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Overview

A wide range of single-axis and two-axis Motor Modules with graded current/power ratings can be supplied:

- Single Motor Modules: Single-axis variant
  Booksize format with rated output currents of 3 A to 200 A
- Double Motor Modules: Two-axis variant
  Booksize format with rated output currents of 3 A to 18 A

In principle, all Single Motor and Double Motor Modules can be operated on Smart Line Modules or Active Line Modules for the corresponding voltage range.

Design

The Single Motor Modules in booksize format feature the following interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 1 electronics power supply connection via integrated 24 V DC busbars
- 3 DRIVE-CLiQ sockets
- 1 motor connection, plug-in (not included in scope of supply) or screw-stud depending on rated output current
- 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 motor cable shield is inside the connector on 50 mm (1.97 in) and 100 mm (3.94 in) width modules. A shield connection kit can be supplied for 150 mm, 200 mm and 300 mm (5.91 in, 7.87 in and 11.81 in) wide modules. On these modules, the motor cable shield can be connected using a tube clip.

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.

Design (continued)

The scope of supply of the Motor Modules includes:

- DRIVE-CLiQ cable (length depends on module width) to connect Motor Module to adjacent module
- 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 with a rated output current of 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 set of warning signs in foreign languages

Integration

Single Motor Modules communicate with a CU320 Control Unit or SINUMERIK solution line via DRIVE-CLiQ.

Technical specifications

General technical specifications

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 type Servo	0 ... 650 Hz[1)]
• Control type Vector	0 ... 300 Hz[1)]
• Control type *V/f*	0 ... 300 Hz[1)]
Electronics power supply	24 V DC -15%/+20%
Type of cooling	• Internal/external air cooling, power sections with increased air cooling by means of built-in fan • Cold-plate cooling on request
Permissible ambient or coolant temperature (air) in 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
Conformity	CE (low-voltage and EMC directives)
Approvals	cULus (File No.: E192450)

[1)] Note correlation between max. output frequency, pulse frequency and current derating; see system description on the CD-ROM supplied with the catalog for further information.

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Single Motor Modules in booksize format

Technical specifications (continued)

DC link voltage 510 ... 720 V DC

Order No.						
• Internal air cooling		**6SL3120-1TE13-0AA3**	**6SL3120-1TE15-0AA3**	**6SL3120-1TE21-0AA3**	**6SL3120-1TE21-8AA3**	**6SL3120-1TE23-0AA3**
• External air cooling		**6SL3121-1TE13-0AA3**	**6SL3121-1TE15-0AA3**	**6SL3121-1TE21-0AA3**	**6SL3121-1TE21-8AA3**	**6SL3121-1TE23-0AA3**
Product name		Single Motor Modules in booksize format				
Output current						
• Rated current I_{rated}	A	3	5	9	18	30
• Base load current I_H	A	2.6	4.3	7.7	15.3	25.5
• for S6 duty (40%) I_{S6}	A	3.5	6	10	24	40
• I_{max}, maximum	A	6	10	18	36	56
Power						
• with 600 V DC link voltage	kW (HP)	1.6 (1.5)	2.7 (3)	4.8 (5)	9.7 (10)	16.0 (20)
• based on I_H	kW (HP)	1.4 (1)	2.3 (2.5)	4.1 (5)	8.2 (10)	13.7 (18)
Rated pulse frequency	kHz	4	4	4	4	4
DC link current I_d [1]	A	3.6	6	11	22	36
Current capacity						
• 24 V DC busbars	A	20	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 (connection cross-section, max. 6 mm^2, fuse protection, max. 20 A).				
• DC link busbars	A	100	100	100	100	100
DC link capacitance	µF	110	110	110	220	710
Current requirement with 24 V DC, max.	A	0.85	0.85	0.85	0.85	0.9
Power loss						
• Internal air cooling	kW	0.035	0.055	0.080	0.165	0.290
• External air cooling int./ext. [2]	kW	0.015/0.015	0.023/0.03	0.035/0.045	0.075/0.09	0.08/0.210
Cooling air requirement	m^3/s (ft^3/s)	0.008 (0.283)	0.008 (0.283)	0.008 (0.283)	0.008 (0.283)	0.016 (0.565)
Sound pressure level	dB (A)	< 60	< 60	< 60	< 60	< 60
Motor connection U2, V2, W2		Plug-in connector (X1) [3], max. 30 A				
Shield connection		Integrated in connector (X1)				
PE connection		On housing with M5 screw				
Motor brake connection		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)	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)	50 (1.97)	100 (3.94)
• Height	mm (in)	380 (14.98)	380 (14.98)	380 (14.98)	380 (14.98)	380 (14.98)
• Depth						
- with internal air cooling	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
- with external air cooling in front of/behind mounting surface	mm (in)	226/66.5 (8.9/2.6)	226/66.5 (8.9/2.6)	226/66.5 (8.9/2.6)	226/66.5 (8.9/2.6)	226/66.5 (8.9/2.6)
Weight, approx.						
• with internal air cooling	kg (lb)	5.0 (11)	5.0 (11)	5.0 (11)	5.0 (11)	6.9 (15)
• with external air cooling	kg (lb)	5.7 (13)	5.7 (13)	5.7 (13)	5.7 (13)	8.5 (19)

