Overview

SINAMICS G130 converter built-in units, frame sizes FX and HX

The SINAMICS G130 is a converter that can be combined very flexibly with the associated system components and installed into customer-specific control cabinets or directly into machines.

SINAMICS G130 converter built-in units are available for the following voltages and power ratings:

Line voltage	Power
380 ... 480 V 3 AC	110 ... 560 kW
500 ... 600 V 3 AC	110 ... 560 kW
660 ... 690 V 3 AC	75 ... 800 kW

A wide range of add-on electrical components allow the drive system to be optimized for specific requirements. Configuration and commissioning are greatly simplified by predefined interfaces.

The control accuracy of the sensorless vector control is suitable for most applications, which means that an additional actual speed value encoder is not required.

However, encoder evaluation units are available for the SINAMICS G130 converters so that they can address applications that require an encoder for plant-specific reasons.

Communication between the Control Unit, the Power Module and other active SINAMICS components is performed via DRIVE-CLiQ, the drive's internal interface. The DRIVE-CLiQ connections, which are available as pre-assembled cables of different lengths, allow a complete converter system to be put together quickly.

For communication with the process control system, with the CU320-2 Control Unit either a PROFIBUS or a PROFINET interface is available as standard. The interface can also be expanded with digital and analog inputs and outputs. The TM31 Terminal Module and TB30 Terminal Board are provided for this purpose. Additional expansion cards can also be installed to allow communication via CANopen or EtherNet/IP.

Benefits

- Particularly quiet and compact converters due to the use of state-of-the-art IGBT power semiconductors and an innovative cooling concept.
- Individual modules and power components can be replaced quickly and easily, which ensures a higher level of plant availability. Replaceable components have been designed so that they can be quickly and easily replaced. In addition, the "Spares On Web" Internet tool makes it easy to view the spare parts that are available for the particular order (www.siemens.com/sow).
- Easily integration in automation solutions by means of a standard communications interface as well as a range of analog and digital interfaces.
- Simple commissioning and parameterization using interactive menus on the AOP30 Advanced Operator Panel with graphic LCD and plain-text display, or PC-supported using the STARTER commissioning tool (www.siemens.com/starter).
- Preset software functions make it easier to adapt the converter to the individual plant.
- All components, from individual parts to the ready-to-connect cabinet, undergo rigorous testing throughout the entire production process. This guarantees a high level of functional reliability during installation and commissioning, as well as in operation.

Application

Variable-speed drives are ideal for all applications that involve moving, conveying, pumping or compressing solids, liquids or gases.

This means the following applications in particular:

- Pumps and fans
- Compressors
- Extruders and mixers
- Mills

Design

The SINAMICS G130 converter built-in units provide machine builders and plant constructors with a modular drive system that can be tailored to specific applications.

SINAMICS G130 converter built-in units mainly consist of the following modular, stand-alone components:

- Power Module
- Control Unit

They may be located separately from one another or combined in a single unit. The Power Module contains a slot for the Control Unit.

The Power Modules are supplied with a DRIVE-CLiQ cable for communication and a cable for the 24 V supply to the Control Unit. These cables are pre-assembled for installing the Control Unit in the Power Module. If the two units are installed in separate locations, the cables must be ordered in the appropriate lengths.

The AOP30 Advanced Operator Panel and the numeric BOP20 Basic Operator Panel can be used for commissioning and local operation.

Predefined interfaces, via terminal block or the CU320-2 Control Unit with either PROFIBUS or PROFINET, make commissioning and control of the drive much easier. The interfaces of the CU320-2 Control Unit can be supplemented with add-on modules, such as the plug-in TB30 Terminal Board or the TM31 Terminal Module.

If further customer interfaces are required for the communication with the drive, an external 24 V supply must be provided.

The following two figures provide assistance when assembling the required converter components. The first figure shows the design and individual components of a SINAMICS G130 drive. The second figure is a flowchart containing the decision and selection criteria required for the individual components.

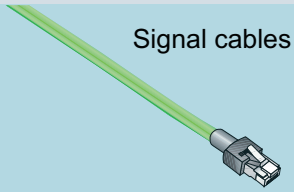
Design (continued)

3 AC supply

Line-side power components
e.g.
Switch disconnectors
Line contactors
Line filters
Line reactors
Line Harmonics Filters

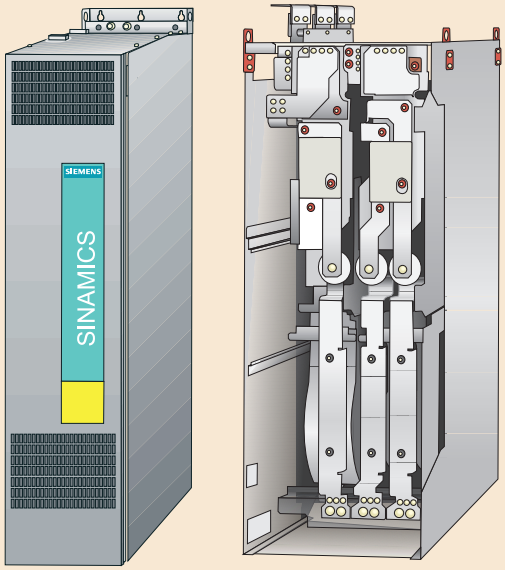
Connection system

Signal cables



SINAMICS G130 components

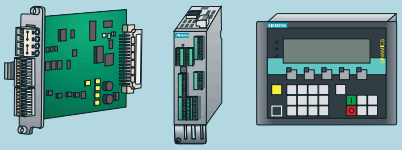
Power Modules



Control Unit Kit

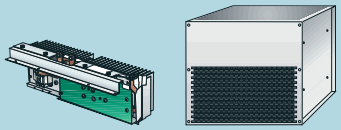
CU320-2 Control Unit
with CompactFlash card

Supplementary system components
e.g.
Terminal Board
Terminal Module
Sensor Module
Advanced Operator Panel
PROFINET board
CANopen board

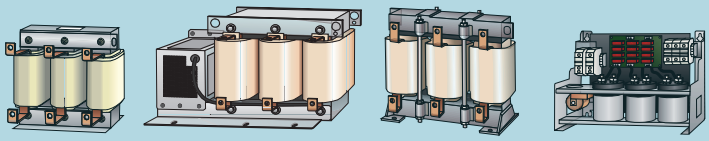


DC link components

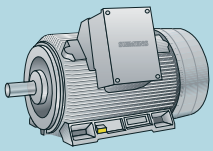
Braking Modules
with braking resistors



Motor-side power components
Motor reactors
Sine-wave filters
dv/dt-filter plus VPL
dv/dt-filter compact plus VPL



Motors



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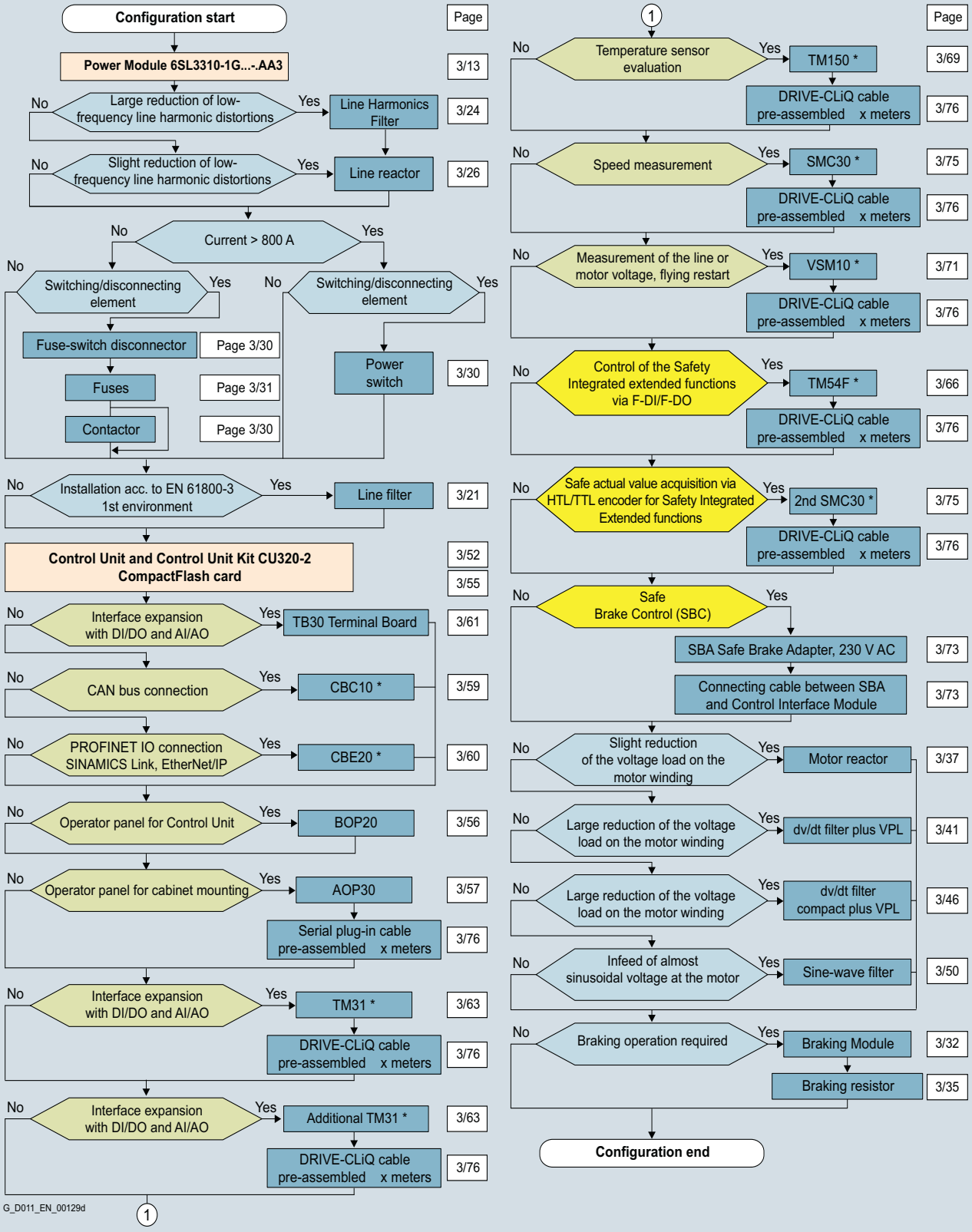
Design (continued)



Note:
The use of an external 24 V supply must be checked for the components marked with *.
For further information, please refer to the SINAMICS Low Voltage Engineering Manual.

Design (continued)

Coated modules

The following converter components are equipped as standard with coated modules:

- Power Modules
- Control Units
- Sensor Modules
- Terminal Modules
- Advanced Operator Panel (AOP30)

The coating on the modules protects the sensitive SMD components against corrosive gases, chemically active dust and moisture.

Nickel-plated busbars

All copper busbars of the Power Modules are nickel-plated in order to achieve the best possible immunity to environmental effects. The bare copper connections also do not have to be cleaned for customer connections.

Function

Communication with higher-level controller and customer terminal block

A PROFIBUS or PROFINET communication interface is provided as standard on the CU320-2 Control Unit for use as a customer interface to the controller; there are also expansions such as the TM31 Terminal Module, the TB30 Terminal Board and modules to support CANopen or EtherNet/IP communication.

These interfaces can be used to connect the system to the higher-level controller using analog and digital signals, or to connect additional devices.

To simplify configuration and commissioning of the drive, the TM31 Terminal Module can be preset with a variety of factory settings.

For further information, please refer to the SINAMICS Low Voltage Engineering Manual.

Open-loop and closed-loop control functions

The converter control contains a high-quality vector control with speed and current control as well as motor and converter protection.

