

Milano, 9 Maggio 2008

### XMPA – Azionamenti a velocità variabile

#### **Oggetto:** Sinamics S120 Compact

Con effetto immediato è rilasciato alla vendita il Sinamics S120 Compact; la struttura è identica al Booksize (alimentatore Line Module + Motor Module) ma si contraddistingue per le dimensioni estremamente (altezza e profondità corrispondono a quelle della CU320) compatte. Il prodotto nasce per soddisfare le esigenze di tutti quei clienti che hanno la necessità di allestire il quadro elettrico nella parte sottostante della macchina, dove diventa importante il fattore altezza, o comunque per tutte le applicazioni dove lo spazio nel quadro è ridotto. La gamma di potenze disponibile (alimentatore e moduli potenza) è limitata come range rispetto al S120 Booksize. S120 Compact è inserito nel nuovo catalogo PM21 – 2008 e nel Sizer 2.9. Tutti i componenti opzionali del Booksize sono utilizzabili anche con il Booksize Compact.



Smart Line Module		
16 kW	6SL3430-6TE21-6AA0	
Single Motor Modules		
3 A	6SL3420-1TE13-0AA0	
5 A	6SL3420-1TE15-0AA0	
9 A	6SL3420-1TE21-0AA0	
18 A	6SL3420-1TE21-8AA0	
Double Motor Modules		
2x 1.7 A	6SL3420-2TE11-7AA0	
2x 3 A	6SL3420-2TE13-0AA0	
2x 5A	6SL3420-2TE15-0AA0	

#### Overview



Smart Line Modules are non-regulated feed/feedback units (diode bridge for incoming supply; line-commutated feedback via IGBTs) with 100 % 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-neutral (TN, TT) and non-grounded (IT) supply systems.

The DC link is pre-charged via integrated precharging resistors.

The associated line reactor is absolutely essential for operating a Smart Line Module.

#### Design

Smart Line Modules in compact booksize format feature the following connections and interfaces as standard:

- 1 power connection via screw-type terminals
- 1 connection for the 24 V DC electronic 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 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 Control Unit on the immediate left for drive control
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- DRIVE-CLiQ cable (length depends on module width) to connect Smart Line Modules to adjacent Motor Module
- 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
- 1 set of warning signs in foreign languages
- 1 heat conducting foil

# SINAMICS S120

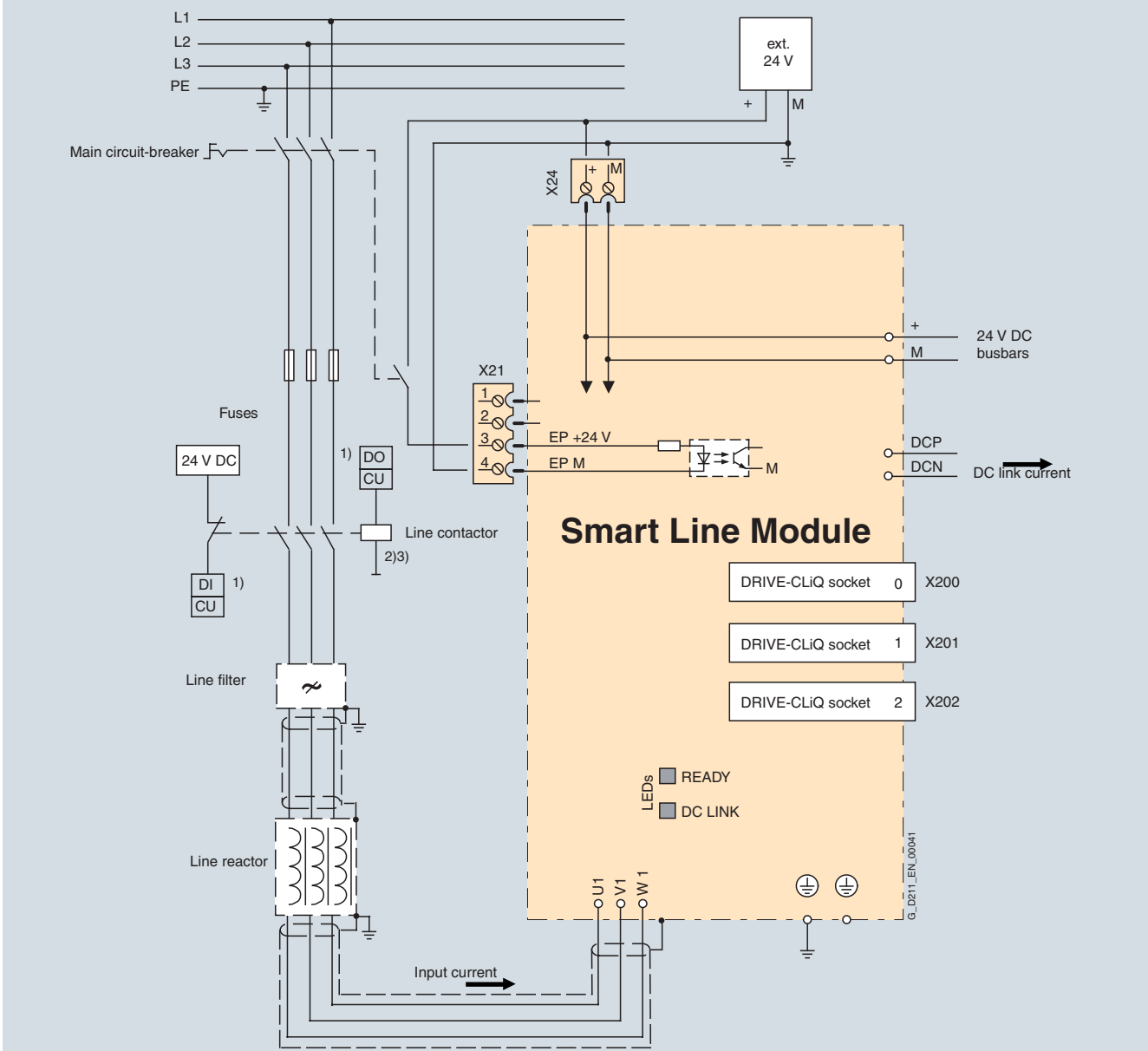
## Line Modules and line-side components

### Smart Line Modules in compact booksize format

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#### Integration

The Smart Line Module communicates with a CU320 or SIMOTION D4x5 Control Unit via DRIVE-CLiQ.



- 1) Digital input (DI) or digital output (DO), controlled via Control Unit.
- 2) No additional load permitted downstream of the line contactor.
- 3) The current load of the digital output (DO) must be observed; an output interface may have to be used.

Connection example of a Smart Line Modules in compact booksize format

# SINAMICS S120

## Line Modules and line-side components

Smart Line Modules in compact booksize format

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### Technical data

General technical data	
<b>Electrical data</b>	
<b>Line connection voltage</b> (up to 2000 m (6562 ft) above sea level)	380 ... 480 V 3 AC $\pm 10\%$ (-15 % < 1 min) <sup>1)</sup>
<b>Power frequency</b>	47 ... 63 Hz
<b>Line Power factor</b> at rated power	
• Fundamental Power factor ( $\cos \varphi_1$ )	> 0.96
• Total ( $\lambda$ )	0.65 ... 0.90
<b>Overvoltage category</b> according to EN 60664-1	Class III
<b>DC link voltage, approx.</b>	1.35 x line voltage <sup>2)</sup>
<b>Electronic power supply</b>	24 V DC, -15 %/+20 %
<b>Radio Interference suppression</b>	
• Standard	No interference suppression
• With line filter	Category C2 to EN 61800-3 up to 350 m (1148 ft) total cable length (shielded)
<b>Ambient conditions</b>	
<b>Type of cooling</b>	The devices are designed so that <ul style="list-style-type: none"> <li>- internal air cooling (power units with increased air cooling by built-in fans) or</li> <li>- cold plate cooling is possible</li> </ul>
<b>Permissible ambient and coolant temperature (air)</b> 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
<b>Site altitude</b>	Up to 1000 m (3281 ft) above sea level without derating, > 1000 ... 4000 m (3281 ... 13124 ft) above sea level see derating characteristics
<b>Certificates</b>	
<b>Conformity</b>	CE (low-voltage and EMC Directives)
<b>Approvals</b>	cULus available soon

<sup>1)</sup> Can also be operated on supply systems with 200 ... 240 V 3 AC  $\pm 10\%$  with appropriate parameterization and reduced output.

