

SINAMICS S120 drive system

Chassis format for Line and Motor Modules

Active Line Modules in chassis format

Overview



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

- Active Interface Modules: Single-axis version Chassis format with rated power from 132 kW to 300 kW (200 to 450 HP)
- Active Line Modules: Single-axis version Chassis format with rated power from 132 kW to 300 kW (200 to 450 HP)
- Single Motor Modules: Single-axis design Chassis format with rated output currents of 210 A to 490 A

In principle, all Single Motor Modules can operate on Active Line Modules in the corresponding voltage range.

The self-commutated feed/feed-back units (with IGBTs in infeed and regenerative feedback directions) generate a regulated 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.

If required, the Active Line Modules can also provide reactive power compensation.

Active Line Modules are designed for connection to grounded-neutral (TN, TT) and non-grounded (IT) supply systems.

Design

The Active Line Modules in chassis format feature the following interfaces as standard:

- 1 power connection
- 1 connection for the 24 V DC electronics power supply
- 1 DC link connection (DCP, DCN) for supplying the connected Motor Module
- 1 DC link connection (DCPA, DCNA) for connecting a Braking Module
- 3 DRIVE-CLiQ sockets
- 2 PE (protective earth) connections

The status of the Active Line Modules is indicated via two multi-color LEDs.

The scope of supply of the Active Line Modules includes:

- Frame sizes FX and GX:
 - 0.60 m (1.97 ft) DRIVE-CLiQ cable for connection to the CU320 Control Unit or SINUMERIK solution line NCU

Technical specifications

General technical specifications

Line connection voltage (up to 2000 m (6562 ft) above sea level)	380 ... 480 V 3 AC \pm 10% (-15% < 1 min)
Line frequency	47 ... 63 Hz
Power factor	
• Fundamental power factor ($\cos \varphi_1$)	1.0 (factory setting), can be altered by input of a reactive current setpoint
• Total (λ)	1.0 (factory setting)
Overvoltage category	Class III to EN 60664-1
DC link voltage V_d	The DC link voltage is regulated and can be adjusted as a voltage decoupled from the line voltage. Factory setting for DC link voltage: 1.5 x line voltage
Electronics power supply	24 V DC, -15%/+20%
Radio interference suppression	
• Standard (with Active Interface Module)	Category C3 to EN 61800-3
Type of cooling	Increased air cooling by means of built-in fan
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 2000 m (6562 ft) above sea level without derating, > 2000 ... 4000 m (6562 ... 13124 ft) above sea level see derating characteristics
Conformity	CE (low-voltage and EMC directives)
Approvals Active Line Modules only 380 ... 480 V 3 AC	cULus (File No.: E192450)

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Technical specifications (continued)

Line voltage 380 ... 480 V 3 AC

Order No.		6SL3330-7TE32-1AA0	6SL3330-7TE32-6AA0	6SL3330-7TE33-8AA0	6SL3330-7TE35-0AA0
Product name		Active Line Modules in chassis format			
Feed/feedback power					
• Rated power P_{rated}					
- with 400 V 3 AC	kW (HP)	132 (200)	160 (225)	235 (350)	300 (450)
- with 460 V 3 AC ²⁾					
• P_{max}	kW	198	240	352.5	450
DC link current					
• Rated current I_{rated_DC}	A	235	291	425	549
• I_{H_DC}	A	209	259	378	489
• Base load current I_{max_DC}	A	352	436	637	823
Input current					
• Rated current at 400 V 3 AC	A	210	260	380	490
• Maximum	A	315	390	570	735
Current requirement					
• with 24 V DC electronics power supply, max.	A	1.1	1.1	1.35	1.35
• of fan supply with 400 V 2 AC, 50 Hz/60 Hz, max.		0.63/0.95	1.13/1.7	1.6/2.4	1.6/2.4
DC link capacitance	μF	4200	5200	7800	9600
Power loss, max.	kW	2.3	2.9	4.2	5.1
Cooling air requirement	m ³ /s (ft ³ /s)	0.17 (6)	0.23 (8.12)	0.36 (12.71)	0.36 (12.71)
Sound pressure level L_{pA} (1 m (3.28 ft)) ¹⁾ at 50 Hz/60 Hz	dB (A)	74/76	75/77	76/78	76/78
Line connection U1, V1, W1		Flange connection with M10 screw, max. cross-section 2 × 185 mm ²			
DC link connection DCP, DCN		Flange connection with M10 screw, max. cross-section 2 × 185 mm ²			
PE connection		On housing with M10 screw			
• Conductor cross-section, max.					
- PE1/GND	mm ²	1 × 185	1 × 185	1 × 185	1 × 185
- PE2/GND	mm ²	2 × 185	2 × 185	2 × 185	2 × 185
Cable length, max. Total of all motor cables and DC link					
• Shielded	m (ft)	1000 (3281)	1000 (3281)	1000 (3281)	1000 (3281)
• Unshielded	m (ft)	1500 (4921)	1500 (4921)	1500 (4921)	1500 (4921)
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	326 (12.83)	326 (12.83)	326 (12.83)	326 (12.83)
• Height	mm (in)	1400 (55.15)	1400 (55.15)	1533 (60.35)	1533 (60.35)
• Depth	mm (in)	356 (14.02)	356 (14.02)	543 (21.38)	543 (21.38)
Frame Size		FX	FX	GX	GX
Weight, approx.	kg (lb)	88 (194)	88 (194)	152 (335)	152 (335)