Function (continued)

Software and protective functions

The software functions available as standard are described below:

Software and protective functions	Description
Setpoint specification	The setpoint can be specified both internally and externally; internally as a fixed setpoint, motorized potentiometer setpoint or jog setpoint, externally via the communications interface or an analog input on the customer terminal block. The internal fixed setpoint and the motorized potentiometer setpoint can be switched or adjusted via control commands from any interface.
Motor identification	The automatic motor identification function makes commissioning faster and easier and optimizes closed-loop control of the drive.
Ramp-function generator	A user-friendly ramp-function generator with separately adjustable ramp-up and ramp-down times, together with adjustable rounding times in the lower and upper speed ranges, allows the drive to be smoothly accelerated and braked. As a consequence, this avoids the drive train from being overloaded and reduces the stress on mechanical components. The down ramps can be parameterized separately for quick stop.
$V_{dc\ max}$ controller	The $V_{dc\ max}$ controller automatically prevents overvoltages in the DC link, if the set down ramp is too short, for example. This may also extend the set ramp-down time.
Vdc_min control	For brief line supply failures, the kinetic energy of the rotating drive is used to buffer the DC link and therefore prevents fault trips. The converter remains operational as long as the drive can provide regenerative energy as a result of its motion and the DC-link voltage does not drop below the shutdown threshold. When the line supply recovers within this time, the drive is again accelerated up to its speed setpoint.
Automatic restart [1]	The automatic restart switches the drive on again when the power is restored after a power failure, and ramps up to the current speed setpoint.
Flying restart [1]	The flying restart function allows the converter to be switched to a motor that is still turning. With the voltage sensing capability provided by the optional VSM10 Voltage Sensing Module, the flying restart time for large induction motors can be significantly reduced because the motor does not need to be de-magnetized.
Technology controller	The technology controller function module allows simple control functions to be implemented, e.g. level control or volumetric flow control. The technology controller is designed as a PID controller. The differentiator can be switched to the control deviation channel or to the actual value channel (factory setting). The P, I, and D components can be set separately.
Free function blocks	Using the freely programmable function blocks, it is easy to implement logic and arithmetic functions for controlling the SINAMICS G130. The blocks can be programmed by means of an operator panel or the STARTER commissioning tool.
Drive Control Chart (DCC)	Drive Control Chart (DCC) is an additional tool for the easy configuration of technology functions for the SINAMICS G130. The block library contains a large selection of control, arithmetic and logic blocks as well as extensive open-loop and closed-loop control functions. The user-friendly DCC editor enables easy graphics-based configuration, allows control loop structures to be clearly represented and provides a high degree of reusability of charts that have already been created. DCC is an add-on to the STARTER commissioning tool.
***Pt* detection for motor protection**	A motor model stored in the converter software calculates the motor temperature based on the current speed and load. More exact measurement of the temperature, which also takes into account the influence of the ambient temperature, is possible by means of direct temperature measurement using KTY84 sensors in the motor winding.
Motor temperature evaluation	Motor protection by evaluating a KTY84, PTC or Pt100 temperature sensor. When a KTY84 sensor is connected, the limit values can be set for alarm or trip. When a PTC thermistor is connected, the system reaction to triggering of the thermistor (alarm or trip) can be defined.
Motor blocking protection	A blocked motor is detected and protected against thermal overloading by a fault trip.
Essential service mode	Special converter operating mode that increases the availability of the drive system, e.g. in the event of a fire.
Bypass	This circuit allows the motor to be operated via the converter or directly on the line supply.
Brake control	"Simple brake control" for control of holding brakes: The holding brake is used to secure drives against unwanted motion when deactivated. "Extended brake control" function module for complex brake control, e.g. for motor holding brakes and operational brakes: When braking with a feedback signal, the brake control reacts to the feedback signal contacts of the brake.
Write protection	Write protection to prevent unintentional changing of the setting parameters (without password function).
Know-how protection	Know-how protection for encrypting stored data, e.g. to protect configuration know-how, and to protect against changes and duplication (with password function).
Web server	The integrated web server provides information about the drive unit via its web pages. The web server is accessed using an Internet browser via unsecured (http) or secured transmission (https).
Power unit protection	**Description**
Ground fault monitoring at the output	A ground fault at the output is detected by a total current monitor and results in shutdown in grounded systems.
Electronic short-circuit protection at the output	A short-circuit at the output (e.g. at the converter output terminals, in the motor cable or in the motor terminal box) is detected and the converter shuts down with a "fault".
Thermal overload protection	An alarm is issued first when the overtemperature threshold responds. If the temperature rises further, the device either shuts down or independently adjusts the pulse frequency or output current so that a reduction in the thermal load is achieved. Once the cause of the fault has been eliminated (e.g. cooling has been improved), the original operating values are automatically resumed.

[1] Factory setting: Not activated (can be parameterized).

Technical specifications

The most important directives and standards are listed below. These are used as basis for the SINAMICS G130 converter built-in units and they must be carefully observed to achieve an EMC-compliant configuration that is safe both functionally and in operation.

European directives	
2006/95/EC	Low-voltage directive: Directive of the European Parliament and Council of December 12, 2006, on the approximation of the laws of the member states relating to electrical equipment designed for use within certain voltage limits
2006/42/EC	Machinery directive: Directive of the European Parliament and Council of May 17, 2006 on machinery and for changing Directive 95/16/EC (amendment)
2004/108/EC	EMC directive: Directive of the European Parliament and Council of December 15, 2004, which repeals directive 89/336/EEC, on the approximation of laws of the member states relating to electromagnetic compatibility
European standards	
EN ISO 3744	Acoustics – Determination of the sound power level and sound energy level for noise sources that result from sound pressure measurements – envelope surface procedure of the accuracy class 2 for a largely free sound field over a reflecting plane
EN ISO 13849-1	Safety of machinery – Safety-related parts of control systems Part 1: General design principles (ISO 13849-1:2006) (replaced EN 954-1)
EN 60146-1-1	Semiconductor converters – General requirements and line-commutated converters Part 1-1: Specification of basic requirements
EN 60204-1	Electrical equipment of machines Part 1: General definitions
EN 60529	Degrees of protection provided by enclosures (IP code)
EN 61508-1	Functional safety of electrical/electronic/programmable electronic safety-related systems Part 1: General requirements
EN 61800-2	Adjustable speed electrical power drive systems Part 2: General requirements – Rating specifications for the measurement of low-voltage adjustable frequency AC power drive systems
EN 61800-3	Adjustable speed electrical power drive systems Part 3: EMC product standard including special test procedure
EN 61800-5-1	Adjustable speed electrical power drive systems Part 5: Safety requirements Main section 1: Electrical and thermal requirements
EN 61800-5-2	Adjustable speed electrical power drive systems Part 5-2: Safety requirements – Functional safety (IEC 61800-5-2:2007)
North American standards	
UL508A	Industrial Control Panels
UL508C	Power Conversion Equipment
CSA C22.2 No. 14	Industrial Control Equipment
Approvals	
cULus, cURus	Testing by UL (Underwriters Laboratories, www.ul.com) according to UL and CSA standards

Certification marks: (see Approvals)

General technical specifications

Electrical specifications	
Line voltages and power ranges	• 380 ... 480 V 3 AC ±10% (-15% <1 min) 110 ... 560 kW • 500 ... 600 V 3 AC ±10% (-15% <1 min) 110 ... 560 kW • 660 ... 690 V 3 AC ±10% (-15% <1 min) 75 ... 800 kW
Line system configurations	Grounded TN/TT systems or ungrounded IT systems (a grounded line conductor is not permissible in 690 V line supplies)
Line frequency	47 ... 63 Hz
Output frequency	0 ... 550 Hz[1)]
Line power factor	
• Fundamental	> 0.96
• Total	0.75 ... 0.93
Efficiency	> 98%
Overvoltage category	III according to EN 61800-5-1

Technical specifications (continued)

Electrical specifications (continued)			
Rated short-circuit current according to IEC, in conjunction with the specified fuses			
• 1.1 … 447 kW	65 kA		
• 448 ... 671 kW	84 kA		
• 672 ... 1193 kW	170 kA		
• > 1194 kW	200 kA		
Rated short-circuit current SCCR (Short Circuit Current Rating) according to UL508C (up to 600 V), in conjunction with the specified fuses or circuit breakers			
• 1.1 … 447 kW	65 kA		
• 448 ... 671 kW	84 kA		
• 672 ... 1193 kW	170 kA		
• > 1194 kW	200 kA		
Control method	Vector control with and without encoder or V/f control		
Fixed speeds	15 fixed speeds plus 1 minimum speed, parameterizable (in the default setting, 3 fixed setpoints plus 1 minimum speed are selectable using terminal block / PROFIBUS)		
Speed ranges that can be skipped	4, parameterizable		
Setpoint resolution	0.001 rpm digital 12-bit analog		
Braking operation	By means of additional Braking Modules and braking resistors		
Mechanical specifications			
Degree of protection	IP00 or IP20 depending on type		
Protection class	I according to EN 61800-5-1		
Touch protection	EN 50274 / BGV A3 when used for the intended purpose		
Cooling method	Forced air cooling AF according to EN 60146		
Ambient conditions	**Storage**	**Transport**	**Operation**
Ambient temperature	-25 ... +55° C	-25 ... +70° C as of -40° C for 24 hours	0 ... +40° C up to +55° C see derating data
Relative humidity (condensation not permissible)	5 ... 95%	5 ... 95% at 40° C	5 ... 95%
	Class 1K4 according to EN 60721-3-1	Class 2K3 according to EN 60721-3-2	Class 3K3 according to EN 60721-3-3
Environmental class / harmful chemical substances	Class 1C2 according to EN 60721-3-1	Class 2C2 according to EN 60721-3-2	Class 3C2 according to EN 60721-3-3
Organic/biological influences	Class 1B1 according to EN 60721-3-1	Class 2B1 according to EN 60721-3-2	Class 3B1 according to EN 60721-3-3
Degree of pollution	2 according to EN 61800-5-1		
Installation altitude	Up to 2000 m above sea level without derating; > 2000 m see derating data		
Mechanical stability	**Storage**	**Transport**	**Operation**
Vibratory load			
• Deflection	1.5 mm at 5 ... 9 Hz	3.1 mm at 5 ... 9 Hz	0.075 mm at 10 ... 58 Hz
• Acceleration	5 m/s^2 at > 9 ... 200 Hz	10 m/s^2 at > 9 ... 200 Hz	10 m/s^2 at > 58 … 200 Hz
	Class 1M2 according to EN 60721-3-1	Class 2M2 according to EN 60721-3-2	–
Shock load			
• Acceleration	40 m/s^2 for 22 ms	100 m/s^2 for 11 ms	100 m/s^2 for 11 ms
	Class 1M2 according to EN 60721-3-1	Class 2M2 according to EN 60721-3-2	Class 3M4 according to EN 60721-3-3
Compliance with standards			
CE marking	According to EMC Directive No. 2004/108/EC and Low Voltage Directive No. 2006/95/EC and Machinery Directive No. 2006/42/EC for functional safety.		
Radio interference suppression	The SINAMICS G130 converter systems are not designed for connection to the public power network ("first environment"). Radio interference suppression is compliant with the EMC product standard for variable-speed drives EN 61800-3, "Second environment" (industrial networks). EMC disturbances can occur when connected to the public power networks. However, if additional measures are taken (e.g. line filter), it can also be operated in the "first environment". 2)		
Approvals	cULus (only for 380 ... 480 V 3 AC and 500 ... 600 V 3 AC)		

Deviations from the specified classes are underlined.

1) The output frequency is also affected by the selected control method and the pulse frequency. For further information, please refer to the SINAMICS Low Voltage Engineering Manual.

2) Applies to motor cable lengths < 100 m.

Characteristic curves

Derating data

SINAMICS G130 built-in units and the associated system components are rated for an ambient temperature of 40° C and installation altitudes up to 2000 m above sea level.

At ambient temperatures > 40° C, the output current must be reduced. Ambient temperatures above 55° C are not permissible.

At installation altitudes > 2000 m above sea level, it must be taken into account that the air pressure, and therefore air density, decreases as the height increases. As a consequence, the cooling efficiency and the insulation capacity of the air also decrease.

Due to the reduced cooling efficiency, it is necessary, on the one hand, to reduce the ambient temperature and on the other hand, to reduce the heat loss in the built-in unit by reducing the output current, whereby ambient temperatures lower than 40° C may be offset to compensate.

The following table lists the permissible output currents depending on the installation altitude and ambient temperature.
The specified values already include a permitted compensation in respect of installation altitude and ambient temperatures < 40° C (temperature at the air intake of the built-in unit).

The values apply under the precondition that a cooling air flow through the devices is guaranteed as specified in the technical specifications.

As additional measure for installation altitudes from 2000 m up to 5000 m, an isolating transformer is required in order to reduce transient overvoltages according to EN 60664-1.

For further information, please refer to the SINAMICS Low Voltage Engineering Manual.