<sup>2)</sup> The DC link voltage is unregulated and load-dependent. For further information see System Description.

# SINAMICS S120

## Line Modules and line-side components

### Smart Line Modules in compact booksize format

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#### Technical data (continued)

<b>Line voltage</b> 380 ... 480 V 3 AC	<b>Smart Line Modules</b> <b>in compact booksize format</b>
<b>Internal air cooling/ cold plate cooling</b>	<b>6SL3430-6TE21-6AA0</b>
<b>Feed/feedback power</b>	
• Rated power $P_{rated}$ with 380 V 3 AC	16 (21.5) kW (HP)
• for S6 duty (40 %) $P_{S6}$	21 (28.2) kW (HP)
• $P_{max}$	35 (46.9) kW (HP)
<b>DC link current</b>	
• at 600 V DC	27 A
• for S6 duty (40 %)	35 A
• Maximum	59 A
<b>Input current</b>	
• Rated current at 380 V 3 AC	26 A
• for S6 duty (40 %)	35 A
• Maximum	59 A
<b>Current requirement</b> 24 V DC electronics power supply, max.	
	1.1 A
<b>Current carrying capacity</b>	
• 24 V DC busbars	20 A
• DC link busbars	100 A
<b>DC link capacitance</b>	
• Smart Line Module	705 $\mu$ F
• Drive line-up, max.	6000 $\mu$ F
<b>Power loss <sup>1)</sup></b>	
• with internal air cooling	0.19 (0.25) kW (HP)
• with cold plate cooling, int./ext.	0.06/0.13 (0.08/0.17) kW (HP)
• Thermal resistance $R_{th}$	0.1 K/W
<b>Cooling air requirement</b>	
	0.016 m <sup>3</sup> /s
<b>Sound pressure level <math>L_{pA}</math></b> <b>(1 m (3.28 ft))</b>	
	< 60 dB
<b>Line connection</b> U1, V1, W1	
	Screw-type terminals (X1)
• Conductor cross-section, max.	2.5 ... 10 mm <sup>2</sup>
<b>Shield connection</b>	
	Shield connection plate integrated into the connector
<b>PE connection</b>	
	M5 screw
<b>Cable length, max.</b> (total of all motor cables and DC link) <sup>2)</sup>	
• Shielded	350 (1148) m (ft)
• Unshielded	560 (1837) m (ft)
<b>Degree of protection</b>	
	IP20
<b>Dimensions</b>	
• Width	100 (3.94) mm (in)
• Height	270 (10.6) mm (in)
• Depth	226 (8.90) mm (in)
<b>Weight, approx.</b>	
	5.3 (11.7) kg (lb)

<sup>1)</sup> Power loss of Smart Line Module at rated output including losses of 24 V DC electronic power supply.

<sup>2)</sup> Max. cable lengths in conjunction with Voltage Clamping Module, see "Derating characteristics".

#### Selection and ordering data

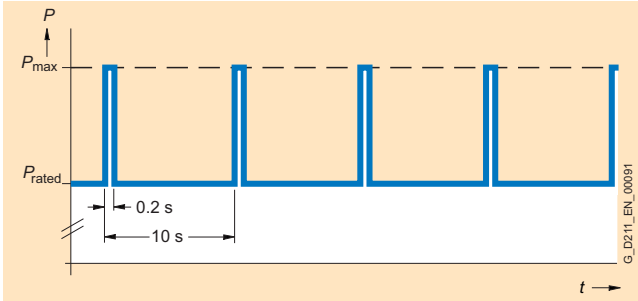
Rated power	<b>Smart Line Module</b> <b>in compact booksize</b> <b>format</b>
kW (HP)	<b>Internal air cooling</b> Order No.
<b>Line voltage 380 ... 480 V 3 AC</b>	
16 (21.5)	<b>6SL3430-6TE21-6AA0</b>

#### Accessories

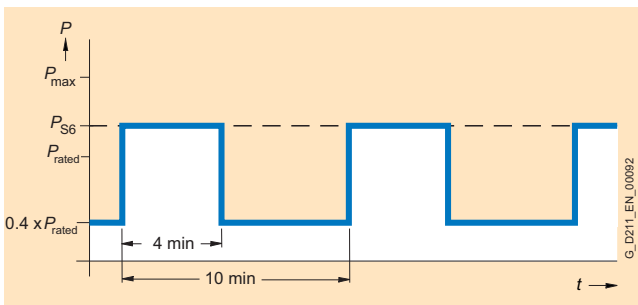
Description	Order No.
<b>DC link supply adapter</b> for direct infeed of DC link voltage	
• Screw-type terminals 0.5 to 10 mm <sup>2</sup> for Line Modules and Motor Modules in booksize format with a width of 50 mm (1.97 in) or 100 mm (3.94 in)	<b>6SL3162-2BD00-0AA0</b>
<b>DC link adapters (2 units)</b> for multi-tier configuration Screw-type terminals 35 to 95 mm <sup>2</sup> for all Line Modules and Motor Modules in booksize format	<b>6SL3162-2BM01-0AA0</b>
<b>24 V terminal adapter</b> for all Line Modules and Motor Modules in booksize format	<b>6SL3162-2AA00-0AA0</b>
<b>24 V jumper</b> for connection of the 24 V busbars (for booksize format)	<b>6SL3162-2AA01-0AA0</b>
<b>Warning signs in foreign languages</b>	<b>6SL3166-3AB00-0AA0</b>
This set foreign language warning signs can be placed on top of the standard German or English signs. One set of labels is supplied with the devices. The following languages are available in each label set:	
Chinese Simplified	Polish
Danish	Portuguese/
Dutch	Brazilian
Finnish	Russian
French	Swedish
Greek	Spanish
Italian	Czech
Japanese	Turkish
Korean	

### Characteristic curves

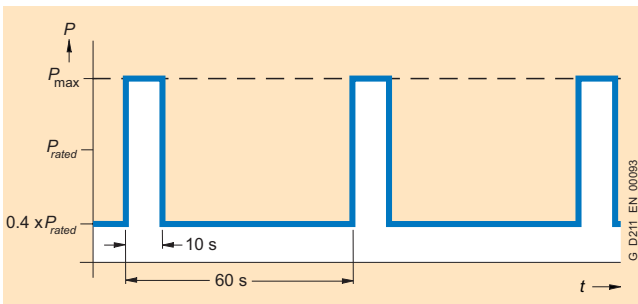
#### Overload capability



Load cycle with initial load

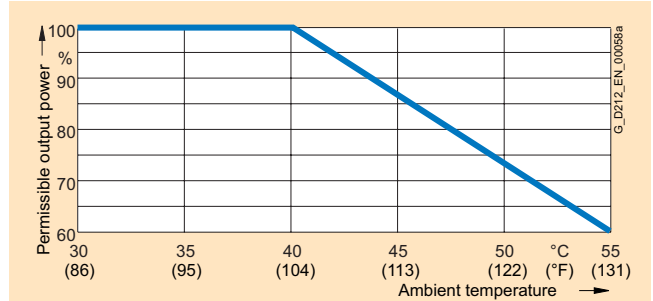


S6 load cycle with initial load

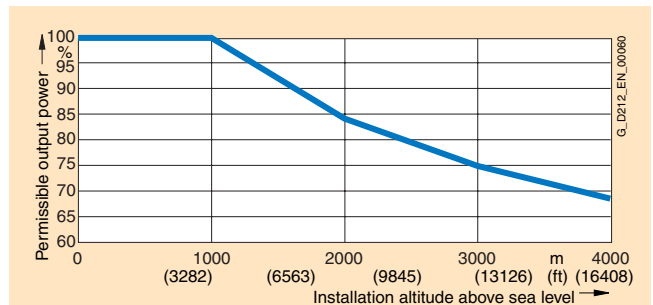


S6 load cycle with initial load

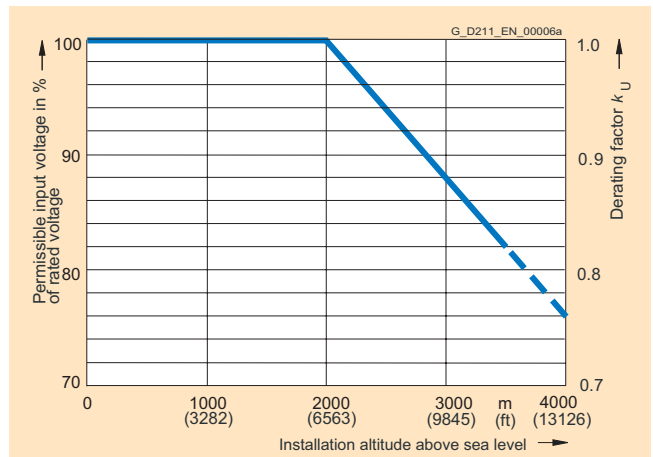
#### Derating characteristics



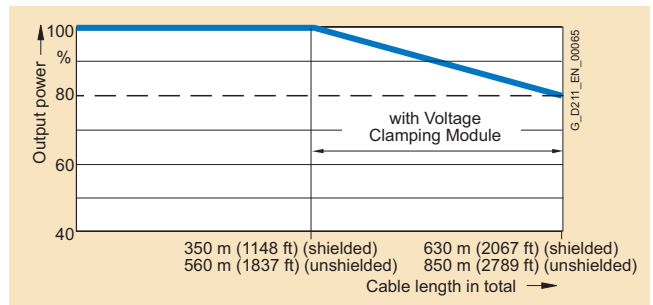
Output power dependent on ambient temperature