[1] Rated DC link current for dimensioning an external DC connection. For DC link current calculation for dimensioning the Line Module, see system description "Power units/Line Modules" on the CD-ROM supplied with the catalog.

[2] Power loss of Motor Module at rated power without losses of 24 V DC electronics power supply.

[3] Not included in scope of supply, see Accessories.

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Technical specifications (continued)

DC link voltage 510 ... 720 V DC

Ordering data						
• Internal air cooling		**6SL3120-1TE24-5AA3**	**6SL3120-1TE26-0AA3**	**6SL3120-1TE28-5AA3**	**6SL3120-1TE31-3AA3**	**6SL3120-1TE32-0AA3**
• External air cooling		**6SL3121-1TE24-5AA3**	**6SL3121-1TE26-0AA3**	**6SL3121-1TE28-5AA3**	**6SL3121-1TE31-3AA3**	**6SL3121-1TE32-0AA3**
Product name		Single Motor Modules in booksize format				
Output current						
• Rated current I_{rated}	A	45	60	85	132	200
• Base load current I_H	A	38	51	68	105	141
• for S6 duty (40%) I_{S6}	A	60	80	110	150	250
• I_{max}, maximum	A	85	113	141	210	282
Power						
• with 600 V DC link voltage	kW (HP)	24 (30)	32 (40)	46 (60)	71 (100)	107 (150)
• based on I_H	kW (HP)	21 (25)	28 (40)	37 (50)	57 (75)	76 (100)
Rated pulse frequency	kHz	4	4	4	4	4
DC link current I_d [1]	A	54	72	102	158	200
Current capacity						
• 24 V DC busbars	A	20	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 (connection cross-section, max. 6 mm^2, fuse protection, max. 20 A).				
• DC link busbars	A	200	200	200	200	200
DC link capacitance	µF	1175	1410	1880	2820	3995
Current requirement with 24 V DC, max.	A	1.2	1.2	1.5	1.5	1.5
Power loss						
• Internal air cooling in control cabinet	kW	0.43	0.59	0.75	1.25	2.05
• External air cooling int./ext. [2]	kW	0.011/0.32	0.135/0.455	0.16/0.59	0.25/1.0	0.4/1.65
Cooling air requirement	m^3/s (ft^3/s)	0.031 (1.095)	0.031 (1.095)	0.044 (1.554)	0.144 (5.085)	0.144 (5.085)
Sound pressure level	dB (A)	< 65	< 65	< 60	< 73	< 73
Motor connection U2, V2, W2		M6 screw studs, (X1)	M6 screw studs, (X1)	M8 screw studs, (X1)	M8 screw studs, (X1)	M8 screw studs, (X1)
• Conductor cross-section	mm^2	2.5 ... 50	2.5 ... 50	2.5 ... 95, 2 × 35	2.5 ... 120, 2 × 50	2.5 ... 120, 2 × 50
Shield connection		See Accessories	See Accessories	See Accessories	See Accessories	See Accessories
PE connection		On housing with M6 screw	On housing with M6 screw	On housing with M6 screw	On housing with M8 screw	On housing with 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	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)	100 (328)	100 (328)
• Unshielded	m (ft)	150 (492)	150 (492)	150 (492)	150 (492)	150 (492)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	150 (5.91)	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) with fan [3]: 629 (24.8)	380, (14.96) with fan [3]: 629 (24.8)
• Depth						
- with internal air cooling	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
- with external air cooling in front of/behind mounting surface	mm (in)	226/71 (8.9/2.8)	226/71 (8.9/2.8)	226/92 (8.9/3.6)	226/82 (8.9/3.2)	226/82 (8.9/3.2)
Weight, approx.						
• with internal air cooling	kg (lb)	9 (20)	9 (20)	15 (33)	21 (46)	21 (46)
• with external air cooling	kg (lb)	13.2 (29)	13.4 (30)	17.2 (38)	27.2 (60)	30 (66)