¹⁾ Total sound pressure level of Active Interface Module and Active Line Module.

²⁾ Nominal HP ratings are provided for ease of assigning components only. The Line Module power is dependent on the Motor Module loading and is to be dimensioned accordingly.

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Selection and Ordering Data

Feed/feedback power	Active Line Module in chassis format
	Order No.
Line voltage 380 ... 480 V 3 AC	
132 kW (200 HP)	6SL3330-7TE32-1AA0
160 kW (225 HP)	6SL3330-7TE32-6AA0
235 kW (350 HP)	6SL3330-7TE33-8AA0
300 kW (450 HP)	6SL3330-7TE35-0AA0

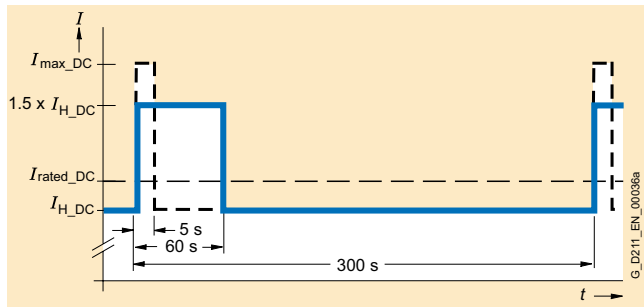
Warning signs in foreign languages

Warning signs in other languages can be placed on top of the standard warning signs in English or German.

Modules in chassis format are supplied as standard with the following signs:
Chinese, Czech, Danish, Dutch, Finnish, French, Greek, Italian, Japanese, Korean, Polish, Portuguese, Russian, Spanish, Swedish and Turkish.