Output power dependent on installation altitude



Voltage derating dependent on installation altitude



Output power dependent on total cable length

# SINAMICS S120

## Line Modules and line-side components

Smart Line Modules in booksize format  
Line reactors

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### Overview



Smart Line Modules are not warranted to operate without the specified line reactors. 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	Suitable for Smart Line Module in booksize or compact booksize format	Line reactor
kW (HP)		Order No.
<b>Line voltage 380 ... 480 V 3 AC</b>		
5 (6.71)	6SL3130-6AE15-0AB0 6SL3131-6AE15-0AA0 6SL3136-6AE15-0AA0	<b>6SL3000-OCE15-0AA0</b>
10 (13.4)	6SL3130-6AE21-0AB0 6SL3131-6AE21-0AA0 6SL3136-6AE21-0AA0	<b>6SL3000-OCE21-0AA0</b>
16 (21.5)	6SL3130-6TE21-6AA3 6SL3430-6TE21-6AA0	<b>6SL3000-OCE21-6AA0</b>
36 (48.3)	6SL3130-6TE23-6AA3	<b>6SL3000-OCE23-6AA0</b>

### Technical data

Line voltage 380 ... 480 V 3 AC		Line reactor 6SL3000-OCE15-0AA0	6SL3000-OCE21-0AA0	6SL3000-OCE21-6AA0	6SL3000-OCE23-6AA0
<b>Rated current</b>	A	14	28	35	69
<b>Power loss</b>	kW (HP)	0.062 (0.08)	0.116 (0.16)	0.11 (0.15)	0.17 (0.23)
<b>Line/load connection</b> 1U1, 1V1, 1W1 / 1U2, 1V2, 1W2		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm <sup>2</sup>	4	10	10	16
<b>PE connection</b>		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm <sup>2</sup>	4	10	10	16
<b>Degree of protection</b>		IP20	IP20	IP20	IP20
<b>Dimensions</b>					
• Width	mm (in)	150 (5.91)	177 (6.97)	219 (8.62)	228 (8.98)
• Height	mm (in)	175 (6.89)	196 (7.72)	180 (7.09)	235 (9.25)
• Depth	mm (in)	70 (2.76)	110 (4.33)	144 (5.67)	224 (8.82)
<b>Weight, approx.</b>	kg (lb)	3.7 (8.16)	7.5 (16.5)	9.5 (20.9)	17 (37.5)
<b>Approvals</b>		cURus	cURus	cURus	cURus
<b>Suitable for Smart Line Module in booksize or compact booksize format</b>	Type	6SL3130-6AE15-0AB0 6SL3131-6AE15-0AA0 6SL3136-6AE15-0AA0	6SL3130-6AE21-0AB0 6SL3131-6AE21-0AA0 6SL3136-6AE21-0AA0	6SL3130-6TE21-6AA3 6SL3430-6TE21-6AA0	6SL3130-6TE23-6AA3
• Rated infeed power of the Smart Line Module	kW (HP)	5 (6.71)	10 (13.4)	16 (21.5)	36 (48.3)

# SINAMICS S120

## Line Modules and line-side components

### Smart Line Modules in booksize format

#### Line filters

#### 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. Line filters are suited only for direct connection to TN (grounded) systems.

#### Selection and ordering data

Rated infeed power of the Smart Line Module kW (HP)	Suitable for Smart Line Module in booksize or compact booksize format	Line filter Order No.
<b>Line voltage 380 ... 480 V 3 AC</b>		
5 (6.71)	6SL3130-6AE15-0AB0 6SL3131-6AE15-0AA0 6SL3136-6AE15-0AA0	<b>6SL3000-0HE15-0AA0</b>
10 (13.4)	6SL3130-6AE21-0AB0 6SL3131-6AE21-0AA0 6SL3136-6AE21-0AA0	<b>6SL3000-0HE21-0AA0</b>
16 (21.5)	6SL3130-6TE21-6AA3 6SL3430-6TE21-6AA0	<b>6SL3000-0BE21-6DA0</b>
36 (48.3)	6SL3130-6TE23-6AA3	<b>6SL3000-0BE23-6DA0</b>

#### Technical data

Line voltage 380 ... 480 V 3 AC		Line filter			
		6SL3000-0HE15-0AA0	6SL3000-0HE21-0AA0	6SL3000-0BE21-6DA0	6SL3000-0BE23-6DA0
<b>Rated current</b>	A	16	25	36	65
<b>Power loss</b>	W (HP)	20 (0.027)	20 (0.027)	6 (0.008)	10 (0.013)
<b>Line/load connection</b> L1, L2, L3 / U, V, W		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm <sup>2</sup>	10	10	10	35
<b>PE connection</b>		M6 screw stud	M6 screw stud	M6 screw stud	M6 screw stud
<b>Degree of protection</b>		IP20	IP20	IP20	IP20
<b>Dimensions</b>					
• Width	mm (in)	60 (2.36)	60 (2.36)	50 (1.97)	75 (2.95)
• Height	mm (in)	285 (11.22)	285 (11.22)	420 (16.54)	420 (16.54)
• Depth	mm (in)	122 (4.80)	122 (4.80)	226 (8.90)	226 (8.90)
<b>Weight, approx.</b>	kg (lb)	3.8 (8.38)	5.7 (12.6)	5.0 (11.0)	6.5 (14.3)
<b>Approvals</b>		cURus (File No.: E70122)	cURus (File No.: E70122)	cURus (File No.: E70122)	cURus (File No.: E70122)
<b>Suitable for Smart Line Module in booksize or compact booksize format</b>	Type	6SL3130-6AE15-0AB0 6SL3131-6AE15-0AA0 6SL3136-6AE15-0AA0	6SL3130-6AE21-0AB0 6SL3131-6AE21-0AA0 6SL3136-6AE21-0AA0	6SL3130-6TE21-6AA3 6SL3430-6TE21-6AA0	6SL3130-6TE23-6AA3
• Rated infeed power of the Smart Line Module	kW (HP)	5 (6.71)	10 (13.4)	16 (21.5)	36 (48.3)

# SINAMICS S120

## Line Modules and line-side components

Smart Line Modules in booksize format  
Recommended line-side components

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### Overview

Suitable line-side power components are assigned depending on the power rating of the Smart Line Module.

The tables below list recommended components.

Further information about the main contactors, switch disconnectors, fuses and circuit-breakers specified in the tables can be found in Catalogs LV 1, LV 1T and ET B1.

