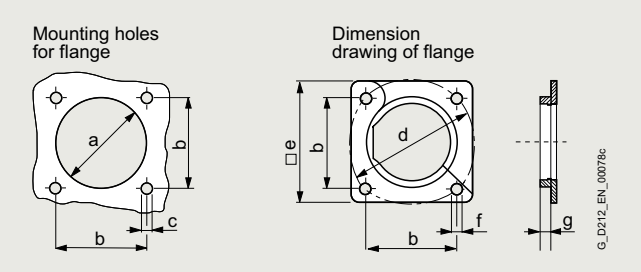
Mounting flange for power connectors

Mounting flanges are used to route or fix connectors in IP67 degree of protection, for example, in control cabinets. With the exception of angled connectors, a mounting flange can be retrofitted on connectors with a cap nut or with external thread.

Selection and ordering data

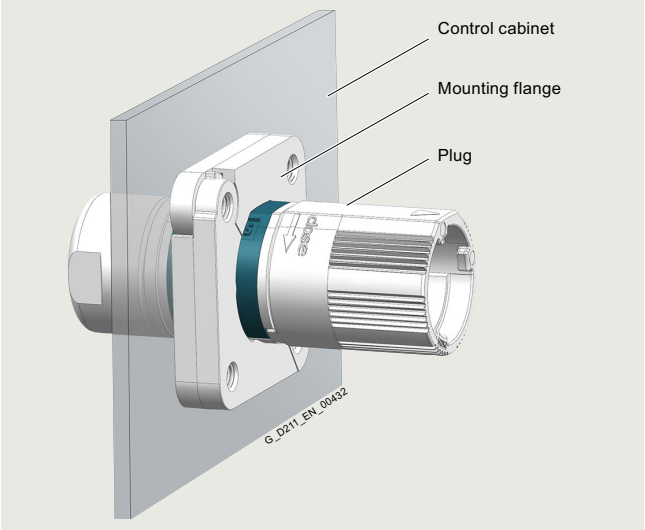
Description	Article No.
Mounting flange for	
• Power connector, size 0.5 and signal connector M17	**6FX2003-7HX00**
• Power connector, size 1	**6FX2003-7BX00**
• Power connector, size 1.5	**6FX2003-7CX00**
• Power connector, size 3	**6FX2003-7AX00**
• Signal connector M23	**6FX2003-7DX00**

Dimensional drawings



Dimensions	Power connector				Signal connector	
	Connector size 0.5	Connector size 1	Connector size 1.5	Connector size 3	M17	M23
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
a	∅ 23 (0.91)	∅ 28.6 (1.13)	∅ 47 (1.85)	∅ 66 (2.6)	∅ 23 (0.91)	∅ 27.6 (1.09)
b	22.6 (0.89)	28.3 (1.11)	42.4 (1.67)	75 (246)	22.6 (0.89)	28.3 (1.11)
c	4 × M2.5	4 × M3	4 × M4	4 × M4	4 × M2.5	4 × M3
d	∅ 32 (1.26)	∅ 40 (1.57)	∅ 60 (2.36)	∅ 63 (2.48)	∅ 32 (1.26)	∅ 40 (1.57)
e	32 (1.26)	35 (1.38)	55 (2.17)	84.9 (3.34)	32 (1.26)	35 (1.38)
f	M3	M4	M5	M6	M3	M4
g	6.5 (0.26)	6.5 (0.26)	7 (0.28)	10 (0.39)	6.5 (0.26)	6.5 (0.26)

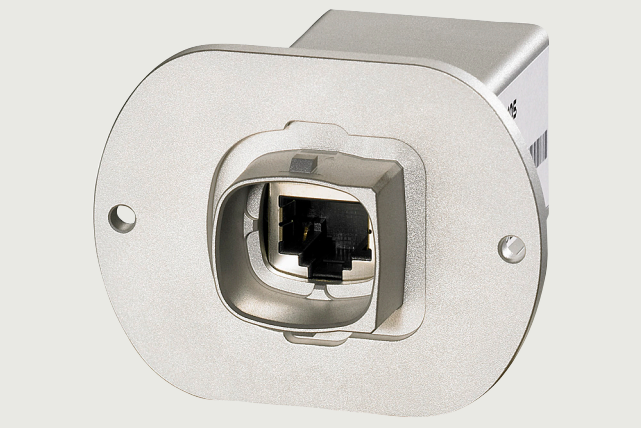
More Information



Arrangement of mounting flange and plug in a cabinet control panel

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Overview



DRIVE-CLiQ cabinet bushing for signal cables (RJ45)

The DRIVE-CLiQ cabinet bushing (RJ45) provides the high IP67 degree of protection for the appropriate MOTION-CONNECT DRIVE-CLiQ signal cables routed through openings in control cabinets. The DRIVE-CLiQ cabinet bushing offers IP54 degree of protection on the outside and IP20 on the inside of the control cabinet.



DRIVE-CLiQ cabinet bushing for signal cables (M12)

The DRIVE-CLiQ cabinet bushing (M12) provides the high IP67 degree of protection for the appropriate MOTION-CONNECT DRIVE-CLiQ signal cables routed through openings in control cabinets. The DRIVE-CLiQ cabinet bushing (M12) has IP67 degree of protection at both ends and is designed as a socket with internal thread on the outside of the cabinet and as pins with an external thread on the inside of the cabinet.

Note:

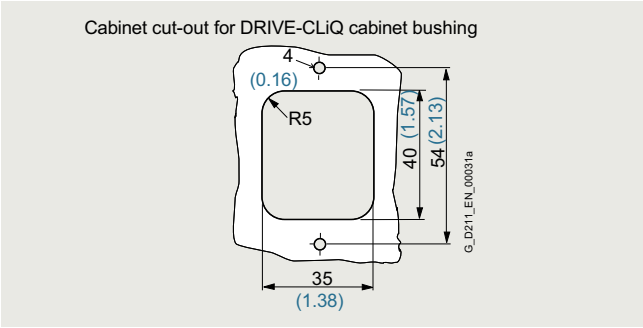
The IP67 degree of protection is only achieved with the DRIVE-CLiQ signal cables connected.

Selection and ordering data

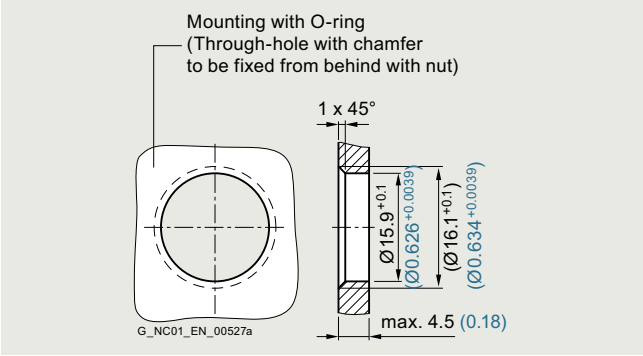
Description	Article No.
DRIVE-CLiQ cabinet bushing For DRIVE-CLiQ signal cables MOTION-CONNECT (RJ45)	**6SL3066-2DA00-0AA0**
DRIVE-CLiQ cabinet bushing For DRIVE-CLiQ signal cables MOTION-CONNECT (M12)	**6FX2003-0DT67**
DRIVE-CLiQ cabinet bushing For DRIVE-CLiQ Gigabit signal cables M12 X-coded	**6FX2003-1FG00**

Dimensional drawings

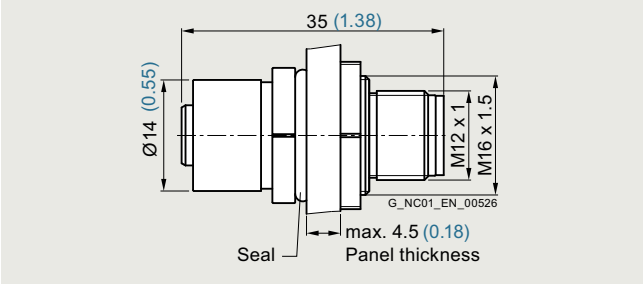
Dimensions in mm (in)



DRIVE-CLiQ cabinet bushing for signal cables (RJ45)



DRIVE-CLiQ cabinet bushing for signal cables (M12)



Cutout in cabinet for DRIVE-CLiQ cabinet bushing

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DRIVE-CLiQ coupler

Overview



DRIVE-CLiQ coupler for signal cables

The DRIVE-CLiQ coupler makes it possible to join two MOTION-CONNECT DRIVE-CLiQ signal cables with IP67 degree of protection.

Selection and ordering data

Description	Article No.
DRIVE-CLiQ coupler For MOTION-CONNECT DRIVE-CLiQ signal cables	**6SL3066-2DA00-0AB0**

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Digitalization

11/2 Introduction

Further information about SINAMICS Drive Software is available on the internet at:
www.siemens.com/sinamics-drive-software

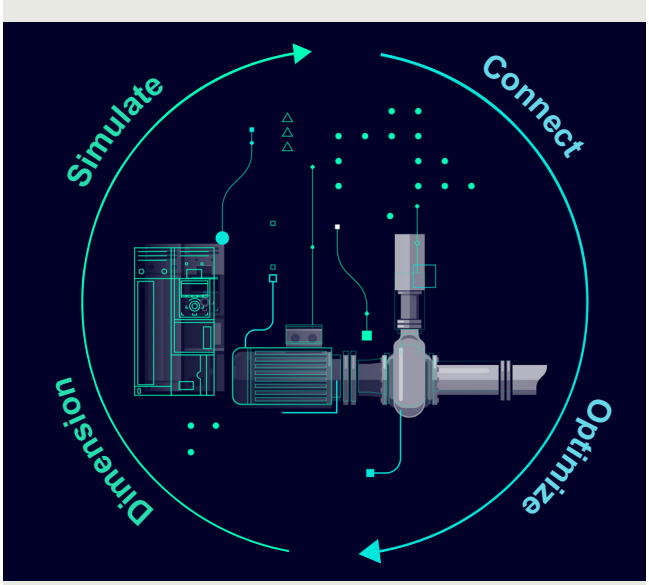
For more information on ordering and configuration, see catalog D 99 and SiePortal at:
www.siemens.com/d-99
www.siemens.com/sinamics-drive-software/sieportal

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Introduction

Overview

Motion beyond expectations



Drives move the industries. But how can they make them more efficient, more reliable and more sustainable – and exceed all expectations while they are doing it? Our answer: Siemens Xcelerator for Digital Drivetrain.

Digital solutions for Drivetrain Design and Drivetrain Health

With digitalization solutions for Drivetrain Design and Drivetrain Health, you can optimize your drivetrain processes and use data to improve efficiency.

- Drivetrain Design:
  Simplify and shorten the engineering steps to get faster and more efficiently from concept to the commissioned drivetrain.
- Drivetrain Health:
  Reduce total cost of ownership for your equipment and machine park – energy, maintenance, downtime.

www.siemens.com/digital-drivetrain

For more information on ordering and configuration, see catalog D 99 section "Digital Drivetrain" and SiePortal at:
www.siemens.com/d99
https://sieportal.siemens.com/en-ww/products-services/10595583?tree=CatalogTree

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Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial cybersecurity measures that may be implemented, please visit
www.siemens.com/cybersecurity-industry

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Cybersecurity RSS Feed under
www.siemens.com/cert

12/2 Engineering tools
12/2 Siemens Product Configurator
12/3 TIA Selection Tool
12/5 STARTER Commissioning tool
12/6 SINAMICS DCC (STARTER)
12/7 SINAMICS Startdrive commissioning tool
12/9 SINAMICS DCC (Drive Control Chart) in the TIA Portal
12/12 SINAMICS web server for SINAMICS S120
12/12 Drive ES engineering software

12/14 Configuration notes
12/14 Planning
12/15 EMC notes for the application of the product standard EN 61800-3
12/19 SINAMICS S120 Control Units
12/30 Motors
12/31 Power units
12/40 System components
12/44 Mechanical configuration of the drive system
12/47 Heat dissipation

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Overview

The Siemens Product Configurator helps you to configure the optimum drive technology products for a number of applications. The product portfolio comprises the full drive technology range of gearbox, motor, converter and connection system as well as corresponding controller with suitable software license. The intuitive user interface in conjunction with product-specific preliminary selectors makes it simple, fast and efficient to configure products. The result is a bill of materials with extensive documentation consisting of technical data sheets, motor characteristic curves, 2D dimensional drawings / 3D CAD models, EPLAN macros and much more. You can order the products directly by transferring the bill of materials to the shopping cart of SiePortal.



Siemens Product Configurator at a glance

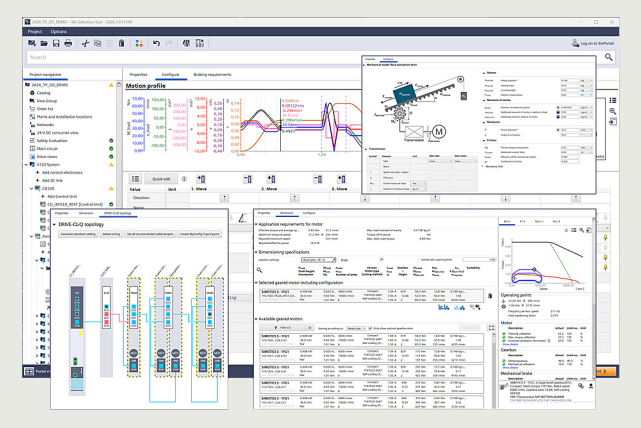
- Quick and easy configuration of drive products and associated components – gearboxes, motors, converters, controllers, connection systems
- Extensive documentation for all products and components, such as
  - Data sheets in up to 12 languages
  - Motor characteristic curves
  - 2D dimensional drawings / 3D CAD models in different formats
  - Terminal box drawing and terminal connection diagram
  - Certificates
  - EPLAN macros
- Ability to order products directly through SiePortal

Access to the Siemens Product Configurator

The Siemens Product Configurator can be accessed without the need for registration or logging in:
www.siemens.com/spc

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Overview



Selection guide and configurator for automation technology

Error-free configuration without expert knowledge through intelligent configurators and selection wizards. Desktop and cloud versions enable cross-team collaboration with maximum flexibility.

There are two versions of TIA Selection Tool:

- Desktop version: for downloading and executing on Microsoft Windows PCs (from Microsoft Windows 10)
- Cloud version: for running in the cloud and launching directly out of the browser (we recommend Google Chrome, Mozilla Firefox and Microsoft Edge)

Projects stored in the cloud can be edited with both tools. This makes it possible to work on-the-go using a tablet, at home on a PC – and vice versa, or together with colleagues and customers.

To use the full functionality, we recommended setting up a SiePortal account for both cases. This gives you access to prices and enables you to save your projects to our cloud.

Drive system dimensioning with SIZER integrated in TIA Selection Tool (desktop version)

SIZER provides support in the technical design of the hardware and firmware components required for a drive task. This includes the project planning of the complete drive system and enables the handling of simple individual drives to complex multi-axis applications.

The following drives and controls can be configured using the engineering tool:

- SIMOTICS motors, including servo geared motors
- SINAMICS low-voltage drive systems, including extra low-voltage drives
- SINUMERIK CNC
- SIMATIC controller
- MOTION-CONNECT connection systems
- Partner products in the field of low-voltage motors and connection systems

In addition, the integration into the TIA Selection Tool offers the selection and configuration of many other components of automation technology, thus allowing complete project planning in one tool.

SIZER supports all of the engineering steps in one workflow:

- Configuring the power supply
- Defining loads by means of mechanical systems and traversing profiles, load cycle imports or load characteristic curves
- Designing the motor and gearbox, including calculation of mechanical transmission elements
- Configuring of the drive components
- Compiling the necessary accessories
- Selecting the line-side and motor-side power options, e.g. cables, filters, and reactors

When designing SIZER, particular importance was placed on user-friendliness and a holistic, function-oriented approach to the drive application. It is easy to switch between the individual steps of the dimensioning and thus change previously made selections without discarding other inputs. Status information and messages are continuously updated and keeps you continually informed about the progress of the configuration process.

The projected drive configurations, including all inputs, are saved in projects and can be fully reloaded. The results of the engineering can be exported to project documentation.

The configuration process produces the following results:

- Parts list of the required components (export to Microsoft Excel, use of the Microsoft Excel data sheet for import into SAP)
- Technical specifications of the system
- Characteristic curves and load curves
- Arrangement of the drive and control components and dimensional drawings of the motors and converters (using separate download links)

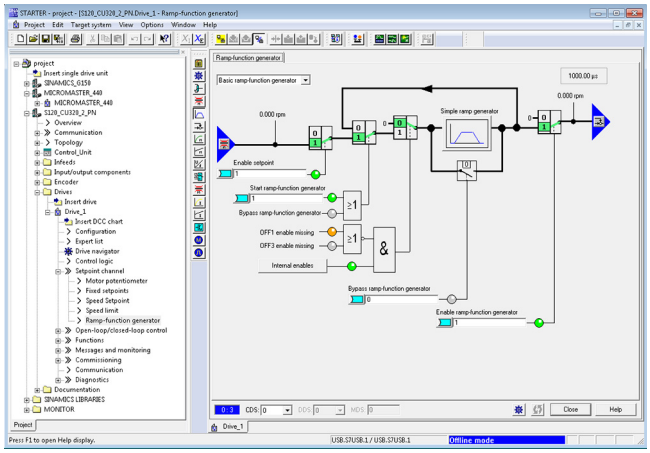
More information

The download of the current desktop version of the TIA Selection Tool with integrated drive dimensioning as well as further information on the TIA Selection Tool can be found at www.siemens.com/tia-selection-tool

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STARTER commissioning tool

Overview



The user-friendly STARTER commissioning tool can be used for:

- Commissioning
- Optimization
- Diagnostics

This software can be operated as a standalone PC application, or integrated as a TIA-compatible program in SIMATIC STEP 7. The basic functions and handling are the same in both cases.

STARTER supports SINAMICS drives.

The project wizards can be used to create the drives within the structure of the project tree.

Beginners are supported by solution-based dialog guidance, whereby a standard graphics-based display maximizes clarity when setting the drive parameters.

First commissioning is guided by a wizard which makes all the basic settings in the drive. Therefore, getting a motor up and running is merely a question of setting a few of the drive parameters as part of the drive configuration process.

The individual settings required are made using graphics-based parameterization screens, which also precisely visualize the principle of operation of the drive.

Examples of individual settings that can be made include:

- Use of terminals
- Bus interface
- Setpoint channel (e.g. fixed setpoints)
- Closed-loop speed control (e.g. ramp-function generator, limits)
- BICO interconnections
- Diagnostics

For experts, the expert list can be used to specifically and quickly access individual parameters at any time. An individual compilation of frequently used parameters can be saved in dedicated user lists and watch tables.

In addition, the following functions are available for optimization purposes:

- Self-optimization of the controller settings (depending on drive unit)
- Setup and evaluation of trace recordings [1)]
  Tool function for recording 2 × 8 signals with
  - Measuring cursor function
  - Extensive trigger functions
  - Several Y scales
  - Sampling times in the current controller cycle clock

Diagnostics functions provide information about:

- Control/status words
- Parameter status
- Operating conditions
- Communication states

Performance features

- User-friendly: Only a small number of settings need to be made for successful first commissioning: The motor starts to rotate
- Solution-oriented dialog-based user guidance simplifies commissioning
- Self-optimization functions reduce manual effort for optimization.

System requirements

The following minimum requirements must be complied with:

- Hardware
  - PG or PC with Pentium III min. 1 GHz (recommended >1 GHz)
  - Work memory 2 GB (4 GB recommended)
  - Screen resolution 1024 × 768 pixels, 16-bit color depth
  - Free hard disk memory: min. 5 GB
- Software
  - Microsoft Internet Explorer V6.0 or higher
  - Microsoft Windows 64-bit operating systems:
    Windows 10 Pro, from Version 22H2
    Windows 10 Enterprise, from Version 22H2
    Windows 10 (IoT) Enterprise 2016 LTSB (OS Build 14393)
    Windows 10 (IoT) Enterprise 2019 LTSC (OS Build 17763)
    Windows 10 (IoT) Enterprise 2021 LTSC (OS Build 19044)
    Windows 11 Pro, from Version 22H2
    Windows 11 Enterprise, from Version 22H2
    Windows Server 2019
    Windows Server 2022

Supported virtualization platforms

STARTER (from V5.1 SP1) can be installed on a virtual machine. For this purpose, one of the following virtualization platforms in the specified version or a newer version can be used:

- VMware vSphere Hypervisor ESX(i) V8.0
- VMware Workstation Pro 17
- VMware Player 17
- Microsoft Hyper-V Server 2022

You can use the following guest operating systems to install STARTER within the selected virtualization platform:

- Microsoft Windows 10 Pro/Enterprise (64 bit)
- Microsoft Windows 11 Pro/Enterprise (64 bit)

Notes:

- The same hardware requirements apply to the guest operating system as for STARTER and SINAMICS DCC.
- The system operator must ensure that the guest operating systems have sufficient system resources.
- The use of manufacturer-certified hardware is recommended for the operation of VMware vSphere Hypervisor ESX(i).

[1)] Depending on drive unit.
Not supported for MICROMASTER 4, SINAMICS G110, SINAMICS G120 <firmware V4.4, SINAMICS G110D and SINAMICS G120D <firmware V4.5.

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Integration

Data can be exchanged (depending on the version) via PROFIBUS or PROFINET/Ethernet or via a serial interface.

For commissioning and service, a PG/PC can be connected to the CU320-2 Control Unit via PROFIBUS. A PROFIBUS connection must be available with a connecting cable at the PG/PC.

Further, communication between a CU320-2 Control Unit and PG/PC can also be established via Ethernet, either via an (optional) CBE20 Communication Board or the Ethernet interface -X127 on the CU320-2 Control Unit.

Note:

The terminal strip -X127 is suitable as a communication link to the PG/PC only for the purposes of servicing and commissioning.

Selection and ordering data

Description	Article No.
STARTER commissioning tool Single license and certificate of license English, French, German, Italian, Spanish • On DVD-ROM (STARTER V5.6 HF1) • Software download (email address required for delivery)	 **6SL3072-0AA00-0AG0** **6SL3072-0AA00-0AK0**

Note:

In addition to the STARTER commissioning tool, SINAMICS Drive Control Chart (SINAMICS DCC) can be installed. This allows the device functionality in the SINAMICS drive system to be expanded with dedicated technology functions as required.

Further information about SINAMICS DCC can be found in the section SINAMICS DCC (Drive Control Chart) with STARTER.

Accessories

Depending on the version of the Control Unit (CU), the Control Unit of the drive unit can communicate with the programming device (PG) or PC via PROFIBUS or PROFINET/Ethernet or via a serial interface. The following accessories are available for the particular drive system as listed in the following table.

Description		**Recommended accessories** For communication between the drive unit and the programming device or PC Article No.
SINAMICS S120		
• RS232	Standard null modem cable	–
• PROFIBUS	**CP 5711 communication module** USB adapter for connecting a PG or notebook to PROFIBUS or MPI USB cable (2 m (6.56 ft)) included in scope of supply	**6GK1571-1AA00**
• PROFINET/ Ethernet	Standard CAT5 Ethernet cable or PROFINET cable	–

More information

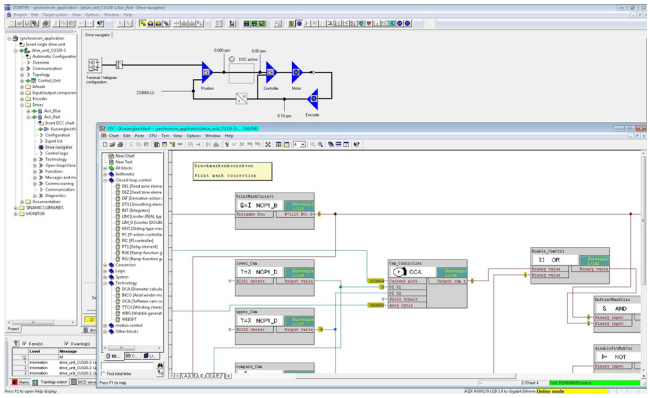
The STARTER commissioning tool is also available on the internet under
www.siemens.com/starter

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SINAMICS DCC (STARTER)

Overview

SINAMICS DCC (Drive Control Chart) is a technological expansion for the SINAMICS S120/S150/G130/G150/ MV/DCM/DCP drive systems. This allows the device functions of the SINAMICS drive system to be expanded individually with freely available closed-loop control, arithmetic and logic blocks. SINAMICS DCC for STARTER enables simple, graphic configuration of these blocks and integrates them in the drive unit.



A comprehensive standard library is available for the configuration, which can be expanded by additional libraries, the so-called DCB Extension.

Via the Siemens application support, a range of example applications (winder, synchronous operation, cross-cutter, etc.) are available for download on the basis of SINAMICS DCC with STARTER and can be used as a ready-to-use solution or be individually adapted or expanded.

Minimum hardware and software requirements

See STARTER commissioning tool.

Minimum software requirements for existing SIMATIC CFC Editor

The installation of STARTER V5.7 HF1 and SINAMICS DCC V3.7 HF1 results in the following minimum requirements:

- When using STEP 7 OEM V5.7 in the standalone installation: SIMATIC CFC Editor V9.0 SP5 Upd4
- When using STEP 7 V5.7 SP1 full version (with monitoring of application integrity): SIMATIC CFC Editor V9.0 SP5 Upd4
- When using STEP 7 V5.7 SP1 full version (without monitoring of the application integrity): SIMATIC CFC Editor V9.0 SP3 Upd4

Please check the minimum requirements in relation to the product SIMATIC CFC when installing STEP 7 or SIMATIC PCS 7.

Selection and ordering data

SINAMICS DCC consists of a graphic configuration tool (DCC Editor based on SIMATIC CFC) and the standard library. SINAMICS DCC is installed as an add-on to the STARTER commissioning tool.

The SINAMICS DCC V3.7 HF1 with SIMATIC CFC Editor V9.0 SP8 Upd1 software package is a component of STARTER V5.7 HF1.
The necessary license key (floating license) for the configuration of SINAMICS DCC V3.7 HF1 must be ordered separately.

The included DCB standard library of SINAMICS DCC V3.7 HF1 does not require a runtime license. Existing licenses for SINAMICS DCC V2.1 and higher can also be used for SINAMICS DCC V3.7 HF1.

An upgrade variant for the application in STARTER V5.7 HF1 and SINAMICS DCC V3.7 HF1 is available for an existing license key of SINAMICS DCC V2.0 SPx.

Description	Article No.
SINAMICS DCC V3.4 SP2 License Key for SINAMICS DCC V3.4, V3.5, V3.6 and V3.7	
• License key on USB flash drive	**6AU1810-1HA34-0XB0**
• Upgrade license key on USB flash drive	**6AU1810-1HA34-0XF0**
SINAMICS DCB Extension license Runtime license for license upgrading with firmware version V4.6 or later (can also be ordered in conjunction with the CompactFlash card, see CompactFlash card for CU310-2 and CU320-2 Control Units)	
• Electronic license	**6SL3077-0AA00-0AH0**
SINAMICS DCB Studio V2.3 SP1 Development tool for programming blocks that can be imported as an additional library (DCB Extension) for SINAMICS DCC in STARTER or in the TIA Portal	On request

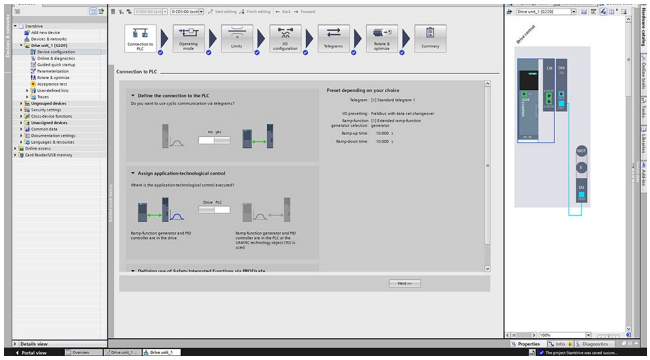
Further information about SINAMICS DCB Extension and SINAMICS DCB Studio can be found in the section SINAMICS DCC (Drive Control Chart) in the TIA Portal.

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Overview

SINAMICS Startdrive is integrated in the TIA Portal and is a tool for the configuration, commissioning and diagnostics of the SINAMICS family of converters.

The SINAMICS Startdrive commissioning tool has been optimized with regard to user friendliness and consistent use of the TIA Portal benefits of a common working environment for PLC, HMI and drives. Time-saving and guided step-by-step commissioning with maximum flexibility is complemented by user-friendly graphic function views for all drive functions, including functional safety (Safety Integrated) and drive-based technology functions (e.g. EPOS). The automatic message display, the powerful real-time trace and the context-sensitive online help make converter diagnostics very easy.



The software packages based on the TIA Portal are harmonized with each other and offer important benefits, the main advantage being a shared project storage. The TIA Portal enables simple integration of SINAMICS converters in your automation solution. Thanks to the standardization of operator actions and the integration in general TIA Portal operating concepts (e.g. UMAC, Openness) as well as standard TIA Portal functions (e.g. Undo/Redo), familiarization is easy both for drive experts as well as SIMATIC users. Special focus is placed on the interaction between SIMATIC and SINAMICS, especially when connecting the SINAMICS drives to SIMATIC technology objects.

Integration

Supported frequency converters

SINAMICS Startdrive Basic enables complete commissioning, diagnostics, parameterization, optimization and connection to the PLC for the following SINAMICS converters integrated in SINAMICS Startdrive:

- SINAMICS G120, G120C, G120D, G120P
- SINAMICS G115D
- SINAMICS G130, G150
- SINAMICS G200 [1)]
- SINAMICS G210, G210C, G210X [1)]
- SINAMICS G220
- SINAMICS S120, S150
- SINAMICS S200
- SINAMICS S200 Spindle [1)]
- SINAMICS S210 (6SL3...) and innovated SINAMICS S210 (6SL5...)
- SINAMICS S220
- SINAMICS MV

SINAMICS Startdrive Advanced

With SINAMICS Startdrive Advanced (available as of V15) you benefit from powerful engineering functions that save you considerable time and ultimately costs.

- Safety acceptance test:
  - Guided acceptance test wizard for all drive-based Safety Integrated functions
  - Automatic and safety function-specific generation of traces to analyze the machine behavior
  - Generation of an acceptance report as Excel file (xlsx format, can also be used with OpenOffice)
- Improved optimization options in the drive: Extended measuring functions (available for CU320-2 PN/DP and CU310-2 PN as of V5.2 SP3 and all devices from V6.x), long-term trace (available for CU320-2 PN/DP and CU310-2 PN from V5.2 SP3)
- Export of backup files from the Startdrive project
- Import of backup files into the Startdrive project
- Also contains all Startdrive Basic functions
- Only license key required, no additional installation

New in V21

Startdrive Basic V21

- Comparison of drive parameters for up to 5 drives
- Offline firmware upgrade as a mass operation
- Download in the background
- Integration of the drive version V6.6 for SINAMICS G220, S220, G200 Basic
- Integration of the drive version V6.7 for SINAMICS G200, G210, G210C, G210X, G220, S200, S200 Spindle, S220
- Support of the virtual motor encoder for encoderless positioning on SINAMICS G210, G220 and S220

Startdrive Advanced V21

- Import of backup files as station upload to the Startdrive project (from V21 Update 1)

[1)] As of SINAMICS Startdrive V21 Update 1.

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Integration

Installation versions

SINAMICS Startdrive can only be installed as an option package for SIMATIC STEP 7. However, a SIMATIC STEP 7 license is not required to run SINAMICS Startdrive.

System requirements

The following table shows the recommended hardware and system equipment for the operation of SINAMICS Startdrive.

Hardware	Recommendation
Computer	As of SIMATIC FIELD PG M6 Comfort (or comparable PC)
Processor	Intel Core i5-8400H (2.5 ... 4.2 GHz; 4 cores + hyper-threading; 8 MB Smart Cache)
RAM	16 GB or more (32 GB for large projects)
Hard disk	SSD with at least 50 GB available memory
Screen resolution	15.6" Full HD display (1920 × 1080 or larger)
Operating systems	• **Microsoft Windows 10 (64 bit)** - Windows 10 Enterprise 21H2 • **Microsoft Windows 11 (64 bit)** - Windows 11 Home Version 24H2 - Windows 11 Professional Version 24H2 - Windows 11 Enterprise 24H2, 23H2 • **Microsoft Windows Server (64 bit)** - Windows Server 2022 Standard (full installation) - Windows Server 2025 Standard (full installation)

Compatibility with other products

- SINAMICS Startdrive V21 operates with STEP 7 and WinCC V21 in one framework
- SINAMICS Startdrive V21 can be installed on the same computer in parallel with other versions of SINAMICS Startdrive V12 to V20
- SINAMICS Startdrive can be installed on the same computer as SINAMICS MICROMASTER STARTER

Supported virtualization platforms

SINAMICS Startdrive can be installed in a virtual machine. For this purpose, one of the following virtualization platforms in the specified version or a newer version can be used:

- VMware vSphere Hypervisor (ESXi) 8.0 or higher
- VMware Workstation 17.0 or higher
- VMware Player 17.0 or higher
- Microsoft Hyper-V Server 2019 or higher

Supported safety programs

The following safety programs have been tested with SINAMICS Startdrive V20:

- Virus scanners:
  - Symantec Endpoint Protection 14.3 RU8
  - Trend Micro Apex One
  - McAfee Endpoint Security (ENS) 10.7
  - Microsoft Defender
  - Qihoo 360 (Safe Guard and Virus Scanner)
  - Crowdstrike Falcon Go (Falcon Prevent and Falcon Device Control)
- Encryption software:
  - Microsoft Bitlocker
- Host-based Intrusion Detection System
  - McAfee Application Control 8.4 (Trellix)

Selection and ordering data

Description	Article No.
SINAMICS Startdrive Basic V21 commissioning tool Single license and certificate of license English, French, German, Italian, Spanish, Chinese Simplified	
• Software download (email address required for delivery)	**6SL3072-4MA02-0XG0**
SINAMICS Startdrive Advanced V21 commissioning tool License key (floating license) English, French, German, Italian, Spanish, Chinese Simplified	
• On USB flash drive	**6SL3072-4MA02-0XA5**
• Software download incl. license key (email address required for delivery)	**6SL3072-4MA02-0XG5**
Upgrade SINAMICS Startdrive Advanced V15 ... V20 to V21	
• On USB flash drive	**6SL3072-4MA02-0XE5**
• Software download incl. license key (email address required for delivery)	**6SL3072-4MA02-0XK5**
Software Update Service with SINAMICS Startdrive Advanced in the TIA Portal Delivery is performed according to the number of ordered SUS products (e.g. 10 upgrade license keys (floating license) with 10 USB flash drives, etc.)	
• On USB flash drive	**6SL3072-4AA02-0XL8**
• Software download incl. license key (email address required for delivery)	**6SL3072-4AA02-0XY8**

Note:

SINAMICS DCC can be installed in addition to the SINAMICS Startdrive commissioning tool. This allows the device functionality in the SINAMICS drive system to be expanded with dedicated technological functions as required.

Further information on SINAMICS DCC can be found in the section "SINAMICS DCC (Drive Control Chart) in the TIA Portal" and the section "Drive Control Chart (DCC)" in the Technology Functions section for the SINAMICS Drive Software for the next generation of SINAMICS frequency converters (from firmware V6.4).

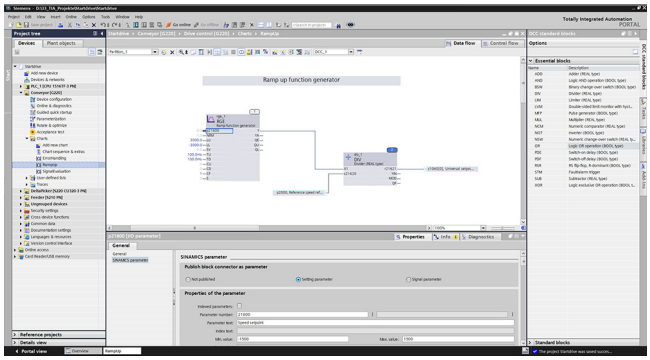
More information

The SINAMICS Startdrive Basic commissioning tool is available free on the internet at
www.siemens.com/startdrive

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Overview

SINAMICS DCC (Drive Control Chart) is a technological expansion for the SINAMICS drive systems. This allows the device functions of the converter systems to be expanded individually and flexibly with freely available closed-loop control, arithmetic and logic blocks and thus opens up a new dimension of adaptation capabilities for the specific functions of the machine for the user. The user-friendly configuration tool in the TIA Portal enables simple, graphic configuration of these blocks and integrates them in the drive unit. SINAMICS DCC is available as an option for SINAMICS Startdrive Basic and Advanced in the TIA Portal.



With the integration into the TIA Portal, the focus is on simple usability. For this reason, closed loop control and open loop control functions can be graphically interconnected in just a few steps via drag and drop.

The SINAMICS DCC installation contains a comprehensive standard block library. Furthermore, additional libraries can be installed as DCB Extension to expand the range of functions of the blocks. The diagnostics functions allow the program behavior to be verified and, in the case of a fault, the cause to be identified.