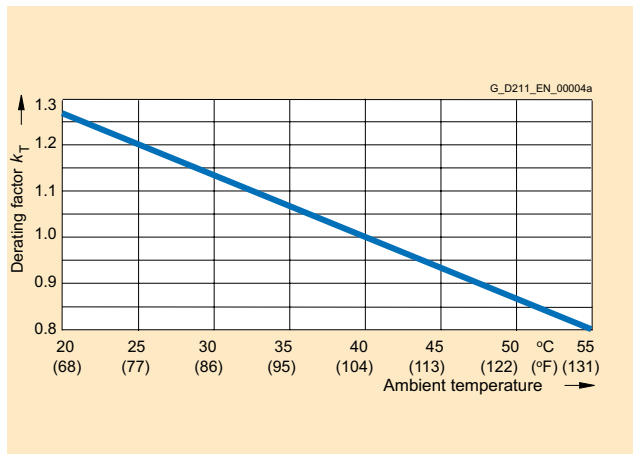
Characteristic curves

Overload capability



High overload

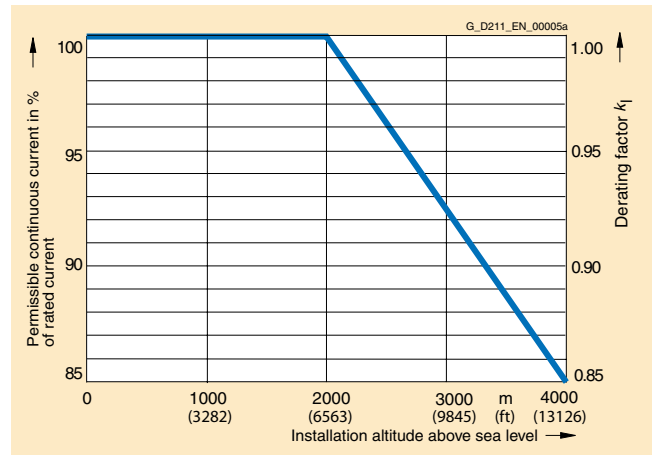
Derating characteristics



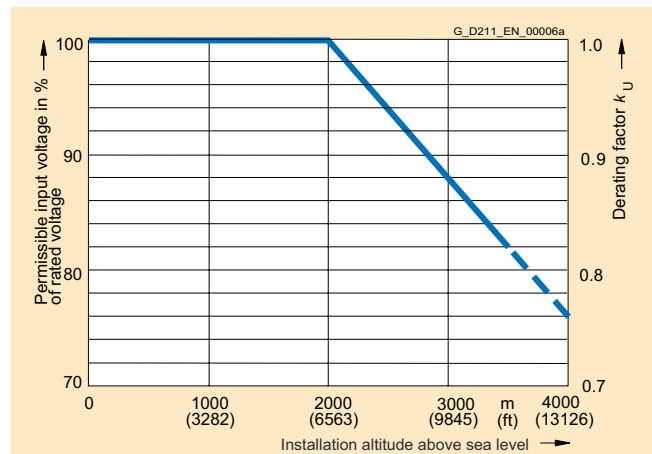
Current derating dependent on ambient temperature

Note:
A derating factor $k_T > 1.0$ must be taken into account only in conjunction with current derating dependent on installation altitude. See also system description.

Derating characteristics (continued)



Current derating dependent on installation altitude



Voltage derating dependent on installation altitude

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Active Line Modules in chassis format Active Interface Modules

Overview



Active Interface Modules are used in combination with Active Line Modules in chassis format. Active Interface Modules contain a clean power filter with basic radio interference suppression, the pre-charging circuit for the Active Line Module, the line voltage sensing circuit and monitoring sensors. The bypass contactor is an integral component in types FI and GI, thereby making the module very compact. The bypass contactor must be provided separately for types HI and JI. The vast majority of line harmonics are suppressed by the clean power filter.

The scope of supply of the Active Interface Modules includes:

- Frame size FI:
 - 0.60 m (1.97 ft) DRIVE-CLiQ cable for connection between Active Interface Module and Active Line Module
 - 1.45 m (4.76 ft) DRIVE-CLiQ cable for connection between the CU320 Control Unit or the SINUMERIK solution line NCU and the first Motor Module.
- Frame size GI:
 - 0.95 m (3.12 ft) DRIVE-CLiQ cable for connection between Active Interface Module and Active Line Module
 - 1.45 m (4.76 ft) DRIVE-CLiQ cable for connection between the CU320 Control Unit or the SINUMERIK solution line NCU and the first Motor Module.

Technical specifications

Line voltage 380 ... 480 V 3 AC		6SL3300-7TE32-6AA0		6SL3300-7TE33-8AA0		6SL3300-7TE35-0AA0	
Order No.							
Product name		Active Interface Modules in chassis format					
Rated current	A	210	260	380	490		
Bypass connector		included	included	included	included		
DC link capacitance of the drive group							
• at 400 V/50 Hz	μF	31200	31200	57600	57600		
• at 480 V/60 Hz	μF	20800	20800	38400	38400		
Current requirement							
• 24 V DC electronics power supply, max.	A	0.17	0.17	0.17	0.17		
• of fan supply with 230 V 2 AC, 50 Hz/60 Hz, max.	A	0.45/0.6	0.45/0.6	0.9/1.2	0.9/1.2		
Power loss	kW	2.1	2.2	3.0	3.9		
Cooling air requirement	m ³ /s (ft ³ /s)	0.24 (8.48)	0.24 (8.48)	0.47 (16.6)	0.47 (16.6)		
Sound pressure level L_{pA} (1 m (3.28 ft) ¹) at 50 Hz/60 Hz	dB (A)	74/76	75/77	76/78	76/78		
Line/load connection L1, L2, L3/U2, V2, W2							
• Conductor cross-section	mm ²	2 × 185	2 × 185	2 × 185	2 × 185		
PE connection • Conductor cross-section							
	mm ²	2 × 185	2 × 185	2 × 185	2 × 185		
Degree of protection		IP20	IP20	IP20	IP20		
Dimensions							
• Width	mm (in)	325 (12.8)	325 (12.8)	325 (12.8)	325 (12.8)		
• Height	mm (in)	1400 (55.12)	1400 (55.12)	1533 (60.35)	1533 (60.35)		
• Depth	mm (in)	355 (13.98)	355 (13.98)	544 (21.42)	544 (21.42)		