### Assignment of line-side power components to Smart Line Modules in booksize or compact booksize format

Rated power	Assignment to Smart Line Module in booksize or compact booksize format	Main contactor	Circuit-breaker IEC 60947	Circuit-breaker UL489/CSA C22.2 No. 5-02	Main switch
kW (HP)	Type	Type	Order No.	Order No.	Order No.
<b>Line voltage 380 ... 480 V 3 AC</b>					
5 (6.71)	6SL3130-6AE15-0AB0 6SL3131-6AE15-0AA0 6SL3136-6AE15-0AA0	3RT1023-...	3RV1031-4BA10	–	3LD2003-0TK51
10 (13.4)	6SL3130-6AE21-0AB0 6SL3131-6AE21-0AA0 6SL3136-6AE21-0AA0	3RT1026-...	3RV1031-4FA10	–	3LD2203-0TK51
16 (21.5)	6SL3130-6TE21-6AA3 6SL3430-6TE21-6AA0	3RT1035-...	3RV1031-4FA10	–	3LD2504-0TK51
36 (48.3)	6SL3130-6TE23-6AA3	3RT1045-...	3RV1041-4LA10	3VL2108-3KN30-0AA0	3LD2704-0TK51

Rated power	Assignment to Smart Line Module in booksize or compact booksize format	Fuse switch disconnecter	Switch disconnecter with fuse holders	LV HRC fuse(gL/gG)			UL/CSA fuse, Class J Available from: Ferraz Shawmut <a href="http://www.ferrazshawmut.com">http://www.ferrazshawmut.com</a>		
kW (HP)	Type	Order No.	Order No.	Order No.	Rated current	Size	Reference No.	Rated current	Size
<b>Line voltage 380 ... 480 V 3 AC</b>									
5 (6.71)	6SL3130-6AE15-0AB0 6SL3131-6AE15-0AA0 6SL3136-6AE15-0AA0	3NP4010-0CH01	3KL5030-1EB01	3NA3805	16 A	000	AJT17-1/2	17.5 A	21 × 57 (0.83 × 2.24)
10 (13.4)	6SL3130-6AE21-0AB0 6SL3131-6AE21-0AA0 6SL3136-6AE21-0AA0	3NP4010-0CH01	3KL5030-1EB01	3NA3814	35 A	000	AJT35	35 A	27 × 60 (1.06 × 2.36)
16 (21.5)	6SL3130-6TE21-6AA3 6SL3430-6TE21-6AA0	3NP4010-0CH01	3KL5030-1EB01	3NA3814	35 A	000	AJT35	35 A	27 × 60 (1.06 × 2.36)
36 (48.3)	6SL3130-6TE23-6AA3	3NP4010-0CH01	3KL5230-1EB01	3NA3824	80 A	000	AJT80	80 A	29 × 117 (1.14 × 4.61)

# SINAMICS S120

## Motor Modules

### Single Motor Modules in compact booksize format

#### Design

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The Single Motor Modules in compact 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
- 1 safe standstill input (enable pulses)
- 1 safe motor brake control
- 1 temperature sensor input (KTY84-130 or PTC)
- 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.

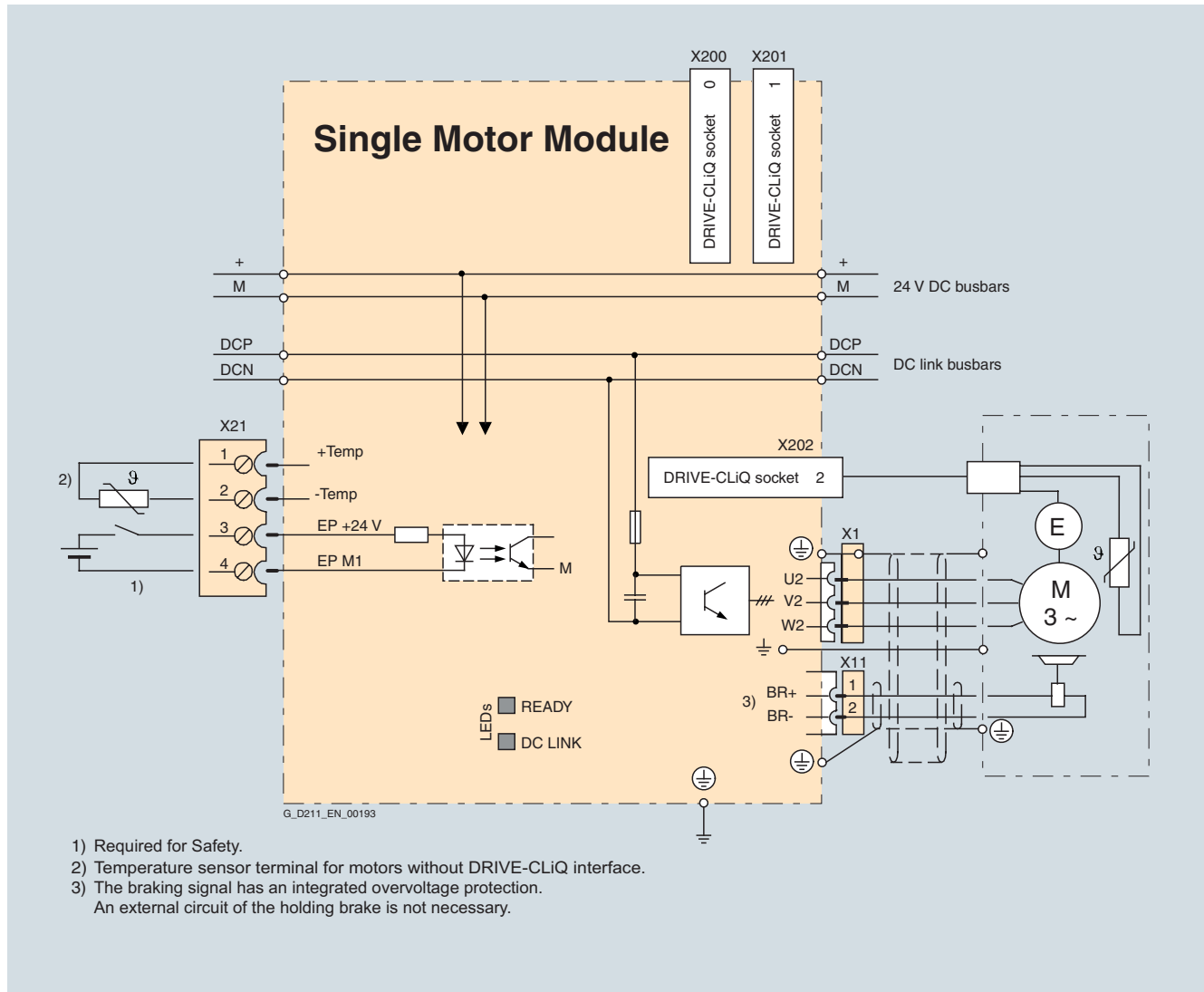
The signal cable shield can be connected to the Motor Module by means of a shield connection terminal, e.g. Weidmüller type KLBÜ 3-8 SC.

The scope of supply of the Motor Modules includes:

- DRIVE-CLiQ cable (length depends on module width) to connect Motor Module to adjacent module
- 2 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 signs in foreign languages
- 1 heat conducting foil

### Integration

Single Motor Modules communicate with the Control Unit via DRIVE-CLiQ.



Connection example of Single Motor Module in compact booksize format

# SINAMICS S120

## Motor Modules

Single Motor Modules  
in compact booksize format

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### Technical data

#### General technical data

#### Electrical data

**DC link voltage**  
(up to 2000 m (6562 ft) above sea level) 510 ... 720 V DC  
(line voltage 380 ... 480 V 3 AC) <sup>1)</sup>

#### Output frequency

- Control type Servo 0 ... 650 Hz <sup>2)</sup>
- Control type Vector 0 ... 300 Hz <sup>2)</sup>
- Control type V/f 0 ... 600 Hz <sup>2)</sup>

**Electronics power supply** 24 V DC -15 %/+20 %

#### Ambient conditions

**Type of cooling** The devices are designed so that  
- internal air cooling (power units with increased air cooling by built-in fans) or  
- cold plate cooling is possible.

**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

**Site altitude** Up to 1000 m (3281 ft) above sea level without derating,  
> 1000 ... 4000 m (3281 ... 13124 ft) above sea level see derating characteristics

#### Certificates

**Conformity** CE (low-voltage and EMC Directives)

**Approvals** cULus available soon

**Safety Integrated** Safety Integrity Level 2 (SIL 2) to IEC 61508,  
control category 3 to EN 954-1  
For further information, see the Safety Integrated section

<sup>1)</sup> With firmware version V2.5 and higher with appropriate parameterization and reduced output also operable on 200 ... 240 V 3 AC networks in accordance with a DC-link voltage of 270 ... 360 V DC.

<sup>2)</sup> Note correlation between max. output frequency, pulse frequency and current derating, see System Description.