Current derating factors for built-in units depending on the ambient / air intake temperature and the installation altitude

Installation altitude above sea level	**Current derating factor** (as a percentage of the rated current) for an ambient / air intake temperature of							
m	20 °C	25 °C	30 °C	35 °C	40 °C	45 °C	50 °C	55 °C
0 ... 2000						93.3 %	86.7 %	80 %
2001 ... 2500					96.3 %			
2501 ... 3000		100 %		98.7 %				
3001 ... 3500								
3501 ... 4000			96.3 %					
4001 ... 4500		97.5 %						
4501 ... 5000	98.2 %							

Characteristic curves (continued)

Current derating depending on the pulse frequency

To reduce motor noise or to increase output frequency, the pulse frequency can be increased relative to the factory setting (1.25 kHz or 2 kHz). When the pulse frequency is increased, the derating factor of the output current must be taken into account. This derating factor must be applied to the currents specified in the technical specifications.

For further information, please refer to the SINAMICS Low Voltage Engineering Manual.

Derating factor of the output current depending on the pulse frequency for devices with a rated pulse frequency of 2 kHz

Article No.	Type rating	Output current at 2 kHz	**Derating factor** for pulse frequency				
6SL3310-...	kW	A	2.5 kHz	4 kHz	5 kHz	7,5 kHz	8 kHz
380 ... 480 V 3 AC							
1GE32-1AA3	110	210	95 %	82 %	74 %	54 %	50 %
1GE32-6AA3	132	260	95 %	83 %	74 %	54 %	50 %
1GE33-1AA3	160	310	97 %	88 %	78 %	54 %	50 %
1GE33-8AA3	200	380	96 %	87 %	77 %	54 %	50 %
1GE35-0AA3	250	490	94 %	78 %	71 %	53 %	50 %

Derating factor of the output current depending on the pulse frequency for devices with a rated pulse frequency of 1.25 kHz

Article No.	Type rating	Output current at 1.25 kHz	**Derating factor** for pulse frequency				
6SL3310-...	kW	A	2 kHz	2.5 kHz	4 kHz	5 kHz	7.5 kHz
380 ... 480 V 3 AC							
1GE36-1AA3	315	605	83 %	72 %	64 %	60 %	40 %
1GE37-5AA3	400	745	83 %	72 %	64 %	60 %	40 %
1GE38-4AA3	450	840	87 %	79 %	64 %	55 %	40 %
1GE41-0AA3	560	985	92 %	87 %	70 %	60 %	50 %
500 ... 600 V 3 AC							
1GF31-8AA3	110	175	92 %	87 %	70 %	60 %	40 %
1GF32-2AA3	132	215	92 %	87 %	70 %	60 %	40 %
1GF32-6AA3	160	260	92 %	88 %	71 %	60 %	40 %
1GF33-3AA3	200	330	89 %	82 %	65 %	55 %	40 %
1GF34-1AA3	250	410	89 %	82 %	65 %	55 %	35 %
1GF34-7AA3	315	465	92 %	87 %	67 %	55 %	35 %
1GF35-8AA3	400	575	91 %	85 %	64 %	50 %	30 %
1GF37-4AA3	500	735	87 %	79 %	64 %	55 %	35 %
1GF38-1AA3	560	810	83 %	72 %	61 %	55 %	35 %
660 ... 690 V 3 AC							
1GH28-5AA3	75	85	93 %	89 %	71 %	60 %	40 %
1GH31-0AA3	90	100	92 %	88 %	71 %	60 %	40 %
1GH31-2AA3	110	120	92 %	88 %	71 %	60 %	40 %
1GH31-5AA3	132	150	90 %	84 %	66 %	55 %	35 %
1GH31-8AA3	160	175	92 %	87 %	70 %	60 %	40 %
1GH32-2AA3	200	215	92 %	87 %	70 %	60 %	40 %
1GH32-6AA3	250	260	92 %	88 %	71 %	60 %	40 %
1GH33-3AA3	315	330	89 %	82 %	65 %	55 %	40 %
1GH34-1AA3	400	410	89 %	82 %	65 %	55 %	35 %
1GH34-7AA3	450	465	92 %	87 %	67 %	55 %	35 %
1GH35-8AA3	560	575	91 %	85 %	64 %	50 %	35 %
1GH37-4AA3	710	735	87 %	79 %	64 %	55 %	35 %
1GH38-1AA3	800	810	83 %	72 %	61 %	55 %	35 %

Note:

The derating factors for pulse frequencies in the range between the specified fixed values can be determined by linear interpolation.

Characteristic curves (continued)

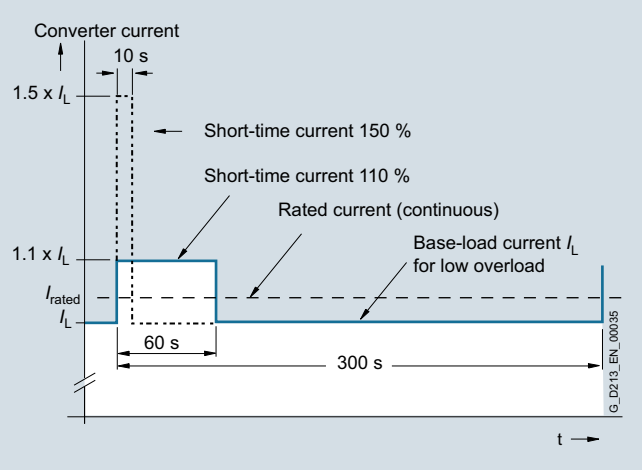
Overload capability

The SINAMICS G130 converters have an overload reserve in order to overcome breakaway torques, for example. If larger surge loads occur, this must be taken into account in the configuration. For drives with overload requirements, the appropriate base load current must, therefore, be used as a basis for the required load.

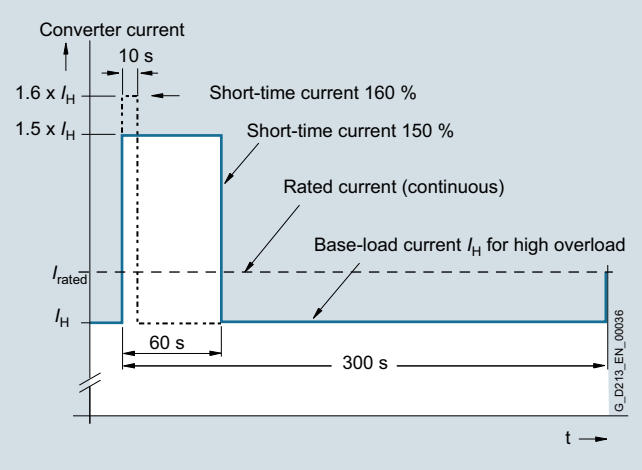
The criterion for overload is that the drive is operated with its base load current before and after the overload occurs on the basis of a duty cycle duration of 300 s.

The base load current for a low overload I_L is based on a duty cycle of 110% for 60 s or 150% for 10 s.

The base load current for a high overload I_H is based on a duty cycle of 150% for 60 s or 160% for 10 s.



Low overload



High overload

More information

Documentation

The device documentation consists of the following parts:

- Operating instructions
- Spare parts list
- Device-specific dimension drawings, layout diagrams, circuit and terminal diagrams

The documentation is available in English, French, German, Italian and Spanish.

Overview

The Power Module contains:

- The line-side 6-pulse rectifier
- The DC-link capacitors
- The inverter in IGBT technology
- The associated control and monitoring electronics
- The precharging circuit for the DC link
- The control and power supply for the fans in the Power Module

Design

As standard, the Power Module has the following interfaces:

- 1 line supply connection
- 1 motor connection
- 1 connection for Braking Module
- 1 connection for dv/dt filter or dv/dt filter compact plus VPL
- 1 connection for external 24 V DC supply
- 24 V power supply (max. 2.5 A) for
  - CU320-2 Control Unit
  - AOP30 Advanced Operator Panel
  - Further DRIVE-CLiQ components
- 3 DRIVE-CLiQ sockets
- 1 temperature sensor input (KTY84-130, PTC or Pt100)
- 1 connection for Safe Brake Adapter
- 1 connection for Safety Integrated
- 2 PE connections

DRIVE-CLiQ cables for connections to further DRIVE-CLiQ devices can be ordered pre-assembled and cut to length as required (see Section Supplementary system components → Signal cables).

The scope of supply of the Power Modules includes:

- 1 DRIVE-CLiQ cable for connection to the Control Unit
- 1 set of warning labels in 30 languages (BG, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, JP, KR, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR)

Selection and ordering data

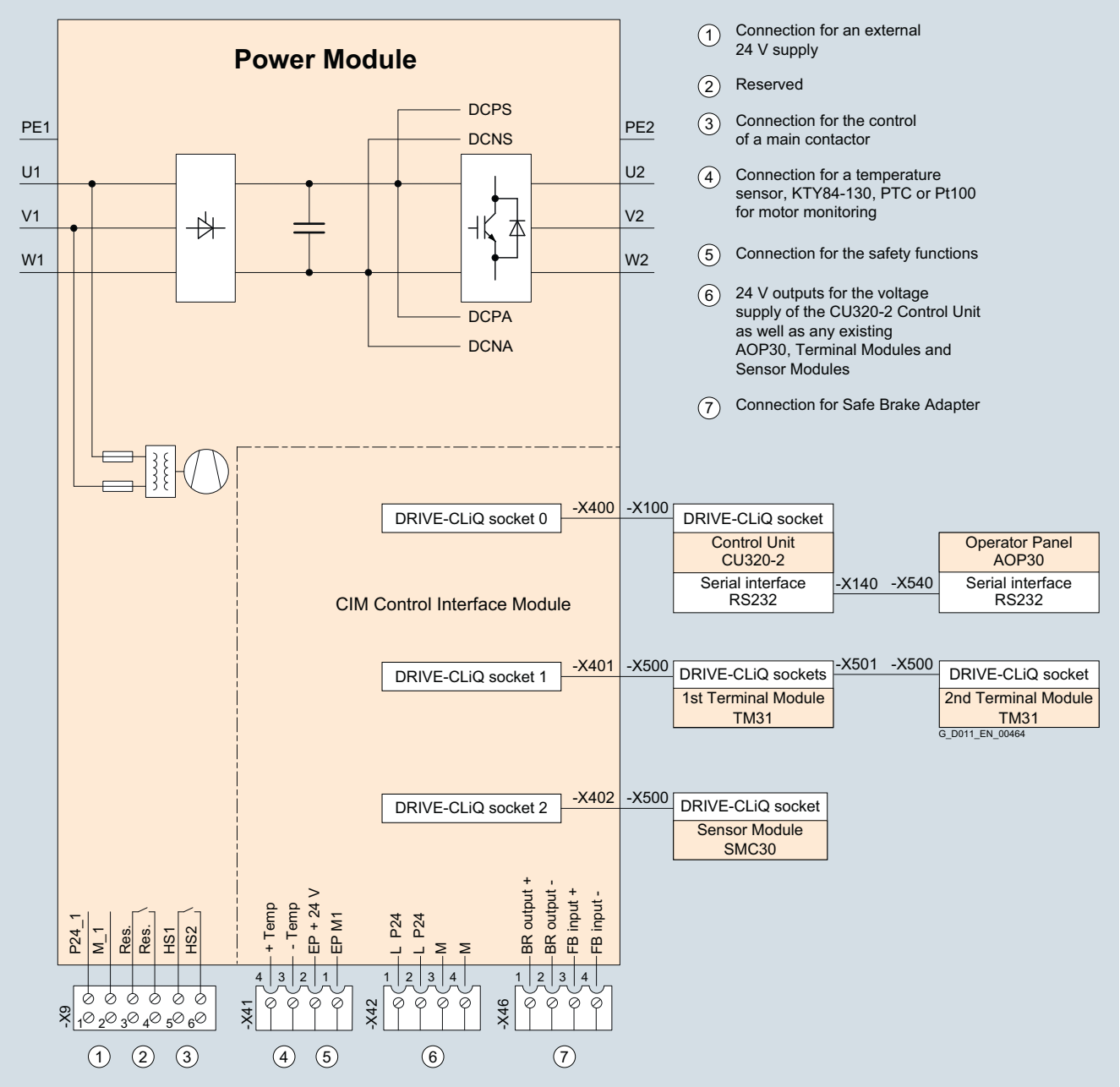
Type rating		Rated output current	Power Module
at 50 Hz 400 V, 500 V or 690 V	at 60 Hz 460 V or 575 V		
kW	hp	A	Article No.
380 ... 480 V 3 AC			
110	150	210	**6SL3310-1GE32-1AA3**
132	200	260	**6SL3310-1GE32-6AA3**
160	250	310	**6SL3310-1GE33-1AA3**
200	300	380	**6SL3310-1GE33-8AA3**
250	400	490	**6SL3310-1GE35-0AA3**
315	500	605	**6SL3310-1GE36-1AA3**
400	600	745	**6SL3310-1GE37-5AA3**
450	700	840	**6SL3310-1GE38-4AA3**
560	800	985	**6SL3310-1GE41-0AA3**
500 ... 600 V 3 AC			
110	150	175	**6SL3310-1GF31-8AA3**
132	200	215	**6SL3310-1GF32-2AA3**
160	250	260	**6SL3310-1GF32-6AA3**
200	300	330	**6SL3310-1GF33-3AA3**
250	400	410	**6SL3310-1GF34-1AA3**
315	450	465	**6SL3310-1GF34-7AA3**
400	600	575	**6SL3310-1GF35-8AA3**
500	700	735	**6SL3310-1GF37-4AA3**
560	800	810	**6SL3310-1GF38-1AA3**
660 ... 690 V 3 AC			
75		85	**6SL3310-1GH28-5AA3**
90		100	**6SL3310-1GH31-0AA3**
110		120	**6SL3310-1GH31-2AA3**
132		150	**6SL3310-1GH31-5AA3**
160		175	**6SL3310-1GH31-8AA3**
200		215	**6SL3310-1GH32-2AA3**
250		260	**6SL3310-1GH32-6AA3**
315		330	**6SL3310-1GH33-3AA3**
400		410	**6SL3310-1GH34-1AA3**
450		465	**6SL3310-1GH34-7AA3**
560		575	**6SL3310-1GH35-8AA3**
710		735	**6SL3310-1GH37-4AA3**
800		810	**6SL3310-1GH38-1AA3**