Via the Siemens application support, a range of example applications (winder, synchronous operation, cross-cutter, etc.) are available for download on the basis of SINAMICS DCC and can be used as a ready-to-use solution or be individually adapted or expanded.
www.siemens.com/sinamics-applications

Supported frequency converters

With SINAMICS DCC, you can flexibly and individually extend the following devices:

- SINAMICS G220 (as of drive version V6.4)
- SINAMICS G210, G210C, G210X (as of drive version V6.7) [1)]
- SINAMICS G200 (as of drive version V6.7) [1)]
- SINAMICS G200 Basic (as of drive version V6.6)
- SINAMICS G130, G150
- SINAMICS S120, S150
- SINAMICS MV
- SINAMICS S120 integrated in SIMATIC Drive Controller
- SINAMICS S220 (as of drive version V6.6)

New in V21

- Support of SINAMICS DCC with SINAMICS G220, G200 Basic and S220 from drive version V6.6
- Support of indexed DCC parameters from drive version V6.6
- Extension of user-specific SINAMICS DCC messages from drive version V6.6
- Support of SINAMICS DCC with SINAMICS G210, G210X and G200 from drive version V6.7

Licenses

With the support of SINAMICS DCC for SINAMICS G220 and S220 drive units, licensing becomes even easier and more flexible. While the SINAMICS DCC Combo engineering licenses are still required for the drive units with drive version V5.x (e.g. SINAMICS S120), SINAMICS DCC Engineering licenses are no longer required for the SINAMICS G220 and S220 drive units. Instead, the licensing depends on the scope of the SINAMICS DCC application.

For simple SINAMICS DCC applications with up to 20 modules, the SINAMICS DCC application can be used free of charge! For more extensive SINAMICS DCC applications, scalable SINAMICS Drive licenses are available, which are precisely tailored to the required needs.

In order to be able to project SINAMICS DCC with the V6.x drive version, the SINAMICS DCC V21 Basic product variant is required.

In the case of using SINAMICS DCC with the V5.x drive version, the SINAMICS DCC V21 Combo Floating License is required, which is offered in the product of the same name. The floating license allows the use of software on any number of computers. This allows one user per license to use the software independently of the computer being used or a specific workstation. The number of existing licenses determines the number of computers on which the software can be used simultaneously.

- Existing SINAMICS DCC combo licenses V15 ... V20 can be upgraded to V21. This requires an upgrade license.
- The combo license allows parallel use of SINAMICS DCC V3.3/V3.4/V3.5/V3.6 and SINAMICS DCC V21 if both tools are installed on the same PC.

Installation versions

SINAMICS DCC is an option package for SINAMICS Startdrive Basic and Advanced.

System requirements

The SINAMICS DCC V21 option package has the same system requirements and supports the same virtualization platforms and safety programs as SINAMICS Startdrive V21.

Compatibility with other products

- SINAMICS DCC V21 operates with Startdrive, STEP 7 and WinCC in one framework
- SINAMICS DCC V21 can be installed on a computer in parallel with SINAMICS MICROMASTER STARTER with SINAMICS DCC

Supported languages

- Standard installation: English, German, Chinese (simplified)
- Language packages: French, Italian, Spanish

[1)] As of SINAMICS DCC V21 Update 1.

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SINAMICS DCC (Drive Control Chart) in the TIA Portal

Selection and ordering data

SINAMICS DCC in the TIA Portal, consisting of the graphical configuration tool and the standard library, is the continuation of SINAMICS DCC in the STARTER.

For drive versions V5.x. no runtime license is required for the standard library included in the scope of supply.

Description	Article No.
SINAMICS DCC V21 Basic Single License as an option package for SINAMICS Startdrive Basic or Advanced V21 for SINAMICS drives as of drive version V6.6 German, English, French, Italian, Spanish, Chinese Simplified	
• Software download (email address required for delivery)	**6SL3070-4MA01-0XG0**
SINAMICS DCC V21 for TIA Portal incl. Floating as an option package for SINAMICS Startdrive Basic or Advanced V21 Combo license key (floating license) German, English, French, Italian, Spanish, Chinese Simplified	
• On USB flash drive	**6SL3070-4MA01-0XA5**
• Software download incl. license key (email address required for delivery)	**6SL3070-4MA01-0XG5**
Upgrade SINAMICS DCC V15.1 ... V20 to V21	
• On USB flash drive	**6SL3070-4MA01-0XE5**
• Software download incl. license key (email address required for delivery)	**6SL3070-4MA01-0XK5**
Software Update Service with SINAMICS DCC in the TIA Portal [1)] Delivery is performed according to the number of ordered SUS products (e.g. 10 upgrade license keys with 10 USB flash drives, etc.)	
• On USB flash drive	**6SL3070-4AA01-0XL8**
• Software download incl. license key (email address required for delivery)	**6SL3070-4AA01-0XY8**

DCB Extension

With DCB Extension, additional libraries can be added as specifically programmed blocks to the standard block library at SINAMICS S120/S150/G130/G150//G210/G210X/MV drive systems and SIMATIC Drive Controller. As a result, complex tasks can be implemented in the drive and the internal know-how protection can be increased as a Black Box. These blocks or libraries are programmed with the separate SINAMICS DCB Studio development tool in the C/C++ high-level language and can be used as a DCB Extension library for SINAMICS DCC. A SINAMICS Drive software option license is required to use these blocks from the DCB extension libraries. The selection sof the required license depends on the drive system running firmware V5.x and V6.x.

SINAMICS DCB Studio

Development tool for programming blocks that can be imported as an additional library (DCB Extension) for SINAMICS DCC in the TIA Portal or in STARTER (upon request).

More information

TIA Portal highlights
www.siemens.com/tiaportal

The SINAMICS DCC option package as trial version is available free on the internet at
www.siemens.com/startdrive

[1)] See Software Update Service section.

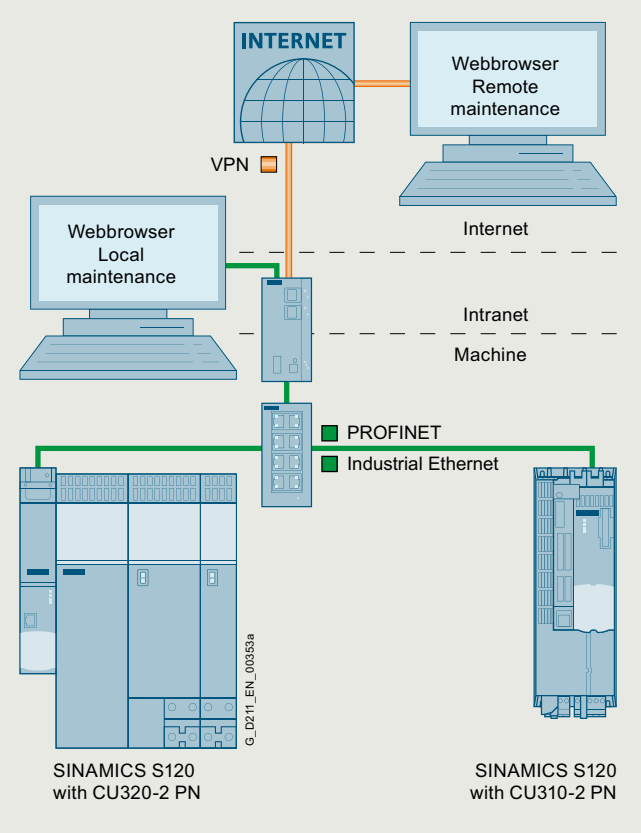
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Overview

Web server for efficient diagnostics and maintenance – available everywhere at all times

The SINAMICS drive system can be expanded with the web server to provide an efficient diagnostics and maintenance option. The web server provides access to multi-faceted new options for drive diagnostics and remote maintenance for every network-compatible PC with a Web browser. For example:

- Downloading a configuration
- Updating firmware
- Providing a status overview of the drive
- Evaluating warnings and fault messages
- Monitoring and adapting parameter settings
- Saving machine documentation, including notes
- Setting up of a user administration to provide access protection



Integration of the SINAMICS web server as shown by the example of the SINAMICS S120 and PROFINET communication

The SINAMICS web server is available from SINAMICS firmware V4.7 or higher on the CompactFlash card for the Control Units

- CU310-2 DP
- CU310-2 PN
- CU320-2 DP
- CU320-2 PN

For further information, refer to CU310-2 and CU320-2 Control Units.

Benefits

Shorter machine downtimes

- Efficient diagnostics and maintenance

Direct language selection

- English, German, Chinese, Italian, French, Spanish

Accessibility

- Via all LAN or PROFINET interfaces

Two users with different rights can be configured

- e. g. for operators and service personnel

Diagnostic functions

- Quick overview of the current configuration and the state of the drive
- Understandable diagnostic information and messages are displayed in plain text in multiple languages

Freely configurable parameter lists

- Monitoring parameters for diagnostic purposes, for example for operating personnel
- Adapting/optimizing existing projects, for example for service personnel

Updating functions

- The device functionality can be updated from any network-compatible PC (locally or by remote access)
- Series commissioning is possible without the STARTER commissioning tool

Archiving machine documentation

- Appropriate documentation and the state of the service and maintenance work are available on site to the operating and service personnel

Access security

- Protection against unauthorized access to the drive information

Integration of customer-specific websites

- Integrating customer know-how into the websites enables the quick, purposeful diagnostics of the customer application

Application

The web server is ideal for applications not requiring any special software (STARTER) or version dependencies. Easy diagnostics and maintenance are possible both locally and remotely, provided appropriate security measures are applied.

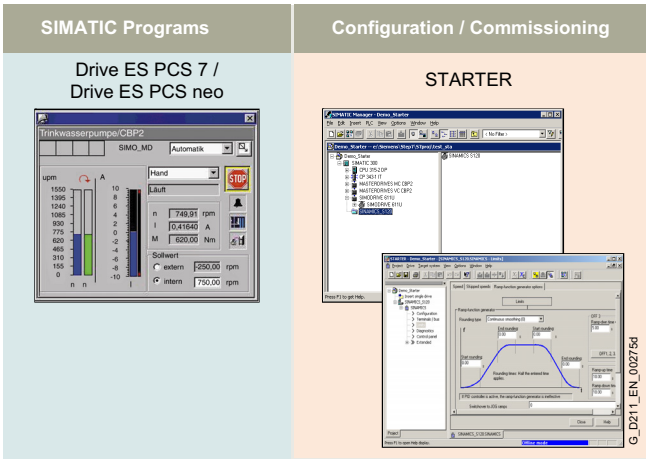
More information

Further information about the SINAMICS web server is available on the internet at
www.siemens.com/sinamics-webserver

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Drive ES engineering software

Overview



Drive ES/STARTER is the engineering system used to integrate the communication, configuration and data management functions of Siemens drive technology into the SIMATIC automation world easily, efficiently and cost-effectively.

The following software packages are available for selection:

- STARTER
- SIMATIC PDM with FDI Device Package
- Drive ES PCS 7

The Drive ES (**D**rive **E**ngineering **S**oftware) fully integrates drives from Siemens into the world of Totally Integrated Automation (STEP 7 V5.x).

- Drive ES PCS neo Add-On

Drive ES PCS neo integrates drives from Siemens into the world of SIMATIC PCS neo system.

Design

The following software packages are available for selection:

- **STARTER**
- **SIMATICS PDM with FDI Device Package**
- **Drive ES PCS 7** (APL Style or Classic Style) /
  Drive ES PCS neo Add-On

STARTER

The STARTER commissioning tool is for first-time users of the world of Totally Integrated Automation and the basic software for setting the parameters of the SINAMICS and MICROMASTER 4 drives online and offline in this environment. The STARTER integration enables both the automation system and the drives to be handled using the SIMATIC Manager software. STARTER is the starting point for common data archiving in complete projects and for extending the use of the routing and the SIMATIC teleservice to drives. STARTER provides the configuration tools for the Motion Control functions – device-to-device communication, equidistance and isochronous operation with PROFIBUS DP and ensures that drives with PROFINET IO are simply integrated into the SIMATIC environment.

SIMATIC PDM with FDI Device Package

The FDI Device Package enables parameterization and diagnostics for SINAMICS G120X and SINAMICS G220 using host software within a Distributed Control System (DCS). Currently, the FDI Device Package is optimized for SIMATIC Process Device Manager (SIMATIC PDM) and has not been certified for use with third-party host software. The package is designed to support service operations and commissioning via PROFINET and PROFIBUS protocol.

Drive ES PCS 7 (APL Style or Classic Style)

Drive ES PCS 7 links the drives with a PROFIBUS DP interface into the SIMATIC PCS 7 process control system, and it requires that SIMATIC PCS 7, V6.1 or higher has first been installed. Drive ES PCS 7 provides a block library with blocks for the drives and the corresponding faceplates for the operator station, which enables the drives to be operated from the PCS 7 process control system. From Drive ES PCS 7 V6.1 and higher, drives will also be able to be represented in the PCS 7 Maintenance Station.

From Drive ES PCS 7 V8.0 and higher, two versions of the library are available: The APL (Advanced Process Library) variant and the previous version in the so-called Classic Style.

Detailed contents of the Drive ES PCS 7 (APL Style or Classic Style)

- **Block library for SIMATIC PCS 7** Faceplates and control blocks for SIMOVERT MASTERDRIVES VC and MC, as well as MICROMASTER/MIDIMASTER of the third and fourth generation and SIMOREG DC MASTER and SINAMICS
- **STEP 7 V5.x slave object manager** for user-friendly configuration of drives and non-cyclic PROFIBUS DP communication with the drives
- **STEP 7 V5.x device object manager** for easy configuration of drives with PROFINET-IO interfaces (V8.0 SP1 and higher)
- **SETUP program** for installing the software in the SIMATIC PCS 7 environment

Drive ES PCS neo Add-On

Siemens SINAMICS drives can be controlled via SIMATIC PCS neo and operated and monitored on the OCM client with the SINAMICS library Drive ES PCS neo Add-On. The Drive ES PCS neo faceplates make the data relevant for system operation available on the OCM client. The STARTER commissioning tool on the engineering server can also be used for parameter assignment, commissioning and detailed diagnostics of the SINAMICS drives.

More information

Further information is available on the internet at:
www.siemens.com/drive-es

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Selection and ordering data

Drive ES PCS 7

Description	Article No.
Drive ES PCS 7 V9.1 SPx *)	
Block library for PCS 7 for the integration of drives in Classic Style (as predecessor)	
Requirement: PCS 7 V9.1 or higher	
Type of delivery: DVD-ROM Languages: en, de, fr, it, es With electronic documentation	
• Single-user license incl. 1 runtime license	**6SW1700-2JD00-0AA0**
• Runtime license (on paper)	**6SW1700-5JD00-1AC0**
• Runtime license (eCoL)	**6SW1700-5JD00-1AH0**
• Update service for single-user license	**6SW1700-0JD00-0AB2**
• Upgrade from V6.x/V7.x/V8.x/V9.x to V9.1 SPx *)	**6SW1700-2JD00-0AA4**
Drive ES PCS 7 APL V9.1 SPx *)	
Block library for PCS 7 for the integration of drives in APL Style (Advanced Process Library)	
Requirement: PCS 7 V9.1 or higher	
Type of delivery: DVD-ROM Languages: en, de, fr, it, es With electronic documentation	
• Single-user license incl. 1 runtime license	**6SW1700-2JD01-0AA0**
• Runtime license (on paper)	**6SW1700-5JD00-1AC0**
• Runtime license (eCoL)	**6SW1700-5JD00-1AH0**
• Update service for single-user license	**6SW1700-0JD01-0AB2**
• Upgrade of Drive ES PCS 7 APL V8.x, V9.x to V9.1 SPx *) or Drive ES PCS 7 V6.x, V7.x, V8.x, V9.x classic to Drive ES PCS 7 APL V9.1 SPx *)	**6SW1700-2JD01-0AA4**
Drive ES PCS 7 V10.0 SPx *)	
Block library for PCS 7 for the integration of drives in Classic Style (as predecessor)	
Requirement: PCS 7 V10.0 or higher	
Type of delivery: DVD-ROM, OSD Languages: en, de, fr, it, es With electronic documentation	
• Single-user license incl. 1 runtime license (DVD-ROM)	**6SW1700-3JD00-0AA0**
• Single-user license incl. 1 runtime license (OSD)	**6SW1700-3JD00-0AG0**
• Runtime license (on paper)	**6SW1700-5JD00-1AC0**
• Runtime license (eCoL)	**6SW1700-5JD00-1AH0**
• Update service for single-user license	**6SW1700-0JD00-0AB2**
• Upgrade from V8.x/V9.x to V10.0 SPx *) for DVD-ROM	**6SW1700-3JD00-0AA4**
• Upgrade from V8.x/V9.x to V10.0 SPx *) for OSD	**6SW1700-3JD00-0AG4**
Drive ES PCS 7 APL V10.0 SPx *)	
Block library for PCS 7 for the integration of drives in APL Style (Advanced Process Library)	
Requirement: PCS 7 V10.0 or higher	
Type of delivery: DVD-ROM, OSD Languages: en, de, fr, it, es With electronic documentation	
• Single-user license incl. 1 runtime license (DVD-ROM)	**6SW1700-3JD01-0AA0**
• Single-user license incl. 1 runtime license (OSD)	**6SW1700-3JD01-0AG0**
• Runtime license (on paper)	**6SW1700-5JD00-1AC0**
• Runtime license (eCoL)	**6SW1700-5JD00-1AH0**
• Update service for single-user license	**6SW1700-0JD01-0AB2**
• Upgrade from V8.x/V9.x to V10.0 SPx *) for DVD-ROM	**6SW1700-3JD01-0AA4**
• Upgrade from V8.x/V9.x to V10.0 SPx *) for OSD	**6SW1700-3JD01-0AG4**

Drive ES PCS 7 Software Update Service

A software update service can also be purchased for the Drive ES PCS 7 software. The user will automatically receive the latest software, service packs and full versions for one year after ordering.

The update service can only be ordered in addition to an existing (i.e. previously ordered) full version.

- Period of update service: 1 year

The update service is automatically extended by 1 further year unless canceled up to 6 weeks prior to expiration.

Description	Article No.
Drive ES PCS 7	
• Update service for single-user license	**6SW1700-0JD00-0AB2**
Drive ES PCS 7 APL	
• Update service for single-user license	**6SW1700-0JD01-0AB2**

Drive ES PCS neo

Description	Article No.
Drive ES PCS neo V4.1 Add-On for SIMATIC PCS neo for the integration of SINAMICS drives Requirement: PCS neo V4.1 License reference for the license code and the Certificate of License for the Drive ES PCS neo Add-On via OSD Languages: de, en, fr, it, es, zh, ja	**6SW1700-2JE01-0AH0**
Drive ES PCS neo V5.0 Add-On for SIMATIC PCS neo for the integration of SINAMICS drives Requirement: PCS neo V5.0 License reference for the license code and the Certificate of License for the Drive ES PCS neo Add-On via OSD Languages: de, en, fr, it, es, zh, ja	**6SW1750-1CE00-0YA0**
Drive ES PCS neo V6.0 SP1 Add-On for SIMATIC PCS neo for the integration of SINAMICS drives Requirement: PCS neo V6.0 and V6.0 SPx License reference for the license code and the Certificate of License for the Drive ES PCS neo Add-On via OSD Languages: de, en, fr, it, es, zh, ja	**6SW1750-1CE01-0YA0**
Runtime license Drive ES PCS neo Add-On SINAMICS library To execute the function blocks for an additional SIMATIC PCS neo Controller Language-neutral, single license for 1 installation Type of delivery: Electronic Certificate of License (OSD)	**6SW1750-2CE00-0YB0**

*) Orders are automatically supplied with the latest Service Pack (SP).

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Overview

General configuration sequence

The function description of the machine provides the basis for the configuration. The definition of the components is based on physical dependencies and is usually carried out as follows:

Step	Description of configuration activity
1	Clarification of type of drive
2	Definition of boundary conditions and integration into automated system
3	Definition of loading case, calculation of max. load torque, definition of motor
4	Definition of the Motor Module
5	Repetition of steps 3 and 4 for additional axes
6	Calculation of the required infeed power and defining the Line Module
7	Specification of the required control performance and selection of the Control Unit, definition of component cabling
8	Specification of the line-side power options (main switch, fuses, line filters, etc.) and cable cross-sections for connecting to the line supply and motor
9	Definition of additional system components
10	Calculation of the current requirement for the 24 V DC supply for the components and specification of power supplies (SITOP devices, Control Supply Modules)
11	Specification of components for connection system
12	Configuration of drive line-up components
13	Thermal design of the control cabinet

Configuration begins with the mechanical interface to the machine. A suitable motor is selected according to the specified torques and speeds. A matching power unit is then also chosen. Depending on the requirements of the machine, the motor is supplied as a single drive via a Power Module or within a multi-motor drive group via a Motor Module. Once the basic components have been defined, the system components for matching to the electrical and mechanical interfaces are selected.

The SIZER for Siemens Drives (integrated in the TIA Selection Tool) engineering tool allows the correct components to be selected quickly and easily. Based on the torque and speed characteristics entered, SIZER for Siemens Drives (integrated in the TIA Selection Tool) guides the user through the configuring process, identifying suitable motors and matching SINAMICS power units and other system components.

The following sections describe those SINAMICS S120 components which are needed to create a drive system subject to certain boundary conditions. For information about individual components, please also refer to the online help of the SIZER for Siemens Drives engineering tool (integrated in the TIA Selection Tool).

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Overview

The electromagnetic compatibility describes – according to the definition of the EMC directive – the "capability of a device to work satisfactorily in an electromagnetic environment without itself causing electromagnetic interference which is unacceptable for other devices present in this environment". To guarantee that the appropriate EMC standards are observed, the devices must demonstrate a sufficiently high noise immunity, and also the emitted interference must be limited to acceptable values.

Product standard EN 61800-3 describes the EMC requirements placed on "Variable-speed drive systems".

A variable-speed drive system (or Power Drive System PDS) consists of the Control Unit and Power Module or Control Unit, Line Module and Motor Module plus the relevant electric motors and encoders including connecting cables.

The driven machine is not part of the drive system.

Environments

EN 61800-3 defines different requirements depending on the location where the drive is installed, designated as a first and second environment.
Residential buildings or locations where the drive system is directly connected to a public low-voltage supply without intermediate transformer are defined
as the **first environment**.
All locations outside a residential area are defined as the **second environment**. These are basically industrial areas which are supplied from the medium-voltage network via their own transformers.

Categories

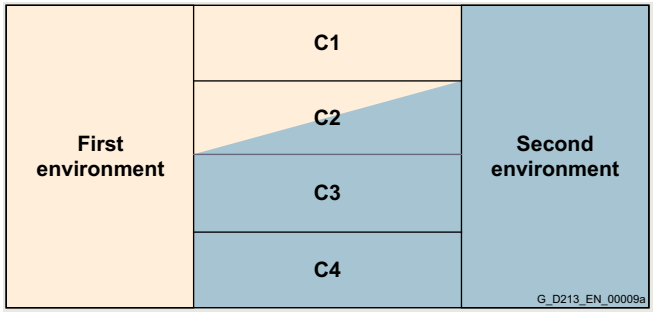
Four different categories are defined in EN 61800-3 depending on the installation site of the drive:

Category C1: Drive systems for rated voltages < 1000 V for unlimited use in the first environment.

Category C2: Stationary drive systems for rated voltages < 1000 V for use in the second environment. Use in the first environment is possible if the drive system is operated and installed by qualified personnel. The warning information and installation instructions supplied by the manufacturer must be observed.

Category C3: Drive systems for rated voltages < 1000 V for exclusive use in the second environment.

Category C4: Drive systems for rated voltages ≥ 1000 V, for rated currents ≥ 400 A or IT supply systems for use in complex systems in the second environment. An EMC plan must be drawn up.



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EMC notes for the application of the product standard EN 61800-3

Configuration

SINAMICS S120 Power Drive Systems (PDS) can be operated in the first and second environments. The measures necessary for operation in the respective environment are subsequently listed.

Measures for complying with product standard EN 61800-3 second environment

Interference immunity

The SINAMICS S120 drive system is suitable for operation in the second environment.

Regarding interference immunity, SINAMICS S120 can be used in the **first and second environments**.

Interference emission – complying with Category C2 second environment

Regarding interference emission, to comply with the limit values according to EN 61800-3 second environment, Category C2, the following measures must be applied:

- The drive system must be installed in compliance with EMC regulations by appropriately trained professionals.
- The SINAMICS S120 drive system requires a radio interference suppression filter, Category C2 (integrated as line filter, or as optional external line filter with/without line reactor)
- The pulse frequency is less than or equal to the rated pulse frequency
- The maximum motor cable length is complied with (shielded)
- Line supply with grounded neutral point (TN/TT supply system)

Device-specific assignment of the measures to comply with product standard EN 61800-3 second environment, Category C2

SINAMICS S120 drive system			Measures for		
			Radio interference suppression filter, Category C2	Maximum pulse frequency f_p	Maximum motor cable length (shielded)
Device format	Supply voltage	Frame size		kHz	m (ft)
Booksize Line Modules	380 ... 480 V 3 AC	–	External line filter required [1]	4 [2]	350 (1148)
Chassis Active Line Modules Smart Line Modules	380 ... 480 V 3 AC	FX ... JX	External line filter required	4 [2]	300 (984)
	500 ... 690 V 3 AC	FX ... JX	External line filter required	4 [2]	300 (984)
Chassis Basic Line Modules	380 ... 480 V 3 AC	FB ... GD	External line filter plus line reactor required [1]	4 [2]	100 (328)
	500 ... 690 V 3 AC	FB ... GD	External line filter plus line reactor required [1]	4 [2]	100 (328)
Chassis Power Modules	380 ... 480 V 3 AC	FX and GX	External line filter plus line reactor required [1]	2	100 (328)
Blocksize Power Modules with integrated line filter	200 ... 240 V 1/3 AC	FSA ... FSC	No measure required, as a line filter is integrated	4	50 (164)
	380 ... 480 V 3 AC	FSA ... FSC	No measure required, as a line filter is integrated	4	50 (164)
		FSD ... FSF (75 and 90 kW)	No measure required, as a line filter is integrated	4	150 (492)
		FSF (110 and 132 kW)	No measure required, as a line filter is integrated	2	150 (492)
		FSG	No measure required, as a line filter is integrated	2	150 (492)
	500 ... 690 V 3 AC	FSD and FSE	No measure required, as a line filter is integrated	2	100 (328)
		FSF	No measure required, as a line filter is integrated (Category C3)	2	150 (492)
		FSG	No measure required, as a line filter is integrated (category C3)	2	300 (984)
Blocksize Power Modules without integrated line filter	200 ... 240 V 3 AC	FSD ... FSF	External line filter required	4	150 (492)
	380 ... 480 V 3 AC	FSA ... FSC	External line filter required [1]	4	50 (164)
		FSD ... FSF (75 and 90 kW)	Version with integrated line filter available	4	150 (492)
		FSF (110 and 132 kW)	Version with integrated line filter available	2	150 (492)
		FSG	Version with integrated line filter available	2	150 (492)
	500 ... 690 V 3 AC	FSD ... FSF	Version with integrated line filter available (Category C3)	2	100 (328)
		FSG	Version with integrated line filter available (Category C3)	2	300 (984)

Interference emission – complying with Category C3 second environment

All Active Line Modules in booksize format, Basic Line Modules in booksize format 100 kW as well as Line Modules in chassis format in the standard version are compliant.
A line reactor is required for Power Modules in chassis format.

The maximum cable lengths and pulse frequencies (see the previous table) must be taken into account.
For Active Line Modules in booksize format, when using an external line filter, the maximum cable length can be increased to 1000 m (3281 ft).

Interference emission – complying with Category C4 second environment

When connected to IT line supplies, only devices without integrated filter, Basic Line Modules in booksize format up to 40 kW, and all Smart Line Modules in booksize format are permissible. To limit symmetrical interference emission, suitable external filters without capacitors connected to ground must be used.

Further selected accessories are available from "Siemens Product Partner for Drives Options":
www.siemens.com/drives-options-partner

[1] Selection and ordering data for line filters and line reactors see sections Line-side power components.

[2] Refers to the pulse frequency of the Motor Modules.

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Configuration

Measures for complying with product standard EN 61800-3 first environment

Only PM240-2 Power Modules in blocksize format can be used in the first environment.

Interference immunity

The SINAMICS S120 drive system is suitable for operation in the second environment.

Regarding interference immunity, SINAMICS S120 can be used in the **first and second environments**.

Interference emission – complying with Category C2 first environment

For use in the first environment, **in addition** to the requirements for use in the second environment, device-specific notes to maintain the **harmonic current** limits must be **taken into consideration**. Here, EMC product standard EN 61800-3 makes reference to the standards pertaining to harmonic currents: EN 61000-3-2 and EN 61000-3-12.

Device-specific notes for complying with harmonic current limit values according to EN 61000-3

- Power Modules with a power $P_N \leq 1$ kW
  Complying with limit values according to EN 61000-3-2 cannot be guaranteed in this case. The installation company or company operating professionally used devices must obtain authorization to connect the device to the low-voltage grid from the responsible power utility company.
- Power Modules with a power $P_N > 1$ kW and a rated input current $I_{N, input} < 16$ A
  These devices are not subject to any limit values regarding the harmonic currents, and can therefore be connected to the public low-voltage grid without prior authorization.
- Power Modules with a rated input current > 75 A
  There are no applicable standards when installing these types of devices. However, it is recommended that the utility company (grid operator) be informed when connecting such a device.

Device-specific measures to comply with harmonic current limit values:

Power Modules in **blocksize** format with a rated input current $I_{N, input} > 16$ A and ≤ 75 A				Measures to comply with harmonic current limits according to EN 61000-3-12	
Rated power	Rated input current $I_{N, input}$	Supply voltage	Frame size	Line reactor $u_k = 4$ %	Minimum short-circuit power S_{SC} at the connection point of the customers plant or system
3 ... 7.5 kW	20.7 ... 37 A	200 ... 240 V 3 AC	FSC	Required [1]	$S_{SC} \geq 120 \times \sqrt{3} \times U_{line} \times I_{N, input}$
5.5 ... 15 kW	17.2 ... 39.9 A	380 ... 480 V 3 AC	FSB and FSC	Required [1]	
11 ... 18.5 kW	40 ... 64 A	200 ... 240 V 3 AC	FSD	Not required	$S_{SC} \geq 120 \times \sqrt{3} \times U_{line} \times I_{N, input}$
18.5 ... 37 kW	36 ... 70 A	380 ... 480 V 3 AC	FSD	Not required	

Example of calculating the minimum short-circuit power required

Determining the minimum short-circuit power S_{SC} for the Power Module in blocksize format FSD: 37 kW with $U_{line} = 400$ V and $I_{N, input} = 70$ A

$S_{SC} \geq 120 \times \sqrt{3} \times U_{line} \times I_{N, input}$

The short-circuit power must be greater than $120 \times 1.73 \times 400$ V $\times 70$ A = 5812 kVA

As guide value, this typically corresponds to a low-voltage transformer with an apparent power of approximately 300 ... 400 kVA.

Note:

The installation company or company operating the device is responsible for ensuring that this device is only connected at a connection point with an appropriate short-circuit power (fault level), if this is necessary after consulting the power utility (grid operator).
The installation company or company operating the device requires authorization from the power utility (grid operator) in the following situations:
- Three-phase connection to a line supply with lower short-circuit power
- Three-phase connection without a line reactor
- Connecting single-phase devices with a rated input current $I_{N, input} > 16$ A

[1] Available from the "Siemens Product Partner for Drives Options":
www.siemens.com/drives-options-partner

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EMC notes for the application of the product standard EN 61800-3

Configuration

Maximum permissible cable lengths from the motor to the converter when using output reactors, sine-wave filters, dv/dt filters plus VPL or filters depending on the voltage range and the Power Module being used

Frame size	Maximum permissible motor cable lengths (shielded/unshielded) in m (ft) FSA	FSB	FSC	FSD	FSE	FSF	FSG
PM240-2 Power Module with integrated braking chopper							
Without optional power components							
• 200 V versions without integrated line filter	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)	200/300 (656/984)	200/300 (656/984)	300/450 (984/1476)	–
• 200 V versions with integrated line filter	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)	–	–	–	–
• 400 V versions without integrated line filter	150/150 (492/492)	150/150 (492/492)	150/150 (492/492)	200/300 (656/984)	200/300 (656/984)	300/450 (984/1476)	300/450 (984/1476)
• 400 V versions with integrated line filter	50/100 (164/328)	100/100[1] (328/328)[1]	150/150[1] (492/492)[1]	200/300 (656/984)	200/300 (656/984)	300/450 (984/1476)	300/450 (984/1476)
• 690 V versions	–	–	–	200/300 (656/984)	200/300 (656/984)	300/450 (984/1476)	300/450 (984/1476)
With optional output reactor							
• At 200 ... 240 V 1 AC/3 AC	150/225 (492/738)	150/225 (492/738)	150/225 (492/738)	200/300 (656/984)[2]	200/300 (656/984)[2]	300/450 (984/1476)[2]	–
• At 380 ... 415 V 3 AC	150/225 (492/738)	150/225 (492/738)	150/225 (492/738)	200/300 (656/984)[2]	200/300 (656/984)[2]	300/450 (984/1476)[2]	300/450 (984/1476)[2]
• At 440 ... 480 V 3 AC	100/150 (328/492)	100/150 (328/492)	100/150 (328/492)	200/300 (656/984)[2]	200/300 (656/984)[2]	300/450 (984/1476)[2]	300/450 (984/1476)[2]
• At 500 ... 690 V 3 AC	–	–	–	350/525 (1148/1723)	350/525 (1148/1723)	525/800 (1723/2625)[2]	525/800 (1723/2625)[2]
With optional sine-wave filter							
• At 380 ... 480 V 3 AC	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	–	–	–	–
With optional dv/dt filter plus VPL							
• At 380 ... 480 V 3 AC	–	–	–	30 kW: 350/525 (1148/1723) 37 kW: 450/650 (1476/2133)[3]	450/650 (1476/2133)[3]	450/650 (1476/2133)[3]	–
• At 500 ... 690 V 3 AC	–	–	–	350/525 (1148/1723)	350/525 (1148/1723)	450/650 (1476/2133)[3]	450/650 (1476/2133)[3]
With integrated line filter According to EN 55011 to comply with radio interference emissions according to EN 61800-3 EMC Category C2							
• At 200 ... 240 V 1 AC/3 AC	50/– (164/–)	50/– (164/–)	50/– (164/–)	–	–	–	–
• At 380 ... 480 V 3 AC	50/– (164/–)	100/– (328/–)[4]	150/– (492/–)[4]	150/– (492/–)	150/– (492/–)	150/– (492/–)	150/– (492/–) (Category C2) 300/– (984/–) (Category C3[5])
• At 500 ... 690 V 3 AC	–	–	–	100/– (328/–)	100/– (328/–)	150 /– (492/–) (Category C3)	300/– (984/–) (Category C3[5])
With optional, external line filter class B According to EN 55011 to comply with conducted radio interference emissions according to EN 61800-3 EMC Category C1 [6], **together with unfiltered Power Module**							
• At 380 ... 480 V 3 AC	50/– (164/–)	50/– (164/–)	50/– (164/–)	–	–	–	–
With optional, external line filter class B According to EN 55011 to comply with conducted radio interference emissions according to EN 61800-3 EMC Category C2 [6], **together with unfiltered Power Module**							
• At 380 ... 480 V 3 AC	150/– (492/–)[4]	100/– (328/–)[4]	100/– (328/–)[4]	–	–	–	–
With optional, external line filter class B According to EN 55011 **and optional output reactor** to comply with radio interference emissions according to EN 61800-3 EMC Category C2 [6], **together with unfiltered Power Module**							
• At 380 ... 415 V 3 AC	150/– (492/–)	150/– (492/–)	150/– (492/–)	–	–	–	–
• At 440 ... 480 V 3 AC	100/– (328/–)	100/– (328/–)	100/– (328/–)	–	–	–	–

More information

Converters are equipment used on a professional basis, deployed in certain areas of business and industry – and are not operated in the general public domain.

For EMC-compliant installation, observe the information in the Configuration Manual EMC installation guideline:
https://support.industry.siemens.com/cs/document/60612658

[1] The values apply with low-capacitance CY cables – the max. permissible motor cable length is 50 m (164 ft) (shielded) and 100 m (328 ft) (unshielded) as standard.

[2] For frame sizes FSD to FSG the maximum permissible cable lengths are not increased with an output reactor. By means of the output reactor, the loading of the motor windings is reduced by lower rates of voltage rise (dv/dt). By means of two output reactors connected in series, the maximum permissible cable lengths for frame sizes FSD and FSE are increased to 350 m (1148 ft) (shielded) and 525 m (1723 ft) (unshielded), and for frame sizes FSF and FSG to 525 m (1723 ft) (shielded) and 800 m (2625 ft) (unshielded).