[1] Rated DC link current for dimensioning an external DC connection.
For DC link current calculation for dimensioning the Line Module, see system description "Power units/Line Modules" on the CD-ROM supplied with the catalog.

[2] Power loss of Motor Module at rated power without losses of 24 V DC electronics power supply.

[3] The fan is supplied with the Motor Module and must be installed before the Motor Module is commissioned.

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Single Motor Modules in booksize format

Selection and Ordering Data

Rated output current	Rated power	Single Motor Module in booksize format	
		Internal air cooling	External air cooling
		Order No.	Order No.
DC link voltage 510 ... 720 V DC			
3 A	1.6 kW (1.5 HP)	**6SL3120-1TE13-0AA3**	**6SL3121-1TE13-0AA3**
5 A	2.7 kW (3 HP)	**6SL3120-1TE15-0AA3**	**6SL3121-1TE15-0AA3**
9 A	4.8 kW (5 HP)	**6SL3120-1TE21-0AA3**	**6SL3121-1TE21-0AA3**
18 A	9.7 kW (10 HP)	**6SL3120-1TE21-8AA3**	**6SL3121-1TE21-8AA3**
30 A	16 kW (20 HP)	**6SL3120-1TE23-0AA3**	**6SL3121-1TE23-0AA3**
45 A	24 kW (30 HP)	**6SL3120-1TE24-5AA3**	**6SL3121-1TE24-5AA3**
60 A	32 kW (40 HP)	**6SL3120-1TE26-0AA3**	**6SL3121-1TE26-0AA3**
85 A	46 kW (60 HP)	**6SL3120-1TE28-5AA3**	**6SL3121-1TE28-5AA3**
132 A	71 kW (100 HP)	**6SL3120-1TE31-3AA3**	**6SL3121-1TE31-3AA3**
200 A	107 kW (150 HP)	**6SL3120-1TE32-0AA3**	**6SL3121-1TE32-0AA3**

Accessories

Designation	Order No.
Power connector (X1/X2) At Motor Module end, with screw-type terminals 1.5 ... 10 mm^2, For Motor Modules with a rated output current of 3 ... 30 A	**6SL3162-2MA00-0AA0**
Shield connection plates for Line/Motor Modules in booksize format	
• 150 mm (5.91 in) wide	
- Internal air cooling	**6SL3162-1AF00-0AA1**
- External air cooling	**6SL3162-1AF00-0BA0**
• 200 mm (7.87 in) wide	
- Internal air cooling	**6SL3162-1AH01-0AA0**
- External air cooling	**6SL3162-1AH01-0BA0**
• 300 mm (11.81 in) wide	
- Internal/external air cooling	**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) or 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
• Screw-type terminals 35 ... 95 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**

Accessories (continued)