Note: The power data in hp units is based on the NEC/CEC standards for the North American market.

3

Integration

The Power Module communicates with the CU320-2 Control Unit via DRIVE-CLiQ and receives its control information via this route.



Connection example of a Power Module

Technical specifications

Line voltage 380 ... 480 V 3 AC		Power Modules				
		6SL3310-1GE32-1AA3	6SL3310-1GE32-6AA3	6SL3310-1GE33-1AA3	6SL3310-1GE33-8AA3	6SL3310-1GE35-0AA3
Type rating						
• For I_L at 50 Hz 400 V [1]	kW	**110**	**132**	**160**	**200**	**250**
• For I_H at 50 Hz 400 V [1]	kW	90	110	132	160	200
• For I_L at 60 Hz 460 V [2]	hp	150	200	250	300	400
• For I_H at 60 Hz 460 V [2]	hp	150	200	200	250	350
Output current						
• Rated current I_n	A	210	260	310	380	490
• Base-load current I_L [3]	A	205	250	302	370	477
• Base-load current I_H [4]	A	178	233	277	340	438
Input current						
• Rated input current	A	229	284	338	395	509
• Input current, max.	A	335	410	495	606	781
• Current requirement, 24 V DC auxiliary power supply [5]	A	0.8	0.8	0.9	0.9	0.9
Minimum short-circuit current [6]	A	3000	3600	4400	4400	8000
Power loss, max. [7]						
• At 50 Hz 400 V	kW	2.4	3.2	3.9	4.3	5.6
• At 60 Hz 460 V	kW	2.6	3.3	4.4	4.9	6.1
Cooling air requirement	m^3/s	0.17	0.23	0.36	0.36	0.36
Cable length, max. between Power Module and motor [8]						
• Shielded	m	300	300	300	300	300
• Unshielded	m	450	450	450	450	450
Degree of protection		IP20	IP20	IP20	IP20	IP20
Sound pressure level L_{pA} (1 m) at 50/60 Hz	dB	64/67	64/67	69/73	69/73	69/73
Line connection U1, V1, W1		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
• Conductor cross section, max. (IEC)	mm^2	2 × 185	2 × 185	2 × 240	2 × 240	2 × 240
Motor connection U2/T1, V2/T2, W2/T3		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
• Conductor cross section, max. (IEC)	mm^2	2 × 185	2 × 185	2 × 240	2 × 240	2 × 240
PE1/GND connection		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
• Conductor cross section, max. (IEC)	mm^2	2 × 185	2 × 185	2 × 240	2 × 240	2 × 240
PE2/GND connection		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
• Conductor cross section, max. (IEC)	mm^2	2 × 185	2 × 185	2 × 240	2 × 240	2 × 240
Dimensions						
• Width	mm	326	326	326	326	326
• Height	mm	1400	1400	1533	1533	1533
• Depth	mm	356	356	545	545	545
Weight, approx.	kg	104	104	176	176	176
Frame size		FX	FX	GX	GX	GX

Note: The power data in hp units is based on the NEC/CEC standards for the North American market.

[1] Rated output of a typical 6-pole standard induction motor based on I_L or I_H for 3 AC 50 Hz 400 V.

[2] Rated output of a typical 6-pole standard induction motor based on I_L or I_H for 3 AC 60 Hz 460 V.

[3] The base-load current I_L is based on a load cycle of 110% for 60 s or 150% for 10 s with a load cycle duration of 300 s (see Technical specifications → Overload capability)

[4] The base-load current I_H is based on a load cycle of 150% for 60 s or 160% for 10 s with a load cycle duration of 300 s (see Technical specifications → Overload capability).

[5] If the auxiliary supply is to be fed in separately from the load supply, e.g. if the control should be able to continue communication when the line voltage fails

[6] The minimum current required to reliably trigger 3NE1 protective devices.

[7] The specified power losses are the maximum values for a utilization of 100%. The values are lower under normal operating condition.

[8] Longer cable lengths for specific configurations are available on request.

Technical specifications (continued)

Line voltage 380 ... 480 V 3 AC		Power Modules			
		6SL3310-1GE36-1AA3	6SL3310-1GE37-5AA3	6SL3310-1GE38-4AA3	6SL3310-1GE41-0AA3
Type rating					
• For I_L at 50 Hz 400 V [1]	kW	**315**	**400**	**450**	**560**
• For I_H at 50 Hz 400 V [1]	kW	250	315	400	450
• For I_L at 60 Hz 460 V [2]	hp	500	600	700	800
• For I_H at 60 Hz 460 V [2]	hp	350	450	600	700
Output current					
• Rated current I_n	A	605	745	840	985
• Base-load current I_L [3]	A	590	725	820	960
• Base-load current I_H [4]	A	460	570	700	860
Input current					
• Rated input current	A	629	775	873	1024
• Input current, max.	A	967	1188	1344	1573
• Current requirement, 24 V DC auxiliary power supply [5]	A	1	1	1	1.25
Minimum short-circuit current [6]	A	10000	10500	16000	18400
Power loss, max. [7]					
• At 50 Hz 400 V	kW	7.2	8.5	9.1	12.7
• At 60 Hz 460 V	kW	8.1	9.4	10.2	14.5
Cooling air requirement	m^3/s	0.78	0.78	0.78	1.48
Cable length, max. between Power Module and motor [8]					
• Shielded	m	300	300	300	300
• Unshielded	m	450	450	450	450
Degree of protection		IP00	IP00	IP00	IP00
Sound pressure level L_{pA} (1 m) at 50/60 Hz	dB	70/73	70/73	70/73	72/75
Line connection U1, V1, W1		2 × M12 screws	2 × M12 screws	2 × M12 screws	3 × M12 screws
• Conductor cross section, max. (IEC)	mm^2	4 × 240	4 × 240	4 × 240	6 × 240
Motor connection U2/T1, V2/T2, W2/T3		2 × M12 screws	2 × M12 screws	2 × M12 screws	3 × M12 screws
• Conductor cross section, max. (IEC)	mm^2	4 × 240	4 × 240	4 × 240	6 × 240
PE1/GND connection		M12 screw	M12 screw	M12 screw	2 × M12 screws
• Conductor cross section, max. (IEC)	mm^2	2 × 240	2 × 240	2 × 240	4 × 240
PE2/GND connection		2 × M12 screws	2 × M12 screws	2 × M12 screws	3 × M12 screws
• Conductor cross section, max. (IEC)	mm^2	4 × 240	4 × 240	4 × 240	6 × 240
Dimensions					
• Width	mm	503	503	503	909
• Height	mm	1506	1506	1506	1510
• Depth	mm	540	540	540	540
Weight, approx.	kg	294	294	294	530
Frame size		HX	HX	HX	JX

Note: The power data in hp units is based on the NEC/CEC standards for the North American market.

[1] Rated output of a typical 6-pole standard induction motor based on I_L or I_H for 3 AC 50 Hz 400 V.

[2] Rated output of a typical 6-pole standard induction motor based on I_L or I_H for 3 AC 60 Hz 460 V.

[3] The base-load current I_L is based on a load cycle of 110% for 60 s or 150% for 10 s with a load cycle duration of 300 s (see Technical specifications → Overload capability).

[4] The base-load current I_L is based on a load cycle of 150% for 60 s or 160% for 10 s with a load cycle duration of 300 s (see Technical specifications → Overload capability).

[5] If the auxiliary supply is to be fed in separately from the load supply, e.g. if the control should be able to continue communication when the line voltage fails.

[6] The minimum current required to reliably trigger 3NE1 protective devices.

[7] The specified power losses are the maximum values for a utilization of 100%. The values are lower under normal operating conditions.

[8] Longer cable lengths for specific configurations are available on request.

Technical specifications (continued)

Line voltage 500 ... 600 V 3 AC		Power Modules				
		6SL3310-1GF31-8AA3	6SL3310-1GF32-2AA3	6SL3310-1GF32-6AA3	6SL3310-1GF33-3AA3	6SL3310-1GF34-1AA3
Type rating						
• For I_L at 50 Hz 500 V [1]	kW	**110**	**132**	**160**	**200**	**250**
• For I_H at 50 Hz 500 V [1]	kW	90	110	132	160	200
• For I_L at 60 Hz 575 V [2]	hp	150	200	250	300	400
• For I_H at 60 Hz 575 V [2]	hp	150	200	200	250	350
Output current						
• Rated current I_n	A	175	215	260	330	410
• Base-load current I_L [3]	A	171	208	250	320	400
• Base-load current I_H [4]	A	157	192	233	280	367
Input current						
• Rated input current	A	191	224	270	343	426
• Input current, max.	A	279	341	410	525	655
• Current requirement, 24 V DC auxiliary power supply [5]	A	0.9	0.9	0.9	0.9	1
Minimum short-circuit current [6]	A	2400	3000	3600	5200	5200
Power loss, max. [7]						
• At 50 Hz 500 V	kW	2.8	3.2	3.7	4.6	6.1
• At 60 Hz 575 V	kW	3.2	3.6	4.1	5.1	7.1
Cooling air requirement	m^3/s	0.36	0.36	0.36	0.36	0.78
Cable length, max. between Power Module and motor [8]						
• Shielded	m	300	300	300	300	300
• Unshielded	m	450	450	450	450	450
Degree of protection		IP20	IP20	IP20	IP20	IP00
Sound pressure level L_{pA} (1 m) at 50/60 Hz	dB	69/73	69/73	69/73	69/73	70/73
Line connection U1, V1, W1		M10 screw	M10 screw	M10 screw	M10 screw	2 × M12 screws
• Conductor cross section, max. (IEC)	mm^2	2 × 240	2 × 240	2 × 240	2 × 240	4 × 240
Motor connection U2/T1, V2/T2, W2/T3		M10 screw	M10 screw	M10 screw	M10 screw	2 × M12 screws
• Conductor cross section, max. (IEC)	mm^2	2 × 240	2 × 240	2 × 240	2 × 240	4 × 240
PE1/GND connection		M10 screw	M10 screw	M10 screw	M10 screw	M12 screw
• Conductor cross section, max. (IEC)	mm^2	2 × 240	2 × 240	2 × 240	2 × 240	2 × 240
PE2/GND connection		M10 screw	M10 screw	M10 screw	M10 screw	2 x M12 screws
• Conductor cross section, max. (IEC)	mm^2	2 × 240	2 × 240	2 × 240	2 × 240	4 × 240
Dimensions						
• Width	mm	326	326	326	326	503
• Height	mm	1533	1533	1533	1533	1506
• Depth	mm	545	545	545	545	540
Weight, approx.	kg	176	176	176	176	294
Frame size		GX	GX	GX	GX	HX

Note: The power data in hp units is based on the NEC/CEC standards for the North American market.