### Technical data (continued)

DC link voltage 510 ... 720 V DC Internal air cooling/ cold plate cooling		Single Motor Modules in compact booksize format			
		6SL3420-1TE13-0AA0	6SL3420-1TE15-0AA0	6SL3420-1TE21-0AA0	6SL3420-1TE21-8AA0
<b>Output current</b>					
• 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
<b>Type of output <sup>1)</sup></b>					
• based on $I_{rated}$	kW (HP)	1.6 (2.15)	2.7 (3.62)	4.8 (6.44)	9.7 (13.0)
• based on $I_H$	kW (HP)	1.4 (1.88)	2.3 (3.08)	4.1 (5.50)	8.2 (11.0)
<b>Rated pulse frequency</b>	kHz	8	8	4	4
<b>DC link current <math>I_d</math> <sup>2)</sup></b>	A	3.6	6	11	22
<b>Current carrying capacity</b>					
• DC link busbars	A	100	100	100	100
• 24 V DC busbars	A	20	20	20	20
If, due to a number of Line 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 <sup>2</sup> , max. fuse protection 20 A).					
<b>DC link capacitance</b>	μF	110	110	110	235
<b>Current requirement with 24 V DC, max.</b>	A	0.85	0.85	0.85	0.85
<b>Power loss</b>					
• with internal air cooling in control cabinet <sup>3)</sup>	kW (HP)	0.07 (0.09)	0.1 (0.13)	0.1 (0.13)	0.18 (0.24)
• with cold plate cooling, int./ext.	kW (HP)	0.026/0.04 (0.03/0.05)	0.031/0.065 (0.04/0.09)	0.031/0.065 (0.04/0.09)	0.051/0.095 (0.07/0.13)
Thermal resistance $R_{th}$	K/W	0.265	0.265	0.265	0.23
<b>Cooling air requirement</b>	m <sup>3</sup> /s	0.008	0.008	0.008	0.008
<b>Sound pressure level <math>L_{pA}</math> (1 m (3.28 ft))</b>	dB	< 60	< 60	< 60	< 60
<b>Motor connection</b> 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 <sup>2</sup>	0.2 ... 6	0.2 ... 6	0.2 ... 6	0.2 ... 6
<b>Shield connection</b>		integrated in connector (X1)	integrated in connector (X1)	integrated in connector (X1)	integrated in connector (X1)
<b>PE connection</b>		M5 screw	M5 screw	M5 screw	M5 screw
<b>Motor brake connection</b>		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
<b>Motor cable length, max.</b>					
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	70 (230)
• Unshielded	m (ft)	75 (246)	75 (246)	75 (246)	100 (328)
<b>Degree of protection</b>		IP20	IP20	IP20	IP20
<b>Dimensions</b>					
• 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)
<b>Weight, approx.</b>	kg (lb)	2.7 (5.95)	2.7 (5.95)	2.7 (5.95)	3.4 (7.50)

<sup>1)</sup> Rated power of a typical standard asynchronous motor at 400 V 3 AC.

<sup>2)</sup> Rated DC link current for dimensioning an external DC connection. For DC link current calculation for dimensioning the Line Module, see System Description "Power Modules/Line Modules".

<sup>3)</sup> Power loss of Motor Module at rated output including losses of 24 V DC electronic power supply.

# SINAMICS S120

## Motor Modules

### Single Motor Modules in compact booksize format

3

#### Selection and ordering data

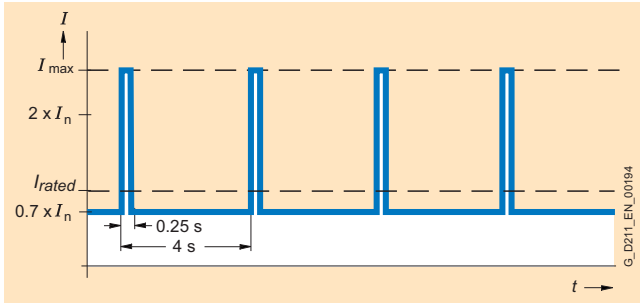
Rated output current	Type of output	Single Motor Module in compact booksize format
A	kW (HP)	Internal air cooling Order No.
<b>DC link voltage 510 ... 720 V DC</b>		
3	1.6 (2.15)	<b>6SL3420-1TE13-0AA0</b>
5	2.7 (3.62)	<b>6SL3420-1TE15-0AA0</b>
9	4.8 (6.44)	<b>6SL3420-1TE21-0AA0</b>
18	9.7 (13.0)	<b>6SL3420-1TE21-8AA0</b>

#### Accessories

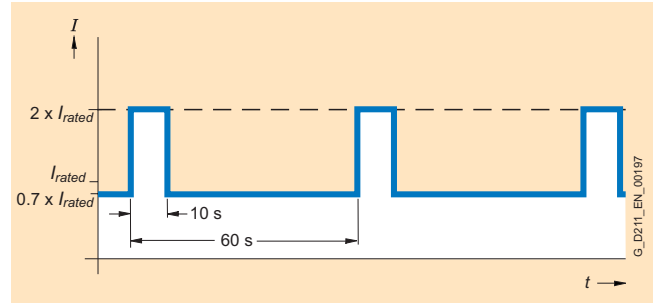
Description	Order No.
<b>DC link supply adapter</b> for direct infeed of DC link voltage • Screw-type terminals 0.5 ... 10 mm <sup>2</sup> for Line Modules and Motor Modules in booksize format with a width of 50 mm (1.97 in) or 100 mm (3.94 in)	<b>6SL3162-2BD00-0AA0</b>
<b>DC link adapters (2 units)</b> for multi-tier configuration Screw-type terminals 35 ... 95 mm <sup>2</sup> for all Line Modules/Motor Modules in booksize format	<b>6SL3162-2BM01-0AA0</b>
<b>24 V terminal adapter</b> for all Line Modules/Motor Modules in booksize format	<b>6SL3162-2AA00-0AA0</b>
<b>24 V jumper</b> for connection of the 24 V busbars (for booksize format)	<b>6SL3162-2AA01-0AA0</b>
<b>Mounting bracket</b> for Motor Module in compact booksize format the mounting depth is increased when the mounting bracket is screwed on so that the Motor Modules in compact booksize format can be directly integrated into a drive line-up in booksize format • Mounting bracket for modules with a width of 50 mm (1.97 in) • Mounting bracket for modules with a width of 75 mm (2.95 in)	<b>6SL3462-1CB00-0AA0</b>  <b>6SL3462-1CC00-0AA0</b>
<b>Warning signs in foreign languages</b> This set of foreign language warning signs can be placed on top of the standard German or English signs. One set of labels is supplied with the devices. The following languages are available in each label set: Chinese Simplified    Polish Danish                    Portuguese/ Dutch                      Brazilian Finnish                    Russian French                     Swedish Greek                      Spanish Italian                     Czech Japanese                Turkish Korean	<b>6SL3166-3AB00-0AA0</b>

## Characteristic curves

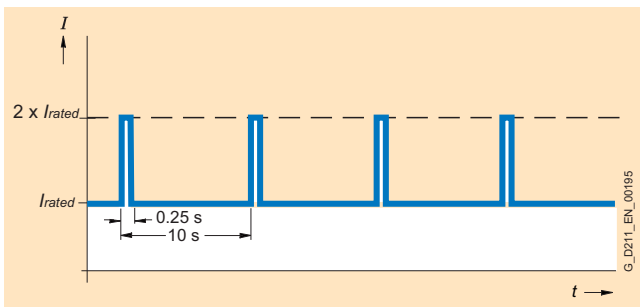
### Overload capability



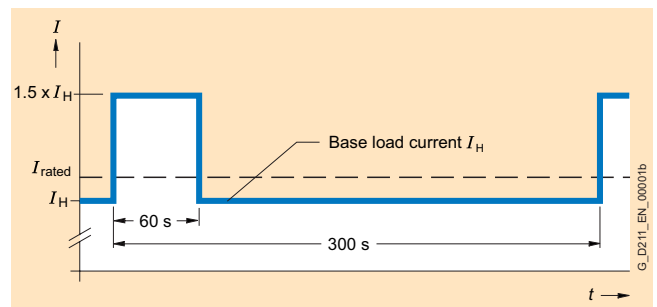
Maximum current load cycle with previous load



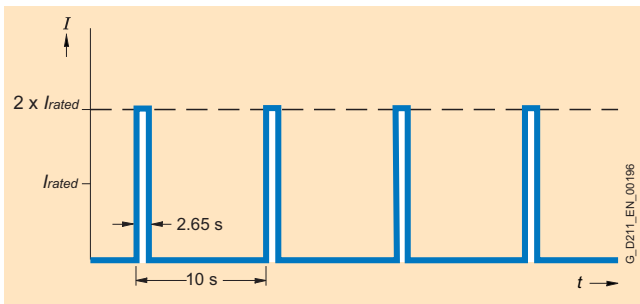
S6 load cycle with previous load with a load cycle period of 60 s