[3] Maximum overvoltage at the motor terminals <1350 V with cable lengths up to 450 m (1476 ft) shielded or 650 m (2133 ft) unshielded – maximum overvoltage at the motor terminals <1500 V with cable lengths up to 525 m (1723 ft) shielded or 800 m (2625 ft) unshielded.

[4] The values apply with low-capacitance CY cables – the max. permissible motor cable length is 50 m (164 ft) (shielded) as standard.

[5] PM240-2 Power Modules in frame size FSG, equipped with an integrated Category C3 line filter, can be operated in the following power supply systems (up to 600 V):
- TN systems with a grounded line conductor
- TT systems without a grounded neutral point
- IT systems, provided the functional grounding screw is removed

Note: Removing the functional grounding screw is required for operation in IT systems. However, this action degrades the EMC performance, and the device no longer complies with Category C3 requirements.

[6] More information is available on the internet at
www.siemens.com/sinamics-g120/documentation

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Overview

For the closed-loop control of drives and the implementation of basic technological tasks, for SINAMICS S120 the CU320-2 Control Unit is available for multi-axis applications, and the CU310-2 Control Unit is available for individual drives.

Each of these Control Units is based on object-orientated SINAMICS S120 standard firmware, which includes all of the usual V/f control modes, scalable so that even the highest performance requirements can be satisfied.

The following are ready-to-configure drive objects (drive controls):

- The control for a line infeed:
  Infeed Control
- The control for the broad scope of rugged asynchronous (induction) motors and torque motors, including sensorless:
  Vector Control
- The control for permanent-magnet excited synchronous and servo asynchronous motors with demanding dynamic requirements:
  Servo Control

All these control versions are based on the principle of field-oriented, closed-loop vector control, with a special expansion for reluctance motors.

The most commonly used V/f control modes are stored in the "Vector control" drive object and are ideal for implementing even simple applications such as group drives with synchronous motors.

Configuration

Guide to selecting a closed-loop control variant

SINAMICS S120 closed-loop control properties

Criteria for assessing control quality	Explanations, definitions
Rise time	The rise time is the period which elapses between an abrupt change in a setpoint and the moment the actual value first reaches the tolerance band (2 %) around the setpoint. The dead time is the period which elapses between the abrupt change in the setpoint and the moment the actual value begins to increase. The dead time is partially determined by the read-in, processing and output cycles of the digital closed-loop control. Where the dead time constitutes a significant proportion of the rise time, it must be separately identified.
Characteristic angular frequency -3 dB	The limit frequency is a measure of the dynamic response of a closed-loop control. A pure sinusoidal setpoint is input to calculate the limit frequency; no part of the control loop must reach the limit. The actual value is measured under steady-state conditions and the ratio between the amplitudes of actual value and setpoint is recorded. -3 dB limit frequency: Frequency at which the absolute value of the actual value drops by 3 dB (to 71 %) for the first time. The closed-loop control can manage frequencies up to this value and remain stable.
Ripple	The ripple is the undesirable characteristic of the actual value which is superimposed on the mean value (useful signal). Oscillating torque is another term used in relation to torque. Typical oscillating torques are caused by certain motor slot arrangements, by limited encoder resolution or by the limited resolution of the voltage control of the IGBT power unit. The torque ripple is also reflected in the speed ripple as being indirectly proportional to the mass inertia of the drive.
Accuracy	The accuracy defines the magnitude of the average, repeatable deviation between the actual value and setpoint under rated operating conditions. Deviations between the actual value and setpoint are caused by internal inaccuracies in the measuring and control systems. External influencing factors, such as temperature or speed, are not included in the accuracy assessment. The closed-loop and open-loop controls should be optimized with respect to the relevant variable.

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Configuration

SINAMICS S120 performance characteristics

Characteristics	**Servo Control**	**Vector Control**	**V/f control**	Notes
Typical application	• Drives with high dynamic motion control • Angular-locked synchronism with isochronous PROFIBUS/ PROFINET in conjunction with SIMOTION • For use in machine tools and clocked production machines	• Variable-speed drives with high speed and torque stability in general machinery construction • Especially suitable for induction motors and reluctance motors	• Drives with low requirements on dynamic response and accuracy • Group drives running with a high degree of precision, e.g. on textile machines with synchronous motors	Mixed operation of Servo Control and Vector Control is not possible on CU320-2. Mixed operation is possible for V/f control modes.
Dynamic response	Very high	High	Low	Highest dynamic response with 1FK7/1FT2 High Dynamic synchronous motors and Servo Control.
Control modes with encoder	Position control/ Speed control/ Torque control	Position control/ Speed control/ Torque control	None	SIMOTION D with Servo Control is standard for motion control.
Control modes without encoder	Speed control	Speed control/torque control	All V/f control modes	With Servo for induction motors only. With V/f control, the speed can be kept constant by means of selectable slip compensation.
Asynchronous motor (induction motor)	Yes	Yes	Yes	V/f control (textiles) is recommended for synchronous motors.
Synchronous motor	Yes	Yes	No	
Reluctance motor	No	Yes	No	
Torque motor	Yes	Yes	No	
Linear motor	Yes	No	No	
Permissible ratio of motor rated current to rated current of Motor Module	1:1 to 1:4	1.3:1 to 1:4	1:1 to 1:12	For Servo Control and Vector Control, maximum control quality up to 1:4. Between 1:4 and 1:8, increasing restrictions regarding torque and rotational accuracy. V/f control is recommended for < 1:8.
Maximum number of parallel-connected motors per Motor Module	4	8	Unlimited in theory	Motors with identical power ratings can only be connected in parallel if they are induction motors. With V/f Control, the motors can have different power ratings.
Setpoint resolution position controller	31 bit + sign	31 bit + sign	–	
Setpoint resolution speed/ frequency	31 bit + sign	31 bit + sign	0.001 Hz	
Setpoint resolution torque	31 bit + sign	31 bit + sign	–	
Maximum output frequency				Values valid for the factory setting High output frequencies can only be achieved when using suitable motors and the appropriate parameterization. For synchronous motors, observe the voltage limit (2 kV) and use a VPM module.
• For current controller clock cycle/pulse frequency	660 Hz [1] with 125 µs/4 kHz	330 Hz with 250 µs/4 kHz	400 Hz with 250 µs/4 kHz	
• For current controller clock cycle/pulse frequency (chassis frame sizes FX and GX)	330 Hz with 250 µs/2 kHz	160 Hz with 250 µs/2 kHz	200 Hz with 250 µs/2 kHz	
• For current controller clock cycle/pulse frequency (chassis frame sizes HX and JX)	Not permitted	100 Hz with 400 µs/1.25 kHz	100 Hz with 400 µs/1.25 kHz	Only for induction motors: When using edge modulation, 600 Hz is possible at 4 kHz, or 300 Hz at 2 kHz and 200 Hz at 1.25 kHz.
Maximum field weakening				With Servo Control combined with encoder and appropriate special motors, field weakening up to 16 times the field-weakening threshold speed is possible. These values refer to 1FT7/1FT2 synchronous motors. Note voltage limit (k_E factor) for third-party motors.
• For asynchronous (induction) motors	5 times	5 times	4 times	
• For synchronous motors	2 times	2 times	–	
• For reluctance motors	–	2 times	–	

[1] The high output frequency option is required to enable output frequencies above 550 Hz.

For additional information see section Control Units, and on the internet at https://support.industry.siemens.com/cs/document/104020669

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Configuration

Fundamental closed-loop control characteristics of SINAMICS S120

- Booksize format, pulse frequency 4 kHz, closed-loop torque control

	Servo Control		Vector Control		Notes
Synchronous motor	**1FT7**		Vector Control is not designed as an operating mode for 1FT7/1FT2 synchronous motors.		
Controller cycle	125 µs				
Rise time (without delay)	0.5 ms				At a speed operating range from 50 r/min for resolver.
Characteristic angular frequency -3 dB	900 Hz				In this case, the dynamic response is determined primarily by the encoder system.
Torque ripple	0.6 % of M_0				For a speed operating range of 20 r/min up to rated speed. A ripple of < 1 % is possible with an absolute encoder ≤ 1 r/min. Not possible with resolver.
Torque accuracy	± 1.5 % of M_0				Measured value averaged over 3 s. With motor identification and friction compensation. In the torque operating range up to ± M_0. Speed operating range 1:10 up to rated speed. Attention: External influences such as motor temperature can cause an additional long-time inaccuracy (constancy) of about ±2.5 %. Approx. ±1 % lower accuracy in field-weakening range.
Induction motor	**1PH8 without encoder**	**1PH8 with incremental encoder 1024 S/R**	**1PH8 without encoder**	**1PH8 with incremental encoder 1024 S/R**	
Controller cycle	125 µs	125 µs	250 µs	250 µs	
Total rise time (without delay)	–	0.8 ms	2 ms	1.2 ms	With encoderless operation in speed operating range 1:10, with encoder 50 r/min and above up to rated speed.
Characteristic angular frequency -3 dB	–	600 Hz	250 Hz	400 Hz	With encoderless operation in speed operating range 1:10. The dynamic response is improved when using an encoder (feedback signal).
Torque ripple	–	1.5 % of M_N	2 % of M_N	2 % of M_N	With encoderless operation in speed operating range 1:20, with encoder 20 r/min and above up to rated speed.
Torque accuracy	–	± 3.5 % of M_N	± 2 % of M_N	± 1.5 % of M_N	Measured value averaged over 3 s. With motor identification and friction compensation, temperature effects compensated by KTY84 and mass model. In torque operating range up to ± M_N. Approx. additional inaccuracy of ± 2.5 % in field-weakening range. Servo: Speed operating range 1:10 referred to rated speed. Vector: Speed operating range 1:50 referred to rated speed.

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Configuration

Fundamental closed-loop control characteristics of SINAMICS S120 (continued)

- Booksize format, pulse frequency 4 kHz, closed-loop speed control

	Servo Control		**Vector Control**		Notes
Synchronous motor	**1FT7**		Vector Control is not designed as an operating mode for 1FT7/1FT2 synchronous motors.		
Controller cycle	125 µs				
Total rise time (without delay)	2.3 ms				With encoderless operation in speed operating range 1:10, with encoder 50 r/min and above up to rated speed.
Characteristic angular frequency -3 dB	250 Hz				In this case, the dynamic response is determined primarily by the encoder system.
Speed ripple	See note				Determined primarily by the total mass moment of inertia, the torque ripple and especially the mechanical configuration. It is therefore not possible to specify a generally applicable value.
Speed accuracy	≤ 0.001 % of n_N				Determined primarily by the resolution of the control deviation and encoder evaluation in the converter. This is implemented on a 32-bit basis for SINAMICS.
Induction motor	**1PH8 without encoder**	**1PH8 with incremental encoder 1024 S/R**	**1PH8 without encoder**	**1PH8 with incremental encoder 1024 S/R**	
Controller cycle	125 µs	125 µs	250 µs	250 µs	
Total rise time (without delay)	12 ms	5 ms	20 ms	10 ms	With encoderless operation in speed operating range 1:10, with encoder 50 r/min and above up to rated speed.
Characteristic angular frequency -3 dB	40 Hz	120 Hz	50 Hz	80 Hz	With encoderless operation in speed operating range 1:10. The dynamic response is enhanced by an encoder feedback. Servo with encoder is slightly more favorable than Vector with encoder, as the speed controller cycle with Servo is quicker.
Speed ripple	See note	See note	See note	See note	Determined primarily by the total mass moment of inertia, the torque ripple and especially the mechanical configuration. It is therefore not possible to specify a generally applicable value.
Speed accuracy	0.1 × f_{slip}	≤ 0.001 % of n_N	0.05 × f_{slip}	≤ 0.001 % of n_N	Without encoder: Determined primarily by the accuracy of the calculation model for the torque-producing current and rated slip of the induction motor (see table "Typical slip values"). With speed operating range 1:50 (Vector) or 1:10 (Servo) and with activated temperature evaluation.

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Configuration

Fundamental closed-loop control characteristics of SINAMICS S120 (continued)

- Blocksize, booksize compact, booksize and chassis, pulse frequency 4 kHz, position control

	Servo Control		**Vector Control**		Notes
Synchronous motor	**1FT7**		Vector Control is not designed as an operating mode for 1FT7/1FT2 synchronous motors.		
Position controller cycle	1 ms				
Resolution	4.19×10^6 incr./rev.				Correspondingly better with multi-pole resolver.
Achievable positioning accuracy in relation to the motor shaft	10^5 … 10^6 incr./rev.				In practice, the resolution must be higher than the required positioning accuracy by a factor of 4 to 10. These values are approximate nominal values only.
• In relation to the motor shaft, approx.	0.00072 °				
Induction motor	**1PH8 with AM22DQ [1)]**	**1PH8 with incremental encoder 1024 S/R**	**1PH8 with AM22DQ [1)]**	**1PH8 with incremental encoder 1024 S/R**	
Position controller cycle	1 ms	1 ms	2 ms	2 ms	
Resolution	4.19×10^6 incr./rev.	4096 incr./rev.	4.19×10^6 incr./rev.	4096 incr./rev.	
Attainable positioning accuracy	10^5 … 10^6 incr./rev.	1024 incr./rev.	10^5 … 10^6 incr./rev.	512 incr./rev.	In practice, the resolution must be higher than the required positioning accuracy by a factor of 4 to 10. These values are approximate nominal values only. Vector is less accurate than servo by a factor of approximately 2.
• In relation to the motor shaft, approx.	0.00072 °	0.35 °	0.00072 °	0.7 °	

[1)] AM22DQ: Absolute encoder 22 bit singleturn (resolution 4194304, encoder-internal 2048 S/R) + 12 bit multiturn (traversing range 4096 revolutions).

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Configuration

Fundamental closed-loop control characteristics of SINAMICS S120 (continued)

- Chassis format, pulse frequency 2 kHz, closed-loop torque control

	Servo Control		Vector Control		Notes
Synchronous motor	**1FT7 without encoder**	**1FT7 with AM22DQ [1)]**	Vector Control is not designed as an operating mode for 1FT7/1FT2 synchronous motors.		
Controller cycle	250 µs	250 µs			
Total rise time (without delay)	–	1.2 ms			
Characteristic angular frequency -3 dB	–	400 Hz			In this case, the dynamic response is determined primarily by the encoder system.
Torque ripple	–	1.3 % of M_0			A ripple of < 1 % is possible with an absolute encoder ≤ 1 r/min. Not possible with resolver.
Torque accuracy	–	± 1.5 % of M_0			Measured value averaged over 3 s. With motor identification and friction compensation. In torque operating range up to ± M_0. Speed operating range 1:10 up to rated speed. Attention: External influences such as motor temperature can cause an additional long-time inaccuracy (constancy) of about ±2.5 %. Approx. ±1 % lower accuracy in field-weakening range.
Induction motor	**1PH8 without encoder**	**1PH8 with incremental encoder 1024 S/R**	**1PH8 without encoder**	**1PH8 with incremental encoder 1024 S/R**	
Controller cycle	250 µs	250 µs	250 µs	250 µs	
Total rise time (without delay)	–	1.6 ms	2.5 ms	1.6 ms	With encoderless operation in speed operating range 1:10, with encoder 50 r/min and above up to rated speed.
Characteristic angular frequency -3 dB	–	350 Hz	200 Hz	300 Hz	With encoderless operation in speed operating range 1:10. The dynamic response is improved when using an encoder (feedback signal).
Torque ripple	–	2 % of M_N	2.5 % of M_N	2 % of M_N	With encoderless operation in speed operating range 1:20, with encoder 20 r/min and above up to rated speed.
Torque accuracy	–	± 3.5 % of M_N	± 2 % of M_N	± 1.5 % of M_N	Measured value averaged over 3 s. With motor identification and friction compensation, temperature effects compensated by KTY84 and mass model. In torque operating range up to ± M_N. Approx. additional inaccuracy of ± 2.5 % in field-weakening range. Servo: Speed operating range 1:10 referred to rated speed. Vector: Speed operating range 1:50 referred to rated speed.

[1)] AM22DQ: Absolute encoder 22 bit singleturn (resolution 4194304, encoder-internal 2048 S/R) + 12 bit multiturn (traversing range 4096 revolutions).

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Configuration

Fundamental closed-loop control characteristics of SINAMICS S120 (continued)

- Chassis format, pulse frequency 2 kHz, closed-loop speed control

	Servo Control		Vector Control		Notes
Synchronous motor	**1FT7 without encoder**	**1FT7 with AM22DQ [1)]**	Vector Control is not designed as an operating mode for 1FT7/1FT2 synchronous motors.		
Controller cycle	250 µs	250 µs			
Total rise time (without delay)	–	5 ms			With encoderless operation in speed operating range 1:10, with encoder 50 r/min and above up to rated speed.
Characteristic angular frequency -3 dB	–	100 Hz			In this case, the dynamic response is determined primarily by the encoder system.
Speed ripple	–	See note			Determined primarily by the total mass moment of inertia, the torque ripple and especially the mechanical configuration. It is therefore not possible to specify a generally applicable value.
Speed accuracy	–	≤ 0.001 % of n_N			Determined primarily by the resolution of the control deviation and encoder evaluation in the converter. This is implemented on a 32-bit basis for SINAMICS.
Induction motor	**1PH8 without encoder**	**1PH8 with incremental encoder 1024 S/R**	**1PH8 without encoder**	**1PH8 with incremental encoder 1024 S/R**	
Controller cycle	250 µs	250 µs	250 µs	250 µs	
Total rise time (without delay)	21 ms	8 ms	20 ms	12 ms	With encoderless operation in speed operating range 1:10, with encoder 50 r/min and above up to rated speed.
Characteristic angular frequency -3 dB	25 Hz	80 Hz	35 Hz	60 Hz	For encoderless operation in speed operating range 1:10. The dynamic response is improved when using an encoder (feedback signal). Servo with encoder is slightly more favorable than Vector with encoder, as the speed controller cycle with Servo is quicker.
Speed ripple	See note	See note	See note	See note	Determined primarily by the total mass moment of inertia, the torque ripple and especially the mechanical configuration. It is therefore not possible to specify a generally applicable value.
Speed accuracy	0.1 × f_{slip}	≤ 0.001 % of n_N	0.05 × f_{slip}	≤ 0.001 % of n_N	Without encoder: Determined primarily by the accuracy of the calculation model for the torque-generating current and rated slip of the induction motor (see table "Typical slip values"). For a speed operating range 1: 50 (Vector) or 1:10 (Servo) and with active temperature evaluation.

[1)] AM22DQ: Absolute encoder 22 bit singleturn (resolution 4194304, encoder-internal 2048 S/R) + 12 bit multiturn (traversing range 4096 revolutions).

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Configuration

Typical slip values for standard asynchronous motors (induction motors)

Motor output	Slip values	Notes
< 1 kW	6 % of n_N e.g. motor with 1500 r/min: 90 r/min	The slip values of 1PH asynchronous motors are very similar to those of standard motors
< 10 kW	3 % of n_N e.g. motor with 1500 r/min: 45 r/min	
< 30 kW	2 % of n_N e.g. motor with 1500 r/min: 30 r/min	
< 100 kW	1 % of n_N e.g. motor with 1500 r/min: 15 r/min	
> 500 kW	0.5 % of n_N e.g. motor with 1500 r/min: 7.5 r/min	

CU320-2: Axis licensing according to performance enhancement (firmware version 4.3 and higher)

The CU320-2 is licensed purely according to axis number. The expanded performance is essentially required with four or more servo axes, four or more vector axes and seven or more V/f axes, irrespective of computing capacity.

	Dynamic response (current controller clock cycle)	Number of axes without performance enhancement	Number of axes with performance enhancement	Note
Servo Control	62.5 µs	3	3	3 servo axes are possible with a cycle time of 62.5 µs. The performance enhancement is therefore ineffective. The performance enhancement is required with 4 or more servo axes irrespective of computing capacity.
	125 µs	3	6	
	250 µs	3	6	
Vector Control	250 µs	3	3	For 250 µs, 3 vector axes are possible. This means that the performance enhancement is not active. The performance enhancement is required with 4 or more vector axes irrespective of computing capacity.
	500 µs	3	6	
V/f control	250 µs	6	6	For 250 µs, 6 V/f axes are possible. This means that the performance enhancement is not active. The performance enhancement is required with 7 or more V/f axes irrespective of computing capacity.
	500 µs	6	12	
Mixed operation				
Servo Control plus V/f Control	125 µs/500 µs	3+0; 2+2; 1+4; 0+6	6+0; 5+2; 4+4; 3+6 2+8; 1+10; 0+12	Two V/f axes can be computed instead of a servo or vector axis.
Vector Control plus V/f Control	500 µs/500 µs	3+0; 2+2; 1+4; 0+6	6+0; 5+2; 4+4; 3+6 2+8; 1+10; 0+12	

CU320-2: Possible quantity structures, maximum configurations

In addition to the number of axes, for example, the following functions and hardware components also have an influence on the possible quantity structure (maximum configuration) of the CU320-2:

- Extended Safety
- EPOS
- DCC
- CAN bus
- High-speed Terminal Modules (task = 250 µs)

The SIZER for Siemens Drives engineering tool (integrated in the TIA Selection Tool) can be used to very quickly perform reliability checks on more complex quantity structures.

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Configuration

Influencing variables on minimum required pulse frequency of power unit

Basic requirements such as maximum speed or necessary dynamic response of the control have a direct effect in determining the minimum pulse frequency of the power unit. If the minimum pulse frequency required exceeds the rated pulse frequency, derating must be implemented accordingly (see section SINAMICS S120 drive system).

The following table provides a general overview.

Influencing variables		**Minimum pulse frequency**	Notes
Servo Control, Vector Control (required max. output frequency/speed)	100 Hz correspond to: 3000 r/min for Z_p = 2 1500 r/min for Z_p = 4 428 r/min for Z_p = 14 352 r/min for Z_p = 17	1.25 kHz	Z_p is the number of pole pairs of the motor. This equals 2 on 1PH asynchronous motors (induction motors). 1FT7/1FT2 synchronous motors have between 3 and 5 pairs of poles. For torque motors, the numbers of pole pairs are typically 14 and 17. When edge modulation is used (only possible for asynchronous motors), the output frequency is increased by a factor of 2.
	160 Hz correspond to: 4800 r/min for Z_p = 2 2400 r/min for Z_p = 4 685 r/min for Z_p = 14 565 r/min for Z_p = 17	2 kHz	
	200 Hz correspond to: 6000 r/min for Z_p = 2 3000 r/min for Z_p = 4 856 r/min for Z_p = 14 704 r/min for Z_p = 17	2.5 kHz	
	300 Hz correspond to: 9000 r/min for Z_p = 2 4500 r/min for Z_p = 4 1284 r/min for Z_p = 14 1056 r/min for Z_p = 17	4 kHz	
	400 Hz correspond to: 12000 r/min for Z_p = 2 6000 r/min for Z_p = 4	4 kHz	Notice: For Servo Control with 1FT7/1FT2 motors only. Note field weakening requirements and suitable encoder system for higher speeds.
V/f control (required max. output frequency/speed)	100 Hz correspond to: 6000 r/min for Z_p = 1 3000 r/min for Z_p = 2	1.25 kHz	V/f Control is only intended for induction motors and synchronous motors. Z_p is the number of pole pairs of the motor. This is mainly between 1 and 4 on 1LA/1LG standard asynchronous motors (induction motors). Synchronous motors have 1 or 2 pole pairs or, with larger shaft heights, 3 pairs.
	160 Hz correspond to: 9600 r/min for Z_p = 1 4800 r/min for Z_p = 2	2 kHz	
	200 Hz correspond to: 12000 r/min for Z_p = 1 6000 r/min for Z_p = 2	2.5 kHz	
	300 Hz correspond to: 18000 r/min for Z_p = 1 9000 r/min for Z_p = 2	4 kHz	
	400 Hz correspond to: 24000 r/min for Z_p = 1 12000 r/min for Z_p = 2	4 kHz	
Dynamic response requirement (current controller clock cycle)	125 µs 250 µs 400 µs 500 µs	4 kHz 2 kHz 2.5 kHz 1 kHz	Servo Control requires a minimum pulse frequency of 2 kHz.
Sine-wave filters	–	4 kHz	Notice: If sine-wave filters are operated at low pulse frequencies, resonance problems can occur and cause the filters to severely overheat.
Output reactor to motor	Max. frequency: 150 Hz correspond to 4500 r/min for Z_p = 2		The output reactor can be operated at minimum 2 kHz only.

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Configuration

Core topologies: Component cabling with DRIVE-CLiQ

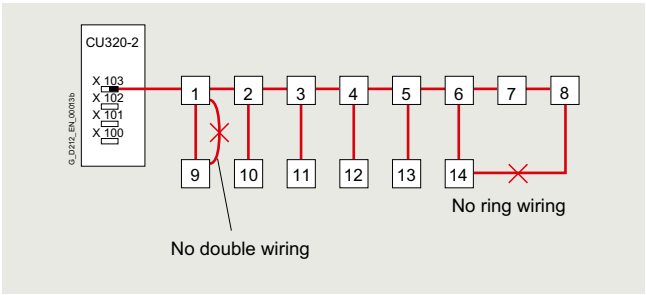
The components communicate with one another via the standard DRIVE-CLiQ interface.

This couples a Control Unit with the power components, encoders and additional system components, for example Terminal Modules. Setpoints and actual values, control commands, status messages and rating plate data of the components is transferred via DRIVE-CLiQ.

Basic rules for wiring with DRIVE-CLiQ

The following rules apply when wiring components with DRIVE-CLiQ:

- A maximum of 14 nodes can be connected to a DRIVE-CLiQ socket on the CU320-2 Control Unit
- Up to 8 nodes can be connected in a line. A line is always seen from the perspective of the Control Unit
- A maximum of 6 Motor Modules can be operated in a line
- Ring wiring is not permitted
- Components must not be double-wired
- The motor encoder should be connected to the associated Motor Module
- Up to 9 encoders can be operated on one Control Unit
- A maximum of 8 Terminal Modules can be connected
- It is not permissible for the TM54F Terminal Module to be operated on the same DRIVE-CLiQ line as Motor Modules
- The Terminal Modules TM15, TM17 High Feature and TM41 have faster sampling cycles than the TM31 and TM54F. For this reason, the two groups of Terminal Modules must be connected in separate DRIVE-CLiQ lines.
- A DRIVE-CLiQ Hub DMC20/DME20 counts as two nodes

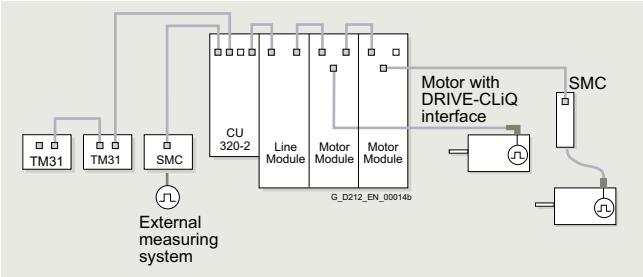


DRIVE-CLiQ configuration examples

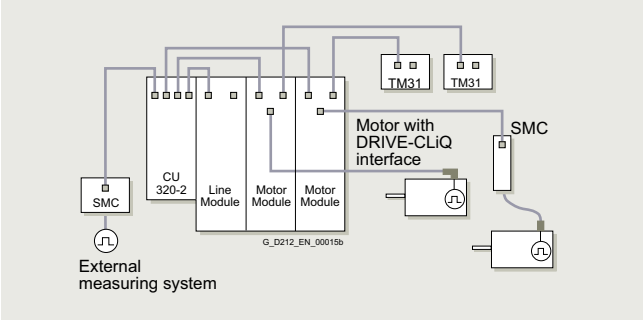
There is a basic clock cycle within a DRIVE-CLiQ connection. For this reason, only combinations of modules with the same sampling cycle or integer-divisible sampling times can be operated on a DRIVE-CLiQ connection. To simplify the configuring process, it is advisable to supply the Line Module and Motor Modules via separate DRIVE-CLiQ connections.

The power components are supplied with the required DRIVE-CLiQ connecting cable for connection to the adjacent DRIVE-CLiQ node in the axis grouping (line topology). Prefabricated DRIVE-CLiQ cables in various lengths up to 100 m (328 ft) are available for connecting motor encoders, direct measuring encoders, Terminal Modules, etc.

The DRIVE-CLiQ cable connections inside the control cabinet must not exceed 70 m (230 ft) in length, e.g. connection between the CU320-2 Control Unit and the first Motor Module or between Motor Modules. The maximum permissible length of DRIVE-CLiQ MOTION-CONNECT cables to external components is 100 m (328 ft).



Example of a line topology for standard solutions

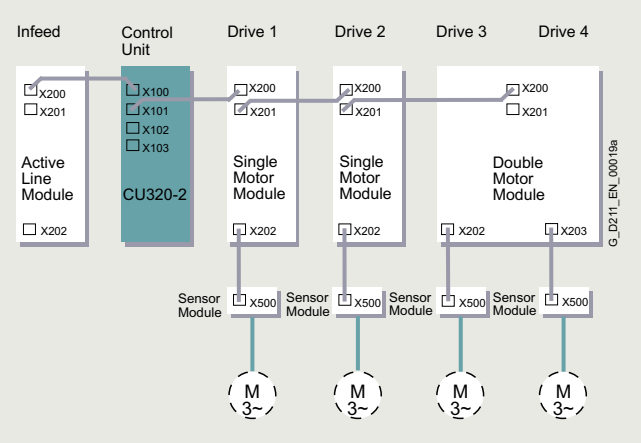


Example of a tree topology for high-performance solutions, e.g. high-speed axes in direct motion control group, selective access to individual axes/axis groupings for maintenance activities, etc.

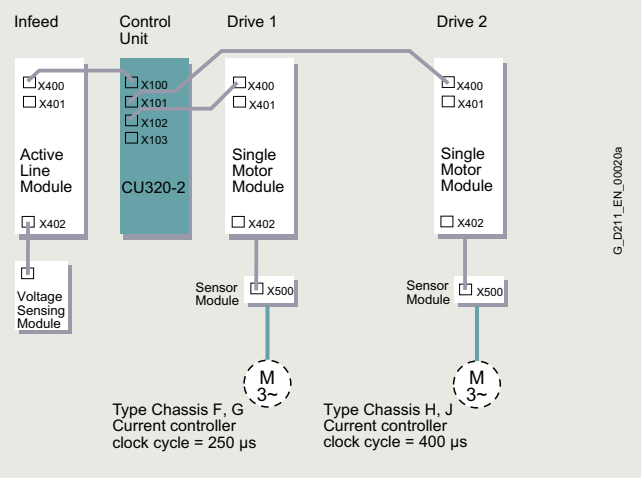
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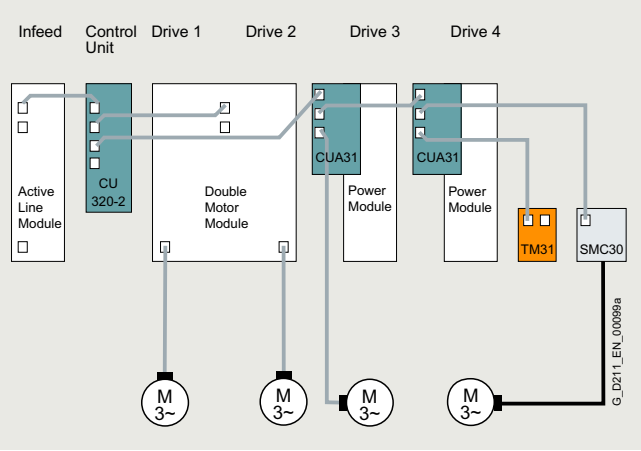
Configuration



Preferred wiring of DRIVE-CLiQ connections illustrated using booksize format
Active Line Module as example: 250 µs current controller clock cycle
Motor Modules: 4 × vector control = current controller clock cycle 500 µs



Wiring illustrated by example of chassis format with different current controller clock cycles



Example of wiring: Power Modules can also be operated on a CU320-2 when connected via a CUA3

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Configuration

Motor selection

The motor is selected on the basis of the required torque, which is defined by the application, e.g. drives for gantries, hoists, test stands, centrifuges, paper and rolling mill drives, feed drives and main spindle drives. Gear units for movement conversion or for adapting the motor speed and motor torque to the load conditions must also be considered.

As well as the load torque which is determined by the application, the following mechanical data are among those required to calculate the torque to be provided by the motor:

- Masses to be moved
- Diameter of the drive wheel/diameter
- Leadscrew pitch, gear ratios
- Frictional resistance data
- Mechanical efficiency
- Traversing paths
- Maximum velocity
- Maximum acceleration and maximum deceleration
- Cycle time

You must decide whether synchronous, induction or our especially energy-efficient synchronous-reluctance motors are to be used.

Synchronous motors should be selected for compact construction volume, low rotor moment of inertia and therefore maximum dynamic response.

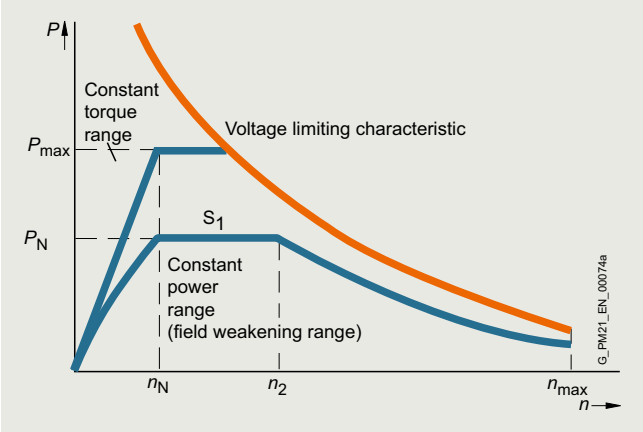
Asynchronous motors (induction motors) can be used to increase maximum speeds in the field-weakening range. Asynchronous motors (induction motors) for higher powers are also available.

The following factors are of prime importance during configuration:

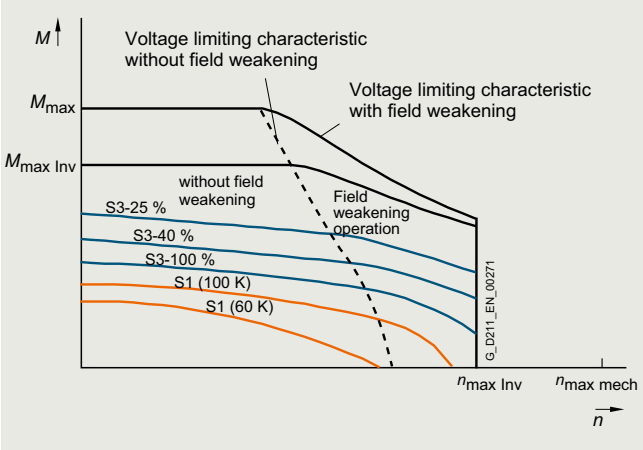
- The line supply configuration when using specific types of motor and/or line filters on IT systems (non-grounded systems)
- The ambient temperatures and the installation altitude of the motors and drive components

The motor-specific limiting characteristics provide the basis for defining the motors.

These define the torque or power characteristic with respect to speed and take into account the motor limits based on the DC link voltage of the Power Module or Motor Module. The DC link voltage in turn is dependent on the line voltage and, with multi-motor drives, on the type of Line Module.



Typical speed/power graph for asynchronous (induction) motors



Torque characteristics of synchronous motors

For detail engineering information, please refer to the motor configuration manuals.

An updated overview of configuration manuals is available in a number of languages on the internet at:
https://support.industry.siemens.com/cs/document/108993276

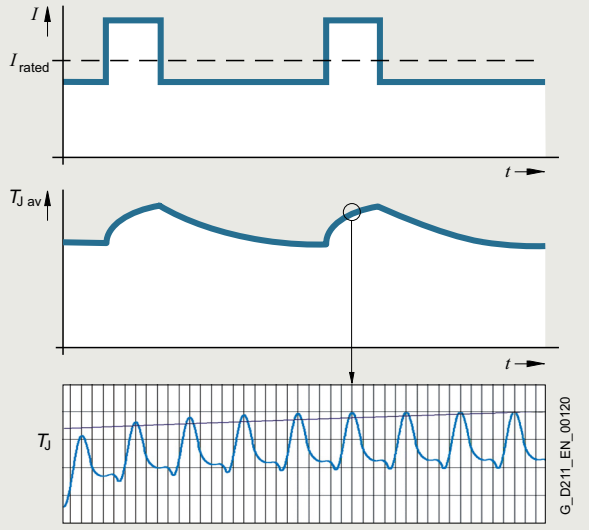
The SIZER for Siemens Drives engineering tool (integrated in the TIA Selection Tool) is available to assist you with configuring.