[1] Rated output of a typical 6-pole standard induction motor based on I_L or I_H for 3 AC 50 Hz 500 V.

[2] Rated output of a typical 6-pole standard induction motor based on I_L or I_H for 3 AC 60 Hz 575 V.

[3] The base-load current I_L is based on a load cycle of 110% for 60 s or 150% for 10 s with a load cycle duration of 300 s (see Technical specifications → Overload capability).

[4] The base-load current I_L is based on a load cycle of 150% for 60 s or 160% for 10 s with a load cycle duration of 300 s (see Technical specifications → Overload capability).

[5] If the auxiliary supply is to be fed in separately from the load supply, e.g. if the control should be able to continue communication when the line voltage fails.

[6] The minimum current required to reliably trigger 3NE1 protective devices.

[7] The specified power losses are the maximum values for a utilization of 100%. The values are lower under normal operating conditions.

[8] Longer cable lengths for specific configurations are available on request.

Technical specifications (continued)

Line voltage 500 ... 600 V 3 AC		Power Modules			
		6SL3310-1GF34-7AA3	6SL3310-1GF35-8AA3	6SL3310-1GF37-4AA3	6SL3310-1GF38-1AA3
Type rating					
• For I_L at 50 Hz 500 V [1]	kW	**315**	**400**	**500**	**560**
• For I_H at 50 Hz 500 V [1]	kW	250	315	450	500
• For I_L at 60 Hz 575 V [2]	hp	450	600	700	800
• For I_H at 60 Hz 575 V [2]	hp	450	500	700	700
Output current					
• Rated current I_n	A	465	575	735	810
• Base-load current I_L [3]	A	452	560	710	790
• Base-load current I_H [4]	A	416	514	657	724
Input current					
• Rated input current	A	483	598	764	842
• Input current, max.	A	740	918	1164	1295
• Current requirement, 24 V DC auxiliary power supply [5]	A	1	1	1.25	1.25
Minimum short-circuit current [6]	A	6200	8400	10500	10400
Power loss, max. [7]					
• At 50 Hz 500 V	kW	6.7	7.9	11	12.1
• At 60 Hz 575 V	kW	7.7	8.9	12.9	14
Cooling air requirement	m^3/s	0.78	0.78	1.48	1.48
Cable length, max. between Power Module and motor [8]					
• Shielded	m	300	300	300	300
• Unshielded	m	450	450	450	450
Degree of protection		IP00	IP00	IP00	IP00
Sound pressure level L_{pA} (1 m) at 50/60 Hz	dB	70/73	70/73	73/75	73/75
Line connection U1, V1, W1		2 × M12 screws	2 × M12 screws	3 × M12 screws	3 × M12 screws
• Conductor cross section, max. (IEC)	mm^2	4 × 240	4 × 240	6 × 240	6 × 240
Motor connection U2/T1, V2/T2, W2/T3		2 × M12 screws	2 × M12 screws	3 × M12 screws	3 × M12 screws
• Conductor cross section, max. (IEC)	mm^2	4 × 240	4 × 240	6 × 240	6 × 240
PE1/GND connection		M12 screw	M12 screw	2 × M12 screws	2 × M12 screws
• Conductor cross section, max. (IEC)	mm^2	2 × 240	2 × 240	4 × 240	4 × 240
PE2/GND connection		2 × M12 screws	2 × M12 screws	3 × M12 screws	3 × M12 screws
• Conductor cross section, max. (IEC)	mm^2	4 × 240	4 × 240	6 × 240	6 × 240
Dimensions					
• Width	mm	503	503	909	909
• Height	mm	1506	1506	1510	1510
• Depth	mm	540	540	540	540
Weight, approx.	kg	294	294	530	530
Frame size		HX	HX	JX	JX

Note: The power data in hp units is based on the NEC/CEC standards for the North American market.

[1] Rated output of a typical 6-pole standard induction motor based on I_L or I_H for 3 AC 50 Hz 500 V.

[2] Rated output of a typical 6-pole standard induction motor based on I_L or I_H for 3 AC 60 Hz 575 V.

[3] The base-load current I_L is based on a load cycle of 110% for 60 s or 150% for 10 s with a load cycle duration of 300 s (see Technical specifications → Overload capability).

[4] The base-load current I_L is based on a load cycle of 150% for 60 s or 160% for 10 s with a load cycle duration of 300 s (see Technical specifications → Overload capability).

[5] If the auxiliary supply is to be fed in separately from the load supply, e.g. if the control should be able to continue communication when the line voltage fails.

[6] The minimum current required to reliably trigger 3NE1 protective devices.

[7] The specified power losses are the maximum values for a utilization of 100%. The values are lower under normal operating conditions.

[8] Longer cable lengths for specific configurations are available on request.

Technical specifications (continued)

Line voltage 660 ... 690 V 3 AC		Power Modules					
		6SL3310-1GH28-5AA3	6SL3310-1GH31-0AA3	6SL3310-1GH31-2AA3	6SL3310-1GH31-5AA3	6SL3310-1GH31-8AA3	6SL3310-1GH32-2AA3
Type rating							
• For I_L at 50 Hz 690 V [1]	kW	**75**	**90**	**110**	**132**	**160**	**200**
• For I_H at 50 Hz 690 V [1]	kW	55	75	90	110	132	160
Output current							
• Rated current I_n	A	85	100	120	150	175	215
• Base-load current I_L [2]	A	80	95	115	142	171	208
• Base-load current I_H [3]	A	76	89	107	134	157	192
Input current							
• Rated input current	A	93	109	131	164	191	224
• Input current, max.	A	131	155	188	232	279	341
• Current requirement, 24 V DC auxiliary power supply [4]	A	0.8	0.8	0.8	0.8	0.9	0.9
Minimum short-circuit current [5]	A	1050	1050	1200	1600	2400	3000
Heat loss, max. [6] at 50 Hz 690 V	kW	1.3	1.6	1.8	2.3	3	3.5
Cooling air requirement	m^3/s	0.17	0.17	0.17	0.17	0.36	0.36
Cable length, max. between Power Module and motor [7]							
• Shielded	m	300	300	300	300	300	300
• Unshielded	m	450	450	450	450	450	450
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20
Sound pressure level L_{pA} (1 m) at 50/60 Hz	dB	64/67	64/67	64/67	64/67	69/73	69/73
Line connection U1, V1, W1		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
• Conductor cross section, max. (IEC)	mm^2	2 × 185	2 × 185	2 × 185	2 × 185	2 × 240	2 × 240
Motor connection U2/T1, V2/T2, W2/T3		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
• Conductor cross section, max. (IEC)	mm^2	2 × 185	2 × 185	2 × 185	2 × 185	2 × 240	2 × 240
PE1/GND connection		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
• Conductor cross section, max. (IEC)	mm^2	2 × 185	2 × 185	2 × 185	2 × 185	2 × 240	2 × 240
PE2/GND connection		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
• Conductor cross section, max. (IEC)	mm^2	2 × 185	2 × 185	2 × 185	2 × 185	2 × 240	2 × 240
Dimensions							
• Width	mm	326	326	326	326	326	326
• Height	mm	1400	1400	1400	1400	1533	1533
• Depth	mm	356	356	356	356	545	545
Weight, approx.	kg	104	104	104	104	176	176
Frame size		FX	FX	FX	FX	GX	GX

Note: The power data in hp units is based on the NEC/CEC standards for the North American market.

[1] Rated output of a typical 6-pole standard induction motor based on I_L or I_H for 3 AC 50 Hz 640 V.

[2] The base-load current I_L is based on a load cycle of 110% for 60 s or 150% for 10 s with a load cycle duration of 300 s

[3] The base-load current I_L is based on a load cycle of 150% for 60 s or 160% for 10 s with a load cycle duration of 300 s (see Technical specifications → Overload capability).

[4] N:_Laufende_Aufträge\EM_LP_MK&CS_2_3\01_Kataloge\PI_3VA_FR_2015\06_Korrekturläufe\04_Freigabe_Kunde\an_Kunde\3VA_gesamt_DRAFT_2015-08-17.pdfIf the auxiliary supply is to be fed in separately from the load supply, e.g. if the control should be able to continue communication when the line voltage fails.

[5] The minimum current required to reliably trigger 3NE1 protective devices.

[6] The specified power losses are the maximum values for a utilization of 100%. The values are lower under normal operating conditions.

[7] Longer cable lengths for specific configurations are available on request.

Technical specifications (continued)

Line voltage 660 ... 690 V 3 AC		Power Modules						
		6SL3310-1GH32-6AA3	6SL3310-1GH33-3AA3	6SL3310-1GH34-1AA3	6SL3310-1GH34-7AA3	6SL3310-1GH35-8AA3	6SL3310-1GH37-4AA3	6SL3310-1GH38-1AA3
Type rating								
• For I_L at 50 Hz 690 V [1]	kW	**250**	**315**	**400**	**450**	**560**	**710**	**800**
• For I_H at 50 Hz 690 V [1]	kW	200	250	315	400	500	560	710
Output current								
• Rated current I_n	A	260	330	410	465	575	735	810
• Base-load current I_L [2]	A	250	320	400	452	560	710	790
• Base-load current I_H [3]	A	233	280	367	416	514	657	724
Input current								
• Rated input current	A	270	343	426	483	598	764	842
• Input current, max.	A	410	525	655	740	918	1164	1295
• Current requirement, 24 V DC auxiliary power supply [4]	A	0.9	0.9	1	1	1	1.25	1.25
Minimum short-circuit current [5]	A	3600	5200	5200	6200	8400	10500	10400
Heat loss, max. [6] at 50 Hz 690 V	kW	4	5	6.7	7.3	8.6	12.1	13.4
Cooling air requirement	m^3/s	0.36	0.36	0.78	0.78	0.78	1.48	1.48
Cable length, max. between Power Module and motor [7]								
• Shielded	m	300	300	300	300	300	300	300
• Unshielded	m	450	450	450	450	450	450	450
Degree of protection		IP20	IP20	IP00	IP00	IP00	IP00	IP00
Sound pressure level L_{pA} (1 m) at 50/60 Hz	dB	69/73	69/73	70/73	70/73	70/73	73/75	73/75
Line connection U1, V1, W1		M10 screw	M10 screw	2 × M12 screws	2 × M12 screws	2 × M12 screws	3 × M12 screws	3 × M12 screws
• Conductor cross section, max. (IEC)	mm^2	2 × 240	2 × 240	4 × 240	4 × 240	4 × 240	6 × 240	6 × 240
Motor connection U2/T1, V2/T2, W2/T3		M10 screw	M10 screw	2 × M12 screws	2 × M12 screws	2 × M12 screws	3 × M12 screws	3 × M12 screws
• Conductor cross section, max. (IEC)	mm^2	2 × 240	2 × 240	4 × 240	4 × 240	4 × 240	6 × 240	6 × 240
PE1/GND connection		M10 screw	M10 screw	M12 screw	M12 screw	M12 screw	2 × M12 screws	2 × M12 screws
• Conductor cross section, max. (IEC)	mm^2	2 × 240	2 × 240	2 × 240	2 × 240	2 × 240	4 × 240	4 × 240
PE2/GND connection		M10 screw	M10 screw	2 × M12 screws	2 × M12 screws	2 × M12 screws	3 × M12 screws	3 × M12 screws
• Conductor cross section, max. (IEC)	mm^2	2 × 240	2 × 240	4 × 240	4 × 240	4 × 240	6 × 240	6 × 240
Dimensions								
• Width	mm	326	326	503	503	503	909	909
• Height	mm	1533	1533	1506	1506	1506	1510	1510
• Depth	mm	545	545	540	540	540	540	540
Weight, approx.	kg	176	176	294	294	294	530	530
Frame size		GX	GX	HX	HX	HX	JX	JX

Note: The power data in hp units is based on the NEC/CEC standards for the North American market.

1) Rated output of a typical 6-pole standard induction motor based on I_L or I_H for 3 AC 50 Hz 640 V.

2) The base-load current I_L is based on a load cycle of 110% for 60 s or 150% for 10 s with a load cycle duration of 300 s

3) The base-load current I_L is based on a load cycle of 150% for 60 s or 160% for 10 s with a load cycle duration of 300 s (see Technical specifications → Overload capability).