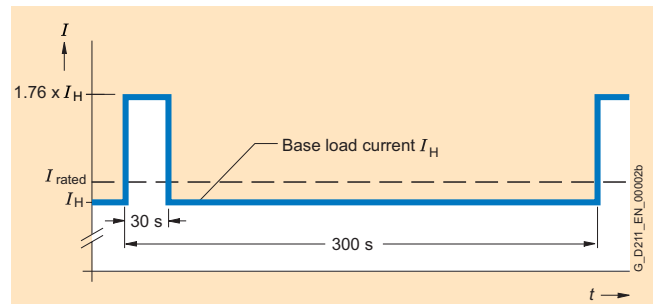
Load cycle with previous load



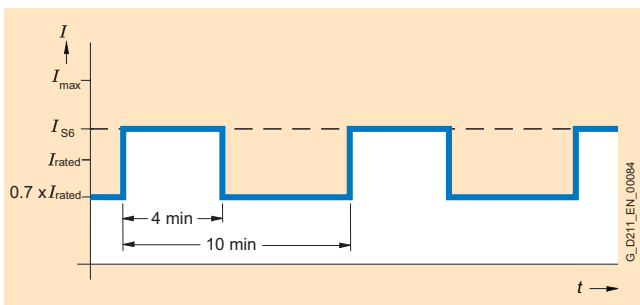
Load cycle with 60 s overload with a load cycle period of 300 s



Load cycle without previous load



Load cycle with 30 s overload with a load cycle period of 300 s



S6 load cycle with previous load with a load cycle period of 600 s

# SINAMICS S120

## Motor Modules

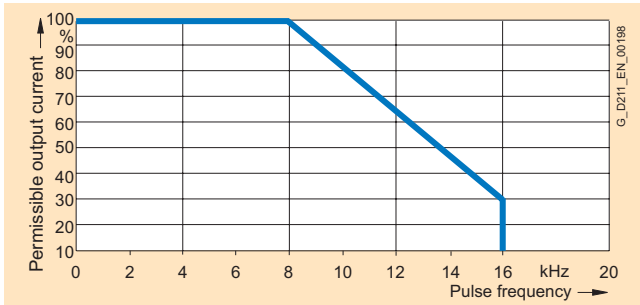
### Single Motor Modules in compact booksize format

3

Characteristic (continued)

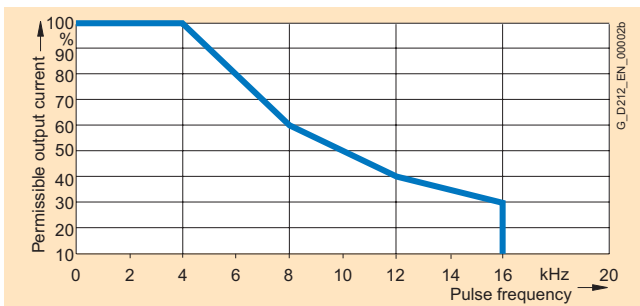
#### Derating characteristics

3 A and 5 A Single Motor Modules in compact booksize format

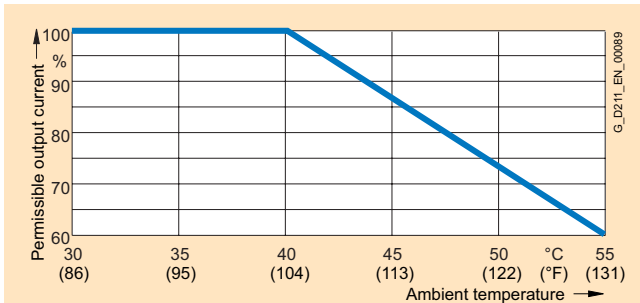


Output current dependent on pulse frequency

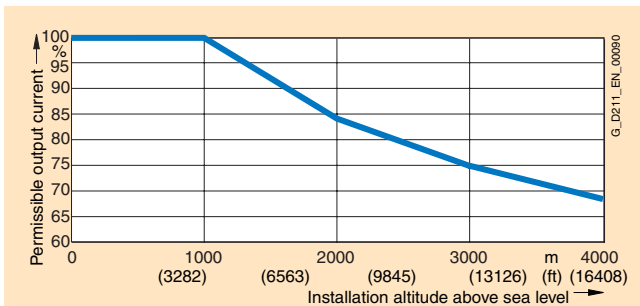
9 A and 18 A Single Motor Modules in compact booksize format



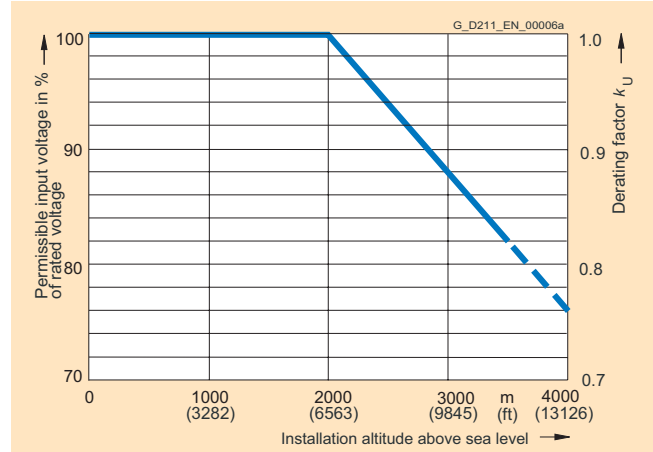
Output current dependent on pulse frequency



Output current dependent on ambient temperature



Output current dependent on installation altitude



Voltage derating dependent on installation altitude

# SINAMICS S120

## Motor Modules

### Double Motor Modules in compact booksize format

#### Design



Double Motor Modules feature the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 2 electronic 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 controllers
- 2 temperature sensor inputs (KTY84-130 or PTC)
- 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 terminal, e.g. type KLBÜ 3-8 SC by Weidmüller.

The scope of supply of the Motor Modules includes:

- DRIVE-CLiQ cable (length depends on module width) to connect Motor Module to adjacent module
- 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 signs in foreign languages
- 1 heat conducting foil

#### Selection and ordering data

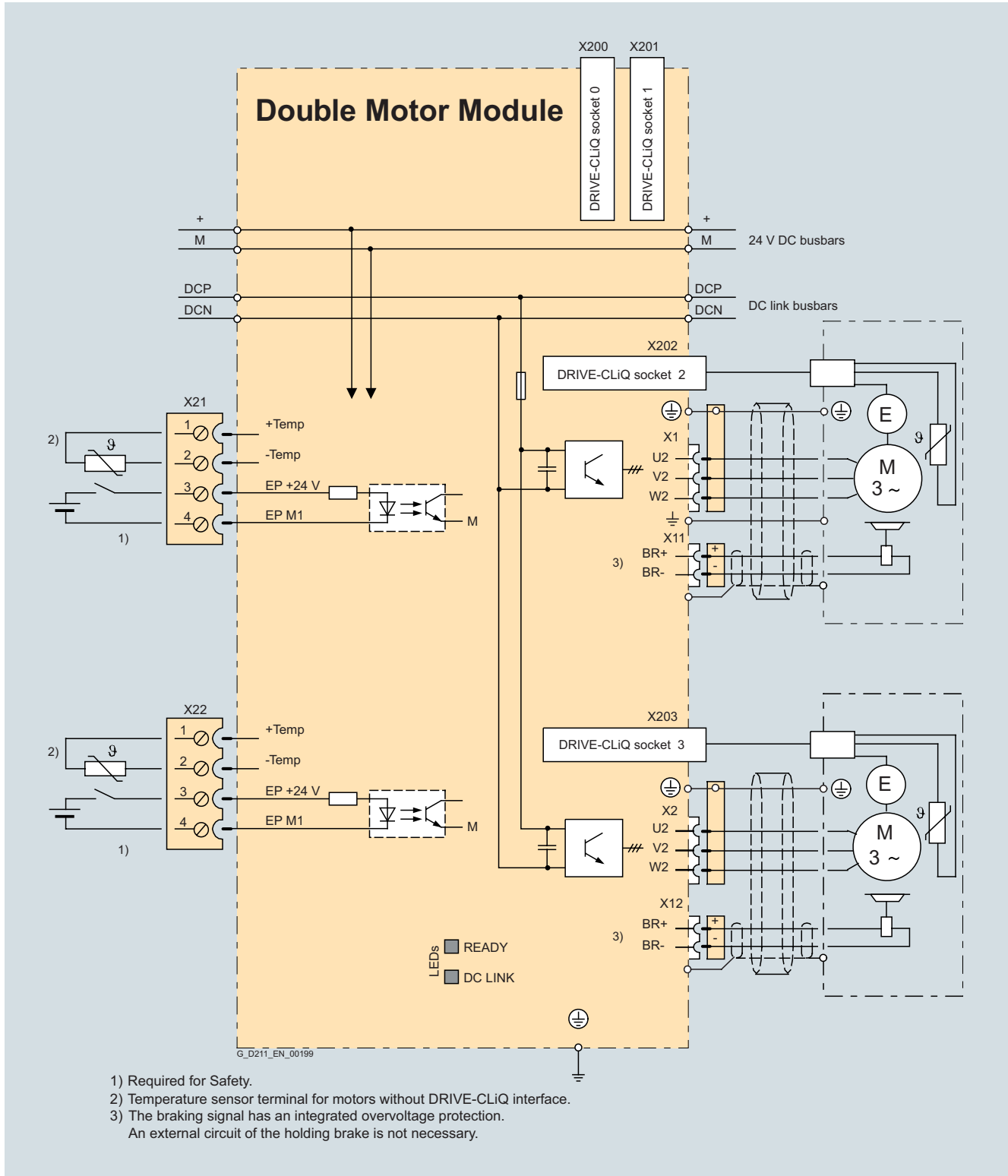
Rated output current	Typical output	Double Motor Module in compact booksize format
		Internal air cooling Order No.
<b>DC link voltage 510 ... 720 V DC</b>		
2 × 1.7 A	2 × 0.9 kW (1.21 HP)	<b>6SL3420-2TE11-7AA0</b>
2 × 3 A	2 × 1.6 kW (2.15 HP)	<b>6SL3420-2TE13-0AA0</b>
2 × 5 A	2 × 2.7 kW (3.62 HP)	<b>6SL3420-2TE15-0AA0</b>