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Configuration

Overload capability

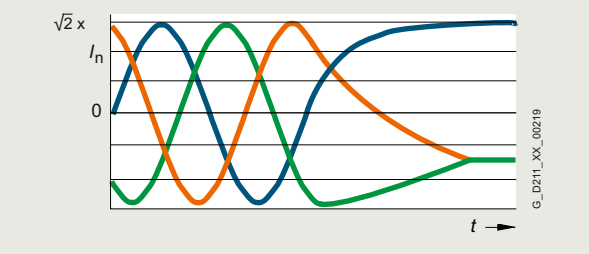
The power units of the Line Modules, Motor Modules and Power Modules are designed for brief overloads, i.e. the Modules are capable of supplying more than the rated current I_N for short periods. In this instance, the thermal capacity of the heat sink is utilized, allowing for the relevant thermal time constants. The power semiconductors and actual current sensing circuit are rated for a maximum current I_{max} which must not be exceeded. The overload capability is determined by I_{max}, I_N and the thermal time constants. A number of characteristic duty cycles are defined in the technical specifications for the power units. The SIZER for Siemens Drives engineering tool (integrated in the TIA Selection Tool) calculates the load on the basis of a specified duty cycle with optional time characteristic and then identifies the power unit which is required.



$T_{J\,av}$ average junction temperature of the power semiconductor
T_J junction temperature of the power semiconductor

The thermal time constant of a power semiconductor chip is typically within the range of 100 ms. With frequencies below 10 Hz, the overload capacity is therefore limited. The software takes account of these limitations by means of a thermal model and protects the devices against overload in all operating states. It must be noted, especially at frequencies around 0 Hz, that the specified rated current I_N is the root-mean-square value of a sinusoidal current. If the frequency of the three-phase system is reduced to 0 Hz, a pure direct current flows in all phases at standstill. The root-mean-square value of this direct current can reach the peak value of the sinusoidal current depending on the phase relation.

The output current in this state is greater than the rated current I_N by a factor of √2. The individual motor terminals and cables are designed thermically for the rated current in normal operation, so the devices are protected against this overload while taking account of the thermal time constant.



Derating characteristics

The power units can be operated with their rated current or power and the specified pulse frequency up to an ambient temperature of 40 °C (104 °F). The heat sink reaches the maximum permissible temperature at this operating point. If the ambient temperature increases above 40 °C (104 °F), the resulting heat loss must be reduced to prevent the heat sink from overheating.

At a given current, the heat loss increases in proportion to the pulse frequency. The rated output current I_N must be reduced to ensure that the maximum heat loss or heat sink temperature for higher pulse frequencies is not exceeded. When the correction factor k_f for the pulse frequency is applied, the rated output current I_{Nf} that is valid for the selected pulse frequency is adjusted.

When configuring a drive, please note that power units may not be capable of supplying the full current or power in the temperature range between 40 °C (104 °F) and 55 °C (131 °F). The power units measure the heat sink temperature and protect themselves against thermal overloading at temperatures > 40 °C (104 °F).

The air pressure, and therefore air density, drops at altitudes above sea level. At these altitudes, the same quantity of air does not have the same cooling effect and the air gap between two electrical conductors can only insulate a lower voltage. Typical air pressure values are:

0 m (0 ft) above sea level: 100 kPa

2000 m (6562 ft) above sea level: 80 kPa

3000 m (9843 ft) above sea level: 70 kPa

4000 m (13124 ft) above sea level: 62 kPa

5000 m (16405 ft) above sea level: 54 kPa

At installation altitudes above 2000 m (6562 ft), the line voltage must not exceed certain limits to ensure that surge voltages can be insulated in accordance with EN 60664-1 for surge voltage category III. If the line voltage is higher than this limit at installation altitudes > 2000 m (6562 ft), measures must be taken to reduce transient category III surge voltages to category II values, e.g. equipment must be supplied via an isolating transformer.

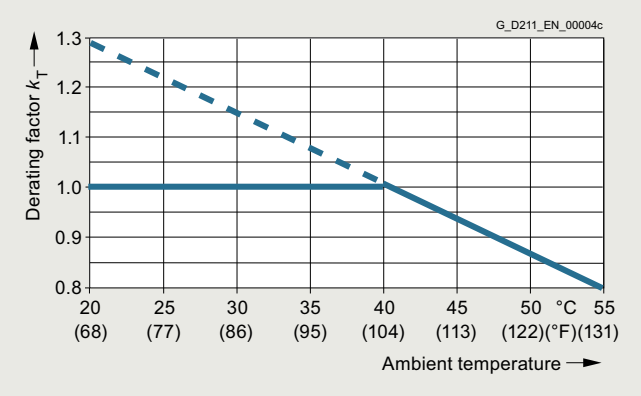
In order to calculate the permissible output current or power, the derating factors must be multiplied for the effects described above. The derating factor k_I for current as a function of installation altitude can be offset against the derating factor k_T for ambient temperature. If the result of multiplying derating factor k_T by derating factor k_I is greater than 1, then the calculation must be based on a rated current of I_N or I_{Nf}. If the result is < 1, then it must be multiplied by the rated current I_N or I_{Nf} to calculate the maximum permissible continuous current. The derating factor $k = k_f \times k_T \times k_I$ calculated by this method to obtain the total derating value must be applied to all current values in the specified duty cycles (I_N, I_H, I_L).

The derating characteristic curves of Power Modules, Line Modules and Motor Modules can be found in the technical specifications of the relevant modules (see section SINAMICS S120 drive system).

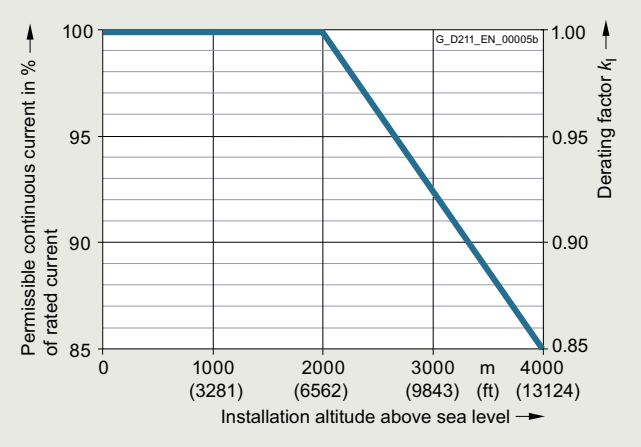
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Configuration

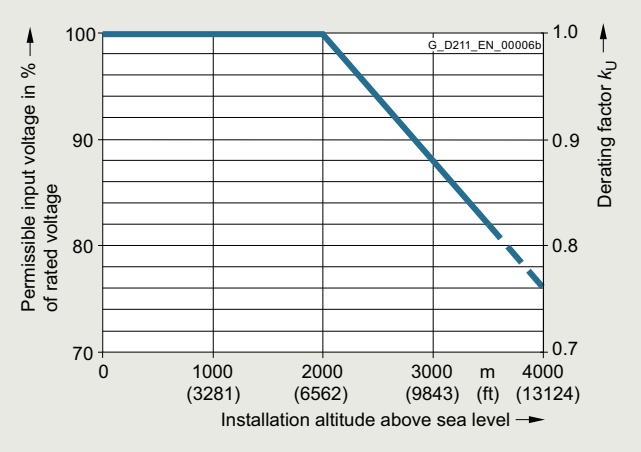
Examples of derating characteristic curves and calculation of the permissible output current:



Current derating as a function of the ambient temperature



Current derating as a function of the installation altitude



Voltage derating as a function of the installation altitude

Example 1

A drive system is to be operated at an altitude of 2500 m (8203 ft) at a maximum ambient temperature of 30 °C (86 °F) and rated pulse frequency.

Since the ambient temperature is below 40 °C (104 °F), a compensation calculation (installation altitude/ambient temperature) can be applied.

Installation altitude 2500 m (8203 ft): Derating factor $k_I = 0.965$, $k_U = 0.94$

Max. ambient temperature 30 °C (86 °F): Derating factor $k_T = 1.133$

$k_I \times k_T = 0.965 \times 1.133 = 1.093 \Rightarrow 1.0$ due to installation altitude/ambient temperature compensation

$k = k_f \times (k_I \times k_T) = 1.0 \times (1.0) = 1.0$

Result: Current derating is not required.

However, IEC 60664-1 stipulates that voltage derating is required.

The units in voltage range 380 V to 480 V can be operated up to a voltage of 480 V x 0.94 = 451 V, and the units in voltage range 660 V to 690 V up to 690 V × 0.94 = 648 V.

Example 2

When a drive line-up is configured, a Motor Module with Article No. 6SL3320-1TE32-1AA0 is selected (rated output current 210 A, base load current for high overload 178 A). The drive line-up is to be operated at an altitude of 3000 m (9843 ft) where ambient temperatures could reach 35 °C (95 °F) as a result of the installation conditions. The pulse frequency must be set to 4 kHz to provide the required dynamic response.

Installation altitude 3000 m (9843 ft): Derating factor $k_I = 0.925$, $k_U = 0.88$

Max. ambient temperature 35 °C (95 °F): Derating factor $k_T = 1.066$

$k_I \times k_T = 0.925 \times 1.066 = 0.987 \Rightarrow$ not fully compensated by installation altitude/ambient temperature

$k = k_f \times (k_I \times k_T) = 0.82 \times (0.925 \times 1.066) = 0.809$

Result: Current derating is required.

Where these boundary conditions apply,

- the max. permissible continuous current of the Motor Module is: 210 A × 0.809 = 170 A
- the base-load current for high overloading is: 178 A × 0.809 = 144 A

IEC 60664-1 stipulates that voltage derating is required.

The selected unit can be operated up to a voltage of 480 V 3 AC × 0.88 or 720 V DC× 0.88 = 422 V 3 AC or 634 V DC. This means that a 400 V induction motor can be operated without any restrictions. Due to the installation altitude, however, derating might be required for the asynchronous motor (induction motor).

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Configuration

Selection of the Power Module or Motor Module

The Motor Module is selected initially on the basis of standstill current $I_{0\ 100\ K}$ (rated current for winding temperature rise 100 K) for synchronous motors and the rated current I_N for asynchronous motors (induction motors), and is specified in the motor description. Dynamic overloads, e.g. during acceleration, must be taken into account by duty cycles and may demand a more powerful Power Module or Motor Module. In this context, it is also important to remember that the output current of the Power Module or Motor Module decreases as a function of installation altitude, ambient temperature and pulse frequency setting (see explanations of derating characteristics).

For an optimum configuration, the rms motor current I_{load} calculated from the duty cycle is replicated on the Power Module or Motor Module. The following must apply:

$I_{N,\ module} \geq I_{load}$

$I_{N,\ module}$ = permissible continuous current of Power Module or Motor Module taking derating characteristic curves into account

The Power Modules or Motor Modules can be required to supply a higher output current for specific time periods. The characteristics or overload capability must be noted (see section SINAMICS S120 drive system) when modules are engineered for overload.

The SIZER for Siemens Drives engineering tool (integrated in the TIA Selection Tool) is capable of performing precise overload calculations.

Rated current – permissible and non-permissible motor/converter combinations

- Motor rated current higher than rated output current of the Power Module or Motor Module:
  In cases where a motor with a higher rated current than the rated output current of the Power Module or Motor Module is to be connected, the motor will only be able to operate under partial load. The following limit applies:
  The short-time current (= 1.5 × base-load current I_H) should be higher or equal to the rated current of the connected motor. Adhering to this dimensioning rule is important because the low leakage inductance of large motors causes current peaks which may result in drive system shutdown or in continuous output limiting by the internal protective electronic circuitry.
- Motor rated current significantly lower than rated output current of the Power Module or Motor Module:
  With the vector control system used, the rated motor current must equal at least 1/8 of the rated output current of the Power Module or Motor Module. With lower motor currents, the drive can be operated in V/f control mode.

Using pulse width modulation, the Power Modules or Motor Modules generate an AC voltage to feed the connected motor from the DC voltage of the DC link. The magnitude of the DC link voltage is determined by the line voltage and, in the case of a Motor Module, by the Line Module used and thus the maximum possible output voltage (see section SINAMICS S120 drive system). The speed and loading of the connected motor define the required motor voltage. The maximum possible output voltage must be greater than or equal to the required motor voltage; it may be necessary to select a motor with a different winding.

It is not possible to utilize all modes of pulse width modulation when a sine-wave filter is connected. The maximum possible output voltage (see sine-wave filter) is lower as a result.

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Configuration

Long motor cables

Using pulse width modulation, the Power Modules or Motor Modules generate an AC voltage to feed the connected motor from the DC voltage of the DC link. Capacitive leakage currents are generated in clocked operation and these limit the permissible length of the motor cable. The maximum permissible motor cable length is specified for each Power Module or Motor Module in the component description.

Motor reactors limit the rate of rise and magnitude of the capacitive leakage currents, thereby allowing longer motor cables to be used. The motor reactor and motor cable capacitance form an oscillating circuit which must not be stimulated by the pulse pattern of the output voltage. The resonant frequency of this oscillating circuit must therefore be significantly higher than the pulse frequency. The longer the motor cable, the higher the cable capacitance and the lower the resonant frequency. To provide a sufficient safety margin between this resonant frequency and the pulse frequency, the maximum possible motor cable length is limited, even when several motor reactors are connected in series. The maximum cable lengths in combination with motor reactors are specified in the technical specifications for the motor reactors.

Where a longer motor cable is required, a higher rating power unit must be selected or the permissible continuous output current $I_{continuous}$ must be reduced in relation to the rated output current I_N.

Rated output current I_N	**Length of the MOTION-CONNECT motor cable (shielded)**			
	> 50 … 100 m (164 … 328 ft)	> 100 … 150 m (328 … 492 ft)	> 150 … 200 m (492 … 656 ft)	> 200 m (656 ft)
Motor Module booksize format				
3 A/5 A	Use Motor Module 9 A	Use Motor Module 9 A	Not permissible	Not permissible
9 A	Use Motor Module 18 A	Use Motor Module 18 A	Not permissible	Not permissible
18 A	Use Motor Module 30 A or $I_{max} \leq 1.5 \times I_N$ $I_{continuous} \leq 0.95 \times I_N$	Use Motor Module 30 A	Not permissible	Not permissible
30 A	Always permissible	$I_{max} \leq 1.35 \times I_N$ $I_{continuous} \leq 0.9 \times I_N$	$I_{max} \leq 1.1 \times I_N$ $I_{continuous} \leq 0.85 \times I_N$	Not permissible
45 A/60 A	Always permissible	$I_{max} \leq 1.75 \times I_N$ $I_{continuous} \leq 0.9 \times I_N$	$I_{max} \leq 1.5 \times I_N$ $I_{continuous} \leq 0.85 \times I_N$	Not permissible
85 A/132 A	Always permissible	$I_{max} \leq 1.35 \times I_N$ $I_{continuous} \leq 0.95 \times I_N$	$I_{max} \leq 1.1 \times I_N$ $I_{continuous} \leq 0.9 \times I_N$	Not permissible
200 A	Always permissible	$I_{max} \leq 1.25 \times I_N$ $I_{continuous} \leq 0.95 \times I_N$	$I_{max} \leq 1.1 \times I_N$ $I_{continuous} \leq 0.9 \times I_N$	Not permissible

Notes for blocksize format Power Modules PM240-2

Motor reactors can be used for frame sizes FSA to FSG to allow longer motor cables to be used. Sine-wave filters can also be used for frame sizes FSA to FSC (400 V versions only).

The maximum cable lengths are shorter in order to comply with EMC compatibility according to EN 61800-3. See section EMC notes.

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Configuration

Line Modules

In multi-axis drive applications, a number of Motor Modules are operated on a common DC link, which is supplied with power by a Line Module.

The first task is to decide whether a Basic Line Module, Smart Line Module or an Active Line Module will be used. On one hand, this depends on whether the drive must be capable of regenerative feedback into the line supply and, on the other hand, whether the line infeed is uncontrolled, and therefore dependent on the line supply voltage, or controlled to obtain a constant DC link voltage. For an uncontrolled infeed Basic Line Modules/ Smart Line Modules, line voltage changes can influence the output power of the Line Modules.

The chassis format units are available in the 380 V to 480 V voltage range, but also include units in the 500 V to 690 V range. Basic Line Modules are designed for infeed operation only. Active Line Modules have regulated infeeds which feature a step-up function.

In order to calculate the required DC link power and select the correct Line Module, it is important to analyse the entire operating sequence of the drive line-up connected to the DC link. Factors such as partial load, redundancies, duty cycles, coincidence factors and the operating mode (motor / generator mode) must be taken into account.

The DC link power P_d of a single Motor Module is calculated from the shaft output P_{mech} of the motor and the efficiency of the motor η_m and Motor Module η_{wr}.

The following applies in motor mode: $P_d = P_{mech} / (\eta_m \times \eta_{wr})$

The following applies in generator mode: $P_d = P_{mech} \times \eta_m \times \eta_{wr}$

The motor and generator outputs must be added with the corresponding sign in order to calculate the total DC link power. For the power calculation, the DC link voltage U_d can be assumed to be constant. Therefore, the required DC link current can be calculated as $I_d = P_d/U_d$

Basic Line Modules

The DC link voltage U_d of the Basic Line Modules is load-dependent. Under no-load conditions, the DC link is charged to the line voltage crest value U_L, i.e. $U_d = \sqrt{2} \times U_L$, e.g. U_d = 566 V when a 400 V supply system is connected.

Under load conditions, the DC link voltage reaches the average value of the rectified line voltage applied to the terminals. This mean value results from the line voltage times a factor of 1.35. Under full load, the voltage in the DC link is slightly less than the theoretical value due to the voltage drop across the line reactor and the line feeder cable. In practice, the range of the DC link voltage U_d is as follows:

$1.41 \times U_L > U_d > 1.32 \times U_L$ (no load → rated power)

Smart Line Modules

The DC link voltage U_d of Smart Line Modules is regulated to the average value of the rectified line voltage U_L, i.e. $U_d \approx 1.35 \times U_L$

Due to the voltage drop across the line reactor and in the line feeder cable, the DC link voltage decreases in motor operation and increases in generator operation. The DC link voltage U_d thus varies within the same range as on drives with a Basic Line Module:

$1.41 \times U_L > U_d > 1.32 \times U_L$ (rated power, generating → rated power, motoring)

Active Line Modules

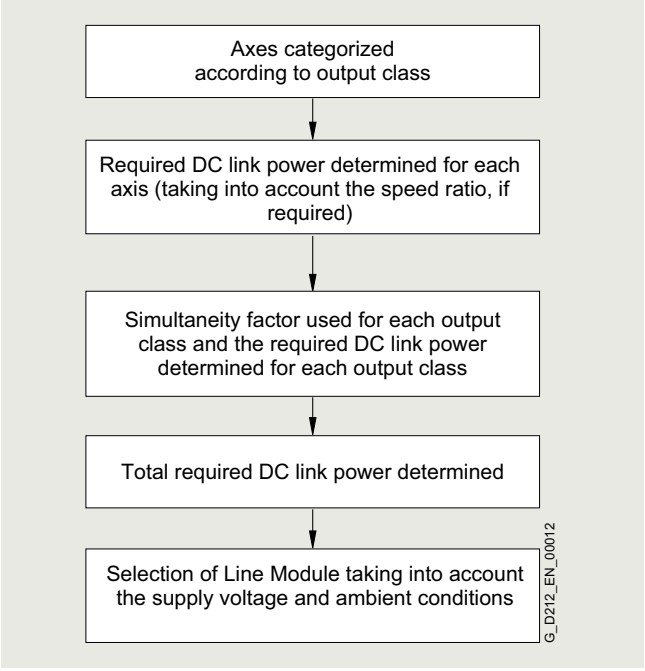
The DC link voltage U_d is regulated to an adjustable value (Active Mode). An Active Line Module can also be switched to Smart Mode and then operates like a Smart Line Module. In Active Mode, the Active Line Module draws a virtually sinusoidal current from the supply system.

The rated infeed power of the Line Module refers to a line voltage of 380 V, 400 V or 690 V (690 V applies only to chassis format Line Modules).

Depending on the ambient conditions (installation altitude, ambient temperature), the rated infeed power of the Line Modules may need to be reduced (see section SINAMICS S120 drive system).

The coincidence factor takes into account the time characteristic of the torque for each individual axis.

On the basis of these principles, the following procedure can be used to dimension the Line Module:



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Configuration

The following factors must also be taken into account when dimensioning the DC link:

Braking operation

As device losses are important in motor mode, the dimensioning for motor mode is also applicable to generator mode. With respect to motor braking operation, check that the energy fed back into the DC link does not exceed the permissible peak load capability of the Line Module.

In the case of higher regenerative outputs and to control the "line failure" operating scenario, a Braking Module must be provided, the Smart or Active Line Module must be overdimensioned or the regenerative output reduced by longer braking times.

For the configuration of the "EMERGENCY STOP" operating scenario, the Line Module must either be overdimensioned or an additional Braking Module must be used, so that the DC link energy can be dissipated as quickly as possible.

Checking the DC link capacitance

During power-up, the Line Modules limit the charging current for the DC link capacitors. Due to the limits imposed by the pre-charging circuit, it is essential to observe the maximum permissible DC link capacitance values for the drive line-up specified in the technical specifications.

Frequency with which the DC link is precharged

For chassis format Line Modules, the maximum permissible DC link pre-charging interval is 3 minutes.

Parallel connection of power units

Up to 4 Motor Modules or Line Modules in chassis format can be connected in parallel. Parallel connections can operate only in the Vector Control mode.

Parallel connections may only include Motor Modules or Line Modules of the same type and with the same voltage and output ratings. Mixtures of different modules, e.g. Basic Line Modules and Active Line Modules, cannot be connected in parallel. The CU320-2 or CX32-2 Control Unit can control only one drive object of type "Parallel connection Line Modules" and one of type "Parallel connection Motor Modules". It is assumed that all Line Modules or Motor Modules linked to the Control Unit are connected in parallel. A Control Unit can control, for example, the following components:

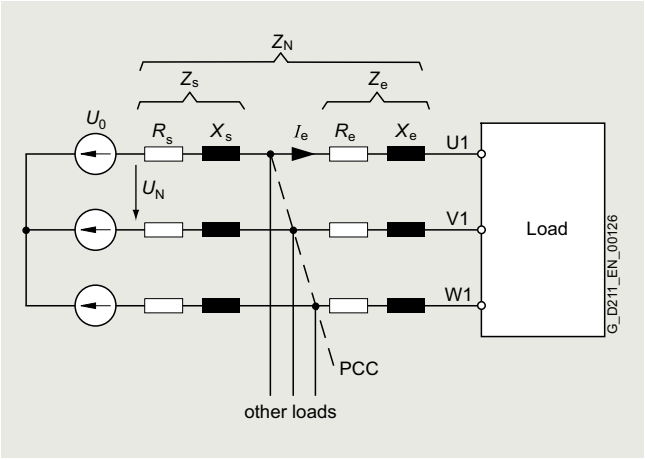
- 1 Line Module + 2 parallel-connected Motor Modules
- 2 parallel-connected Line Modules + 3 parallel-connected Motor Modules

Combinations such as the following are not permissible:
2 Line Modules + 2 parallel-connected Motor Modules + 1 Motor Module

Further information can be found in the following Engineering Manual:
https://support.industry.siemens.com/cs/document/83180185

System disturbances

The voltage drops across the impedance between the supply system and a load as soon as the load draws current. In a symmetrical three-phase supply system, this is the network impedance Z_n which is calculated from the impedance Z_s of the supply system and the line-side impedance Z_e of the load.



Effective impedances when a load is connected to a three-phase supply system

$Z_n = Z_s + Z_e = R_s + j\,X_s + R_e + j\,X_e = R_n + j\,X_n$

On a variable-speed drive, the line-side impedance Z_e is normally the total impedance provided by the line reactor and the feeder cable up to the PCC (Point of Common Coupling) for further loads. The ohmic component R_n is generally negligible as compared to the inductive component X_n. The inductance of an RI suppression filter is irrelevant for the purpose of this calculation, as this inductance is effective only for asymmetrical interference voltages, but not for a symmetrical line current.

If a load causes voltage drops across the impedance Z_s, this system disturbance has an impact at the PCC and thus also in the supply voltage to all other loads.

The voltage drop is proportional to current I_e and the impedance. To facilitate comparison of voltage drops under different supply and load conditions, the voltage drop is specified – normally at rated current – with reference to the phase voltage U_o. The calculation formula, e.g. for the per unit voltage drop u_k across an impedance Z is as follows:

$u_k = Z \times I_e / U_o$

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Configuration

Example 1:

A Power Module with rated line current I_e is directly connected to a low-voltage transformer and the PCC is the transformer connection terminal. The equation for the ratio between rated line current I_e of the Power Module and rated current I_N of the transformer is $I_e = 0.25 \times I_N$. The per unit voltage drop u_k of the 400 V transformer is 4 %. If the transformer is loaded with its rated current I_N, the voltage drop across impedance Z_s is 9.2 V (corresponding to 4 % of the phase voltage U_o = 230 V).

$u_k = (Z_s \times I_N) / 230\ V = 0.04$

The following formula applies to the rated line current I_e of the Power Module: $I_e = k \times I_N$

The per unit voltage drop across the transformer when loaded with I_e is thus: $u_k = Z_s \times I_e / U_o = Z_s \times k \times I_N / U_o$

With the specified ratio between I_e and I_N, the per unit voltage drop is calculated as u_k = 1 % or 2.3 V. In relation to the Power Module, this transformer therefore functions like a line impedance in accordance with u_k = 1 %.

The magnitude of system disturbance in converter systems is assessed on the basis of short-circuit power ratio R_{sc}:

$R_{sc} = S_{cv} / P$

According to this definition in accordance with EN 60146-1, P is the fundamental-wave apparent power drawn by the converter. S_{cv} is the short-circuit power drawn from the mains in the event of a short-circuit on the terminals U1, V1, W1. Since the ohmic components of impedances are negligible in practice, $Z_n \approx j\ X_n$ applies

$S_{cv} \approx 3 \times U_o^2 / X_n$

and thus $R_{sc} \approx 3 \times U_o^2 / (X_n \times P)$

The short-circuit power ratio R_{sc} is therefore dependent on the current output power P of the converter and is determined by network impedance X_n.

If we assume the power to be $P \approx 3 \times U_o \times I_e = \sqrt{3} \times U_N \times I_e$

the short-circuit power ratio R_{sc} is in inverse proportion to the per unit voltage drop u_k across the effective line impedance.

$R_{sc} \approx 3 \times U_o^2 / (X_n \times P) = 3 \times U_o^2 / (X_n \times 3 \times U_o \times I_e) = U_o / (X_n \times I_e) = 1 / u_k$

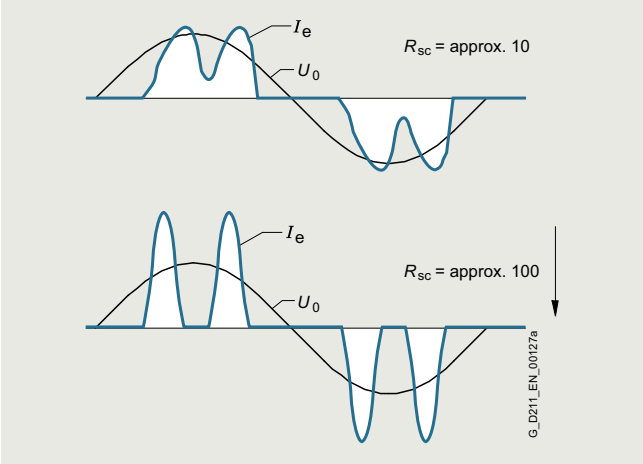
The short-circuit power ratio for example 1 is $R_{sc} \approx 100$ if no line reactor is installed ($Z_e = 0$).

Note:

The term "short-circuit power ratio" as used in technical standards is not a harmonized definition. The short-circuit power ratio R_{sce} defined according to IEC 61000-3-12 is calculated from the short-circuit power S_{SC} at the PCC referred to the power $S_{equ} = 3 \times U_o \times I_e$ consumed by the load.

Basic Line Modules and Power Modules are designed with a rectifier bridge on the line side. An inherent feature of the principle of rectification with load-side capacitance for DC link voltage smoothing are harmonics in the line current which result in a non-sinusoidal power input. The diagram shows the basic current waveform of a Power Module or Basic Line Module as a function of short-circuit power ratio R_{sc}.

Active Line Modules generate virtually no current harmonics (Active Mode) at all and are employed when system disturbance needs to be minimized, e.g. stipulation of IEEE 519 that THD (Total Harmonic Distortion) must be < 10 %.



Line current of a Basic Line Module or Power Module as a function of the short-circuit power ratio R_{sc}

The rms of the line current I_e for which the line-side components must be rated comprises fundamental wave I_{e1} and the current harmonics, which increase in relation to the rise in short-circuit power ratio R_{sc}. If the DC link power P_d has been calculated (see Line Modules), the required line-side active power is a known quantity with Line Module efficiency, or the rectifier efficiency in the case of a Power Module. However, this active power is connected only with the current fundamental wave I_{e1}. The rms of the line current I_e is always greater than I_{e1} as a result of the current harmonics. The following applies for a short-circuit power ratio R_{sc} = 100:

$I_e \approx 1.3 \times I_{e1}$

The apparent power of a transformer selected to supply the drive must be greater than the drive power by a factor of about 1.3.

The harmonic currents produce only alternating power, but no active power. The following applies to the apparent power S on the line side:

$S^2 = P^2 + Q_1^2 + D^2$

- with active component
  $P = 3 \times U_o \times I_1 \times \cos \varphi_1$, which is solely produced by the current fundamental
- reactive component
  $Q_1 = 3 \times U_o \times I_1 \times \sin \varphi_1$
- and the distortion component

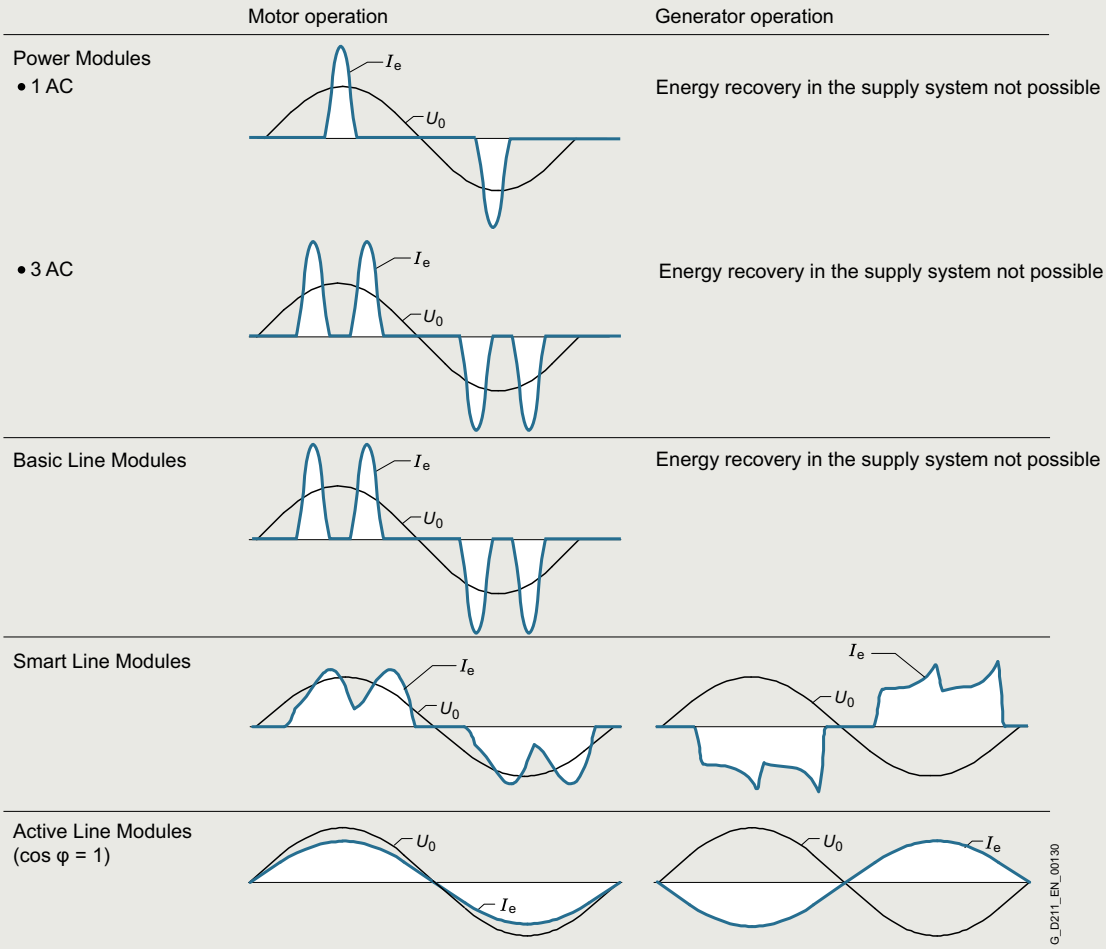
$$D = 3 \times U_0 \sqrt{\sum_{\nu=2}^{\infty} I_\nu^2}$$

The ratio between active power and apparent power is referred to as power factor λ or total power factor:

$$\lambda = \frac{P}{S} = \frac{P}{\sqrt{P^2 + Q_1^2 + D^2}}$$

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Configuration



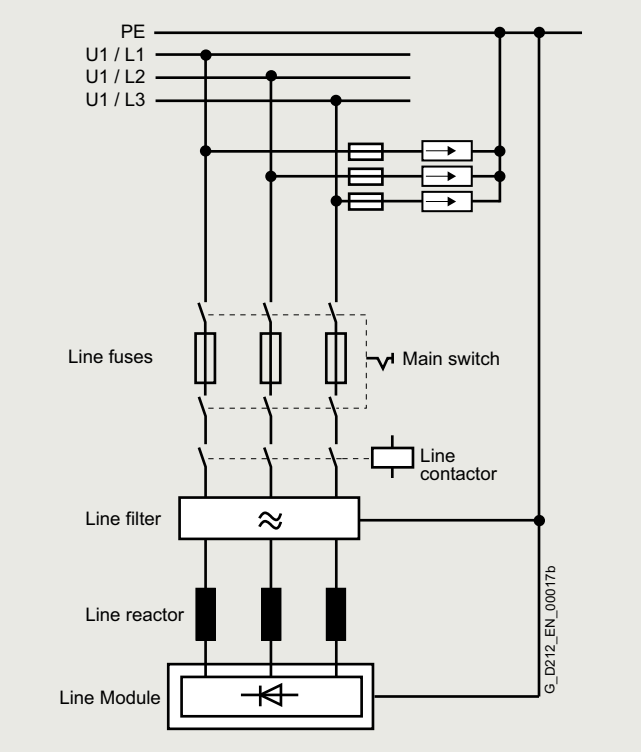
Typical waveform of the line current with Power Modules and Line Modules

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Configuration

Line-side power options (main switch, fuses, line filters, etc.)

The following line-side options are recommended for the drive configuration:



General overview of line infeed

The main switch may take various formats:

- Main and EMERGENCY STOP switch + fuse switch disconnector (with leading signal via auxiliary contact for trip mode)
- Load interruptor with fuses
- Circuit breaker

To protect the units against line-side surge voltages, it is advisable to install overvoltage protection directly at the infeed point (upcircuit of main switch). Surge protection is essential in order to satisfy the requirements of Canadian standard CSA C22.2 No. 14-05. For examples of suitable surge voltage arresters, go to
www.raycap.com or www.dehn-international.com

Depending on the power rating required, a fuse switch disconnector combined with a contactor or a circuit breaker can be used as the main switch.

A line contactor can be used, for example, if the drive has to be disconnected from the line supply in the event of a fault or for remote tripping. Follow the instructions in the SINAMICS S120 Configuration Guides to interlock the line contactor in the context of safety functions.

A line filter should be used on TN (grounded) systems to reduce system disturbance.

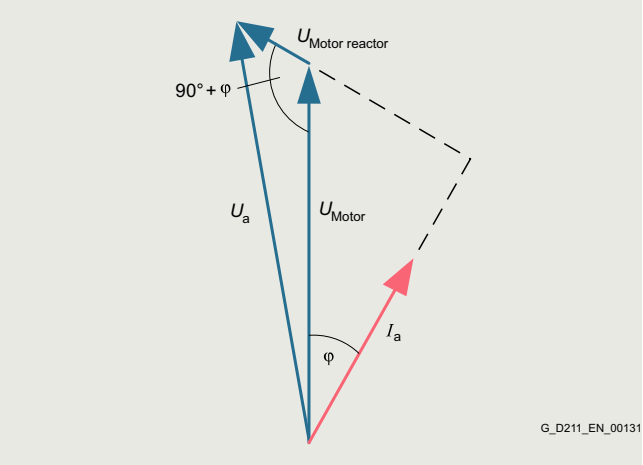
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Configuration

Motor reactors

High-speed switching of the power transistors causes capacitive recharging currents in the motor cable and motor, as well as steep voltage rises and peak voltages in the motor windings. These currents can be reduced by installing a motor reactor.

The voltage drop across the motor reactor is normally negligible at output frequencies of 60 Hz and below. The per unit voltage drop u_k across the reactor is between 1 % and 4 % at rated current and 50 Hz. With a cos φ of 0.86 and an output frequency of 50 Hz, the motor voltage is about 2 % lower (as a result of the motor reactor) than in systems without a motor reactor.



Phasor diagram of motor with motor reactor

Motor reactors are compatible with all modulation types (space vector modulation, edge modulation).