4) If the auxiliary supply is to be fed in separately from the load supply, e.g. if the control should be able to continue communication when the line voltage fails.

5) The minimum current required to reliably trigger 3NE1 protective devices.

6) The specified power losses are the maximum values for a utilization of 100%. The values are lower under normal operating conditions.

7) Longer cable lengths for specific configurations are available on request.

Overview

Line-side power components protect the connected components against transient or continuous overvoltages and ensure that specified limit values are maintained.

To limit the emitted interference, the converters are equipped as standard with a radio interference suppression filter that conforms to the limits defined in Category C3. SINAMICS G130 converters equipped with a line filter also meet the limits for use in the first environment (Category C2) according to EN 61800-3 [1].

SINAMICS G130 converters comply with the noise immunity requirements defined in this standard for the first and second environments.

In conjunction with line reactors, line filters also limit the conducted interference emitted by the Power Modules to the limit values of Category C2 defined in product standard EN 61800-3. Provided that the system has been set up in accordance with the EMC installation guidelines, the limit values at the installation location will be in accordance with the requirements for the first environment.

The line filters are suitable for grounded systems (TN or TT systems with grounded neutral point).

Selection and ordering data

Suitable for Power Module	Type rating of the Power Module at 400 V, 500 V or 690 V	**Line filter**
	kW	Article No.
380 ... 480 V 3 AC		
6SL3310-1GE32-1AA3	110	**6SL3000-0BE32-5AA0**
6SL3310-1GE32-6AA3	132	**6SL3000-0BE34-4AA0**
6SL3310-1GE33-1AA3	160	
6SL3310-1GE33-8AA3	200	
6SL3310-1GE35-0AA3	250	**6SL3000-0BE36-0AA0**
6SL3310-1GE36-1AA3	315	**6SL3000-0BE41-2AA0**
6SL3310-1GE37-5AA3	400	
6SL3310-1GE38-4AA3	450	
6SL3310-1GE41-0AA3	560	
500 ... 600 V 3 AC		
6SL3310-1GF31-8AA3	110	**6SL3000-0BG32-5AA0**
6SL3310-1GF32-2AA3	132	
6SL3310-1GF32-6AA3	160	**6SL3000-0BG34-4AA0**
6SL3310-1GF33-3AA3	200	
6SL3310-1GF34-1AA3	250	
6SL3310-1GF34-7AA3	315	**6SL3000-0BG36-0AA0**
6SL3310-1GF35-8AA3	400	**6SL3000-0BG41-2AA0**
6SL3310-1GF37-4AA3	500	
6SL3310-1GF38-1AA3	560	
660 ... 690 V 3 AC		
6SL3310-1GH28-5AA3	75	**6SL3000-0BG32-5AA0**
6SL3310-1GH31-0AA3	90	
6SL3310-1GH31-2AA3	110	
6SL3310-1GH31-5AA3	132	
6SL3310-1GH31-8AA3	160	
6SL3310-1GH32-2AA3	200	
6SL3310-1GH32-6AA3	250	**6SL3000-0BG34-4AA0**
6SL3310-1GH33-3AA3	315	
6SL3310-1GH34-1AA3	400	
6SL3310-1GH34-7AA3	450	**6SL3000-0BG36-0AA0**
6SL3310-1GH35-8AA3	560	**6SL3000-0BG41-2AA0**
6SL3310-1GH37-4AA3	710	
6SL3310-1GH38-1AA3	800	

For further information about EMC-compliant plant construction, please refer to the SINAMICS Low Voltage Engineering Manual.

[1] Applies to motor cable lengths < 100 m.

Technical specifications

Line voltage 380 ... 480 V 3 AC		**Line filter**			
		6SL3000-0BE32-5AA0	6SL3000-0BE34-4AA0	6SL3000-0BE36-0AA0	6SL3000-0BE41-2AA0
Rated current	A	250	440	600	1200
Power loss	kW	0.015	0.047	0.053	0.119
Line/load connection		1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M12
• Conductor cross section, max. (IEC)	mm^2	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
PE connection		Hole for M8	Hole for M8	Hole for M10	Hole for M10
Degree of protection		IP00	IP00	IP00	IP00
Dimensions					
• Width	mm	360	360	400	425
• Height	mm	240	240	265	265
• Depth	mm	116	116	140	145
Weight, approx.	kg	12.3	12.3	19	25.8
Approvals, according to		cURus	cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GE32-1AA3 (110 kW)	6SL3310-1GE32-6AA3 (132 kW) 6SL3310-1GE33-1AA3 (160 kW) 6SL3310-1GE33-8AA3 (200 kW)	6SL3310-1GE35-0AA3 (250 kW)	6SL3310-1GE36-1AA3 (315 kW) 6SL3310-1GE37-5AA3 (400 kW) 6SL3310-1GE38-4AA3 (450 kW) 6SL3310-1GE41-0AA3 (560 kW)

Line voltage 500 ... 600 V 3 AC		**Line filter**			
		6SL3000-0BG32-5AA0	6SL3000-0BG34-4AA0	6SL3000-0BG36-0AA0	6SL3000-0BG41-2AA0
Rated current	A	250	440	600	1200
Power loss	kW	0.015	0.047	0.053	0.119
Line/load connection		1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M12
• Conductor cross section, max. (IEC)	mm^2	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
PE connection		Hole for M8	Hole for M8	Hole for M10	Hole for M10
Degree of protection		IP00	IP00	IP00	IP00
Dimensions					
• Width	mm	360	360	400	425
• Height	mm	240	240	265	265
• Depth	mm	116	116	140	145
Weight, approx.	kg	12.3	12.3	19	25.8
Approvals, according to		cURus	cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GF31-8AA3 (110 kW) 6SL3310-1GF32-2AA3 (132 kW)	6SL3310-1GF32-6AA3 (160 kW) 6SL3310-1GF33-3AA3 (200 kW) 6SL3310-1GF34-1AA3 (250 kW)	6SL3310-1GF34-7AA3 (315 kW)	6SL3310-1GF35-8AA3 (400 kW) 6SL3310-1GF37-4AA3 (500 kW) 6SL3310-1GF38-1AA3 (560 kW)

Technical specifications (continued)

Line voltage 660 ... 690 V 3 AC		Line filter			
		6SL3000-0BG32-5AA0	6SL3000-0BG34-4AA0	6SL3000-0BG36-0AA0	6SL3000-0BG41-2AA0
Rated current	A	250	440	600	1200
Power loss	kW	0.015	0.047	0.053	0.119
Line/load connection		1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M12
• Conductor cross section, max. (IEC)	mm^2	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
PE connection		Hole for M8	Hole for M8	Hole for M10	Hole for M10
Degree of protection		IP00	IP00	IP00	IP00
Dimensions					
• Width	mm	360	360	400	425
• Height	mm	240	240	265	265
• Depth	mm	116	116	140	145
Weight, approx.	kg	12.3	12.3	19	25.2
Approvals, according to		cURus	cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GH28-5AA3 (75 kW) 6SL3310-1GH31-0AA3 (90 kW) 6SL3310-1GH31-2AA3 (110 kW) 6SL3310-1GH31-5AA3 (132 kW) 6SL3310-1GH31-8AA3 (160 kW) 6SL3310-1GH32-2AA3 (200 kW)	6SL3310-1GH32-6AA3 (250 kW) 6SL3310-1GH33-3AA3 (315 kW) 6SL3310-1GH34-1AA3 (400 kW)	6SL3310-1GH34-7AA3 (450 kW)	6SL3310-1GH35-8AA3 (560 kW) 6SL3310-1GH37-4AA3 (710 kW) 6SL3310-1GH38-1AA3 (800 kW)

Overview

Line Harmonics Filters reduce the low-frequency harmonic effects of converters to a level that can otherwise only be achieved using 12-pulse rectifiers.

The stringent limit values of IEEE 519-1992 are fully complied with.

Design

Line Harmonics Filters are supplied as stand-alone components in a rugged housing. They are installed between the customer's low-voltage distribution panel and the converter. The voltage is disconnected and fused in the customer's low-voltage switchgear, as is the power supply cable.

The Line Harmonics Filters have no fans (natural convection cooling). This means that no external auxiliary power supply is required.

The Line Harmonics Filters are equipped with a floating thermostatic switch, which can be monitored externally, for the monitoring thermal overloads, e.g. as a result of insufficient cooling air being supplied.

Note:

The converter must have a line reactor in order to use a Line Harmonics Filter.

Selection and ordering data

Suitable for Power Module	Type rating of the Power Module at 400 V, 500 V or 690 V kW	**Line Harmonics Filter** Article No.
380 ... 480 V 3 AC		
6SL3310-1GE33-1AA3	160	**6SL3000-0JE36-1AA0**
6SL3310-1GE33-8AA3	200	
6SL3310-1GE35-0AA3	250	
6SL3310-1GE36-1AA3	315	
6SL3310-1GE37-5AA3	400	**6SL3000-0JE38-4AA0**
6SL3310-1GE38-4AA3	450	
6SL3310-1GE41-0AA3	560	**6SL3000-0JE41-0AA0**
500 ... 600 V 3 AC		
6SL3310-1GF31-8AA3	110	**6SL3000-0JH33-3AA0**
6SL3310-1GF32-2AA3	132	
6SL3310-1GF32-6AA3	160	
6SL3310-1GF33-3AA3	200	
6SL3310-1GF34-1AA3	250	**6SL3000-0JH34-7AA0**
6SL3310-1GF34-7AA3	315	
6SL3310-1GF35-8AA3	400	**6SL3000-0JH35-8AA0**
6SL3310-1GF37-4AA3	500	**6SL3000-0JH38-1AA0**
6SL3310-1GF38-1AA3	560	
660 ... 690 V 3 AC		
6SL3310-1GH31-8AA3	160	**6SL3000-0JH33-3AA0**
6SL3310-1GH32-2AA3	200	
6SL3310-1GH32-6AA3	250	
6SL3310-1GH33-3AA3	315	
6SL3310-1GH34-1AA3	400	**6SL3000-0JH34-7AA0**
6SL3310-1GH34-7AA3	450	
6SL3310-1GH35-8AA3	560	**6SL3000-0JH35-8AA0**
6SL3310-1GH37-4AA3	710	**6SL3000-0JH38-1AA0**
6SL3310-1GH38-1AA3	800	

For further information on Line Harmonics Filters, please refer to the SINAMICS Low Voltage Engineering Manual.

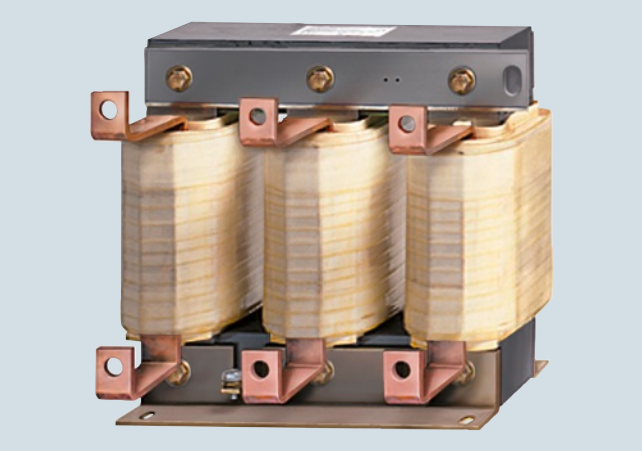
Technical specifications

Line voltage 380 ... 415 V 3 AC (50 Hz) 440 ... 480 V 3 AC (60 Hz)		**Line Harmonics Filter**		
		6SL3000-0JE36-1AA0	6SL3000-0JE38-4AA0	6SL3000-0JE41-0AA0
Rated current [1]	A	500	700	900
Power loss	kW	3.09	4.54	5.6
Line/load connection				
• Conductor cross section, max. (IEC)	mm^2	4 × 240	4 × 240	4 × 240
PE connection		3 × M12 studs	3 × M12 studs	3 × M12 studs
Degree of protection		IP21	IP21	IP21
Dimensions				
• Width	mm	600	800	1000
• Height	mm	1700	1700	1700
• Depth	mm	540	540	540
Weight, approx.	kg	460	600	900
Paint finish		RAL 7035	RAL 7035	RAL 7035
Standards		IEEE 519-1992	IEEE 519-1992	IEEE 519-1992
Suitable for Power Module		6SL3310-1GE33-1AA3 (160 kW) 6SL3310-1GE33-8AA3 (200 kW) 6SL3310-1GE35-0AA3 (250 kW) 6SL3310-1GE36-1AA3 (315 kW)	6SL3310-1GE37-5AA3 (400 kW) 6SL3310-1GE38-4AA3 (450 kW)	6SL3310-1GE41-0AA3 (560 kW)