Designation	Order No.
DC link adapters (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**
24 V jumper For connection of the 24 V busbars for booksize format	**6SL3162-2AA01-0AA0**
DC link busbar kit reinforced For replacement for DC link busbars for 5 modules in booksize format	
• 50 mm (1.97 in) wide	**6SL3162-2DB00-0AA0**
• 100 mm (3.94 in) wide	**6SL3162-2DD00-0AA0**
Warning signs in foreign languages This set of foreign language warning signs can be placed on top of the standard English or German signs. A set of signs is supplied with the units. One sign in each of the following languages is provided in each set: Chinese, Czech, Danish, Dutch, Finnish, French, Greek, Italian, Japanese, Korean, Polish, Portuguese, Russian, Spanish, Swedish and Turkish.	**6SL3166-3AB00-0AA0**

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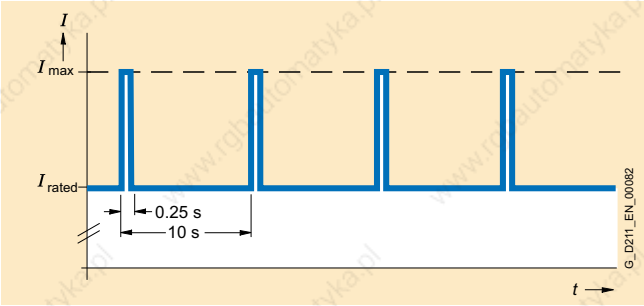
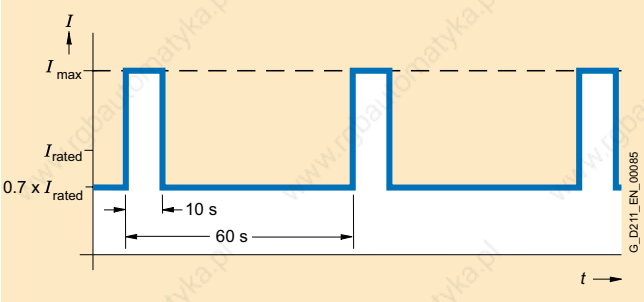
Characteristic curves

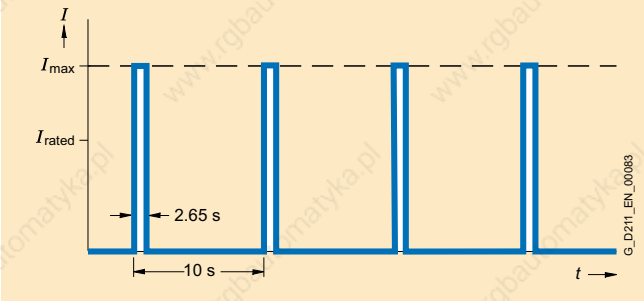
Overload capability



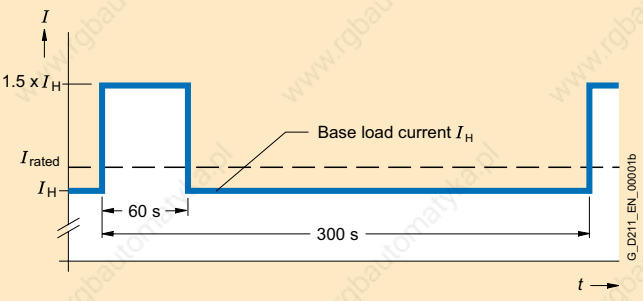
Duty cycle with previous load



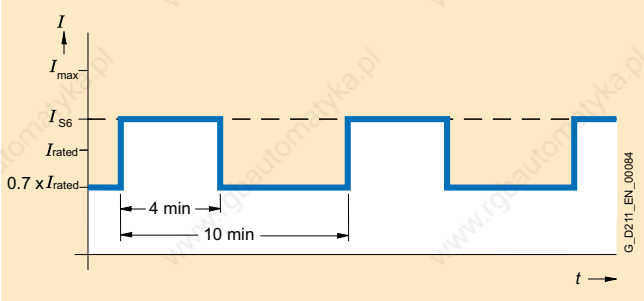
S6 duty cycle with previous load with a duty cycle duration of 60 s