Sine-wave filters

Sine-wave filters are low-pass LC filters which only let through the fundamental component of the square-wave, pulse-width-modulation output voltage of a Power Module or Motor Module. The resonant frequency of the sine-wave filter must be significantly lower than the pulse frequency of the Power Module or Motor Module and be dimensioned with a sufficient margin to the maximum permissible output frequency. Sine-wave filters therefore define the choice of pulse frequency and place a limit on the maximum possible output frequency. This type of filter is compatible only with space vector modulation. The output voltage of a Power Module or Motor Module is thus limited to an output voltage (rms value) of approximately 0.67 x DC link voltage. With the voltage drop across the sine-wave filter, the maximum possible output voltage (rms value) is approximately 0.63 x DC link voltage. Parameters are used to register a sine-wave filter with the Control Unit. This ensures that all those values that are dependent on it, such as permissible modulation modes and maximum output frequency, are correctly preassigned.

Sine-wave filters can be used only in conjunction with Vector Control and V/f Control modes.

dv/dt filter plus VPL and dv/dt filter compact plus VPL

The dv/dt filter plus VPL and dv/dt filter compact plus VPL comprise two components, i.e. a dv/dt reactor and a voltage limiting network (Voltage Peak Limiter). As a consequence, the use of dv/dt filters plus VPL and dv/dt filters compact plus VPL represents a suitable method of reducing the voltage load on the motor winding for line supply voltages of 500 V to 690 V to such an extent that a special motor insulation is not required. The bearing currents are also significantly reduced. Using these filters therefore allows standard motors with standard insulation and without insulated bearings to be operated with SINAMICS converters up to line supply voltages of 690 V. This applies to both Siemens motors and third-party motors.

Sensor Modules

Signal conditioning for various encoders (incremental encoder sin/cos 1 V_{pp}, absolute encoder, resolver) takes place remotely, i.e. in the vicinity of the encoder, with customized Sensor Modules. Depending on the measuring system, SMC10, SMC20 or SMC30 Sensor Modules are used. The Sensor Modules are designed to be mounted on DIN rails. They are also used for the signal conditioning of external (machine) encoders.

Expansion modules

The CU320-2 Control Unit features interfaces and terminals for communication as standard. SINAMICS S120 offers the following expansion modules:

- TB30 Terminal Board (terminal expansion for plugging into the option slot on the CU320-2 Control Unit)
- TM31 Terminal Module (terminal expansion for connection via DRIVE-CLiQ)

The following criteria regarding the use of expansion modules must be taken into account:

- Only one option board can be plugged into the option slot on the CU320-2 Control Unit.
- A maximum of 8 Terminal Modules may be operated in a drive line-up.

Braking Modules and braking resistors

Braking units comprise a Braking Module and a braking resistor, which must be attached externally.

Braking units are used when

- regenerative energy occurs occasionally and briefly, for example when the drive brakes (EMERGENCY STOP) and the drive has no regenerative feedback capability
- the drive features regenerative feedback units but cannot return the energy fast enough to the supply on an "EMERGENCY STOP"
- the drive needs to be shut down after a power failure

The braking units for Power Modules in blocksize format consist of braking resistors only, as they feature a braking chopper as standard.

In keeping with the brake resistors for the blocksize format, the braking choppers integrated in the Power Modules PM240-2 are basically designed for a load clearance of 5 %, corresponding to a load cycle of 12 s with a playing time of 240 s. In addition, the integrated braking choppers can carry 100 % of the maximum regenerative power in frame sizes FSA to FSC, and 50 % in frame sizes FSD to FSF, each at an ambient temperature of 40 °C. This extension does not apply to frame size FSG.

A number of Braking Modules can be connected in parallel to the DC link in order to increase the braking power. Each Braking Module requires its own braking resistor. It is not permissible to operate a mix of braking units in booksize and chassis format on the same DC link.

The braking power required is calculated from the DC link power P_d of the drive line-up or Power Module in generator operation.

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Configuration

Braking Modules and braking resistors for booksize format

For the operation of the Braking Modules for booksize format, a minimum capacitance of 440 µF is required in the DC link per Braking Module.

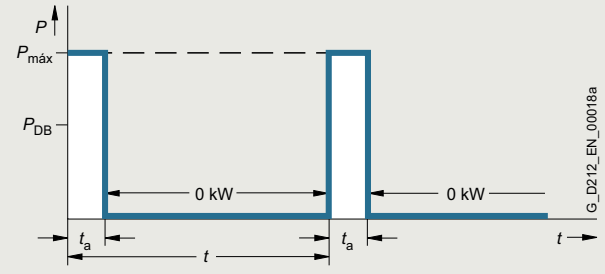
The capacitance of the booksize format Braking Module of 110 µF is included in the total capacitance value. If the DC link capacitance is not sufficient for the use of one or more Braking Modules, a Capacitor Module can be added to increase the effective DC link capacitance of the drive line-up.

When booksize format Braking Modules are connected in parallel, the minimum capacitance specified above must be available for each Braking Module.

Note: Only booksize format modules that are directly connected to each other via the DC link busbar can be included in the total capacitance.

If the DC link capacitance is not sufficient for the operation of a number of Braking Modules, Capacitor Modules can be used to increase the DC link capacitance. The max. permissible DC link capacitance of a drive line-up on a Line Module must be taken into account. The max. DC link capacitances to be taken into account for pre-charging current limiting on the Line Modules are listed in the technical specifications for the Line Modules.

The braking resistor discharges the excess energy from the DC link:



t	Period of braking duty cycle in s
t_a	Load duration in s
P_{DB}	Continuous power of braking resistor in kW
P_{max}	Peak power of braking resistor in kW

Duty cycle for braking resistors

Braking Modules and braking resistors for chassis format

Braking Modules with a braking power of 25 kW (for frame size FX) and 50 kW (for frame sizes GX, HX and JX) are available with matching braking resistors for chassis format units. Braking units can be connected in parallel to obtain higher braking powers. In this case, the units can be installed at the Line Module end or Motor Module end.

When a Braking Module is installed in a Basic Line Module of size GB/GD, the cables supplied for the DC link connection are too short. In this case, the cable harness set 6SL3366-2NG00-0AA0 must be ordered to make the Braking Module connection.

Frame size	**Rated power P_{DB} power**	**Peak power P_{15}**	**Max. possible mounting locations for Braking Module**
FB	25 kW	125 kW	1
GB/GD	50 kW	250 kW	1
FX	25 kW	125 kW	1
GX	50 kW	250 kW	1
HX	50 kW	250 kW	2
JX	50 kW	250 kW	3

The Braking Module features an electronics interface (X21) with monitoring function. The braking resistor housing contains a monitoring thermocontact. Both these monitors can be integrated into the warning or shutdown circuits of the drive system.

Calculation of Braking Module and braking resistor requirements

- For periodic duty cycles with a cycle duration of ≤ 90 s, the average value of the braking power within this duty cycle must be defined. The relevant cycle duration must be applied as the time base.
- For periodic duty cycles with a cycle duration of ≥ 90 s or for sporadic braking operations, a time interval of 90 s in which the highest average value occurs must be selected. The 90 s period must be applied as the time base.

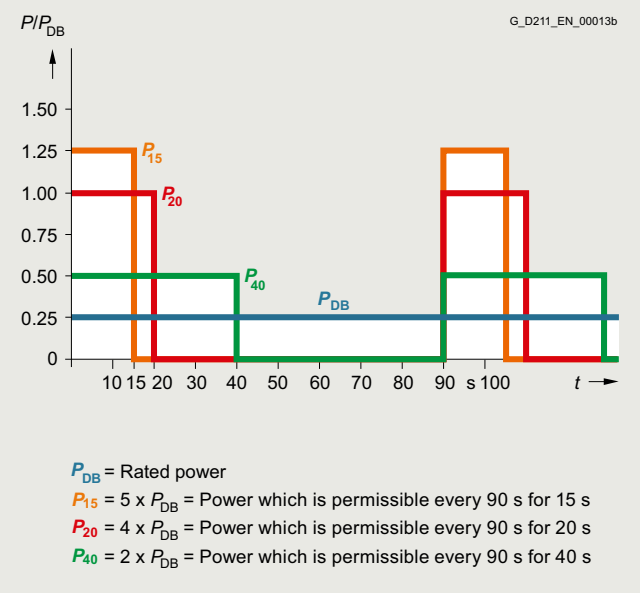
Apart from the average braking power, the required peak braking power must also be taken into account when braking units are selected (Braking Module and braking resistor).

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Configuration

Basic data

Supply voltage	Power range Motor Modules	**Braking Module continuous power P_{DB}**	**Braking Module power P_{40}**	**Braking Module power P_{20}**	**Braking Module peak power P_{15}**
380 … 480 V	110 … 132 kW	25 kW	50 kW	100 kW	125 kW
	160 … 800 kW	50 kW	100 kW	200 kW	250 kW
660 … 690 V	75 … 132 kW	25 kW	50 kW	100 kW	125 kW
	160 … 1200 kW	50 kW)	100 kW	200 kW	250 kW



Load diagram

Braking resistors for Power Modules in blocksize format

The braking resistors for frame sizes FSA and FSB must be externally mounted. Braking resistors for frame sizes FSC to FSG should be mounted outside the control cabinet due to their high heat losses.

The Control Unit monitors the pulse/pause ratio (ON time/OFF time) of the braking resistor and shuts it down on faults if it calculates that the resistor could overheat.

Braking resistors feature a temperature switch with NC contacts that open when the permissible temperature is exceeded. The temperature switch must be evaluated to prevent consequential damage if the braking resistor overheats.

The braking power P_{mech} on the motor shaft is higher than the power loss of the braking resistor, as this only needs to convert the DC link energy into heat. The DC link power P_d of the Power Module in generator mode is calculated from the shaft power P_{mech} of the motor and the power loss in the motor $P_{v\ Motor}$ and in the Power Module $P_{v\ Power\ Module}$ as:

$$P_d = P_{mech} - P_{v\ Motor} - P_{v\ Power\ Module} = P_{braking\ resistor}$$

The power losses can be estimated from the efficiency values of the motor η_m and Power Module η_{wr}:

$$P_{braking\ resistor} = P_d = P_{mech} \times \eta_m \times \eta_{wr}$$

Booksize format Capacitor Module

The Capacitor Module functions as a short-term energy buffer, e.g. for bridging brief power failures or for storing braking energy. The buffered energy W can be calculated with the following formula:

$$W = ½ \times C \times (U_{d1}^2 - U_{d2}^2)$$

C = effective capacity of Capacitor Module 4 mF

U_{d1} = DC link voltage when buffering starts

U_{d2} = DC link voltage when buffering ends

Example:

U_{d1} = 600 V; U_{d2} = 430 V

The resultant energy calculation is W = 350 Ws

With this energy, for example, it is possible to buffer a Motor Module with 3 kW load for about 100 ms.

Booksize format Control Supply Module

The Control Supply Module provides a 24 V DC power supply via the line or DC link in order to maintain the electronics power supply for the components in the event of a line failure. This makes it possible, for example, to make emergency retraction movements in the event of the failure of the line supply.

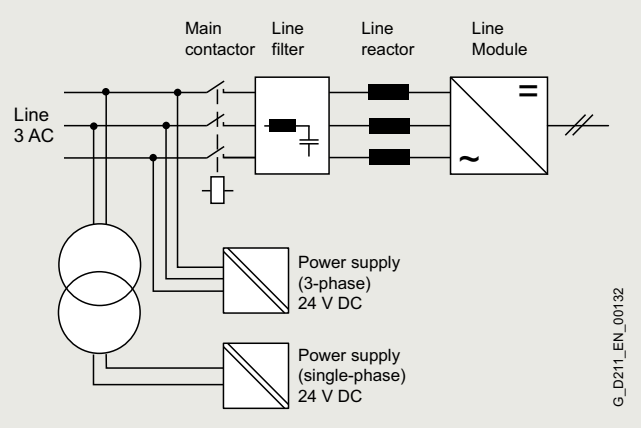
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Configuration

External 24 V DC supply of components

Power units (Line Modules and Motor Modules) and other system components must be provided with a 24 V DC voltage via an electronics power supply made available externally.

SITOP devices, which are available as a modular solution, are provided as the external 24 V DC electronic power supply.



Connecting the external electronics power supply

The current requirement $I_{DC\ ext}$ is calculated using the following formula:

Σ [Control Unit + built-in options (e.g. TB30 + CBC10) + system components + Line Module + Σ (Motor Modules + SMCxx + motor brake control)]

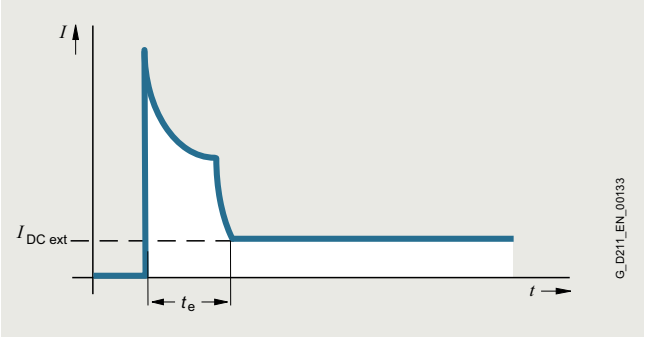
The other system components (e.g. line contactor) must also be taken into account.

The current requirement of individual components can be found in the relevant technical specifications.

Limit values when configuring the system:

- The current-carrying capacity of the integrated 24 V DC busbar (featured only in booksize format) is max. 20 A.
- In the event of higher current requirements, a number of 24 V DC power supplies must be provided in one drive line-up. The other infeeds are implemented by means of 24 V terminal adapters (booksize format only).
- Cable cross sections of up to 2.5 mm^2 may be connected to the Control Units, Terminal Boards, Terminal Modules and Sensor Modules.
- Cable cross sections of up to 6 mm^2 may be connected to the 24 V terminal adapters (booksize format only) for the Line Modules and Motor Modules.
- The external 24 V DC power supply should only be used for the SINAMICS components and the direct loads.

Capacitors in the electronics supply of most components must be charged when the 24 V DC supply is first switched on. To charge these capacitors, the power supply must first supply a current peak which can be a multiple of the current requirement $I_{DC\ ext}$ calculated above. Allowance must be made for this current peak when selecting protective elements, e.g. miniature circuit breakers, for incorporation in the 24 V DC supply system (types with let-through I^2t values according to characteristic D). The current peak flows for an interval t_e of less than 100 ms. The crest value is determined by the impedance of the 24 V DC supply and its electronically limited maximum current.



Typical waveform of the switch-on current of the external 24 V DC supply

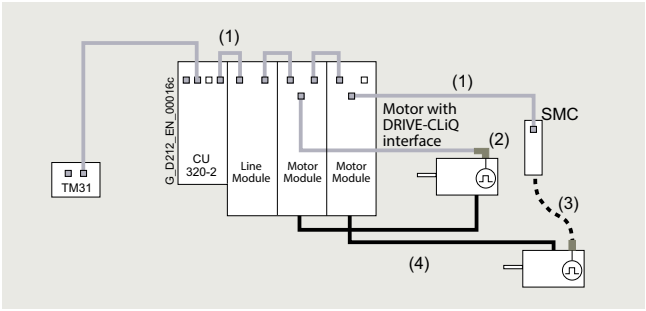
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Configuration

Specification of components for connection system

To complete the drive system, components such as motors and encoders must be connected to it via cables.

For motors with DRIVE-CLiQ interface, the DRIVE-CLiQ cables carry the 24 V DC power supply. On all other Sensor Modules, a separate 24 V DC power supply must be provided.



Drive connection system

Legend	Cable	Description
(1)	DRIVE-CLiQ cables	Standard cables for cabinet-internal configuration without 24 V cores
(2)	DRIVE-CLiQ MOTION-CONNECT 500/800 cables	Shielded cables with 24 V cores MOTION-CONNECT 500 for fixed installation (e.g. in a cable channel) and MOTION-CONNECT 800 for flexible installation (e.g. in cable carriers)
(3)	MOTION-CONNECT 500/800 signal cables	Suitable for the relevant measuring system; in versions MOTION-CONNECT 500 for fixed installation (e.g. in a cable channel) and MOTION-CONNECT 800 for flexible installation (e.g. in cable carriers)
(4)	MOTION-CONNECT 500/800 power cables	Shielded motor cables MOTION-CONNECT 500 for fixed installation (e.g. in a cable channel) and MOTION-CONNECT 800 for flexible installation (e.g. in cable carriers)

DRIVE-CLiQ cables are available in different versions and lengths (see section MOTION-CONNECT connection systems).

The required bending radii apply particularly to short cables. In addition to the distance between the two DRIVE-CLiQ sockets that the cable is to connect, a cable length of at least 60 mm (2.36 in) must be added to allow for bending radii. When defining lengths of prefabricated cables, see section MOTION-CONNECT connection systems.

Unused DRIVE-CLiQ sockets can be sealed with a blanking plug to prevent the ingress of contaminants. Suitable blanking plugs are supplied in the accessories pack for the units.

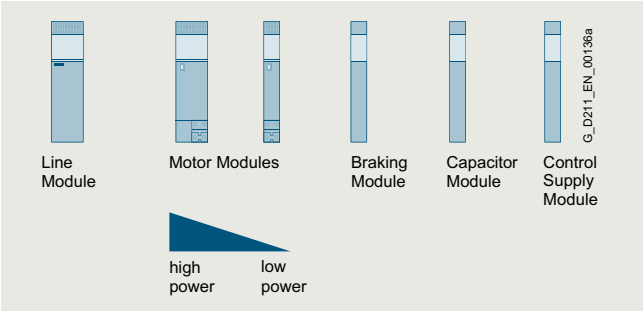
Mechanical configuration of the drive

A SINAMICS S drive line-up comprises a Line Module, Motor Modules, DC link components, a Control Unit, and the optional expansion modules.

Configuration of a drive line-up in booksize format

The following criteria must be taken into account when a drive line-up of booksize format units is configured:

- The Smart Line Modules 5 kW and 10 kW must always be arranged on the left as the first module. All other Line Modules should be arranged on the left as the first module. The CU320-2 Control Unit in this case can be "snapped onto" the left-hand side of the Line Module.
- The DC link busbars can be connected on the right and left with Basic Line Modules, Active Line Modules and Smart Line Modules rated 16 kW and larger. In this case, the modules can be arranged in reverse order (from right to left) or on both sides (see arrangement for units in chassis format).
- Only one Line Module is permitted in each drive line-up.
- A number of drive line-ups must be configured for power supplies which cannot be provided by the highest rating.
- The Motor Modules must be arranged beside the Line Module in descending order of the rated currents, that is, the Motor Module with the highest rated current is to be mounted immediately adjacent to the Line Module, and the Motor Module with the lowest rated current is positioned furthest away from the Line Module.
- DC link busbars are integrated in the Line Modules, Motor Modules, Braking Modules, Capacitor Modules and Control Supply Modules so that the modules can be connected to the drive line-up. The current carrying capacity of the integrated DC link busbars is determined by the module rating and is either 100 A or 200 A (see technical specifications). It must be ensured that the DC link busbars have the required current carrying capacity at every point within the drive line-up. When high-output Motor Modules (DC link busbars 200 A) and low-output Motor Modules (DC link busbars 100 A) are used, for example, the Braking Module (DC link busbars 100 A) must be installed downstream of the high-output Motor Modules.
- DC link adapters can be used to implement multi-tier configurations.
- The drive line-ups should be configured such that the total length of all power cables for the motor cables and the line cable, which should preferably be shielded, in each individual line-up does not exceed the permissible total cable length.



Power-oriented arrangement of booksize format Motor Modules

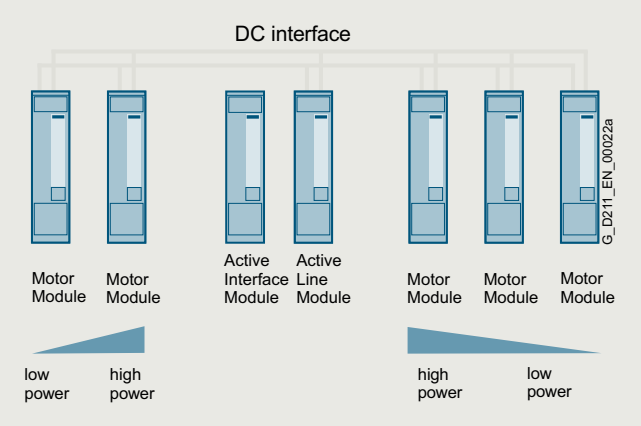
- The Control Unit configuration is flexible. The following configuration options are possible:
  - "Docking" on the left-hand side of the Line Module
  - Direct mounting next to the drive line-up on a mounting plate
  - Mounting in other cabinet panels taking into account the permissible DRIVE-CLiQ cable lengths

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Configuration

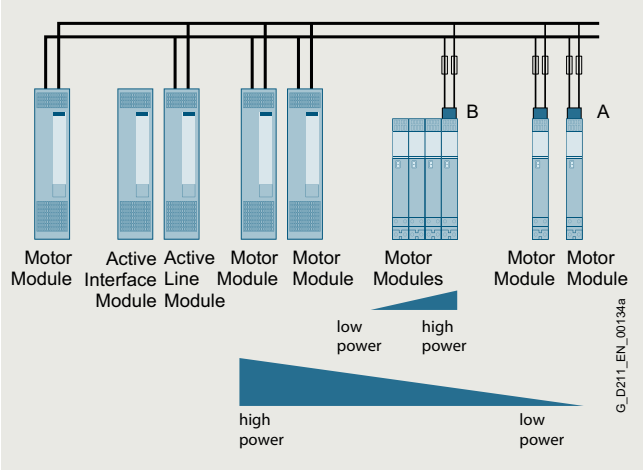
Configuration of a drive line-up in chassis format

- The Motor Modules must be positioned to the left or right of the Line Module with decreasing rated currents (i.e. the Motor Module with the highest rated current is positioned next to the Line Module, while the Motor Module with the lowest rated current is at the end on the left or right). You must ensure that the cables/busbars for the DC link meet the current-carrying capacity requirements for all connected Motor Modules.
- The inductance of the DC link busbars must be low, achieved, for example, by arranging the bars as close as possible in parallel, but observing the required creepage distances and air gaps.
- The Control Unit configuration is flexible. The following configuration options are possible:
  - "Docking" on the left-hand side of the Line Module
  - Direct mounting next to the drive line-up on a mounting plate
  - Mounting in other cabinet panels taking into account the permissible DRIVE-CLiQ cable lengths



Configuration of a mixed drive line-up in chassis and booksize formats

A mixed drive line-up must be configured according to the rules for chassis format units. The Motor Modules in booksize format can be connected to the higher-level DC link busbars by means of DC link rectifier adapters. There are two possible connection options - A and B. With A, each Motor Module in booksize format is connected using the appropriate DC link rectifier adapter. With B, Motor Modules in booksize format are connected to one another and the internal DC link busbars and a DC link rectifier adapter are used on the last Motor Module to make the connection to the higher-level DC link busbars. In the latter case, the DC link rectifier adapter must be attached to the last Motor Module on the right-hand side of the line. As regards the arrangement of modules with different current ratings, the guidelines specified under "Configuration of a drive line-up in booksize format" also apply to mixed drive line-ups.



Ideally, the entire length of the higher-level DC link busbars can be dimensioned for the rated DC link current of the Line Module. The busbars are then protected by the line fuses at the infeed end.

If the cross section of the DC link busbars or cabling is reduced, this branch must be designed to be short-circuit-proof. The current limiting mechanism of the Motor Modules connected to the branch with reduced cross section then protects it against overloading. It is not advisable to reduce busbars or cables down to the mandatory minimum cross section. No additional overload protection (fuse) is required on the assumption that overloading cannot occur as a result of cable damage on the cable route to the Motor Module and that the circuit branch is protected against overloading by the Motor Module.

Where the cross section has been significantly reduced, or the circuit design is not inherently short-circuit-proof, a branch fuse must be installed at the beginning of the section with reduced cross section in order to protect the DC link connections involved. In the event of a fault, the fuse must be capable of interrupting DC fault currents; other types of miniature circuit breaker are not suitable.

Allocation of branch fuses for option (A) in a supply system with grounded neutral (TN system). The calculations are based on the assumption that $\tau = L/R < 10$ ms applies to the time constant τ in the DC fault circuit and that the fault current is interrupted by the fuse after maximum 1 s.

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Configuration

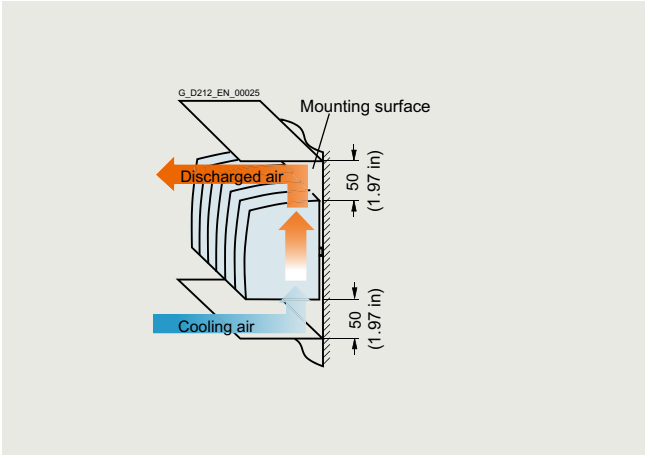
Motor Module booksize format I_N	Recommended cable cross-section for Cu conductors and PVC insulation with a permissible operating temperature of 70 °C (158°F) on the conductor	**DC link rectifier adapter**	**LV HRC fuse**		
				with knife contacts	with screw contacts
A	mm^2	Article No.	A	Article No.	Article No.
3	2.5	**6SL3162-2BD00-0AA0**	25	**3NE8015-1**	**3NE8715-1**
5	2.5		25	**3NE8015-1**	**3NE8715-1**
9	4		50	**3NE8017-1**	**3NE8717-1**
18	10		63	**3NE8018-1**	**3NE8718-1**
30	10		80	**3NE8020-1**	**3NE8720-1**
45	35	**6SL3162-2BM00-0AA0**	125	**3NE8022-1**	**3NE8722-1**
60	70		160	**3NE8024-1**	**3NE8724-1**
85	95		250	**3NE3227**	**3NE8727-1**
132	95		315	**3NE3230-0B**	**3NE8731-1**
200	95		315	**3NE3230-0B**	**3NE8731-1**
2 × 3	2.5	**6SL3162-2BD00-0AA0**	25	**3NE8015-1**	**3NE8715-1**
2 × 5	4		50	**3NE8017-1**	**3NE8717-1**
2 × 9	10		63	**3NE8018-1**	**3NE8718-1**
2 × 18	10		125	**3NE8022-1**	**3NE8722-1**

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Configuration

Mandatory minimum installation clearances

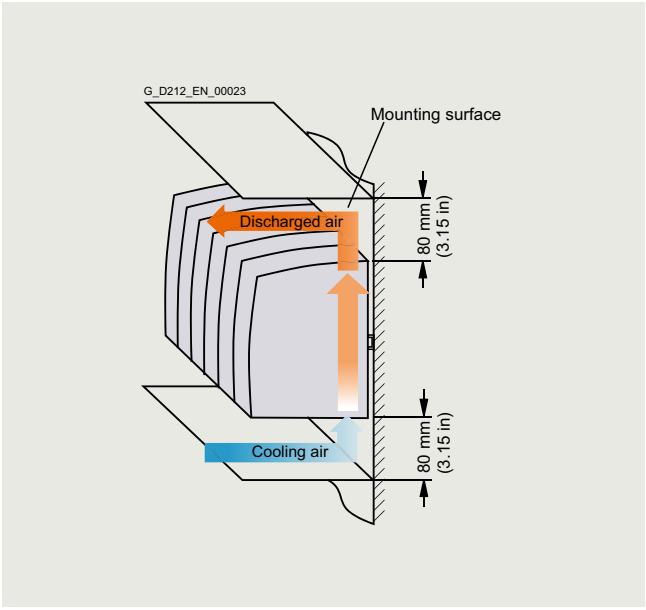
Ventilation clearances for Sensor Modules and Terminal Modules



Sensor Modules and Terminal Modules can be mounted directly adjacent to one another.

When mounted on the wall, line reactors and line filters require a ventilation space of 100 mm (3.94 in) above and below respectively.

Ventilation clearances for booksize format components



Line Modules 5 kW up to 55 kW
Active Interface Modules
Motor Modules up to 85 A

Ventilation clearances for blocksize format components

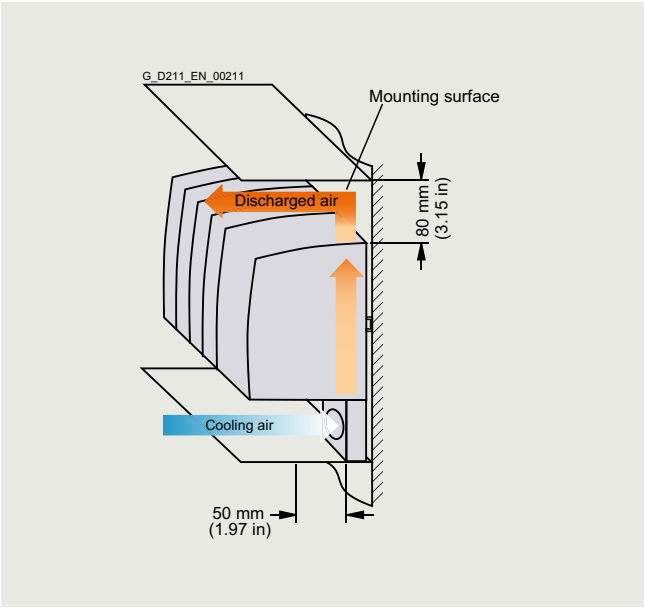
The Power Modules PM240-2 can be mounted side by side. A side clearance of 1 mm (0.04 in) is recommended for tolerance-related reasons.

The ventilation clearances for Power Modules PM240-2 frame sizes FSA to FSC are:

- Top: 80 mm (3.15 in)
- Bottom: 100 mm (3.94 in)
- Front: 0

The ventilation clearances for Power Modules PM240-2 frame sizes FSD to FSG are:

- Top: 300 mm (11.81 in)
- Bottom: 350 mm (13.78 in)
- Front: 100 mm (3.94 in)

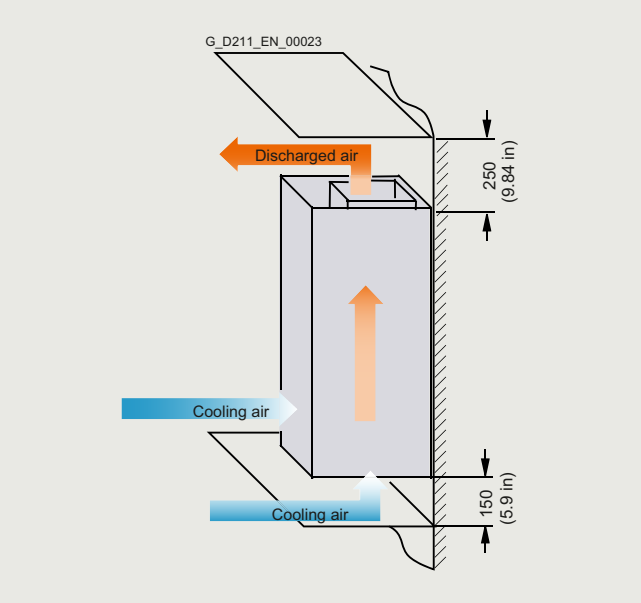


Active Line Modules 80 kW and 120 kW
Motor Modules 132 A and 200 A

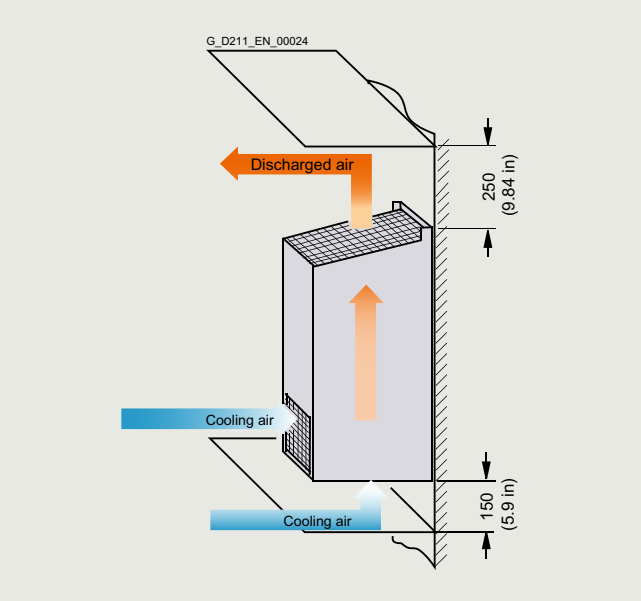
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Configuration

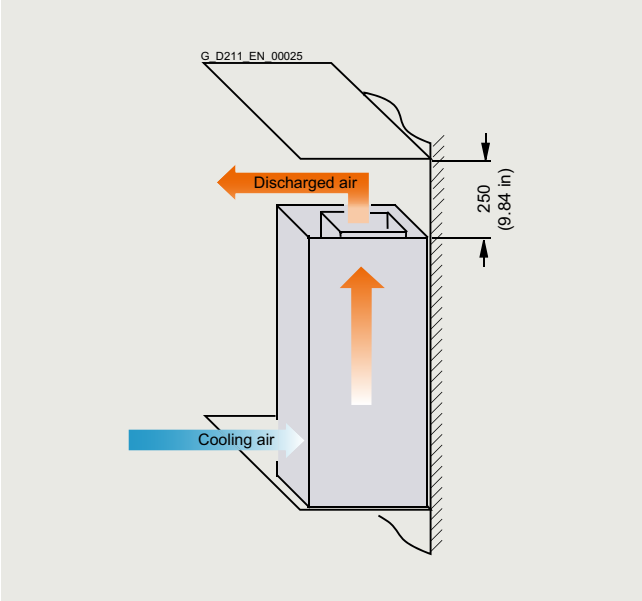
Ventilation clearances for chassis format components



Basic Line Modules



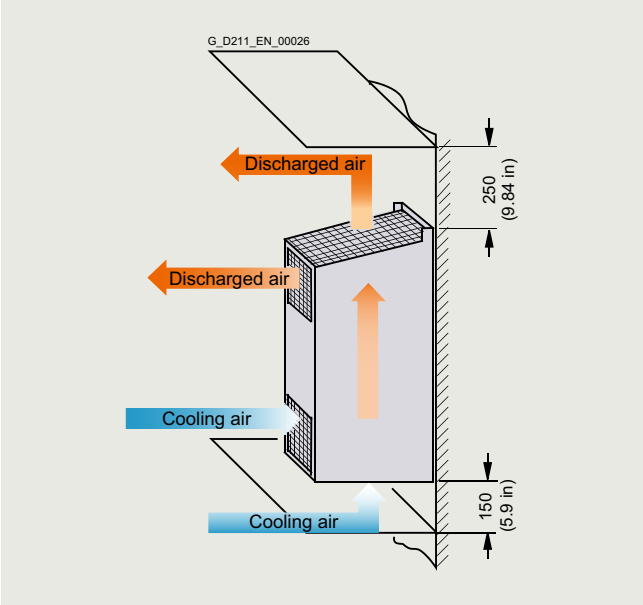
Active Interface Modules in frame sizes FI and GI



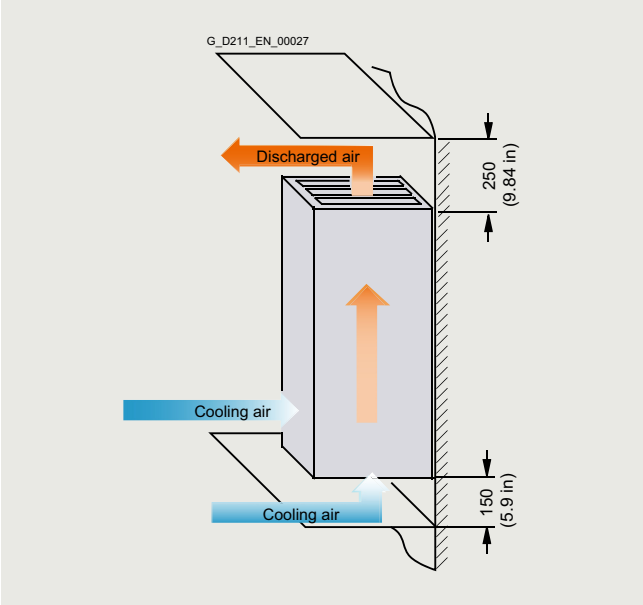
Active Interface Modules in frame sizes HI and JI

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Configuration



Power Modules, Motor Modules and Active Line Modules in frame sizes FX and GX



Active Line Modules in frame sizes HX and JX
Motor Modules in frame sizes HX and JX

Calculation of internal control cabinet temperature

Control cabinet with forced ventilation

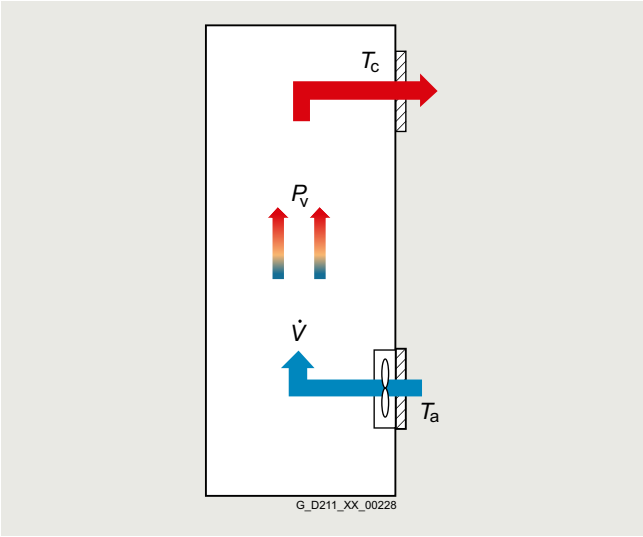
In a control cabinet with forced ventilation, the heat loss P_V passes to the through-flowing air that then rises in temperature by $\Delta\varphi$. In the time interval Δt, the air absorbs the heat $Q = c \times m \times \Delta\varphi = P_V \times \Delta t$, and at the same time the air volume V flows through the control cabinet (c is the specific heat capacity of the air). Mass m and volume V are linked via density ρ. $m = \rho \times V$ applies. When inserted in the formula above, the following equation is obtained: $P_V = c \times \rho \times (V/\Delta t) \times \Delta\varphi$

The heat loss P_V, that can be dissipated by forced ventilation, is thus proportional to the volume flow $\dot{V} = V/\Delta t$ that the fan delivers through the control cabinet and the permissible degree of heating $\Delta\varphi = T_C - T_a$

The heat capacity and density of the air depend on the humidity level and atmospheric pressure. For this reason, the equation is dependent on other parameters. To estimate the temperature rise in the control cabinet in a typical industrial environment, c = 1 kJ/kg × K and ρ = 1.2 kg/m^3 can be assumed. This results in the following quantity equation:

$$P_V\,[\mathrm{W}] = 1200 \times \dot{V}\,[\mathrm{m^3/s}] \times \Delta\vartheta[\mathrm{K}]$$

with $\Delta\varphi = T_C - T_a$



The temperature T_C as the ambient temperature of the components in the interior of the control cabinet can be estimated with the formula given and must be checked by means of measurements for each application because local hot spots can form, e.g. in close proximity to a source of heat or hotspot caused by unfavorable air circulation.