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Active Interface Modules

Technical specifications (continued)

Line voltage 380 ... 480 V 3 AC

Order No.	6SL3300-7TE32-6AA0		6SL3300-7TE33-8AA0	6SL3300-7TE35-0AA0	
Product name	Active Interface Modules in chassis format				
Frame size	FI	FI	GI	GI	
Weight, approx.	kg (lb)	135 (298)	135 (298)	190 (419)	190 (419)
Approvals		cURus	cURus	cURus	cURus
Suitable for Active Line Module in chassis format	Type	6SL3330-7TE32-1AA0	6SL3330-7TE32-6AA0	6SL3330-7TE33-8AA0	6SL3330-7TE35-0AA0
• Infeed power of the Active Line Module	kW (HP)	132 (200)	160 (225)	235 (350)	300 (450)

Selection and Ordering Data

Active Line Module infeed power	Suitable for Active Line Module Order No.	Active Interface Module Order No.
Line voltage 380 ... 480 V 3 AC		
132 kW (200 HP)	6SL3330-7TE32-1AA0	6SL3300-7TE32-6AA0
160 kW (225 HP)	6SL3330-7TE32-6AA0	6SL3300-7TE32-6AA0
235 kW (350 HP)	6SL3330-7TE33-8AA0	6SL3300-7TE33-8AA0
300 kW (450 HP)	6SL3330-7TE35-0AA0	6SL3300-7TE35-0AA0

¹⁾ Total sound pressure level of Active Interface Module and Active Line Module.

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Active Line Modules in chassis format Recommended line-side components

Overview

Suitable line-side power components are assigned depending on the power rating of the Active Line Modules.

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 the Catalogs LV 1, LV 1 T and ET B1.

Assignment of line-side power components to Active Line Modules in chassis format

Infeed power	Input current	Assignment to Active Interface Module	Assignment to Active Line Module	Bypass connector
Line voltage 380 ... 480 V 3 AC				
132 kW (200 HP)	210 A	6SL3300-7TE32-6AA0	6SL3330-7TE32-1AA0	included in Active Interface Module
160 kW (225 HP)	260 A	6SL3300-7TE32-6AA0	6SL3330-7TE32-6AA0	included in Active Interface Module
235 kW (350 HP)	380 A	6SL3300-7TE33-8AA0	6SL3330-7TE33-8AA0	included in Active Interface Module
300 kW (450 HP)	490 A	6SL3300-7TE35-0AA0	6SL3330-7TE35-0AA0	included in Active Interface Module

Infeed power	Input current	Assignment to Active Interface Module	Switch disconnector without handle and shaft	Switch disconnector with handle and shaft	Cable protection fuse		Cable protection fuse incl. semiconductor protection	
			Order No.	Order No.	Order No.	Rated current	Order No.	Rated current
Line voltage 380 ... 480 V 3 AC								
132 kW (200 HP)	210 A	6SL3300-7TE32-6AA0	3KL5530-1AB01	3KL5530-1EB01	3NA3242	224 A	3NE1230-2	315 A
160 kW (225 HP)	260 A	6SL3300-7TE32-6AA0	3KL5730-1AB01	3KL5730-1EB01	3NA3252	315 A	3NE1331-2	350 A
235 kW (350 HP)	380 A	6SL3300-7TE33-8AA0	3KL5730-1AB01	3KL5730-1EB01	3NA3260	400 A	3NE1334-2	500 A
300 kW (450 HP)	490 A	6SL3300-7TE35-0AA0	3KL6130-1AB02	3KL6130-1EB02	3NA3365	500 A	3NE1436-2	630 A