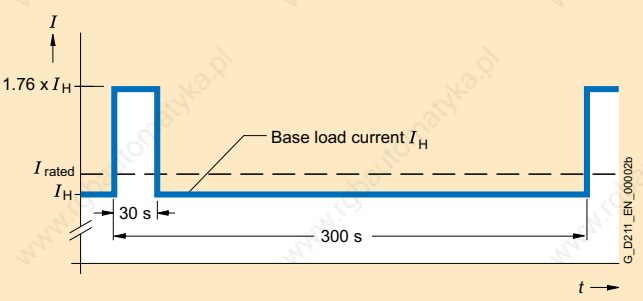
Duty cycle without previous load



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



Duty cycle with 30 s overload with a duty cycle duration of 300 s

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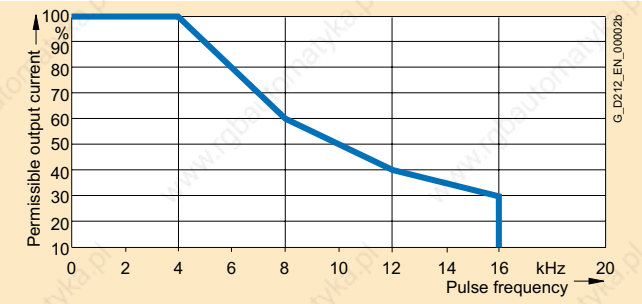
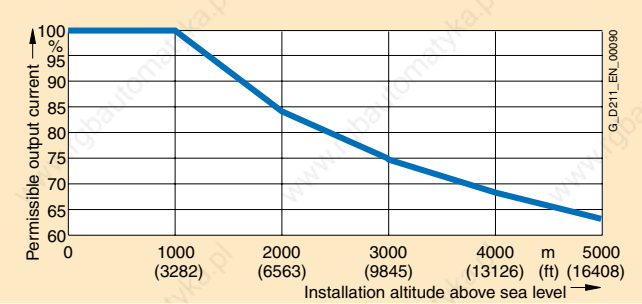
Single Motor Modules in booksize format

Characteristic curves (continued)

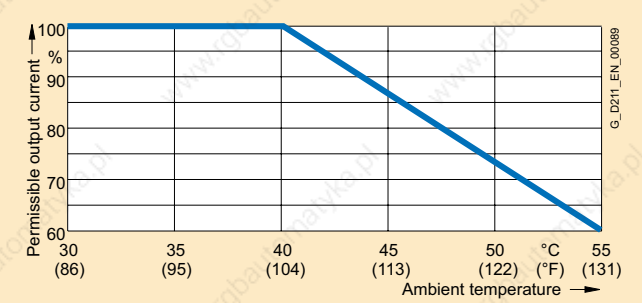
Derating characteristics



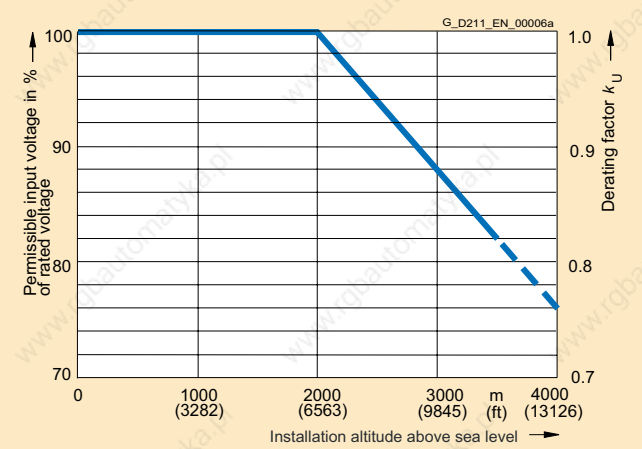
Output current dependent on pulse frequency



Output current dependent on installation altitude



Output current dependent on ambient temperature



Voltage derating dependent on pulse frequency