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Configuration

Control cabinet without forced ventilation

A control cabinet without forced ventilation conducts the heat loss P_v generated in the interior to the surrounding air (external temperature T_a) through the surface. For the heat flow, $\dot{Q}$ the following applies in the steady state:

$$\dot{Q} = k \times A \times \Delta\vartheta = P_v$$

k is the heat transfer coefficient, A is the effective cooling surface of the control cabinet, and $\Delta\varphi$ is the temperature difference between the internal cabinet temperature and the external temperature $\Delta\varphi = T_c - T_a$

The transfer of heat through the walls of the control cabinet is determined by the heat transfer of the interior air to the cabinet wall, heat conduction within the cabinet wall and heat transfer from the cabinet wall to the external air. The heat transfer is to be calculated by the heat transfer coefficient α, and heat conduction by the heat conductivity λ and the thickness d of the cabinet wall. The resulting equation for the possible heat loss P_v is:
$P_v = [1/(1/\alpha_i + d/\lambda + 1/\alpha_a)] \times A \times \Delta\varphi = k \times A \times \Delta\varphi$

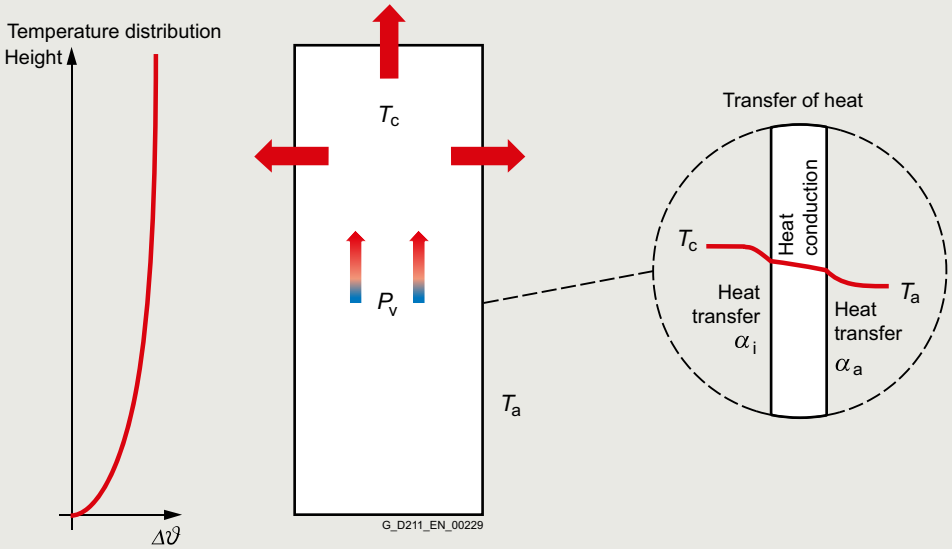
$P_v = k \times A \times \Delta\varphi$

Typical values for the heat transfer coefficient k in the case of control cabinets with walls of painted stainless steel which are up to 2 mm (0.08 in) thick:

	k value
Stationary (non circulating) air in the control cabinet and stationary (non circulating) external air $\alpha_i = \alpha_a = 6$ W/(m² × K)	approx. 3 W/(m² × K)
Circulating air in the control cabinet and non-circulating external air $\alpha_i = 40$ W/(m² × K); $\alpha_a = 6$ W/(m² × K)	approx. 5.2 W/(m² × K)

The calculating procedures of IEC 60890 (VDE 0660 Part 507) can be used for determining the ambient temperature T_c in the interior of the control cabinet. All heat sources in the control cabinet must be taken into account in the calculation, e.g. Line Modules, Motor Modules, power supplies, filters, reactors. It is important to determine the effective cooling surface dependent on the method of setting up the control cabinet. The standard can also be used for control cabinets with ventilation openings (natural convection).

The estimated temperature T_c and the temperature distribution in the control cabinet should be checked with measurements for every application since local hotspots can form, e.g. in close proximity to a source of heat or a hotspot.



Control cabinet with air conditioner

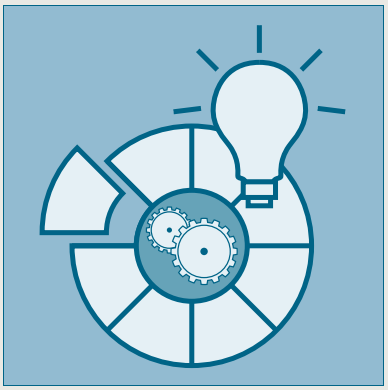
The control cabinet emits heat via its surface and the air conditioner.

Manufacturers provide information on the design of the air conditioner, e.g. Rittal:

www.rittal.de/produkte/system-klimatisierung/index.asp

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Drive applications



13/2 Drive applications
13/6 Test stands
13/7 Storage and retrieval machines
13/9 Converting

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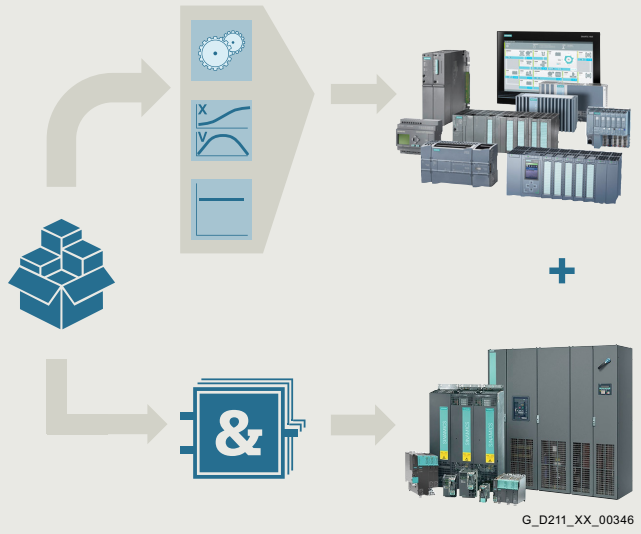
Overview

Standard applications: Understanding and profiting from know-how

The development of standard applications is a major area of activity within the Siemens automation and drive environment. The scope of these standard applications ranges from clearly organized documentation that focuses on one or several technologies (e.g. Safety Integrated) to complete, comprehensive, standardized solutions for complex tasks (e.g. cross cutters).

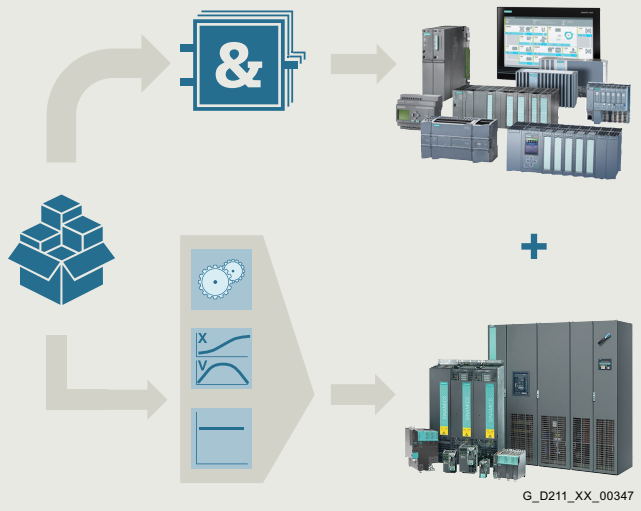
Standard application requirements

One feature that all application examples have in common is that they are designed to help users help themselves. They have been created by developers with extensive tool, commissioning and application know-how to make them as user-friendly as possible. Standard applications generally provide the user with reusable components.



Technology functions in the higher-level control system

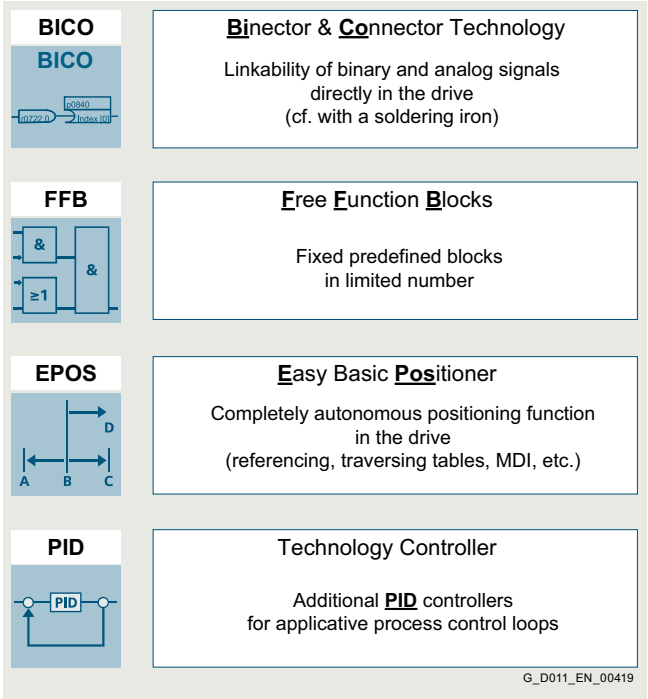
- Tested SIMATIC PLC blocks
- Reusable HMIs and faceplates



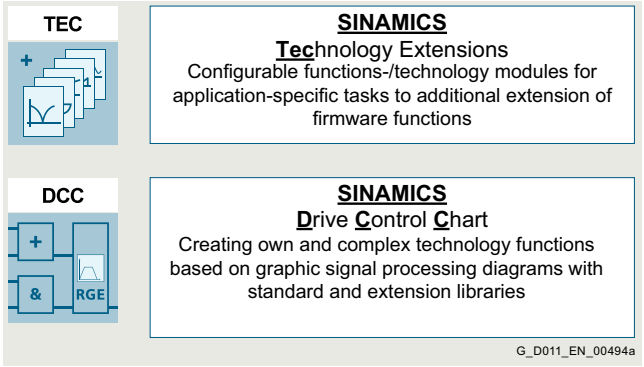
Technology functions in the drive

- Tested SIMATIC PLC blocks
- Application-specific Drive Control Charts (DCC)

Expandable drive technologies using the example of SINAMICS S120



Standard technology functions



Advanced technology functions

The development of standard technological applications is a dedicated area of activity within the Siemens automation and drive environment. Owing to the generally large size of the applications, they are supplied with detailed documentation and example codes.

These applications focus on the use of product features such as SINAMICS Drive Control Chart (DCC) with its Drive Control Block (DCB) libraries of DCB Standard and DCB Extension, SINAMICS Technology Extensions (TEC) and Free Function Blocks (FFB).

This enables extensive, complete and standardized solutions to be developed for complex drive tasks.

These solutions can be flexibly adapted while at the same time allowing the user to expand them with additional elements or special functions as required.

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Overview

Application examples

Freely available application examples offer:

- Explanation of the necessary configuring steps with Siemens engineering tools
- Reusable standardized blocks for SIMATIC PLC
- Functionally coordinated programs and blocks
- Significantly shorter commissioning times

Various application examples also explain how to use logic processing integrated in the drive with Drive Control Chart (DCC) and Safety Integrated.

The following application examples are just a selection of some of the many applications that are available on the internet at:

- SINAMICS S/G/V: Simple cyclic function modules for controlling the SINAMICS in the TIA Portal https://support.industry.siemens.com/cs/document/109747655
- SINAMICS S/G/V: Simple acyclic function modules for controlling the SINAMICS in the TIA Portal https://support.industry.siemens.com/cs/document/109760317
- Configuring Technology Objects with SIMATIC S7-1500 and SINAMICS S210 in TIA Portal https://support.industry.siemens.com/cs/document/109749795
- SINAMICS S: SINAMICS S120 web server – user-defined sample pages https://support.industry.siemens.com/cs/document/78388880
- SIMATIC – Fail-safe LDrvSafe library for controlling Safety Integrated Functions for the SINAMICS converter family https://support.industry.siemens.com/cs/document/109485794

You can find additional information on the internet at:

www.siemens.com/sinamics-applications

https://sieportal.siemens.com/support

Integration

Overview of drive applications for SINAMICS drives up to firmware version V4.x/V5.x, including SIMATIC ET 200pro FC-2 frequency converters

Drive applications	Low voltage									
	Standard Performance frequency converters						Distributed frequency converters			
	SINAMICS						SINAMICS			SIMATIC
	V20	G120C	G120			G130 G150	G115D	G120D		ET 200pro FC-2 [1]
			CU230P-2	CU240E-2	CU250S-2	CU320-2		CU240D-2	CU250D-2	
Standard technology functions										
BICO technology	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Free Function Blocks (FFB)	✓	✓	✓	✓	✓	✓	✓	✓	✓	–
Basic positioner (EPOS)	–	–	–	–	✓	–	–	–	✓	–
Technology controller (PID)	✓	✓	✓	✓	✓	✓	✓	✓	✓	–
Advanced technology functions										
SINAMICS Drive Control Chart (DCC)	–	–	–	–	–	✓	–	–	–	–
SINAMICS Technology Extensions (TEC)	–	–	–	–	–	✓	–	–	–	–
Applications & Branch know-how										
Siemens has applied these technology functions (standard and/or advanced) to generate numerous application solutions. These applications can be downloaded from the Siemens application support website at: www.siemens.com/sinamics-applications										

[1] Information on the SIMATIC ET 200pro FC-2 frequency converter with PROFINET, PROFIBUS DP or EtherNet/IP – depending on the SIMATIC ET 200pro station – is available at: www.siemens.com/et200pro-fc

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Drive applications

Integration

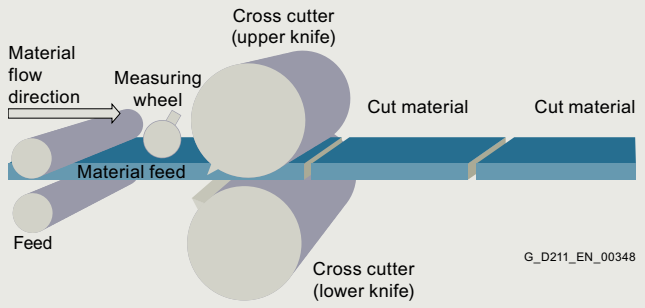
Drive applications	Low voltage					
	Industry-specific frequency converters	Servo converters		High performance frequency converters		
	SINAMICS					
	G120X	V90	S210	S120 S120M		S150
				CU310-2	CU320-2	CU320-2
Standard technology functions						
BICO technology	✓	–	–	✓	✓	✓
Free Function Blocks (FFB)	✓	–	–	✓	✓	✓
Basic positioner (EPOS)	–	✓	–	✓	✓	✓
Technology controller (PID)	✓	–	–	✓	✓	✓
Advanced technology functions						
SINAMICS Drive Control Chart (DCC)	–	–	–	✓	✓	✓
SINAMICS Technology Extensions (TEC)	–	–	–	✓	✓	✓
Applications & Branch know-how						
Siemens has applied these technology functions (standard and/or advanced) to generate numerous application solutions. These applications can be downloaded from the Siemens application support website at: www.siemens.com/sinamics-applications						

Further information about SINAMICS Drive Software for our SINAMICS frequency converters of the next generation (from firmware V6.1) e.g. SINAMICS S220 is available on the internet at:
www.siemens.com/sinamics-drive-software

For more information on ordering and configuration, see catalog D 99 and SiePortal at:
www.siemens.com/d99
www.siemens.com/sinamics-drive-software/sieportal

More information

Technological applications for SINAMICS S120



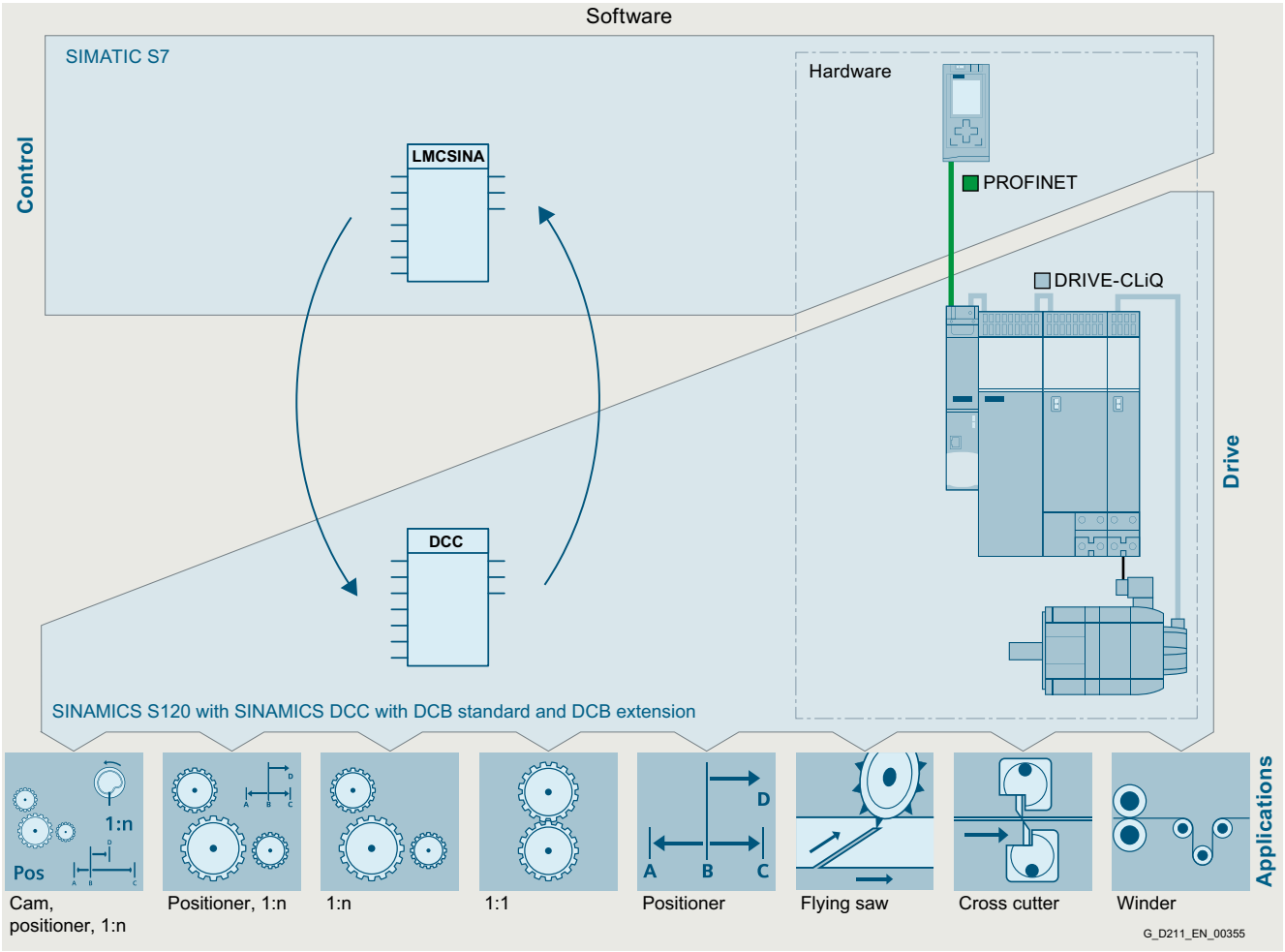
Another focal point are the technologically sophisticated application examples such as:

- Cross cutter
- Flying saw
- Winder
- Angular-locked synchronism in four different variants

13

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More information



The technological applications make selective use of the relevant engineering concepts in order to facilitate implementation.

Customer benefits:

- Drive-oriented solutions of positioning and synchronous operation applications
- Significant expansion of the DCC scope of functions
- Drive-oriented interpretation of application technology know-how in dedicated solutions
- Drive-oriented complex mechanical calculations

Basis for the technological applications

The technological applications supplied by Siemens are based on the DCB Extension library [1] "**GMC**".

GMC: for Motion Control applications [1]

- For applications with an extensive range of Motion Control functions (positioning, synchronous operation, cam, etc.)
- Individual functions are implemented as elementary function blocks
- Functions that can be combined are linked to form complex elementary function blocks
- These functions can be optionally combined to implement complex tasks

Requirement of the technological applications

Technological applications are generally complex in terms of process engineering, mathematics and concept. They are designed to provide the user with reusable components in the form of a standard application.

Reusable components:

- Tested SIMATIC PLC blocks
- Finished commissioning/configuration scripts
- Application-specific Drive Control Charts (DCC)
- With application-specific DCB Extension libraries
- Reusable HMIs and faceplates

For more information and support, please get in touch with your local Siemens contact person.

www.siemens.com/automation-contact

[1] Use of the internal drive interface to integrate a DCB library requires a license. See SINAMICS Drive Control Chart (SINAMICS DCC).

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Overview



Machines for performing reproducible characteristic tests

Test stands are available for many areas. Irrespective whether an automotive, roller, gearbox, motor, power or some other component test stand is involved.

In addition to the mechanical design for mounting the test object, the drive and control equipment as well as sensors must be provided to be able to produce the characteristics and record the measured values.

Test stand requirements

Test stands require a variety of different technological functions, for example:

- Consistent speed and torque
- An open and flexible closed-loop control system with BICO engineering to provide outstanding torque quality
- Rotating field frequencies up to 3200 Hz
- Energy recovery for braking without dangerous current harmonics with adjustable power factor
- Resistance to power fluctuations
- Energy exchange in the coupled DC link for multi-axis test stands
- Integration of modern simulation tools, such as Matlab or Labview
- Computer link for long-term data recording and a continuous trace (including ability to export measurements for evaluation by external tools)
- Extremely high dynamic response, e.g. for the simulation of internal combustion engines
- Safety Integrated functions, e.g. SLS on entering the test cell
- Battery simulation integrated in test stand
- Setpoint specification in real time by PROFINET IRT or an internal drive function

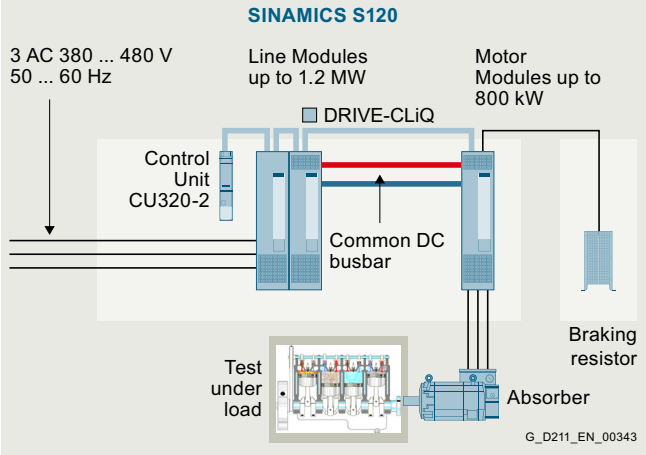
These functions can be implemented by combining a SINAMICS S120 multi-axis converter with SIMOTICS motors.

Benefits

In addition to supplying the appropriate products, Siemens can also support you:

- With the planning of a test stand
- By conducting extensive vibration calculations:
  - Rotor dynamics analyses
  - Multi-body simulations
- With engineering tasks by providing openness for external setpoint sources (e.g. simulation tools)
- By supplying extended drive technologies (e.g. SINAMICS TEC for simulating combustion engines).

Design



The solution illustrated in the diagram demonstrates how combustion engines in the automotive industry are tested "cold" in the end-of-line area.

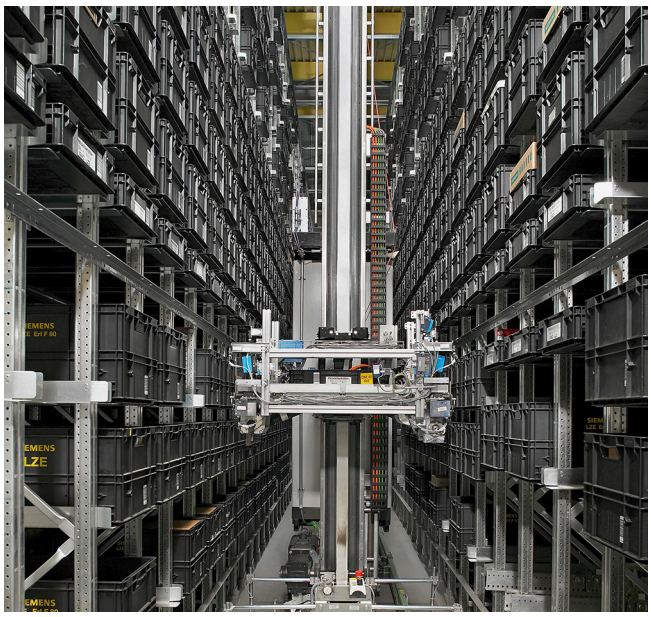
Combustion engines are quality-tested directly in the assembly line. In cold testing as opposed to hot testing, the engine is not powered by fuel but electrically, which allows for more eco-friendly testing On completion of the leak test, the engine is filled with oil and, if required, with fuel. The cold test results will show whether the engine complies with quality requirements.

The challenge in this case is to identify any asymmetry or deviation in relation to a stored reference engine.

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Overview

Benefits to the power of three – outstanding productivity, all-encompassing safety technology and optimized energy efficiency



The more flexible, speedy and precise they are, the greater the competitive edge they deliver: Storage and retrieval machines are a core component of conveyor, logistics and stock movement systems. They offer enormous potential for saving time and money. Furthermore, they play a substantial role in reducing energy consumption. Operator protection is another core issue – the relevant requirements for storage and retrieval machines are clearly defined in the C standard EN 528. As a complete provider of components and systems, Siemens can supply the solutions to all these challenges.

Throughput increased by up to 15 %

Siemens has developed the right solutions for raising the performance of storage and retrieval machines. These are designed to maximize acceleration potential while minimizing wear. They also use sway control to reduce mast vibrations, helping to
deliver material savings.

Performance boost thanks to intelligent all-wheel drive

With two powered wheels on the chassis, the drive torque can be distributed in such a way as to maximize acceleration and prevent the drive wheels from spinning. Siemens can supply a specially developed application that allows the drive torque to be statically and dynamically distributed between both drive wheels.

Integral sway control in drive increases throughput

Fast acceleration rates inevitably lead to mast vibration. With the assistance of the SINAMICS technology extension VIBX (Vibration Extinction), this vibration can be prevented without restricting the dynamic performance of the machine. With VIBX, the acceleration/deceleration of the travel axes is unable to excite the natural frequency of the storage and retrieval machine. The frequency can be adapted as a function of the cargo load and the position of the load handling device while the machine is in operation. There is no need to install a sensor to detect mast vibration. The sway control function is proven to shorten the time that it takes a mast to reach a sufficiently still position to allow load handling devices to move into a rack, pick up goods and move out again so that the storage and retrieval machine can travel to the handover station. This boosts throughput by up to 10 % and also increases warehouse capacity. Thanks to the reduction in wear and tear on the machine, less expensive materials can be used in the machine construction. Energy consumption can be reduced as a result of the lower masses

By combining sway control (VIBX) with an intelligent all-wheel drive, it is possible to boost performance by up to 15 %.

100 % compliance with DIN / EN 528 – standards-compliant safety concepts

A comprehensive, but flexible safety concept is needed in order to protect operator and machine and to optimize the entire plant. Using the safety modules supplied free of charge by Siemens, it is possible to implement safety concepts in accordance with the storage and retrieval machine standard DIN EN 528. These modules are certified by TÜV (German Technical Inspectorate) and are therefore a "plug&play" solution. The optimum interaction between the Safety Integrated functions of SIMATIC S7-F controllers and SINAMICS S120 drives allows customers to develop their own safety concepts. Siemens is offering concepts for warehouses with reduced or without buffer area, safety strategies for systems subject to slip and monitoring devices for typical storage and
retrieval machine applications (e.g. slack rope or overload detection).

Up to 80 % reduction in grid power input[1)]
– by use of self-generated energy

Drives often need to brake heavy weights in hoisting applications. Frequency converters with energy recovery capability help significantly reduce energy requirements. By using Line Modules capable of regenerative feedback, energy can be recovered and used to supply other loads. No braking resistors are required which means that a smaller control cabinet and a simpler cooling system can be used. Energy consumption is balanced via the common DC link of the SINAMICS S120, so minimizing the overall losses in the system. Furthermore, Siemens has used ultracapacitors to implement a strategy for storing energy in the DC link. In addition to reducing power input by up to 80 % [1)], electrical braking remains possible even during power failures. Wear to brakes and wheels is also minimized and the availability of the storage and retrieval machine is increased.

1) Applies to electromechanical systems with an overall efficiency of 90 %. With an efficiency of 80 %, the power input is reduced by 64 %.

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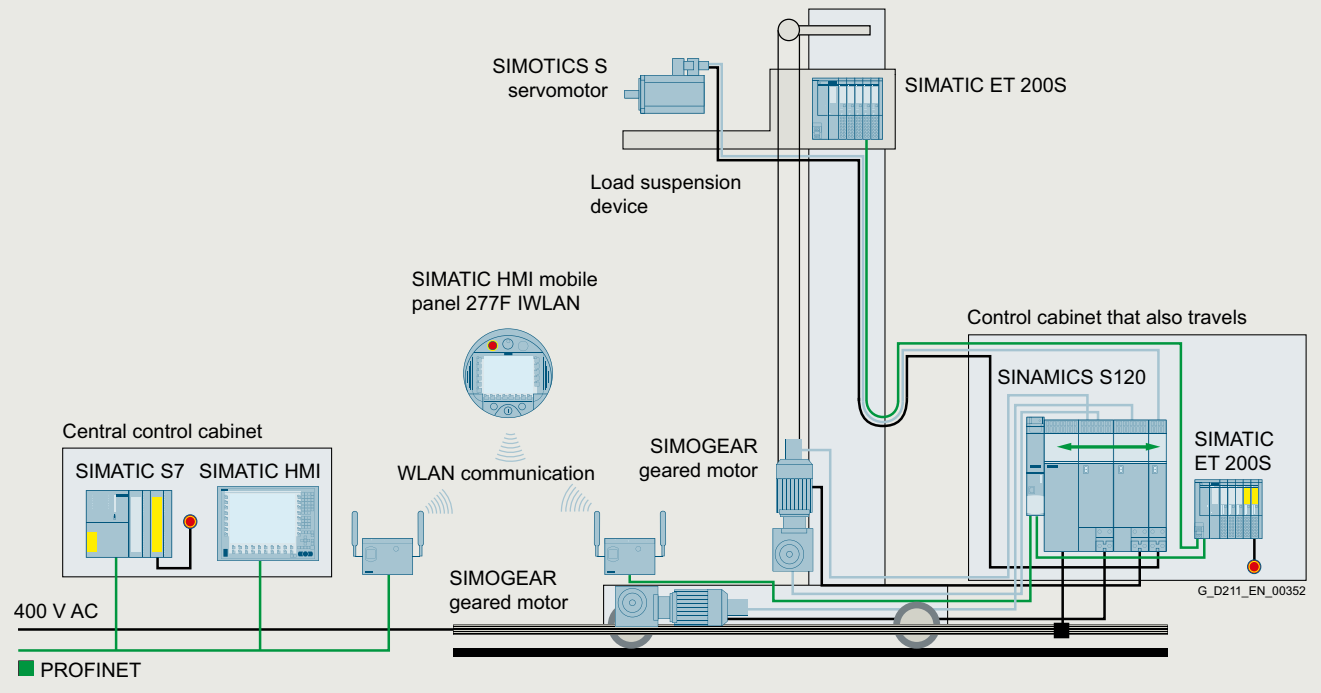
Design

Flexibility based on standard components

The storage and retrieval machine solutions comprise the following standard components:

- SINAMICS S120 converter
- SIMOTICS S-1FG1 servo geared motors
- SINAMICS Drive Control Chart (SINAMICS DCC)
- SINAMICS Technology Extensions VIBX

These components allow users to implement their own individual requirements of storage and retrieval machines down to the very last detail.



Schematic representation of storage and retrieval machine

More information

You can find additional information on the internet at:

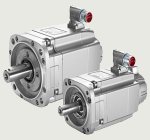
www.siemens.de/foerdertechnik-rbg

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Overview



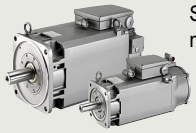
SIMATIC HMI



SIMOTICS S servomotors



SIMATIC S7



SIMOTICS M main motors



SINAMICS S120



SIMOTICS T torque motors

G_D211_EN_00345b

Converting – unwinding, cutting, stamping, sealing, laminating, printing, coating, crosscutting, winding, … – many functions that are used in a broad range of industrial sectors. Sectors such as paper production, the printing industry, the manufacture of cables and wires and the textile and packaging industries, to name but a few.

Siemens is offering complete, standardized drive and automation systems that are capable of performing all of these tasks. These range from an extensive spectrum of motors (asynchronous and synchronous motors, torque and linear motors, reluctance motors) to single-axis and multi-axis drive controllers, from simple vector converters to highly sophisticated multi-axis systems with integral motion controller, safety controller and bus system up to the market-leading SIMATIC S7 automation controller in variants 300, 400, 1200 and 1500. The portfolio is rounded off by a large selection of operator panels and other system components such as filters and reactors.

But it is precisely those highly technological standards that different sectors demand of converting functions that are fulfilled in many cases by the technology functions included in the Converting Toolbox developed by Siemens.

The fully operational, tested standard functions integrated in the Siemens Converting Toolbox can be used to reduce the amount of time and money that need to be invested in all phases of the machine lifecycle.