Line voltage 500 … 600 V 3 AC 660 ... 690 V 3 AC		**Line Harmonics Filter**			
		6SL3000-0JH33-3AA0	6SL3000-0JH34-7AA0	6SL3000-0JH35-8AA0	6SL3000-0JH38-1AA0
Rated current [1]	A	290	400	520	710
Power loss	kW	3.11	4.62	5.69	7.97
Line/load connection					
• Conductor cross section, max. (IEC)	mm^2	4 × 240	4 × 240	4 × 240	4 × 240
PE connection		3 × M12 studs	3 × M12 studs	3 × M12 studs	3 × M12 studs
Degree of protection		IP21	IP21	IP21	IP21
Dimensions					
• Width	mm	600	800	1000	1000
• Height	mm	1700	1700	1700	1700
• Depth	mm	540	540	540	540
Weight, approx.	kg	450	600	830	830
Paint finish		RAL 7035	RAL 7035	RAL 7035	RAL 7035
Standards		IEEE 519-1992	IEEE 519-1992	IEEE 519-1992	IEEE 519-1992
Suitable for Power Module		6SL3310-1GF31-8AA3 (110 kW) 6SL3310-1GF32-2AA3 (132 kW) 6SL3310-1GF32-6AA3 (160 kW) 6SL3310-1GH31-8AA3 (160 kW) 6SL3310-1GF33-3AA3 (200 kW) 6SL3310-1GH32-2AA3 (200 kW) 6SL3310-1GF32-6AA3 (250 kW) 6SL3310-1GH33-3AA3 (315 kW)	6SL3310-1GF34-1AA3 (250 kW) 6SL3310-1GF34-7AA3 (315 kW) 6SL3310-1GH34-1AA3 (400 kW) 6SL3310-1GH34-7AA3 (450 kW)	6SL3310-1GF35-8AA3 (400 kW) 6SL3310-1GH35-8AA3 (560 kW)	6SL3310-1GF37-4AA3 (500 kW) 6SL3310-1GF38-1AA3 (560 kW) 6SL3310-1GH37-4AA3 (710 kW) 6SL3310-1GH38-1AA3 (800 kW)

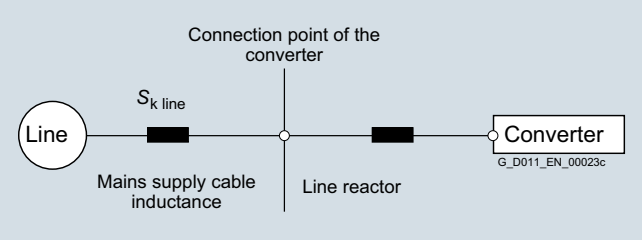
[1] The rated current of the Line Harmonics Filters is defined according to the active power. It can therefore be lower than the rated input current of the associated Power Module.

Overview



A line reactor is needed for high short-circuit power levels, partly to protect the actual converter against excessive harmonic currents, and thus against overload, and partly to limit the line harmonics to the permissible values. The harmonic currents are limited by the complete inductance comprising the line reactor and line supply cable inductance. Line reactors can be omitted if the line supply cable inductance is increased sufficiently, i.e. the RSC value must be sufficiently small.

RSC = Relative Short-Circuit power: Ratio of short-circuit power $S_{K\ line}$ at the supply connection point to fundamental apparent output S_{conv} of the connected converters (according to IEC 60146-1-1).



The following applies for SINAMICS G130 converter built-in units:

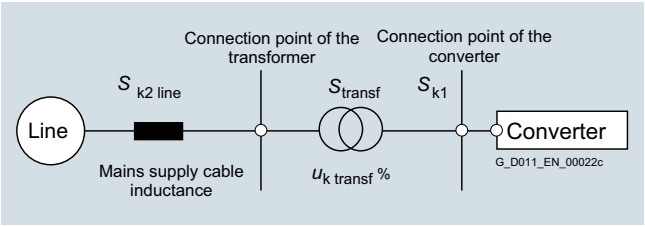
Power	**Line reactor can be omitted**	**Line reactor required**
kW	For RSC	For RSC
<200	≤43	>43
200 ... 500	≤33	>33
>500	≤20	>20

It is recommended that a line reactor is always connected on the line side of the converter, as in practice, it is often not known on which supply configuration individual converters are to be operated, i.e. which supply short-circuit power is present at the converter connection point.

A line reactor can only be omitted when the value for RSC is less than the values listed in the above table. This is the case, when the converter, as shown in the following figure, is connected to the line supply via a transformer with the appropriate rating.

Notice:

However, a line reactor is always required when a line filter is used.



In this case, the line short-circuit power S_{k1} at the connection point of the converter is approximately:
$S_{k1} = S_{transf} / (u_{k\ transf} + S_{transf} / S_{k2\ line})$

Formula symbols	Meaning
S_{transf}	Transformer power rating
$S_{k2\ line}$	Short-circuit power of the higher-level voltage
$u_{k\ transf}$	Per-unit short-circuit voltage

Selection and ordering data

Suitable for Power Module	Type rating of the Power Module at 400 V, 500 V or 690 V kW	**Line reactor** Article No.
380 ... 480 V 3 AC		
6SL3310-1GE32-1AA3	110	**6SL3000-0CE32-3AA0**
6SL3310-1GE32-6AA3	132	**6SL3000-0CE32-8AA0**
6SL3310-1GE33-1AA3	160	**6SL3000-0CE33-3AA0**
6SL3310-1GE33-8AA3	200	**6SL3000-0CE35-1AA0**
6SL3310-1GE35-0AA3	250	
6SL3310-1GE36-1AA3	315	**6SL3000-0CE36-3AA0**
6SL3310-1GE37-5AA3	400	**6SL3000-0CE37-7AA0**
6SL3310-1GE38-4AA3	450	**6SL3000-0CE38-7AA0**
6SL3310-1GE41-0AA3	560	**6SL3000-0CE41-0AA0**
500 ... 600 V 3 AC		
6SL3310-1GF31-8AA3	110	**6SL3000-0CH32-2AA0**
6SL3310-1GF32-2AA3	132	
6SL3310-1GF32-6AA3	160	**6SL3000-0CH32-7AA0**
6SL3310-1GF33-3AA3	200	**6SL3000-0CH33-4AA0**
6SL3310-1GF34-1AA3	250	**6SL3000-0CH34-8AA0**
6SL3310-1GF34-7AA3	315	
6SL3310-1GF35-8AA3	400	**6SL3000-0CH36-0AA0**
6SL3310-1GF37-4AA3	500	**6SL3000-0CH38-4AA0**
6SL3310-1GF38-1AA3	560	
660 ... 690 V 3 AC		
6SL3310-1GH28-5AA3	75	**6SL3000-0CH31-1AA0**
6SL3310-1GH31-0AA3	90	
6SL3310-1GH31-2AA3	110	**6SL3000-0CH31-6AA0**
6SL3310-1GH31-5AA3	132	
6SL3310-1GH31-8AA3	160	**6SL3000-0CH32-2AA0**
6SL3310-1GH32-2AA3	200	
6SL3310-1GH32-6AA3	250	**6SL3000-0CH32-7AA0**
6SL3310-1GH33-3AA3	315	**6SL3000-0CH33-4AA0**
6SL3310-1GH34-1AA3	400	**6SL3000-0CH34-8AA0**
6SL3310-1GH34-7AA3	450	
6SL3310-1GH35-8AA3	560	**6SL3000-0CH36-0AA0**
6SL3310-1GH37-4AA3	710	**6SL3000-0CH38-4AA0**
6SL3310-1GH38-1AA3	800	

Technical specifications

Line voltage 380 ... 480 V 3 AC		**Line reactor**			
		6SL3000-0CE32-3AA0	6SL3000-0CE32-8AA0	6SL3000-0CE33-3AA0	6SL3000-0CE35-1AA0
$I_{th\ max}$	A	224	278	331	508
Nominal inductance L_N	µH	76	62	52	42
Power loss	kW	0.274	0.247	0.267	0.365
Line/load connection • Conductor cross section, max. (IEC)	mm^2	1 × hole for M10 Provided for busbar connection	1 × hole for M10 Provided for busbar connection	1 × hole for M10 Provided for busbar connection	1 × hole for M12 Provided for busbar connection
PE connection		M6 screw	M6 screw	M6 screw	M6 screw
Degree of protection		IP00	IP00	IP00	IP00
Dimensions					
• Width	mm	270	270	270	300
• Height	mm	248	248	248	269
• Depth	mm	200	200	200	212.5
Weight, approx.	kg	24.5	26	27.8	38
Approvals, according to		cURus	cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GE32-1AA3 (110 kW)	6SL3310-1GE32-6AA3 (132 kW)	6SL3310-1GE33-1AA3 (160 kW)	6SL3310-1GE33-8AA3 (200 kW) 6SL3310-1GE35-0AA3 (250 kW)

Line voltage 380 ... 480 V 3 AC		**Line reactor**			
		6SL3000-0CE36-3AA0	6SL3000-0CE37-7AA0	6SL3000-0CE38-7AA0	6SL3000-0CE41-0AA0
$I_{th\ max}$	A	628	773	871	1022
Nominal inductance L_N	µH	27	22	19	16
Power loss	kW	0.368	0.351	0.458	0.498
Line/load connection • Conductor cross section, max. (IEC)	mm^2	1 × hole for M12 Provided for busbar connection	1 × hole for M12 Provided for busbar connection	1 × hole for M12 Provided for busbar connection	1 × hole for M12 Provided for busbar connection
PE connection		M6 screw	M6 screw	M6 screw	M6 screw
Degree of protection		IP00	IP00	IP00	IP00
Dimensions					
• Width	mm	300	300	350	350
• Height	mm	269	269	321	321
• Depth	mm	212.5	212.2	211.5	211.5
Weight, approx.	kg	41.4	51.3	63.2	69.6
Approvals, according to		cURus	cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GE36-1AA3 (315 kW)	6SL3310-1GE37-5AA3 (400 kW)	6SL3310-1GE38-4AA3 (450 kW)	6SL3310-1GE41-0AA3 (560 kW)

Line voltage 500 ... 600 V 3 AC		**Line reactor**			
		6SL3000-0CH32-2AA0	6SL3000-0CH32-2AA0	6SL3000-0CH32-7AA0	6SL3000-0CH33-4AA0
$I_{th\ max}$	A	215	215	270	342
Nominal inductance L_N	µH	150	150	100	81
Power loss	kW	0.24	0.275	0.277	0.27
Line/load connection • Conductor cross section, max. (IEC)	mm^2	1 × hole for M10 Provided for busbar connection	1 × hole for M10 Provided for busbar connection	1 × hole for M10 Provided for busbar connection	1 × hole for M10 Provided for busbar connection
PE connection		M6 screw	M6 screw	M6 screw	M6 screw
Degree of protection		IP00	IP00	IP00	IP00
Dimensions					
• Width	mm	270	270	270	270
• Height	mm	248	248	248	248
• Depth	mm	200	200	200	200
Weight, approx.	kg	31.1	31.1	27.9	38.9
Approvals, according to		cURus	cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GF31-8AA3 (110 kW)	6SL3310-1GF32-2AA3 (132 kW)	6SL3310-1GF32-6AA3 (160 kW)	6SL3310-1GF33-3AA3 (200 kW)

Technical specifications (continued)

Line voltage 500 ... 600 V 3 AC		Line reactor		
		6SL3000-0CH34-8AA0	6SL3000-0CH36-0AA0	6SL3000-0CH38-4AA0
$I_{th\ max}$	A	482	597	840
Nominal inductance L_N	µH	65	46	40
Power loss	kW	0.48	0.485	0.618
Line/load connection • Conductor cross section, max. (IEC)	mm^2	1 × hole for M10 Provided for busbar connection	1 × hole for M12 Provided for busbar connection	1 × hole for M12 Provided for busbar connection
PE connection		M6 screw	M6 screw	M6 screw
Degree of protection		IP00	IP00	IP00
Dimensions				
• Width	mm	350	350	410
• Height	mm	321	321	385
• Depth	mm	232.5	232.5	224
Weight, approx.	kg	55.6	63.8	98
Approvals, according to		cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GF34-1AA3 (250 kW) 6SL3310-1GF34-7AA3 (315 kW)	6SL3310-1GF35-8AA3 (400 kW)	6SL3310-1GF37-4AA3 (500 kW) 6SL3310-1GF38-1AA3 (560 kW)