#### Accessories

Description	Order No.
<b>DC link supply adapter</b> for direct infeed of DC link voltage Screw-type terminals 0.5 ... 10 mm <sup>2</sup> for booksize format Line Modules and Motor Modules with a width of 50 mm (1.97 in) or 100 mm (3.94 in)	<b>6SL3162-2BD00-0AA0</b>
<b>DC link adapters (2 units)</b> for multiter configuration Screw-type terminals 35 ... 95 mm <sup>2</sup> for all Line Modules and Motor Modules in booksize format	<b>6SL3162-2BM01-0AA0</b>
<b>24 V terminal adapter</b> for all Line Modules and Motor Modules in booksize format	<b>6SL3162-2AA00-0AA0</b>
<b>24 V jumper</b> for connection of the 24 V busbars (for booksize format)	<b>6SL3162-2AA01-0AA0</b>
<b>Mounting bracket</b> for Motor Modules in compact booksize format the mounting depth is increased when the mounting bracket is screwed on so that the Motor Modules in compact booksize format can be directly integrated into a drive grouping in booksize format	
• Mounting bracket for modules with a width of 50 mm (1.97 in)	<b>6SL3462-1CB00-0AA0</b>
• Mounting bracket for modules with a width of 75 mm (2.95 in)	<b>6SL3462-1CC00-0AA0</b>
<b>Warning signs in foreign languages</b> This set of foreign language warning signs can be placed on top of the standard German or English signs. One set of labels is supplied with the devices. The following languages are available in each label set:	<b>6SL3166-3AB00-0AA0</b>
Chinese Simplified      Polish Danish                      Portuguese/ Dutch                        Brazilian Finnish                      Russian French                        Swedish Greek                        Spanish Italian                        Czech Japanese                    Turkish Korean	

### Integration

The Double Motor Module communicates with the Control Unit via DRIVE-CLiQ.



Connection example of Double Motor Modules in compact booksize format 2 × 3 A to 2 × 18 A

# SINAMICS S120

## Motor Modules

Double Motor Modules  
in compact booksize format

3

### Technical data

General technical data	
Electrical data	
<b>DC link voltage</b> (up to 2000 m (6562 ft) above sea level)	510 ... 720 V DC (line connection voltage 380 ... 480 V 3 AC) <sup>1)</sup>
<b>Output frequency</b>	
• Control type Servo	0 ... 650 Hz <sup>2)</sup>
• Control type Vector	0 ... 300 Hz <sup>2)</sup>
• Control type V/f	0 ... 600 Hz <sup>2)</sup>
<b>Electronic power supply</b>	24 V DC -15 %/+20 %
Ambient conditions	
<b>Type of cooling</b>	The devices are designed so that - internal air cooling (power units with increased air cooling by built-in fans) or - cold plate cooling is possible
<b>Permissible ambient and coolant temperature (air)</b> 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
<b>Site altitude</b>	Up to 1000 m (3281 ft) above sea level without derating, > 1000 ... 4000 m (3281 ... 13124 ft) above sea level see derating characteristics
Certificates	
<b>Conformity</b>	CE (low-voltage and EMC Directives)
<b>Approvals</b>	cULus available soon
<b>Safety Integrated</b>	Safety Integrity Level 2 (SIL 2) to IEC 61508, control category 3 to EN 954-1 For further information, see the Safety Integrated section

<sup>1)</sup> With firmware version V2.5 and higher with appropriate parameterization and reduced output also operable on 200 ... 240 V 3 AC networks in accordance with a DC-link voltage of 270 ... 360 V DC.

<sup>2)</sup> Note correlation between max. output frequency, pulse frequency and current derating, see System Description.

### Technical data (continued)

DC link voltage 510 ... 720 V DC	Double Motor Module in compact booksize format			
		6SL3420-2TE11-7AA0	6SL3420-2TE13-0AA0	6SL3420-2TE15-0AA0
<b>Internal air cooling/ cold plate cooling</b>				
<b>Output current</b>				
• 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
<b>Type of output <sup>1)</sup></b>				
• based on $I_{rated}$	kW (HP)	2 × 0.9 (1.21)	2 × 1.6 (2.15)	2 × 2.7 (3.62)
• based on $I_H$	kW (HP)	2 × 0.8 (1.07)	2 × 1.4 (1.88)	2 × 2.3 (3.08)
<b>Rated pulse frequency</b>	kHz	8	8	8
<b>DC link current <math>I_d</math> <sup>2)</sup></b>	A	4.1	7.2	12
<b>Current capacity</b>				
• DC link busbars	A	100	100	100
• 24 V DC busbars	A	20	20	20
If, due to a number of Line 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 <sup>2</sup> , max. fuse protection 20 A).				
<b>DC link capacitance</b>	μF	110	110	220
<b>Current requirement with 24 V DC, max.</b>	A	1	1	1
<b>Power loss <sup>3)</sup></b>				
• with internal air cooling in control cabinet	kW (HP)	0.11 (0.15)	0.13 (0.17)	0.19 (0.25)
• With cold plate cooling, int./ext.	kW (HP)	0.04/0.07 (0.05/0.09)	0.04/0.09 (0.05/0.12)	0.06/0.135 (0.08/0.18)
• Thermal resistance $R_{th}$	K/W	0.22 (0.30)	0.22 (0.30)	0.22 (0.30)
<b>Cooling air requirement</b>	m <sup>3</sup> /s	0.008	0.008	0.008
<b>Sound pressure level <math>L_{pA}</math> (1 m (3.28 ft))</b>	dB	< 60	< 60	< 60
<b>Motor connection</b> 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 <sup>2</sup>	0.2 ... 6	0.2 ... 6	0.2 ... 6
<b>Shield connection</b>				
		integrated in connector (X1, X2)	integrated in connector (X1, X2)	integrated in connector (X1, X2)
<b>PE connection</b>				
		M5 screw	M5 screw	M5 screw
<b>Motor brake connection</b>				
		Connector (X11, X12), 24 V DC, 2 A	Connector (X11, X12), 24 V DC, 2 A	Connector (X11, X12), 24 V DC, 2 A
<b>Motor cable length, max.</b>				
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)
• Unshielded	m (ft)	75 (246)	75 (246)	75 (246)
<b>Degree of protection</b>				
		IP20	IP20	IP20
<b>Dimensions</b>				
• 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		226 (8.90)	226 (8.90)	226 (8.90)
<b>Weight, approx.</b>	kg (lb)	3.4 (7.50)	3.4 (7.50)	3.4 (7.50)

1) Rated power of a typical standard asynchronous motor at 400 V 3 AC.