The Converting Toolbox

Contains standard functions for converting processes with the following automation platforms:



SIMATIC

For applications with a PLC as central control system



SINAMICS, SINAMICS DCC

for drive-based applications where the process control is realized in the drive system
SINAMICS S120 with the use of DCC (Drive Control Chart)



Center winder
Identical closed-loop control concepts on all platforms



Web tension control
Identical closed-loop control concepts on all platforms



Automatic roll change
Basic functionality in a drive-based solution



Material web accumulator



Traversing drive
Basic functionality in a drive-based solution



Cross cutter



Flying saw



Load balancing

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More information

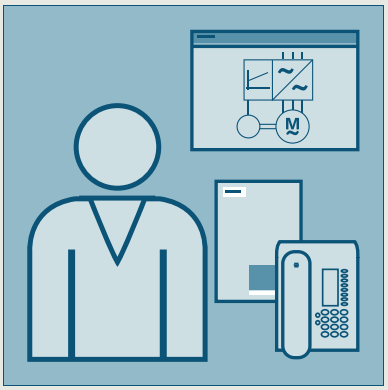
You can find additional information on the internet at:

https://support.industry.siemens.com/cs/document/109744606

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Notes

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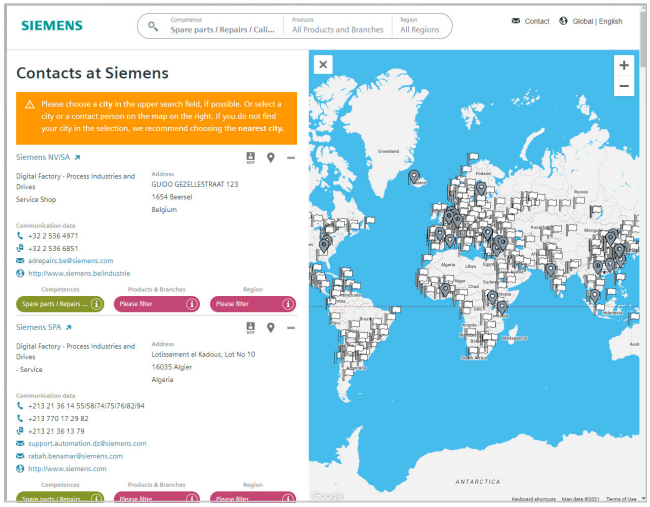


14/2	**Partners**
14/3	**Digital Enterprise Services**
14/6	**Training**
14/6	SITRAIN – Digital Industry Academy
14/6	SINAMICS S120 training case
14/7	**Siemens Automation Cooperates with Education (SCE)**
14/10	**Switchgear**
14/13	**Mechatronic Support**
14/14	**Applications**
14/15	**Drives Options Partner**
14/16	**mySupport documentation**
14/17	**Documentation**
14/17	General documentation

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Overview

Partners at Siemens



At your service locally, around the globe for consulting, sales, training, service, support, spare parts on the entire portfolio of Siemens.

Your partner can be found in our Personal Contacts Database at:
www.siemens.com/automation-contact

You start by selecting

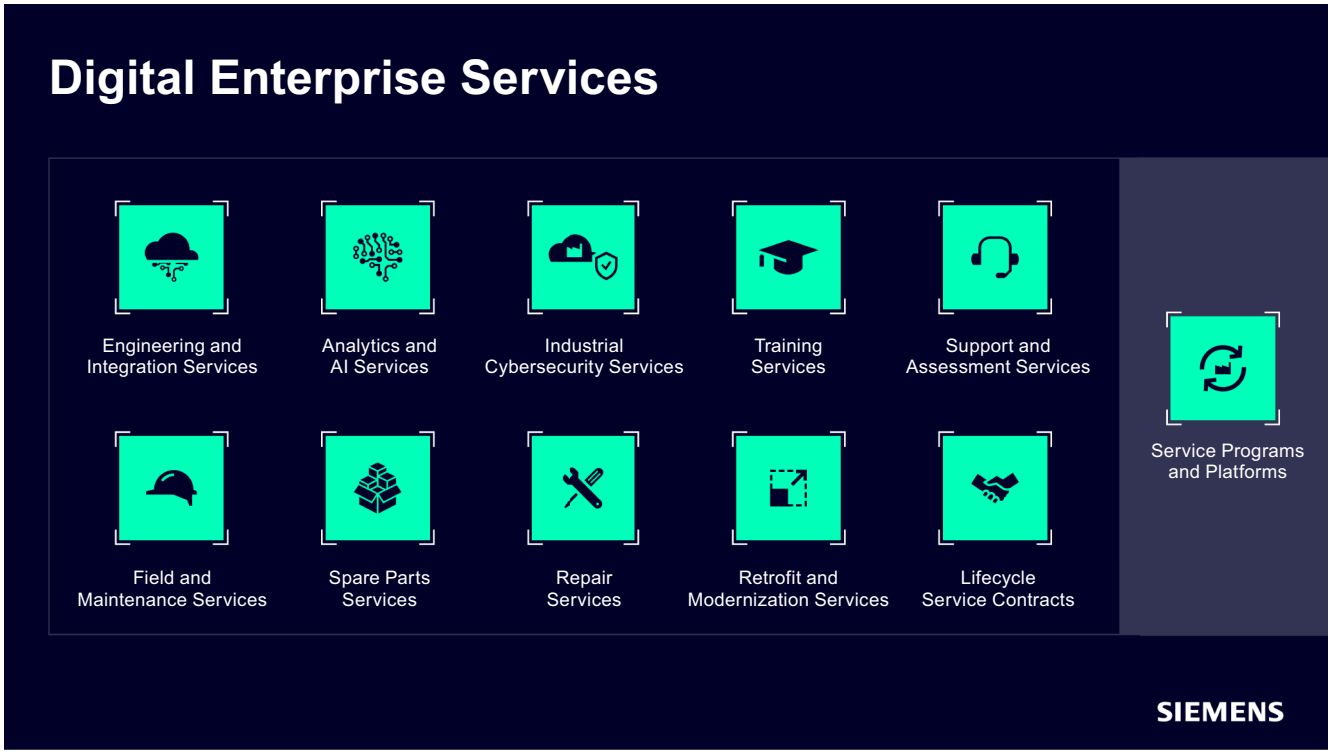
- the required competence,
- products and branches,
- a country and a city

or by a

- location search or free text search.

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Overview



At Digital Enterprise Services, we provide you with comprehensive services throughout the entire lifecycle. From a fully digital factory to a reliable spare parts supply and quick support in the event of outages, we work with our partners to ensure your plant operates optimally – improving availability, productivity, and efficiency.

Our services take industry to the next level and give you a competitive edge:

- **Services for Digital Transformation:**
  Our innovative and scalable services streamline operations by optimizing your Overall Equipment Effectiveness (OEE), increasing productivity, preventing outages and improving business continuity – all while supporting IT/OT convergence.
- **Services for Sustainability:**
  Our services include data-driven energy consumption analyses and measures to extend equipment lifespan. Specific savings potential is system-specific and determined individually. Siemens makes no blanket commitments regarding CO_2 reductions or the customer's sustainability targets. By enabling a circular economy and focusing on product safety, cybersecurity, and supply chain visibility, we extend asset life, save resources, and improve operational efficiency.
- **Lifecycle Services:**
  Our innovative Lifecycle Services provide reliable support worldwide, offering tailored solutions throughout their entire lifecycle. By optimizing maintenance processes, we improve asset performance, efficiency, reliability, and productivity – from machines to entire plants or factories.

For more information, please visit us at:

www.siemens.com/digital-enterprise-services

www.siemens.com/find-your-service

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Introduction

Learn the way you like it – with SITRAIN

SITRAIN provides comprehensive technical knowledge for a wide range of industries and applications. Its offering is consistently aligned with the needs of learners and the requirements of innovative companies. Benefit from modern learning methods, personalized support, and practical knowledge that sustainably enhances your daily work and professional development. SITRAIN stands for successful, flexible, and continuous learning.



Education and training directly from the manufacturer

SITRAIN offers high-quality training covering Siemens' industrial product and solution portfolio and has more than 30 years of experience in technical training. Discover the wide range of opportunities to expand your expertise and find the course that perfectly fits your needs.

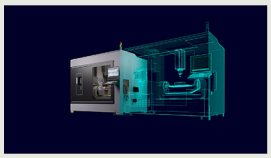
Various training and continuing education modules are available to support your individual learning journey:



Industrial Automation Systems SIMATIC
Training available for:
SIMATIC S7-1200/S7-1500. TIA Portal,
SIMATIC S7-300/400



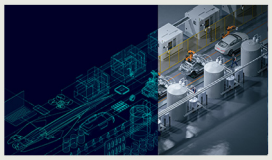
Drive Technology
Training available for:
SINAMICS S120, S210,
SINAMICS G120, G220,
SINAMICS G130/G150/S150,
SINAMICS G180,
SINAMICS DCM



SINUMERIK CNC automation system
Training available for:
SINUMERIK 840D,
SINUMERIK 840D sl and
SINUMERIK ONE



Process Control Systems
Training available for:
SIMATIC PCS 7,
SIMATIC PCS neo



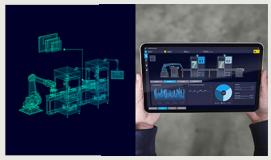
Digital Enterprise
Training available for:
Openness, SIMIT, OPC UA,
Industrial Edge,
virtual commissioning



Industrial Communications
Training available for:
OPC UA, PROFINET, SCALANCE,
RUGGEDOM, Industrial Ethernet,
Remote Communication



Cybersecurity
Training available for:
Industrial security for factory and process automation,
SINEC Security Software Suite and
IT/OT security for industrial networks



Operator Control and Monitoring Systems
Training available for:
SIMATIC WinCC Unified in TIA Portal, SIMATIC WinCC in TIA Portal, SIMATIC WinCC V8



Motion Control
Training available for:
SIMATIC Motion Control and SIMOTION



Smart Infrastructure
Training available for
SIRIUS, SENTRON, SIVACON, ALPHA, SIMOCODE and circuit breakers



Process Analytics & Instrumentation
Training is available for process analytics and instrumentation and explosion protection



Additional training offer
Battery manufacturing, SIMOVE with automated guided vehicles (AGV), cranes, guidelines and standards for control cabinets

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Introduction

Different learning formats and methods for maximum learning success

With SITRAIN trainings, you can shape your further education according to your individual preferences and the demands of your professional routine. You have the option to choose between online training and classroom courses—depending on which format suits you best.

In addition, you decide whether to complete your training flexibly on demand or attend scheduled sessions.

Whether with a learning consultant, as part of a team, or through self-study – SITRAIN offers maximum flexibility and tailored options for your learning process.

Discover our three learning formats:



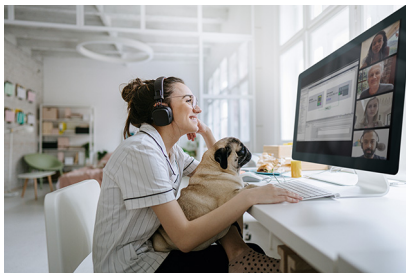
Learning Event

SITRAIN Learning Events are the perfect choice when you want to achieve a defined learning goal in the shortest possible time. You learn in a protected learning environment outside of the daily work routine under the guidance of a learning consultant - virtually, in the training center, or at your company.



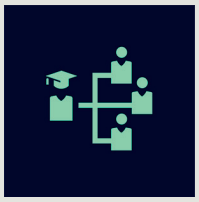
Learning Membership I SITRAIN access

SITRAIN access is a digital learning platform where knowledge is delivered through modular content such as tutorials, presentations, exercises, and tests. Learners benefit from a growing course offering as well as the Siemens Virtual Lab, where they can deepen their knowledge in a practical way—without the need for installation. Learning is flexible, online, and can be individually tailored.



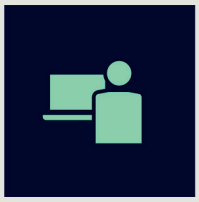
Learning Journey

The Learning Journey is the perfect combination of units taken live and self-study units for sustainable learning success. The modular approach enables simple integration into your daily work. This also includes one-year membership for using the SITRAIN access digital learning platform.



Live

Learn together with others, simultaneously and guided by a learning consultant. Online, in the SITRAIN training center or at your company.



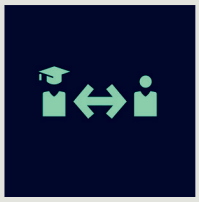
Self-reliant

Expand your knowledge self-determined with industry learning and work on your learning units at your own pace and according to your own schedule.



On demand

Get the knowledge you need, exactly when you need it. Be it to answer a current question or to work on a special topic.



Individual

Talk directly with the learning consultant, clarify detailed questions and get personal coaching for transferring the learned topics to your own application.



More information

https://www.siemens.com/sitrain

Course booking

https://sitrain.siemens.com

Training cases

https://www.siemens.com/sitrain-catalog-training-cases

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SINAMICS S120 training case

Overview



SINAMICS S120 training case with CU320 Control Unit



SINAMICS S120 training case without Control Unit

The SINAMICS S120 training case is used to teach students to use and understand the SINAMICS S120 drive system. It is suitable for direct customer presentations as well as for tests in technical departments.

The case is optimized in terms of weight and volume and is assembled complete with castors and ready for connection. It contains the following components:

- SINAMICS CU320-2 PN Control Unit with memory card with project for functional test
- SINAMICS Smart Line Module 5 kW
- SINAMICS Double Motor Module 2 x 3 A
- 2 motors SIMOTICS S-1FK7022 servomotors with DRIVE-CLiQ interface (absolute encoder or incremental encoder) Stroboscope for testing synchronous operation
- SIMATIC ET 200SP IM 155-6PN with 4 modules DI, DO, TM, AI
- Operator control box, removable for I/Os of the CU320-2 Control Unit or SIMATIC ET 200
- Reference discs for position monitoring
- Prefabricated connections for an external motor (e.g., asynchronous motor) (SIMATIC S7 mounting rail 85 mm with 24 V and PN connection).

The SINAMICS S120 training case is supplied ready-to-use with a demo project on the CompactFlash card and documentation.

Selection and ordering data

Description	Article No.
SINAMICS S120 training case	
• PROFIBUS variant with SINAMICS CU320-2 DP Control Unit	**6ZB2480-0CM00**
• PROFINET variant with CU320-2 PN Control Unit	**6ZB2480-0CN00**
Accessories	
SIMOTION D425-2 DP/PN upgrade kit	**6ZB2470-0AM00**
Operator control box	**6AG1064-1AA01-0AA0**

Technical specifications

SINAMICS S120 training case	6ZB2480-0CM00 6ZB2480-0CN00
Supply voltage	230 V 1 AC 50 Hz
Degree of protection	IP20
Dimensions	
• Width	320 mm (12.60 in)
• Height	650 mm (25.59 in)
• Depth	330 mm (12.99 in)
Weight, approx.	30 kg (66.2 lb)

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Knowledge & technology – the keystones to success in digitalization





Digitalization is quickly and radically changing our world. What does this mean for education?

In the world of Industry 4.0, companies can expect a host of new opportunities and challenges. New systems are verified on the spot through simulations. Automated mass production processes can make every product on the conveyor belt a unique product.

New products are now market-ready much faster. Siemens is shaping this transformation as a technology leader in the field of automation and process lifecycle management (PLM).

These new digitalization processes are changing the know-how requirements for employees. Many educational institutions are facing the challenge of conveying Industry 4.0 know-how as part of their teaching and training. The Siemens Automation Cooperates with Education (SCE) program is supporting educators on the way to Industry 4.0.

The SCE digitalization concept for educators

The SCE digitalization concept presented here shows how digitalization can be implemented in educational institutions – from vocational schools to universities.

Digitalization (or Industry 4.0) know-how is now introduced through computer aided technology, Industrial Edge and IIoT as well as Cloud technologies. It is founded on the basics of automation, such as digital technologies, PLC and information technologies, and on advanced automation and industrial communication technologies.

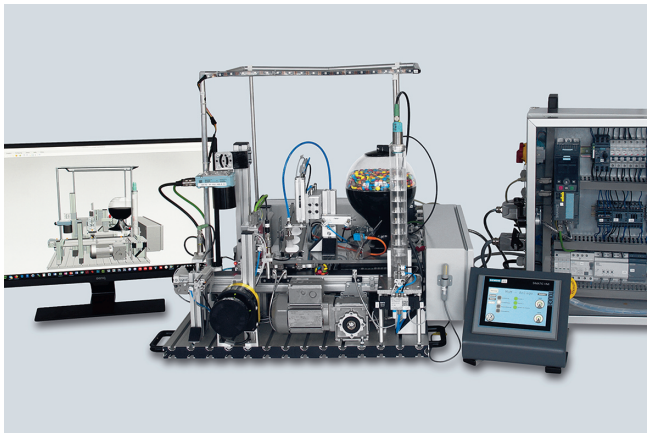
The level of digitalization knowledge can be weighted, depending on the vocational field or branch of study –
e.g. mechanical engineering, automation engineering or computer science.

	Digital Twin	Digital Workflow	Factory Intelligence
CAx, IIoT and cloud technologies	**Computer-assisted technologies** Virtual commissioning using simulation models	**Industrial Edge & IIoT** Analysis and further processing of data	**Cloud technologies** Connection and data analysis with smart data, manufacturing execution system and enterprise resource planning
Automation and industrial communication technologies	**Industrial automation** e.g. distributed IO, HMI, RFID, IO-Link, drive systems, safety technologies		**Industrial IT technologies** e.g. Industrial Ethernet, interface with software of third-party providers (OPC UA), security, communication networks
Basics of automation technologies	**Digital technologies** Boolean functions	**PLC technologies** PLC programming according to IEC 61131	**IT technologies** Ethernet and high-level programming languages, e.g. Python, Node-RED, JSON, C/C++, Linux

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Teaching made easy - Comprehensive support on the way to Industry 4.0

The SCE digitalization concept for educators



As part of their project work, students at Vocational School 2 in Wolfsburg, Germany, have implemented the three levels of the SCE Industry 4.0 concept. A virtual twin created with the Siemens NX Mechatronics Designer (MCD) CAD software was used for the design and virtual commissioning. This enables fast and efficient assembly of the real automation system, e.g. with SIMATIC S7-1500/ET 200SP/RFID, for use in classes. Production data, such as the number of bottles filled, production date and system parameters, are uploaded to a cloud using SIMATIC IOT2000.

siemens.com/sce/iot2000

siemens.com/nx

The SCE offers



Learning and training documents

More than 100 didactically prepared learning and training documents are available through SCE and incorporate the digitalization concept. They are designed for use in classes, but can also be customized or used for individual study. These documents are available for free download, most of them in 7 languages.

siemens.com/sce/documents

Educator courses

Excellent teaching content is needed to introduce students to digitalization. For this purpose, SCE holds educator courses in certain regions. Based on our learning and training documents and through practical exercises, educators acquire the latest Industry 4.0 know-how.

siemens.com/sce/courses



Trainer packages

The 90 SCE trainer packages help educators teaching and implementing the SCE digitalization concept. Trainer packages comprise specially compiled, genuine Siemens hardware and software products. The trainer packages are based on the learning and training documents and are offered to schools, colleges and universities at special terms.

siemens.com/sce/tp

Support for your projects / textbooks

We support you on selected projects with advice and assistance from SCE contact partners.

As a special service, we support textbook authors. We maintain a list of textbooks on the SCE website.

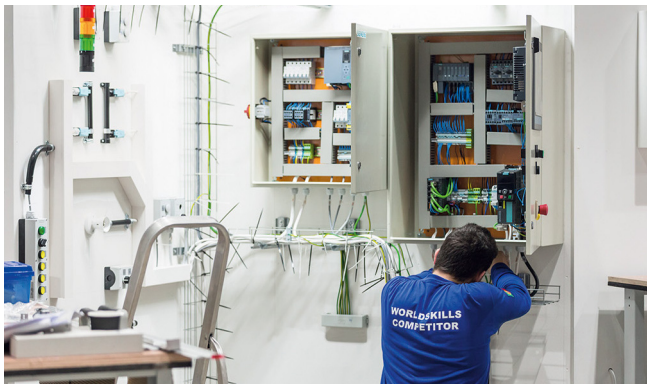
siemens.com/sce/contact

siemens.com/sce/books

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Partnerships for proliferation of Industry 4.0 in education





Partnership with WorldSkills

As a technology powerhouse, we support vocational training of students around the world. Since 2010, we have partnered with WorldSkills as a Global Industry Partner in order to amplify this cause.

WorldSkills is an international organization whose mission is to raise the profile and recognition of skilled people, and show how important vocational skills are in achieving economic growth and personal success. Every two years, WorldSkills hosts the world championships of skills.

Siemens provides the competitors with automation products, such as SIMATIC S7-1500 and LOGO!, for the disciplines: industrial control, electrical installations, Polymechanics/Automation and manufacturing technology.

Additionally, we support selected continental and regional competitions.

siemens.com/worldskills

Partnerships with educators

We provide support to educators and educational organizations in the form of one-on-one advice through SCE contact partners and Siemens experts as well as long-term cooperation.

siemens.com/sce/contact

Partnerships with producers of learning systems

For practical training in classrooms and labs, numerous producers of learning systems offer a wide range of complete didactic solutions based on SCE trainer packages.

siemens.com/sce/learningsystems

Information portal



To facilitate your teaching assignment and/or for selfstudy, we offer educators and students a comprehensive SCE information portal. At this portal you have quick access to all SCE offers, e.g. learning and training documents including projects, Getting Started information, videos, manuals, trial software and newsletters.

siemens.com/sce

Global Industry Partner

worldskills

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Overview

Systems Engineering Plant Chemnitz (WKC) - Electrical equipment for machines and plants

The Siemens Systems Engineering Plant Chemnitz (WKC) is the European market leader in control cabinet construction for machine tools and manufactures equipment for numerous segments the machine and plant construction industry, as well as for project business in the logistics and automotive sectors.



WKC - Control cabinet wiring

Scope of services offered

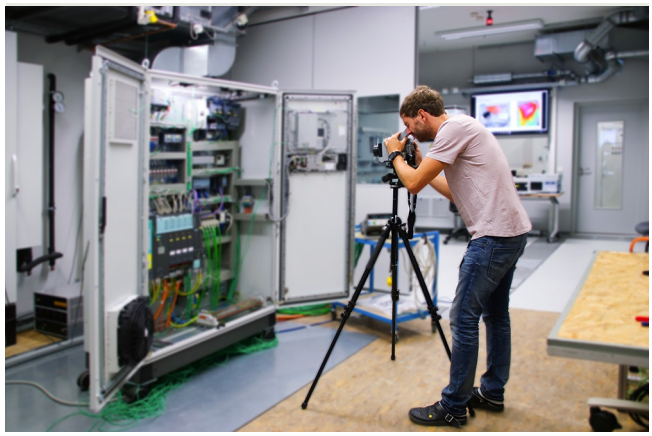
The WKC offers a complete portfolio of services for development and production: From concept support and hardware engineering, construction including complete material procurement to testing, advance commissioning support and worldwide inbound delivery. Each customer decides individually what extent of these services the WKC is to provide.



WKC - Engineering - SSB

Competence center for standardization and air conditioning

The WKC is also competence center for the air conditioning of switchgear, has its own test laboratory, and is a certified UL Panels shop. Siemens WKC therefore is happy to support you with advice on design in accordance with standards and concepts for your drive systems, control, operation and safety. In addition, our engineers configure for you in EPLAN and other CAD systems, execute Design-To-Cost projects, and adapt your documents where necessary to UL or new automation and digitalization technologies.



WKC - Test laboratory - Heat measurement

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Overview

Individual support and maximum flexibility

Our technical consultants for complete equipment support customers and sales departments in the various regions. Our customers are supported by job centers and permanently assigned manufacturing teams. As a customer, you will benefit from individual logistics models, flexible production capacities and production areas, change management in all process phases, as well as maximum flexibility for your orders..

Distance is no problem: For coordination with our customers, we use various digital communication and business applications with user-friendly and powerful functions for screensharing, videoconferencing, file transfer, as we all options for a customer acceptance via webcam (mobile circuit meeting room).



WKC - Automated testing SICAT

Your advantages

We offer complete services from a single source with Siemens quality and stability, extensive specialist support, and flexible resources. We will be glad to accompany you into international markets as well. With us you have a strong partner at your side - from the design stage to final delivery. Whether for series or individual units, Siemens WKC works together with you to implement your projects according to your requirements.

Overview of the portfolio of services

Order coordination

- Project manager with permanent customer assignment
- Complete material purchasing
- Change management in all process phases

Manufacturing

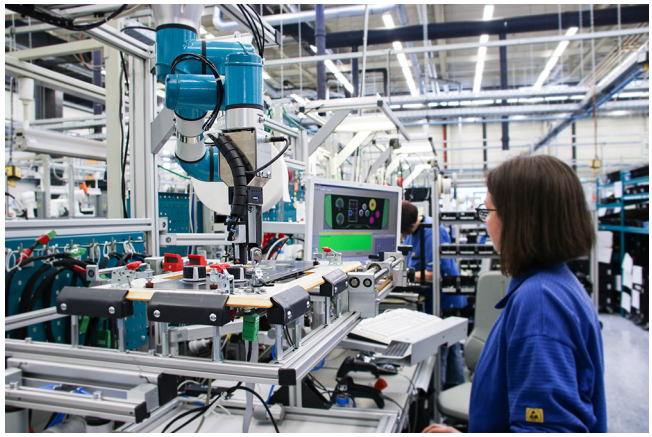
- Creation of a digital twin
- CNC processing of enclosure parts and mounting plates
- In-house painting
- Auto-routing of the wiring
- Automated prefabrication of cables
- Production teams with permanent customer assignment
- Batch or flow production

Automated test (standard)

- Current path test
- Function of switching, operating and signaling devices
- Observance of protective measures and safety

Optional test services / pre-commissioning

- Error-free function of the programmable controllers / I/O devices
- Parameterization and checking of bus systems
- First commissioning of Siemens NC and PLC
- Installation of customer software



WKC - Collaborative robotics

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Overview

Additional services for different project phases

Our portfolio is supplemented by a host of additional services for many different project phases.

Planning

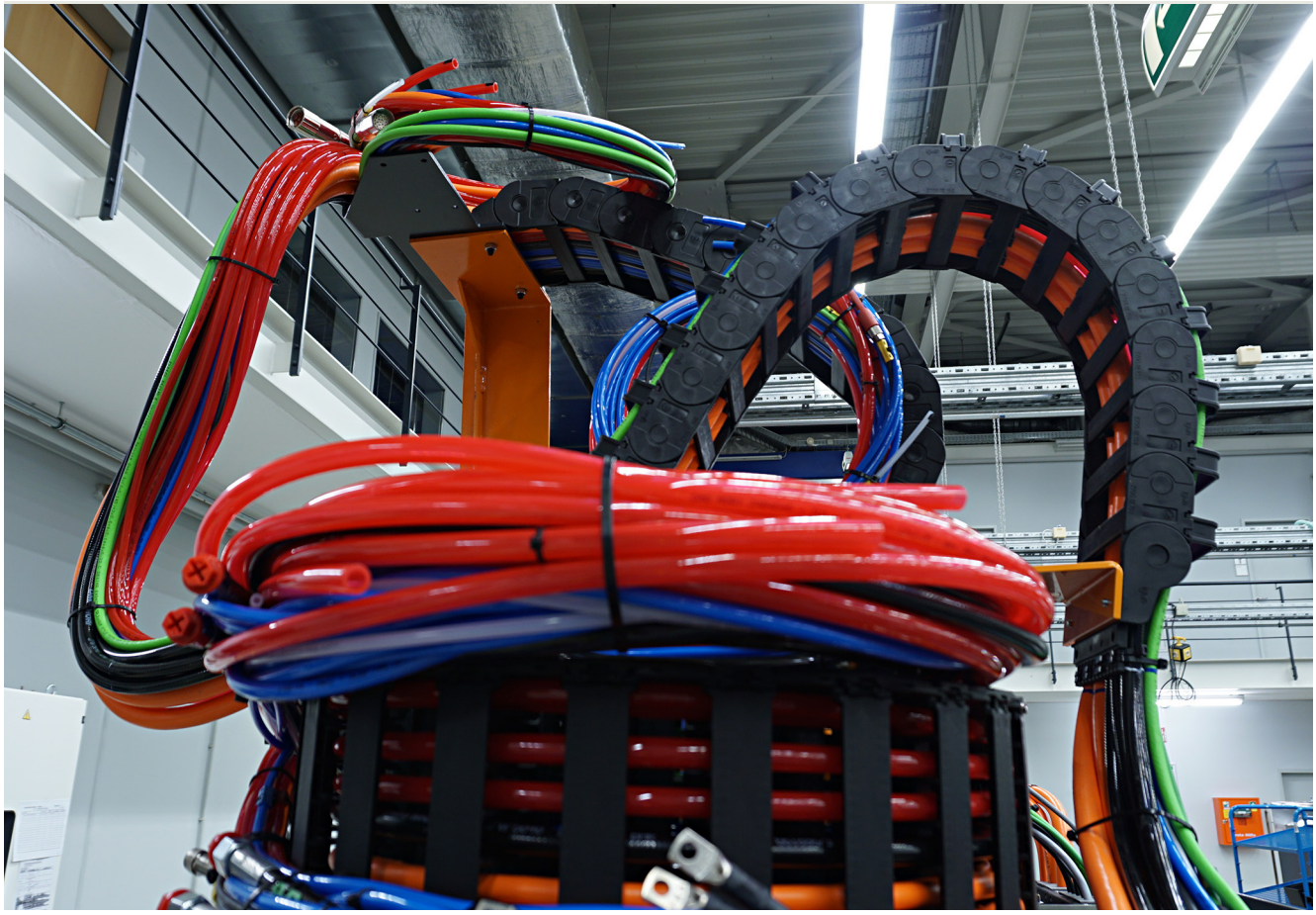
- Evaluation of requirement specifications, requirements
- Advice regarding standard applications and certifications (conformity)
- Advice regarding EMC, air conditioning, and electrical safety
- Design-To-Cost analyses
- Special rated conditions

Implementation/realization

- Creation of an electrical design in various CAE systems
- Creation of an air conditioning design through calculation and simulation
- CAE revision of production documents

Validation/certification

- International standard and certification know-how, e.g.: IEC 60204-1, IEC 61439, UL or cULus
- Checking of air conditioning / EMC designs in own Siemens laboratory or at customer premises
- Execution of EMC precompliance measurements in own laboratory or at your plant location



WKC - Additional service - Festoon cable system

More information

You can find additional information on the internet at:

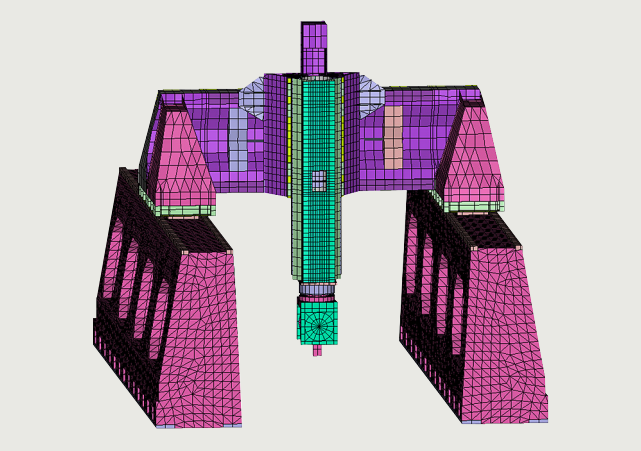
www.siemens.com/panelbuilding

Or contact us by

email: info.wkc.industry@siemens.com

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Overview



Achieve your optimized machine quicker and more efficiently with Mechatronic Support

The Mechatronic Support service ensures that right from the design stage, all the systems involved in the mechanics, electronics, and IT of the new machine are modeled, tested and optimized in a simulation environment in terms of their functionality and interaction, before they are actually built.

Mechatronic Support is thus the intelligent alternative to "trial and error". Innovative machine concepts are compared with one another, and modified and optimized at the outset – a process which of course also takes account of your ideas for new mechatronic components.

Virtual simulation - real build

With the help of the Mechatronic Support service, machine ideas and new developments can be tested mechatronically and modified in a short time at low cost. The first real prototype can be built immediately afterwards as a functioning machine.

As the machine manufacturer, you have the benefit of shorter development phases and faster time-to-market; end users benefit from an optimized high-performance machine solution.

Benefits

- Shorter development times – shorter time to market
- Reliable achievement of development objectives
- Risk-free testing of innovative machine concepts
- Higher quality and productivity from the outset
- Get to the finished machine more quickly with specialist support

Selection and ordering data

Description	Type
Consultation Technical consultation with customer	**6FC5088-1....**
Machine analysis and optimization • Analysis of the existing machine and its limits • Recommendations for manufacturer	**6FC5088-3....**
Machine simulation • Simulation of individual axes and complete machines • Analysis of dynamic behavior in the simulation	**6FC5088-4....**

More information

You can find more information on the internet at:

support.industry.siemens.com/cs/sc/2248

Contact information for your local Siemens office or national company is available on the internet at:

www.siemens.com/automation-contact

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Overview



Our understanding of an application is the customer-specific solution of an automation task based on standard hardware and software components. In this respect, industry knowledge and technological expertise are just as important as expert knowledge about how our products and systems work. We are setting ourselves this challenge with more than 280 application engineers in 20 countries.

Application centers

We currently have application centers in:

- Germany:
  Head Office in Erlangen and in other German regions, e.g. in Munich, Nuremberg, Stuttgart, Mannheim, Frankfurt, Chemnitz, Cologne, Bielefeld, Bremen, Hanover, Hamburg
- Belgium: Brussels
- Brazil: Sao Paulo
- China: Beijing and 12 regions
- Denmark: Ballerup
- France: Paris
- Great Britain: Manchester
- India: Mumbai
- Italy: Bologna, Milan
- Japan: Tokyo, Osaka
- The Netherlands: The Hague
- Austria: Vienna
- Poland: Warsaw
- Sweden: Göteborg
- Switzerland: Zurich, Lausanne
- Spain: Madrid
- South Korea: Seoul
- Taiwan: Taipei
- Turkey: Istanbul
- USA: Atlanta

These application centers specialize in the use of SIMATIC/SINAMICS. You therefore can rely on automation and drive specialists for implementing successful applications. By involving your personnel at an early stage in the process, we can provide a solid basis for rapid knowledge transfer, maintenance and further development of your automation solution.

Advice on applications and implementation

We offer a variety of consultation services to help you find the optimum solution for the SIMATIC/SINAMICS application you want to implement:

The quotation phase includes

- clarification of technical questions,
- discussion of machine concepts and customer-specific solutions,
- selection of suitable technology and
- suggestions for implementation.

A technical feasibility study is also performed at the outset. In this way, difficult points of the application can be identified and solved early on. We can also configure and implement your application as a complete solution from a single source.

A large number of proven standard applications are available for use during the implementation phase. This saves engineering costs.

The system can be commissioned by experienced, competent personnel, if required. This saves time and trouble.

If servicing is required, we can support you on site or remotely. For further information about servicing, please see the section "Industry Services".

On-site application training

Training for the implemented applications can also be organized and carried out on site. This training for machine manufacturers and their customers does not deal with individual products, but the entire hardware and software system (for example, automation, drives and visualization).

From an initial concept to successful installation and commissioning: We provide complete support for SIMATIC/SIMOTION/SINAMICS! Contact your Siemens representative.

You can find further information at
www.siemens.com/machinebuilding

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Overview

Siemens Product Partner for Drives Options

Individual options for our drives

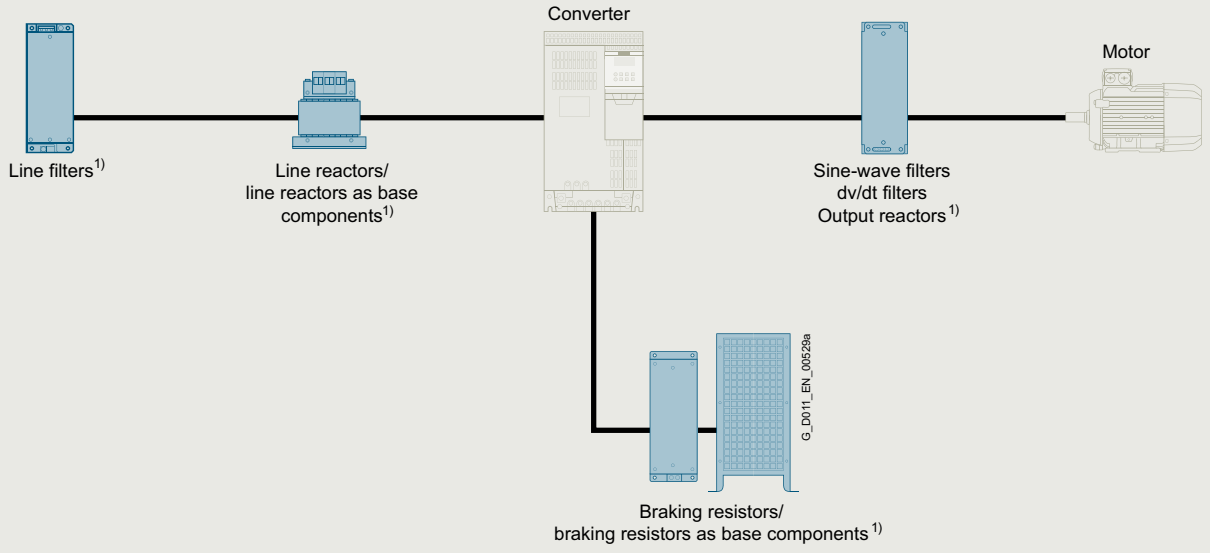
In order to meet as many customer requirements as possible in the field of drive technology, in addition to its own products, Siemens also relies on the individual and complementary services of selected partners.

We are increasingly focusing on the standard drive options, and our Siemens Product Partners for Drives Options supplement our drives with individual drive options.

This gives Siemens a unique flexibility to meet all application requirements. Naturally, we support our Siemens Product Partners for Drives Options in tailoring their options perfectly to our drives.

For you as our customer, there are multiple benefits:

- The Siemens Product Partners for Drives Options meet the same high standards of quality and performance that we place on our own products
- Drive options can be adapted to individual requirements/ designs
- The Siemens Product Partners for Drives Options know our Siemens converter portfolio and can advise you individually and quickly



1) Options that can be supplied from Siemens as well as from Product Partners for Drives Options.