2) Rated DC link current for dimensioning an external DC connection. For DC link current calculation for dimensioning the Line Module, see System Description "Power Modules/Line Modules".

3) Power loss of Motor Module at rated power including losses of 24 V DC electronic power supply.

# SINAMICS S120

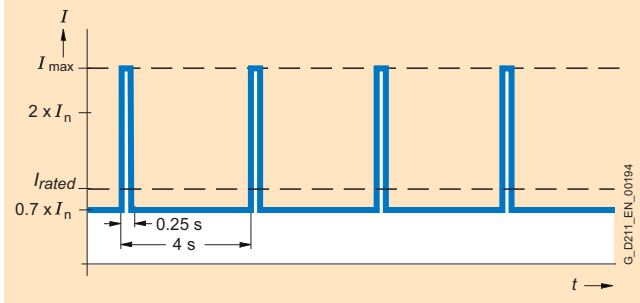
## Motor Modules

Double Motor Modules  
in compact booksize format

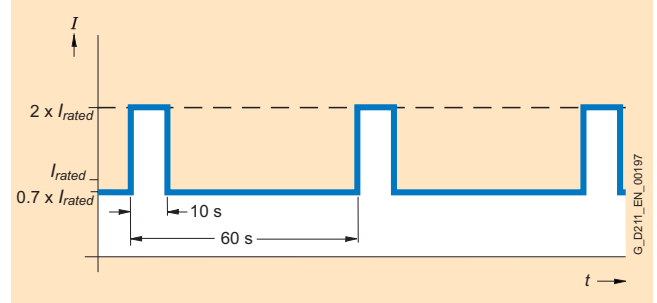
### Characteristic curves

#### Overload capability

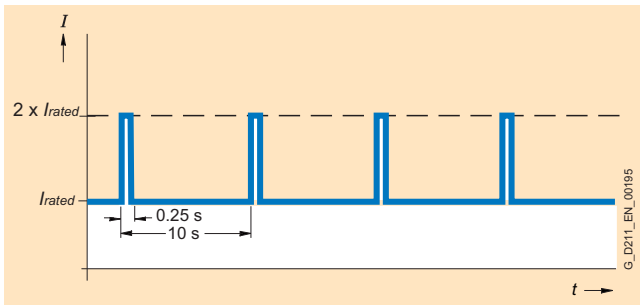
3



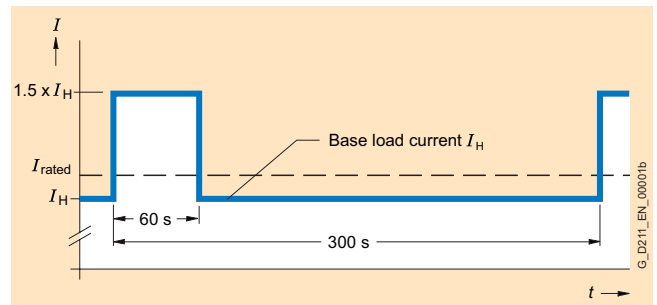
Maximum current load cycle with previous load



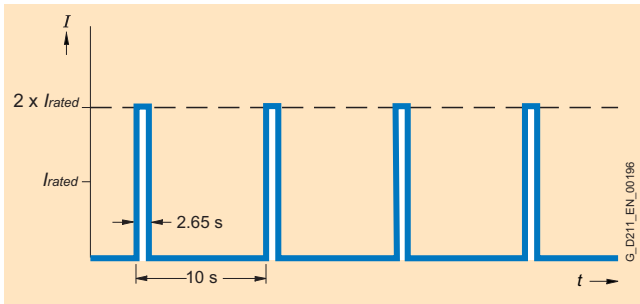
S6 load cycle with previous load with a load cycle period of 60 s



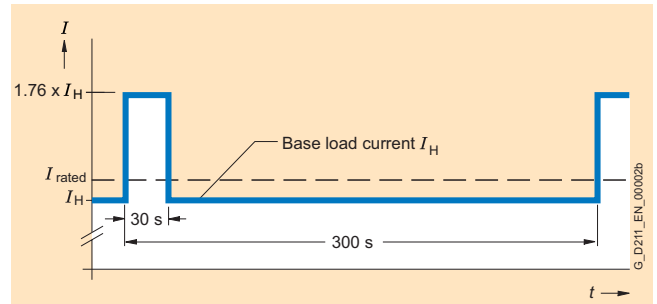
Load cycle with previous load



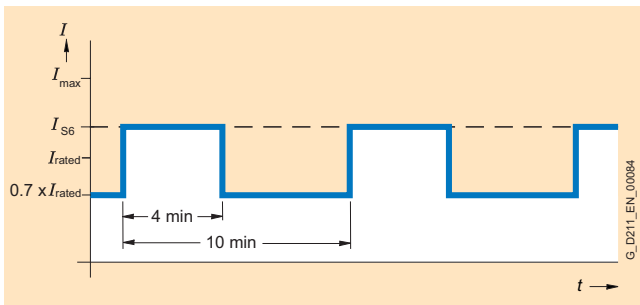
Load cycle with 60 s overload with a load cycle period of 300 s



Load cycle without previous load



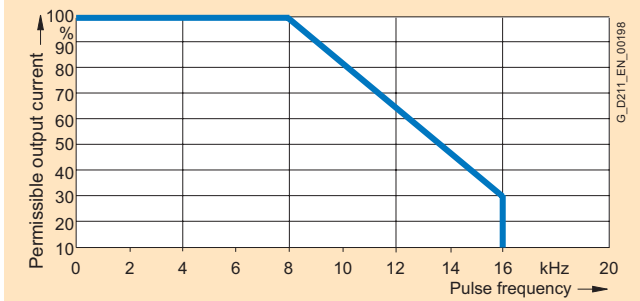
Load cycle with 30 s overload with a load cycle period of 300 s



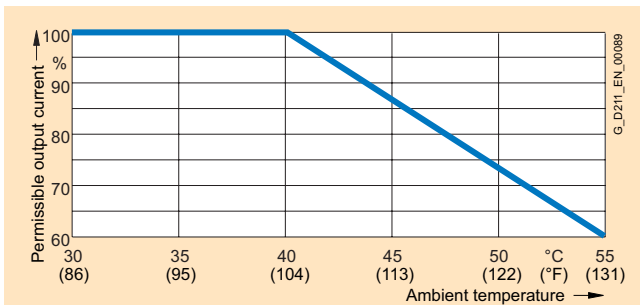
S6 load cycle with previous load with a load cycle period of 600 s

### Characteristic (continued)

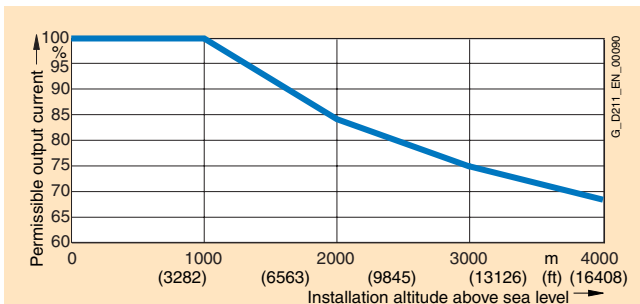
#### Derating characteristics



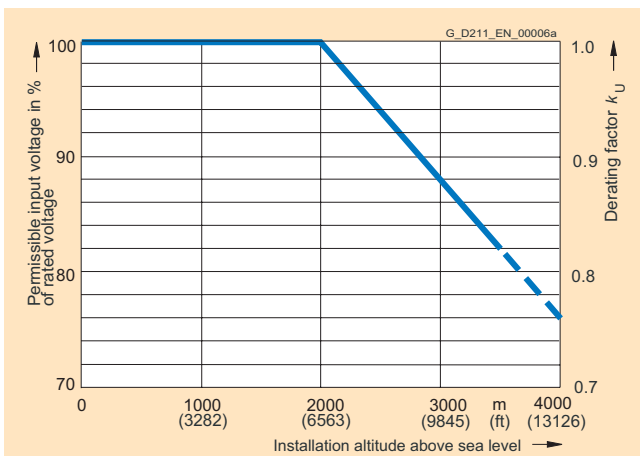
Output current dependent on pulse frequency



Output current dependent on ambient temperature



Output current dependent on installation altitude



Voltage derating dependent on installation altitude