Schematic circuit diagram

More information

You can find more information on the internet at
www.siemens.com/drives-options-partner

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Overview

mySupport documentation – Compiling personal documents



mySupport documentation is a web-based system for generating personalized documentation based on standard documents and is part of the Siemens Industry Online Support portal.

In mySupport, a personal document library can be created in the "Documentation" category. This library can be accessed online in mySupport or also be generated in various formats for offline use.

Previously, this functionality was available in the My Documentation Manager for configurable manuals. Due to the integration in mySupport, all entries of the Industry Online Support can now be imported into the personal document library, including FAQs or product notifications.

If you have already worked with the My Documentation Manager, all of the previously created libraries will continue to be available without restrictions in mySupport.

In addition, the personal library in mySupport can be shared with other mySupport users. In this way, a collection of relevant documents can be created very effectively and used together with other mySupport users all over the world.

You must register/log in for configuring and generating/ managing

Benefits

- Display
  View, print or download standard documents or personalized documents
- Configure
  Transfer standard documents or parts of them to personalized documents
- Generate/Manage
  Generate and manage personalized documents in the formats PDF, RTF or XML in all available languages

Function

Opening mySupport documentation in the Industry Online Support portal

- About the product support, entry type "Manual":
  https://support.industry.siemens.com/cs/ww/en/ps/man
  By clicking on the required version of the manual and then "Show and configure", the manual opens in a modular view, where you can navigate from topic to topic. Here the direct link to a topic can be used and made available to other users. The selected document can be added to the personal library via "mySupport Cockpit" > "Add to mySupport documentation".
- Via the direct link
  https://support.industry.siemens.com/my/ww/en/documentation/advanced
  After logon/registration, the online help is displayed as the current document.

More information

You can find additional information on the internet at

- https://support.industry.siemens.com/my/ww/en/documentation
- https://support.industry.siemens.com/cs/helpcenter/en/index.htm?#persoenliche_bibliothek_aufbauen.htm

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Overview

A high-quality programmable control or drive system can be used to maximum effect only if the user is aware of the performance of the products used as a result of intensive training and good technical documentation.

This is becoming more important due to the shorter innovation cycles of modern automation products and the convergence of electronics and mechanical engineering.

A comprehensive range of documentation is available which includes a Getting Started guide, operating instructions, installation manuals and a list manual.

In addition to technical information for SINUMERIK, SINAMICS and SIMOTICS, the documentation is available for downloading as a PDF file from the internet:

- SINUMERIK
  https://support.industry.siemens.com/cs/document/109766201
- SINAMICS
  https://support.industry.siemens.com/cs/document/109807358
- SIMOTICS
  https://support.industry.siemens.com/cs/document/109813641

Application

Explanations of the manuals:

- **Operating Instructions**
  contain all the information needed to install the device and make electrical connections, information about commissioning and a description of the converter functions.
  Phases of use: Control cabinet construction, commissioning, operation, maintenance and servicing.
- **Hardware Installation Manual**
  contains all relevant information about the intended use of the components of a system (technical specifications, interfaces, dimensional drawings, characteristics, or possible applications), information about installation and electrical connections and information about maintenance and servicing.
  Phases of use: Control cabinet configuration/construction, maintenance and servicing.
- **Operating and Installation Instructions**
  (for converter and accessories)
  contain all relevant information about the intended use of the components, such as technical specifications, interfaces, dimensional drawings, characteristics, or possible applications.
  Phases of use: Control cabinet configuration/construction.
- **Manual/Configuration Manual**
  contains all necessary information about the intended use of the components of a system, e.g. technical specifications, interfaces, dimensional drawings, characteristics, or possible applications.
  Phases of use: Cabinet configuration/setup, circuit diagram configuration/drawing.
- **Commissioning Manual**
  contains all information relevant to commissioning after installation and wiring. It also contains all safety and warning notices relevant to commissioning in addition to overview drawings.
  Phases of use: Commissioning of components that have already been connected, configuration of system functions.
- **List Manual**
  contains all parameters, function diagrams, and faults/alarms for the product/system as well as their meanings and setting options. It contains parameter data and fault/alarm descriptions with functional correlations.
  Phases of use: Commissioning of components that have already been connected, configuration of system functions, fault cause/diagnosis.
- **Getting Started**
  provides information about getting started for the first-time user as well as references to additional information. It contains information about the basic steps to be taken during commissioning. The information in the other documentation should be carefully observed for all of the other work required.
  Phases of use: Commissioning of components that have already been connected.
- **Function Manual Drive Functions**
  contains all the relevant information about individual drive functions: Description, commissioning and integration in the drive system.
  Phases of use: Commissioning of components that have already been connected, configuration of system functions.

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Appendix

15



15/2 Certificates of suitability

15/4 Software licenses

15/6 Conversion tables

15/8 Metal surcharges

15/11 Conditions of sale and delivery

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Certificates of suitability

Overview

Many of the products in this Catalog fulfill requirements, e.g. for UL, CSA or FM and are labeled with the corresponding approval designation.

All of the certificates of suitability, approvals, certificates, declarations of conformity, test certificates, e.g. CE, UL, Safety Integrated etc. have been performed with the associated system components as they are described in the Catalogs and Configuration Manuals.

The certificates are only valid if the products are used with the described system components, are installed according to the Installation Guidelines and used for their intended purpose.

In other cases, the vendor of these products is responsible for arranging for the issue of new certificates.

Test code	Tested by	Device series/ Component	Test standard	Product category/ File-No.
UL: Underwriters Laboratories ***Independent public testing body in North America***				
	UL according to UL standard	SINUMERIK	Standard UL 508, CSA C22.2 No. 142	NRAQ/7.E164110 NRAQ/7.E217227
		SIMOTION	Standard UL 508, CSA C22.2 No. 142	NRAQ/7.E164110
	UL according to CSA standard	SINAMICS	Standard UL 508, 508C, 61800-5-1 CSA C22.2 No. 142, 274	NRAQ/7.E164110, NMMS/2/7/8.E192450, NMMS/2/7/8.E203250, NMMS/7.E214113, NMMS/7.E253831
	UL according to UL and CSA standards			NMMS/2/7/8.E121068 NMMS/7.E355661 NMMS/7.E323473
	UL according to UL standard	SIMODRIVE	Standard UL 508C, CSA C22.2 No. 274	NMMS/2/7/8.E192450 NMMS/7.E214113
	UL according to CSA standard	SIMOTICS	Standard UL 1004-1, 1004-6, 1004-8, CSA C22.2 No. 100	PRGY2/8.E227215 PRHZ2/8.E93429 PRHJ2/8.E342747 PRGY2/8.E253922 PRHZ2/8.E342746
	UL according to UL and CSA standard			
		Line/motor reactors	Standard UL 508, 506, 5085-1, 5085-2, 1561, CSA C22.2 No. 14, 47, 66.1-06, 66.2-06	XQNX2/8.E257859 NMTR2/8.E219022 NMMS2/8.E333628 XPTQ2/8.E257852 XPTQ2/8.E103521 NMMS2/8.E224872 XPTQ2/8.E354316 XPTQ2/8.E198309 XQNX2/8.E475972
		Line filters, dv/dt filters, sine-wave filters	UL 1283, CSA C22.2 No. 8	FOKY2/8.E70122
		Resistors	UL 508, 508C, CSA C22.2 No. 14, 274	NMTR2/8.E224314 NMMS2/8.E192450 NMTR2/8.E221095 NMTR2/8.E226619
TUV: TUV Rheinland of North America Inc. ***Independent public testing body in North America, Nationally Recognized Testing Laboratory (NRTL)*** ***TÜV: TÜV SÜD Product Service*** ***Independent public testing body in Germany, Nationally Recognized Testing Laboratory (NRTL) for North America***				
	TUV according to UL and CSA standards	SINAMICS	NRTL Listing according to standard UL 508C	U7V 12 06 20078 013 U7 11 04 20078 009 U7 11 04 20078 010 U7 11 04 20078 011
		SIMOTION	NRTL Listing according to standard UL 508	U7V 13 03 20078 01
		SIMODRIVE	NRTL Listing according to standard UL 508C, CSA C22.2. No. 14	CU 72090702
		Motion Control Encoder	NRTL Listing according to UL 61010-1 CSA C22.2 No. 61010-1	U8V 10 06 20196 024

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Overview

Test code	Tested by	Device series/ Component	Test standard	Product category/ File-No.
CSA: Canadian Standards Association Independent public testing body in Canada				
	CSA according to CSA standard	SINUMERIK	Standard CSA C22.2 No. 142	2252-01 : LR 102527
FMRC: Factory Mutual Research Corporation Independent public testing body in North America				
	FM according to FM standard	SINUMERIK	Standard FMRC 3600, FMRC 3611, FMRC 3810, ANSI/ISA S82.02.1	–
EAC: Independent public testing body within the Eurasian Conformity Area				
	EAC in accordance with EAC Directive	SINAMICS SINUMERIK SIMOTION	Standard IEC 61800-5-1/-2, IEC 61800-3	–
RCM: Australian Communications and Media Authority Independent public testing body in Australia				
	RCM according to EMV standard	SINAMICS SINUMERIK SIMOTION	Standard IEC AS 61800-3, EN 61800-3	–
KC: National Radio Research Agency Independent public testing body in South Korea				
	KC according to EMV standard	SINAMICS SINUMERIK SIMOTION	Standard KN 11	–
BIA Federal Institute for Occupational Safety				
–	Functional safety	SINAMICS SINUMERIK SIMOTION	Standard EN 61800-5-2	–
TÜV SÜD Rail				
–	Functional safety	SINAMICS SINUMERIK SIMOTION	Standard EN 61800-5-2	–

More information about certificates can be found online at:
https://support.industry.siemens.com/cs/ww/en/ps/cert

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Software licenses

Overview

Software types

Software requiring a license is categorized into types.
The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of supply can be found in the readme file supplied with the relevant product(s).

License types

Siemens Digital Industries and Smart Infrastructure offers various types of software license:

- Floating license
- Single license
- Rental license
- Rental floating license
- Trial license
- Demo license
- Demo floating license

Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.
A license is required for each concurrent user.

Single license

Unlike the floating license, a single license permits only one installation of the software per license.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per instance, per axis, per channel, etc.

One single license is required for each type of use defined.

Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).
One license is required for each installation of the software.

Rental floating license

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

Demo license

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

Demo floating license

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Certificate of License (CoL)

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

Delivery versions

Software is constantly being updated.
The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.
A separate PowerPack must be purchased for each original license of the software to be replaced.

Upgrade

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.
The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.
A separate upgrade must be purchased for each original license of the software to be upgraded.

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Overview

ServicePack

ServicePacks are used to debug existing products. ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

License key

Siemens Digital Industries and Smart Infrastructure supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

Software Update Service (SUS)

As part of the SUS contract, all software updates for the respective product are made available to you free of charge for a period of one year from the invoice date. The contract will automatically be extended for one year if it is not canceled three months before it expires.

The possession of the current version of the respective software is a basic condition for entering into an SUS contract.

You can download explanations concerning license conditions from https://mall.industry.siemens.com/legal/ww/en/terms_of_trade_en.pdf

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Appendix

Conversion tables

Rotary inertia (to convert from A to B, multiply by entry in table)

A \ B	lb-in^2	lb-ft^2	lb-in-s^2	lb-ft-s^2 slug-ft^2	kg-cm^2	kg-cm-s^2	gm-cm^2	gm-cm-s^2	oz-in^2	oz-in-s^2
lb-in^2	1	6.94×10^{-3}	2.59×10^{-3}	2.15×10^{-4}	2.926	2.98×10^{-3}	2.92×10^{3}	2.984	16	4.14×10^{-2}
lb-ft^2	144	1	0.3729	3.10×10^{-2}	421.40	0.4297	4.21×10^{5}	429.71	2304	5.967
lb-in-s^2	386.08	2.681	1	8.33×10^{-2}	1.129×10^{3}	1.152	1.129×10^{6}	1.152×10^{3}	6.177×10^{3}	16
lb-ft-s^2 slug-ft^2	4.63×10^{3}	32.17	12	1	1.35×10^{4}	13.825	1.355×10^{7}	1.38×10^{4}	7.41×10^{4}	192
kg-cm^2	0.3417	2.37×10^{-3}	8.85×10^{-4}	7.37×10^{-5}	1	1.019×10^{-3}	1000	1.019	5.46	1.41×10^{-2}
kg-cm-s^2	335.1	2.327	0.8679	7.23×10^{-2}	980.66	1	9.8×10^{5}	1000	5.36×10^{3}	13.887
gm-cm^2	3.417×10^{-4}	2.37×10^{-6}	8.85×10^{-7}	7.37×10^{-8}	1×10^{-3}	1.01×10^{-6}	1	1.01×10^{-3}	5.46×10^{-3}	1.41×10^{-5}
gm-cm-s^2	0.335	2.32×10^{-3}	8.67×10^{-4}	7.23×10^{-5}	0.9806	1×10^{-3}	980.6	1	5.36	1.38×10^{-2}
oz-in^2	0.0625	4.34×10^{-4}	1.61×10^{-4}	1.34×10^{-5}	0.182	1.86×10^{-4}	182.9	0.186	1	2.59×10^{-3}
oz-in-s^2	24.13	0.1675	6.25×10^{-2}	5.20×10^{-3}	70.615	7.20×10^{-2}	7.09×10^{4}	72.0	386.08	1

Torque (to convert from A to B, multiply by entry in table)

A \ B	lb-in	lb-ft	oz-in	N-m	kg-cm	kg-m	gm-cm	dyne-cm
lb-in	1	8.333×10^{-2}	16	0.113	1.152	1.152×10^{-2}	1.152×10^{3}	1.129×10^{6}
lb-ft	12	1	192	1.355	13.825	0.138	1.382×10^{4}	1.355×10^{7}
oz-in	6.25×10^{-2}	5.208×10^{-3}	1	7.061×10^{-3}	7.200×10^{-2}	7.200×10^{-4}	72.007	7.061×10^{4}
N-m	8.850	0.737	141.612	1	10.197	0.102	1.019×10^{4}	1×10^{7}
kg-cm	0.8679	7.233×10^{-2}	13.877	9.806×10^{-2}	1	10^{-2}	1000	9.806×10^{5}
kg-m	86.796	7.233	1.388×10^{3}	9.806	100	1	1×10^{5}	9.806×10^{7}
gm-cm	8.679×10^{-4}	7.233×10^{-5}	1.388×10^{-2}	9.806×10^{-5}	1×10^{-3}	1×10^{-5}	1	980.665
dyne-cm	8.850×10^{-7}	7.375×10^{-8}	1.416×10^{-5}	10^{-7}	1.0197×10^{-6}	1.019×10^{-8}	1.019×10^{-3}	1

Length (to convert from A to B, multiply by entry in table)

A \ B	inches	feet	cm	yd	mm	m
inches	1	0.0833	2.54	0.028	25.4	0.0254
feet	12	1	30.48	0.333	304.8	0.3048
cm	0.3937	0.03281	1	1.09×10^{-2}	10	0.01
yd	36	3	91.44	1	914.4	0.914
mm	0.03937	0.00328	0.1	1.09×10^{-3}	1	0.001
m	39.37	3.281	100	1.09	1000	1

Power (to convert from A to B, multiply by entry in table)

A \ B	hp	Watts
hp (English)	1	745.7
(lb-in) (deg./s)	2.645×10^{-6}	1.972×10^{-3}
(lb-in) (r/min)	1.587×10^{-5}	1.183×10^{-2}
(lb-ft) (deg./s)	3.173×10^{-5}	2.366×10^{-2}
(lb-ft) (r/min)	1.904×10^{-4}	0.1420
Watts	1.341×10^{-3}	1

Force (to convert from A to B, multiply by entry in table)

A \ B	lb	oz	gm	dyne	N
lb	1	16	453.6	4.448×10^{5}	4.4482
oz	0.0625	1	28.35	2.780×10^{4}	0.27801
gm	2.205×10^{-3}	0.03527	1	1.02×10^{-3}	N.A.
dyne	2.248×10^{-6}	3.59×10^{-5}	980.7	1	0.00001
N	0.22481	3.5967	N.A.	100000	1

Mass (to convert from A to B, multiply by entry in table)

A \ B	lb	oz	gm	kg	slug
lb	1	16	453.6	0.4536	0.0311
oz	6.25×10^{-2}	1	28.35	0.02835	1.93×10^{-3}
gm	2.205×10^{-3}	3.527×10^{-2}	1	10^{-3}	6.852×10^{-5}
kg	2.205	35.27	10^{3}	1	6.852×10^{-2}
slug	32.17	514.8	1.459×10^{4}	14.59	1

Rotation (to convert from A to B, multiply by entry in table)

A \ B	r/min	rad/s	degrees/s
r/min	1	0.105	6.0
rad/s	9.55	1	57.30
degrees/s	0.167	1.745×10^{-2}	1

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Temperature Conversion

°F	°C	°C	°F
0	–17.8	–10	14
32	0	0	32
50	10	10	50
70	21.1	20	68
90	32.2	30	86
98.4	37	37	98.4
212	100	100	212
subtract 32 and multiply by $^5/_9$		multiply by $^9/_5$ and add 32	

Mechanism Efficiencies

Acme-screw with brass nut	~0.35–0.65
Acme-screw with plastic nut	~0.50–0.85
Ball-screw	~0.85–0.95
Chain and sprocket	~0.95–0.98
Preloaded ball-screw	~0.75–0.85
Spur or bevel-gears	~0.90
Timing belts	~0.96–0.98
Worm gears	~0.45–0.85
Helical gear (1 reduction)	~0.92

Friction Coefficients

Materials	μ
Steel on steel (greased)	~0.15
Plastic on steel	~0.15–0.25
Copper on steel	~0.30
Brass on steel	~0.35
Aluminum on steel	~0.45
Steel on steel	~0.58

Mechanism	μ
Ball bushings	<0.001
Linear bearings	<0.001
Dove-tail slides	~0.2++
Gibb ways	~0.5++

Material Densities

Material	lb-in^3	gm-cm^3
Aluminum	0.096	2.66
Brass	0.299	8.30
Bronze	0.295	8.17
Copper	0.322	8.91
Hard wood	0.029	0.80
Soft wood	0.018	0.48
Plastic	0.040	1.11
Glass	0.079–0.090	2.2–2.5
Titanium	0.163	4.51
Paper	0.025–0.043	0.7–1.2
Polyvinyl chloride	0.047–0.050	1.3–1.4
Rubber	0.033–0.036	0.92–0.99
Silicone rubber, without filler	0.043	1.2
Cast iron, gray	0.274	7.6
Steel	0.280	7.75

Wire Gauges[1)]

Cross-section mm^2	Standard Wire Gauge (SWG)	American Wire Gauge (AWG)
0.2	25	24
0.3	23	22
0.5	21	20
0.75	20	19
1.0	19	18
1.5	17	16
2.5	15	13
4	13	11
6	12	9
10	9	7
16	7	6
25	5	3
35	3	2
50	0	1/0
70	000	2/0
95	00000	3/0
120	0000000	4/0
150	–	6/0
185	–	7/0

[1)] The table shows approximate SWG/AWG sizes nearest to standard metric sizes; the cross-sections do not match exactly.

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Explanation of the raw material/metal surcharges[1)]

Surcharge calculation

To compensate for variations in the price of the raw materials silver, copper, aluminum, lead, gold, dysprosium[2)] and/or neodym[2)], surcharges are calculated on a daily basis using the so-called metal factor. These apply to products containing these raw materials and are calculated per raw material. These surcharges are added to the price of a product if the basic official price (BOP) of the raw material in question is exceeded.

Surcharges are calculated in accordance with the following criteria:

Basic official price (BOP) of the raw material

- BOP of the workday prior to receipt of the order or prior to release order (Daily Price) for:
  - Silver (processed) [3)]
  - Gold (processed) [3)]
  - Aluminum (temporary constant 360.31 EUR per 100 kg, due to loss of DEL-Notiz)
  - Copper per 100 kg (LME-notation/10, converted from USD to EUR using LME-FX-Rate [MTLE] +1.2%) + 1% [4)]
  - Lead (constant 199.50 EUR per 100 kg)
- If BOP is suspended, the last one is used.

Metal factor of the products

Certain products are displayed with a metal factor. The metal factor determines the official price (for those raw materials concerned) as of which the metal surcharges are applied and the calculation method used (weight or percentage method). An exact explanation is given below.

Structure of the metal factor

Metal factor consists of several digits; the first digit indicates whether the percentage method of calculation refers to the list price or a discounted price (customer net price) (L = list price / N = customer net price).

The remaining digits indicate the method of calculation used for the respective raw material. If no surcharge is added for a raw material, a "-" is used.

1st digit	List or customer net price using the percentage method
2nd digit	for silver (AG)
3rd digit	for copper (CU)
4th digit	for aluminum (AL)
5th digit	for lead (PB)
6th digit	for gold (AU)
7th digit	for dysprosium (Dy)[2)]
8th digit	for neodym (Nd)[2)]

Weight method

The weight method uses the BOP, the daily price and the raw material weight. In order to calculate the surcharge, the BOP must be subtracted from the daily price. The difference is then multiplied by the raw material weight.

The BOP can be found in the table below using the number (1 to 9) of the respective digit of the metal factor. The raw material weight can be found in the respective product descriptions.

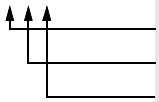
Percentage method

Use of the percentage method is indicated by the letters A-Z at the respective digit of the metal factor.

The surcharge is increased - dependent on the deviation of the daily price compared with the BOP - using the percentage method in "steps" and consequently offers surcharges that remain constant within the framework of this "step range". A higher percentage rate is charged for each new step. The respective percentage level can be found in the table below.

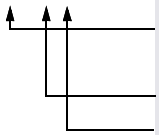
Metal factor examples

L E A – – – – –



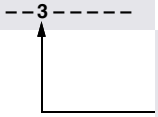
Basis for % surcharge: List price
Silver Basis 150 €, Step 50 €, 0.5 %
Copper Basis 150 €, Step 50 €, 0.1 %
No surcharge for aluminum
No surcharge for lead
No surcharge for gold
No surcharge for dysprosium
No surcharge for neodym

N – A 6 – – – –



Basis for % surcharge: Customer net price
No surcharge for silver
Copper Basis 150 €, Step 50 €, 0.1 %
Aluminum acc. to weight, basic offic. price 225 €
No surcharge for lead
No surcharge for gold
No surcharge for dysprosium
No surcharge for neodym

– – 3 – – – – –



No basis necessary
No surcharge for silver
Copper acc. to weight, basic official price 150 €
No surcharge for aluminum
No surcharge for lead
No surcharge for gold
No surcharge for dysprosium
No surcharge for neodym

1) Refer to the separate explanation on the next page regarding the raw materials dysprosium and neodym (= rare earths).
2) For a different method of calculation, refer to the separate explanation for these raw materials on the next page.
3) Source: Umicore, Hanau (www.metalsmanagement.umicore.com).
4) Source: The London Metal Exchange – an HKEX Company (https://www.lme.com/).
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Explanation of the raw material/metal surcharges for dysprosium and neodym (rare earths)

Surcharge calculation

To compensate for variations in the price of the raw materials silver[1], copper[1], aluminum[1], lead[1], gold[1], dysprosium and/or neodym, surcharges are calculated on a daily basis using the so-called metal factor. This applies to products containing at least one of these raw materials. The surcharge for dysprosium and neodym is calculated as a supplement to the price of a product if the basic official price (BOP) of the raw material in question is exceeded.

The surcharge is calculated in accordance with the following criteria:

- Basic official price (BOP) of the raw material[2]
  Three-month basic average price (see below) in the period before the quarter in which the order was received or the release order took place (average official price) for
  - Dysprosium (Dy metal, 99 % min. FOB China; USD/kg)
  - Neodym (Nd metal, 99 % min. FOB China; USD/kg)
- Metal factor of the products
  Certain products are displayed with a metal factor. The metal factor indicates (for those raw materials concerned) the BOP as of which the surcharges for dysprosium and neodym are calculated using the weight method. An exact explanation of the metal factor is given below.

Three-month average price

The prices of rare earths vary according to the foreign currency, and there is no freely accessible stock exchange listing. This makes it more difficult for all parties involved to monitor changes in price. In order to avoid continuous adjustment of the surcharges, but to still ensure fair, transparent pricing, an average price is calculated over a three-month period using the average monthly foreign exchange rate from USD to EUR (source: European Central Bank). Since not all facts are immediately available at the start of each month, a one-month buffer is allowed before the new average price applies.

Examples of calculation of the average official price:

Period for calculation of the average price:	Period during which the order/release order is effected and the average price applies:
Sep 2012 - Nov 2012	Q1 in 2013 (Jan - Mar)
Dec 2012 - Feb 2013	Q2 in 2013 (Apr - Jun)
Mar 2013 - May 2013	Q3 in 2013 (Jul - Sep)
Jun 2013 - Aug 2013	Q4 in 2013 (Oct - Dec)

Structure of the metal factor

The metal factor consists of several digits; the first digit is not relevant to the calculation of dysprosium and neodym.

The remaining digits indicate the method of calculation used for the respective raw material. If no surcharge is added for a raw material, a "-" is used.

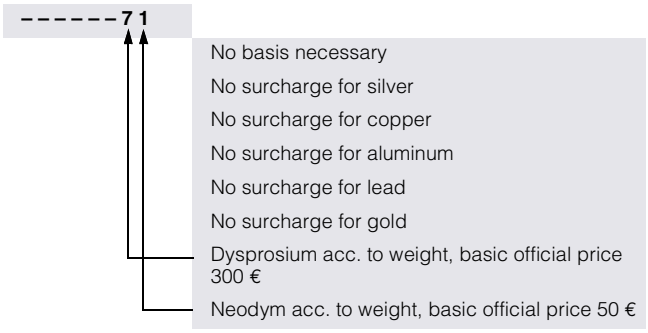
1st digit	List or customer net price using the percentage method
2nd digit	for silver (AG)[1]
3rd digit	for copper (CU)[1]
4th digit	for aluminum (AL)[1]
5th digit	for lead (PB)[1]
6th digit	for gold (AU)[1]
7th digit	for dysprosium (Dy)
8th digit	for neodym (Nd)

Weight method

The weight method uses the basic official price, the average price and the raw material weight. In order to calculate the surcharge, the BOP must be subtracted from the average price. The difference is then multiplied by the raw material weight.

The basic official price can be found in the table below using the number (1 to 9) of the respective digit of the metal factor. Your Sales contact can inform you of the raw material weight.

Metal factor examples



[1] For a different method of calculation, refer to the separate explanation for these raw materials on the previous page.

[2] Source: Asian Metal Ltd (www.asianmetal.com)

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Metal surcharges

Values of the metal factor

Percentage method	Basic official price in €	Step range in €	% surcharge 1st step	% surcharge 2nd step	% surcharge 3rd step	% surcharge 4th step	% surcharge per additional step
			Price in €	Price in €	Price in €	Price in €	
			150.01 - 200.00	200.01 - 250.00	250.01 - 300.00	300.01 - 350.00	
A	150	50	0.1	0.2	0.3	0.4	0.1
B	150	50	0.2	0.4	0.6	0.8	0.2
C	150	50	0.3	0.6	0.9	1.2	0.3
D	150	50	0.4	0.8	1.2	1.6	0.4
E	150	50	0.5	1.0	1.5	2.0	0.5
F	150	50	0.6	1.2	1.8	2.4	0.6
G	150	50	1.0	2.0	3.0	4.0	1.0
H	150	50	1.2	2.4	3.6	4.8	1.2
I	150	50	1.6	3.2	4.8	6.4	1.6
J	150	50	1.8	3.6	5.4	7.2	1.8
			175.01 - 225.00	225.01 - 275.00	275.01 - 325.00	325.01 - 375.00	
O	175	50	0.1	0.2	0.3	0.4	0.1
P	175	50	0.2	0.4	0.6	0.8	0.2
R	175	50	0.5	1.0	1.5	2.0	0.5
			225.01 - 275.00	275.01 - 325.00	325.01 - 375.00	375.01 - 425.00	
S	225	50	0.2	0.4	0.6	0.8	0.2
U	225	50	1.0	2.0	3.0	4.0	1.0
V	225	50	1.0	1.5	2.0	3.0	1.0
W	225	50	1.2	2.5	3.5	4.5	1.0
			150.01 - 175.00	175.01 - 200.00	200.01 - 225.00	225.01 - 250.00	
Y	150	25	0.3	0.6	0.9	1.2	0.3
			400.01 - 425.00	425.01 - 450.00	450.01 - 475.00	475.01 - 500.00	
Z	400	25	0.1	0.2	0.3	0.4	0.1
	Price basis (1st digit)						
L	Calculation based on the list price						
N	Calculation based on the customer net price (discounted list price)						
Weight method	**Basic official price in €**						
1	50	Calculation based on raw material weight					
2	100						
3	150						
4	175						
5	200						
6	225						
7	300						
8	400						
9	555						
Miscellaneous							
-	No metal surcharge						

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1. General Provisions

By using this catalog you can purchase hard- and software products as well as services (together hereinafter referred to as "products") described therein from Siemens Aktiengesellschaft subject to the following Terms and Conditions of Sale and Delivery (hereinafter referred to as "T&C"). Note, for products purchased from any Siemens entity having a registered office outside of Germany, the respective terms and conditions of sale and delivery of the respective Siemens entity apply exclusively. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

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For customers with a seat or registered office in European Union, the following terms and conditions apply subordinate to T&C:

- for products, which include specific terms and conditions in the text of the product description, these specific terms and conditions shall apply and subordinate thereto,,
- for stand-alone software products and software products forming a part of a product or project, the "General Conditions for Software Products for Infrastructure & Industry Business (German law)"[1] and/or
- for consulting services the "Allgemeine Geschäftsbedingungen für Beratungsleistungen für Infrastructure & Industry Geschäft (Deutsches Recht)"[1] (available only in German) and/or
- for other services, the „Supplementary Terms and Conditions for Services for Infrastructure & Industry Business (German Law) ("BL")"[1] and/or
- for other products the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"[1].
  In case such products should contain Open Source Software, the conditions of which shall prevail over the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"[1], the Product will be given a note as to which special conditions apply to this open source software. This shall apply mutatis mutandis for notices referring to other third-party software components.

1.2 For customers with a seat or registered office outside European Union

For customers with a seat or registered office outside European Union, the following terms and conditions apply subordinate to T&C:

- for products, which include specific terms and conditions in the description text, these specific terms and conditions shall apply and subordinate thereto,
- for consulting services the "Standard Terms and Conditions for Consulting Services for Infrastructure & Industry Business (Swiss Law)"[1] and/or
- for other services the "International Terms & Conditions for Services"[1] supplemented by "Software Licensing Conditions"[1] and/or
- for other products the "International Terms & Conditions for Products"[1] supplemented by "Software Licensing Conditions"[1]

1.3 For customers with master or framework agreement

To the extent products offered are covered by an existing master or framework agreement, the terms and conditions of that agreement shall apply instead of T&C.

2. Prices

The prices are in € (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

Prices are subject to change without prior notice. We will charge the prices valid at the time of delivery.

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials.
A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation. The metal factor, provided it is relevant, can be found in the respective product description.

You will find a detailed explanation of the metal factor on the page headed "Metal surcharges".

To calculate the surcharge (except in the cases of copper, dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to copper, the official price from two days prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to dysprosium and neodym ("rare earths"), the corresponding three-month basic average price in the quarter prior to that in which the order was received or the release order was effected is used with a one-month buffer (details on the calculation can be found in the explanation of the metal factor).

3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog – especially with regard to data, dimensions and weights given – these are subject to change without prior notice.

[1] The text of the Terms and Conditions of Siemens AG can be downloaded at https://mall.industry.siemens.com/legal/ww/en/terms_of_trade_en.pdf

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4. Export Control and Sanctions Compliance

4.1 General

Customer shall comply with all applicable sanctions, embargoes and (re-)export control laws and regulations, and, in any event, with those of the European Union, the United States of America and any locally applicable jurisdiction (collectively "Export Regulations").

4.2 Checks for Products

Prior to any transaction by customer concerning products (including hardware, documentation and technology) delivered by Siemens, or products (including maintenance and technical support) performed by Siemens with a third party, customer shall check and certify by appropriate measures that

- (i) the customer's use, transfer, or distribution of such products, the brokering of contracts or the provision of other economic resources in connection with products will not be in violation of any Export Regulations, also taking into account any prohibitions to circumvent these (e.g., by undue diversion)
- (ii) the products are not intended or provided for prohibited or unauthorized non-civilian purposes (e.g. armaments, nuclear technology, weapons, or any other usage in the field of defense and military);
- (iii) customer has screened all direct and indirect parties involved in the receipt, use, transfer, or distribution of the products against all applicable restricted party lists of the Export Regulations concerning trading with entities, persons and organizations listed therein and
- (iv) products within the scope of items-related restrictions, as specified in the respective annexes to the Export Regulations, will not, unless permitted by the Export Regulations, be
  (a) exported, directly or indirectly (e.g., via Eurasian Economic Union (EAEU) countries), to Russia or Belarus, or
  (b) resold to any third party business partner that does not take a prior commitment not to export such products to Russia or Belarus.

4.3 Non-Acceptable Use of Software and Cloud Services

Customer shall not, unless permitted by the Export Regulations or respective governmental licenses or approvals,

(i) download, install, access or use the products from or in any location prohibited by or subject to comprehensive sanctions or subject or to license requirements according to the Export Regulations;
(ii) grant access to, transfer, (re-)export (including any "deemed (re-)exports"), or otherwise make available the products to any entity, person, or organization identified on a restricted party list of the Export Regulations;
(iii) use the products for any purpose prohibited by the Export Regulations (e.g. use in connection with armaments, nuclear technology or weapons);
(iv) upload to a products platform any customer content unless it is non-controlled (e.g. in the EU: AL = N;
in the U.S.: ECCN = N or EAR99);
(v) facilitate any of the afore mentioned activities by any user.
Customer shall provide all users with all information necessary to ensure compliance with the Export Regulations.

4.4 Semiconductor Development

Customer will not, without advance written authorization from Siemens, use offerings for the development or production of integrated circuits at any semiconductor fabrication facility located in China meeting the criteria specified in the U.S. Export Administration Regulations, 15 C.F.R. 744.23.

4.5 Information

Upon request by Siemens, customer shall promptly provide Siemens with all information pertaining to users, the intended use and the location of use or the final destination (in the case of hardware, documentation and technology) of the products. Customer will notify Siemens prior to customer disclosing any information to Siemens that is defense-related or requires controlled or special data handling pursuant to applicable government regulations, and will use the disclosure tools and methods specified by Siemens.

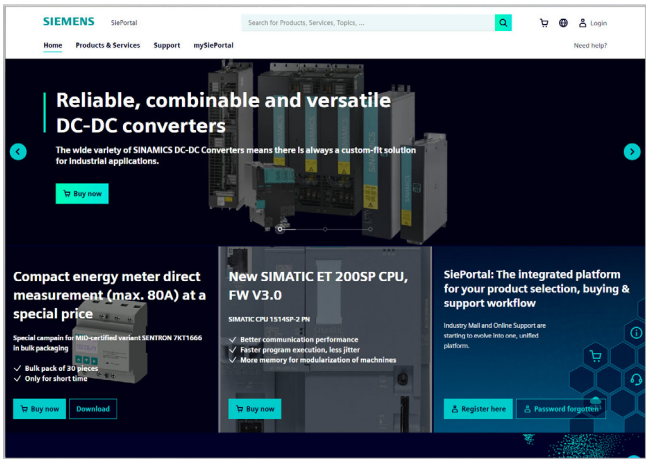
4.6 Reservation

Siemens shall not be obligated to fulfill this agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes or other sanctions. Customer acknowledges that Siemens may be obliged under the Export Regulations to limit or suspend access by customer and/or users to products.

5. Miscellaneous

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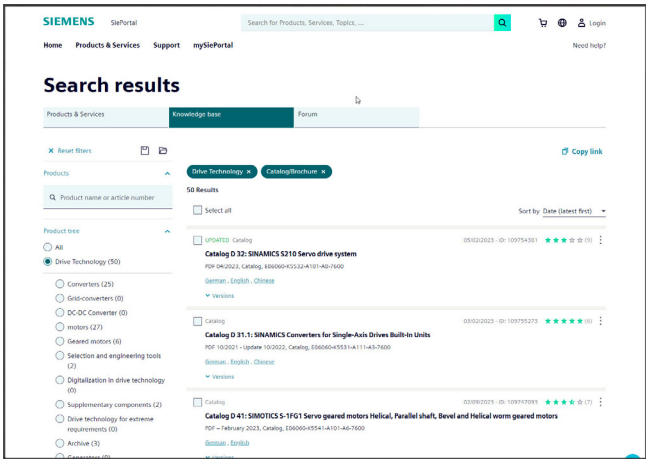
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Cybersecurity information

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In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens' products and solutions constitute one element of such a concept.

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