Line voltage 660 ... 690 V 3 AC		Line reactor			
		6SL3000-0CH31-1AA0	6SL3000-0CH31-6AA0	6SL3000-0CH32-2AA0	6SL3000-0CH32-7AA0
$I_{th\ max}$	A	107	155	230	270
Nominal inductance L_N	µH	310	220	150	100
Power loss	kW	0.252	0.279	0.275	0.277
Line/load connection • Conductor cross section, max. (IEC)	mm^2	1 × hole for M10 Provided for busbar connection	1 × hole for M10 Provided for busbar connection	1 × hole for M10 Provided for busbar connection	1 × hole for M10 Provided for busbar connection
PE connection		M6 screw	M6 screw	M6 screw	M6 screw
Degree of protection		IP00	IP00	IP00	IP00
Dimensions					
• Width	mm	270	270	270	270
• Height	mm	248	248	248	248
• Depth	mm	200	200	200	200
Weight, approx.	kg	24.4	25.9	31.1	27.9
Approvals, according to		cURus	cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GH28-5AA3 (75 kW) 6SL3310-1GH31-0AA3 (90 kW)	6SL3310-1GH31-2AA3 (110 kW) 6SL3310-1GH31-5AA3 (132 kW)	6SL3310-1GH31-8AA3 (160 kW) 6SL3310-1GH32-2AA3 (200 kW)	6SL3310-1GH32-6AA3 (250 kW)

Line voltage 660 ... 690 V 3 AC		Line reactor			
		6SL3000-0CH33-4AA0	6SL3000-0CH34-8AA0	6SL3000-0CH36-0AA0	6SL3000-0CH38-4AA0
$I_{th\ max}$	A	342	482	597	840
Nominal inductance L_N	µH	81	65	46	40
Power loss	kW	0.27	0.48	0.485	0.618
Line/load connection • Conductor cross section, max. (IEC)	mm^2	1 × hole for M10 Provided for busbar connection	1 × hole for M10 Provided for busbar connection	1 × hole for M12 Provided for busbar connection	1 × hole for M12 Provided for busbar connection
PE connection		M6 screw	M6 screw	M6 screw	M6 screw
Degree of protection		IP00	IP00	IP00	IP00
Dimensions					
• Width	mm	270	350	350	410
• Height	mm	248	321	321	385
• Depth	mm	200	232	232	224
Weight, approx.	kg	38.9	55.6	63.8	98
Approvals, according to		cURus	cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GH33-3AA3 (315 kW)	6SL3310-1GH34-1AA3 (400 kW) 6SL3310-1GH34-7AA3 (450 kW)	6SL3310-1GH35-8AA3 (560 kW)	6SL3310-1GH37-4AA3 (710 kW) 6SL3310-1GH38-1AA3 (800 kW)

Selection and ordering data

The table below lists recommended ratings for input-side switching and fuse protection elements according to IEC standards.

Further information about the main contactors, switch disconnectors, fuses and circuit breakers specified in the table can be found in Catalog LV 10.

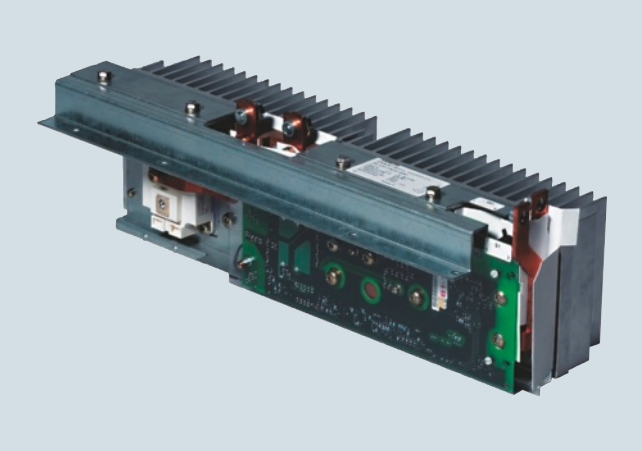
Type rating (for 400V, 500V or 690V)	Rated input current	Assignment to Power Module	**Line contactor**	**Fixed-mounted circuit breaker**	**Switch disconnector** for cable protection fuses incl. semiconductor protection of type 3NE1
kW	A	Typ 6SL3310-...	Type	Type	Type
380 ... 480 V 3 AC					
110	229	1GE32-1AA3	**3RT1456-…..**	–	**3KL5530-…..**
132	284	1GE32-6AA3	**3RT1466-…..**	–	**3KL5730-…..**
160	338	1GE33-1AA3	**3RT1466-…..**	–	**3KL5730-…..**
200	395	1GE33-8AA3	**3RT1476-…..**	–	**3KL6130-…..**
250	509	1GE35-0AA3	**3RT1476-…..**	–	**3KL6130-…..**
315	629	1GE36-1AA3	**3RT1476-…..**	–	**3KL6230-…..**
400	775	1GE37-5AA3	**3RT1466-…..** (3 units)	–	**3KL6230-…..**
450	873	1GE38-4AA3	–	**3WL1110-…** *)	–
560	1024	1GE41-0AA3	–	**3WL1112-…** *)	–
500 ... 600 V 3 AC					
110	191	1GF31-8AA3	**3RT1456-…..**	–	**3KL5530-…..**
132	242	1GF32-2AA3	**3RT1456-…..**	–	**3KL5530-…..**
160	270	1GF32-6AA3	**3RT1466-…..**	–	**3KL5730-…..**
200	343	1GF33-3AA3	**3RT1466-…..**	–	**3KL5730-…..**
250	426	1GF34-1AA3	**3RT1476-…..**	–	**3KL6130-…..**
315	483	1GF34-7AA3	**3RT1476-…..**	–	**3KL6130-…..**
400	598	1GF35-8AA3	**3RT1476-…..**	–	**3KL6230-…..**
500	764	1GF37-4AA3	**3RT1466-…..** (3 units)	–	**3KL6230-…..**
560	842	1GF38-1AA3	–	**3WL1210-…** *)	–
660 ... 690 V 3 AC					
75	93	1GH28-5AA3	**3RT1446-…..**	–	**3KL5230-…..**
90	109	1GH31-0AA3	**3RT1446-…..**	–	**3KL5230-…..**
110	131	1GH31-2AA3	**3RT1446-…..**	–	**3KL5530-…..**
132	164	1GH31-5AA3	**3RT1456-…..**	–	**3KL5530-…..**
160	191	1GH31-8AA3	**3RT1456-…..**	–	**3KL5530-…..**
200	224	1GH32-2AA3	**3RT1456-…..**	–	**3KL5530-…..**
250	270	1GH32-6AA3	**3RT1466-…..**	–	**3KL5730-…..**
315	343	1GH33-3AA3	**3RT1466-…..**	–	**3KL5730-…..**
400	426	1GH34-1AA3	**3RT1476-…..**	–	**3KL6130-…..**
450	483	1GH34-7AA3	**3RT1476-…..**	–	**3KL6130-…..**
560	598	1GH35-8AA3	**3RT1476-….**	–	**3KL6230-…..**
710	764	1GH37-4AA3	**3RT1466-…..** (3 units)	–	**3KL6230-…..**
800	842	1GH38-1AA3	–	**3WL1210-…** *)	–

*) The circuit breakers must always be switched ON and OFF by the sequence control. An interlocking set 3WL9111-0BA21-0AA0 as described in Catalog LV 10 should be provided for the circuit breakers in order to exclude the risk of unintentional manual operation. Manual operation bypasses the pre-charging circuit and can therefore destroy the Power Module.

Selection and ordering data (continued)

Type rating (for 400V, 500V or 690V)	Rated input current	Assignment to Power Module	**Cable protection fuse**		**Cable protection fuse** incl. Semiconductor protection	
				Rated current		Rated current
kW	A	Type 6SL3310-...	Article No.	A	Article No.	A
380 ... 480 V 3 AC						
110	229	1GE32-1AA3	**3NA3144**	250	**3NE1230-2**	315
132	284	1GE32-6AA3	**3NA3250**	300	**3NE1331-2**	350
160	338	1GE33-1AA3	**3NA3254**	355	**3NE1334-2**	500
200	395	1GE33-8AA3	**3NA3260**	400	**3NE1334-2**	500
250	509	1GE35-0AA3	**3NA3372**	630	**3NE1436-2**	630
315	629	1GE36-1AA3	**3NA3475**	800	**3NE1438-2**	800
400	775	1GE37-5AA3	**3NA3475**	800	**3NE1448-2**	850
450	873	1GE38-4AA3	**3NA3365**	2 × 500	**3NE1436-2**	2 × 630
560	1024	1GE41-0AA3	**3NA3472**	2 × 630	**3NE1437-2**	2 × 710
500 ... 600 V 3 AC						
110	191	1GF31-8AA3	**3NA3244-6**	250	**3NE1227-2**	250
132	242	1GF32-2AA3	**3NA3252-6**	315	**3NE1230-2**	315
160	270	1GF32-6AA3	**3NA3354-6**	355	**3NE1331-2**	350
200	343	1GF33-3AA3	**3NA3365-6**	500	**3NE1334-2**	500
250	426	1GF34-1AA3	**3NA3365-6**	500	**3NE1334-2**	500
315	483	1GF34-7AA3	**3NA3252-6**	2 × 315	**3NE1435-2**	560
400	598	1GF35-8AA3	**3NA3354-6**	2 × 355	**3NE1447-2**	670
500	764	1GF37-4AA3	**3NA3365-6**	2 × 500	**3NE1448-2**	850
560	842	1GF38-1AA3	**3NA3365-6**	2 × 500	**3NE1334-2**	2 × 500
660 ... 690 V 3 AC						
75	93	1GH28-5AA3	**3NA3132-6**	125	**3NE1022-2**	125
90	109	1GH31-0AA3	**3NA3132-6**	125	**3NE1022-2**	125
110	131	1GH31-2AA3	**3NA3136-6**	160	**3NE1224-2**	160
132	164	1GH31-5AA3	**3NA3240-6**	200	**3NE1225-2**	200
160	191	1GH31-8AA3	**3NA3244-6**	250	**3NE1227-2**	250
200	224	1GH32-2AA3	**3NA3252-6**	315	**3NE1230-2**	315
250	270	1GH32-6AA3	**3NA3354-6**	355	**3NE1331-2**	350
315	343	1GH33-3AA3	**3NA3365-6**	500	**3NE1334-2**	500
400	426	1GH34-1AA3	**3NA3365-6**	500	**3NE1334-2**	500
450	483	1GH34-7AA3	**3NA3252-6**	2 × 315	**3NE1435-2**	560
560	598	1GH35-8AA3	**3NA3354-6**	2 × 355	**3NE1447-2**	670
710	764	1GH37-4AA3	**3NA3365-6**	2 × 500	**3NE1448-2**	850
800	842	1GH38-1AA3	**3NA3365-6**	2 × 500	**3NE1334-2**	2 × 500

Overview



A Braking Module and the associated braking resistor are required when the drive is to be braked or specifically stopped, e.g. for an EMERGENCY STOP.

The Braking Module includes the power electronics and the associated control circuit. The supply voltage for the electronics is taken from the DC link.

During operation, the DC-link power is converted into heat loss in an external braking resistor.

The Braking Module works independently of the converter control. If more braking power is required than provided by the Braking Modules listed here, then braking units may be connected in parallel for higher converter outputs (on request). In this case, a Braking Module is assigned to each braking resistor.

The activation threshold of the Braking Module can be adjusted by means of a DIP switch. The braking power values specified in the technical specifications apply to the upper activation threshold.

Design

The Braking Module is inserted in a slot inside the Power Module; it is force-cooled by the Power Module fan.

Several Braking Modules can be used for Power Modules with more than one power block:

- Frame size HX: 2 Braking Modules
- Frame size JX: 3 Braking Modules

Each Braking Module is always assigned a dedicated braking resistor.

The Braking Module is connected to the DC link by means of the busbar sets or flexible cables contained in the scope of delivery.

The Braking Module has the following interfaces as standard:

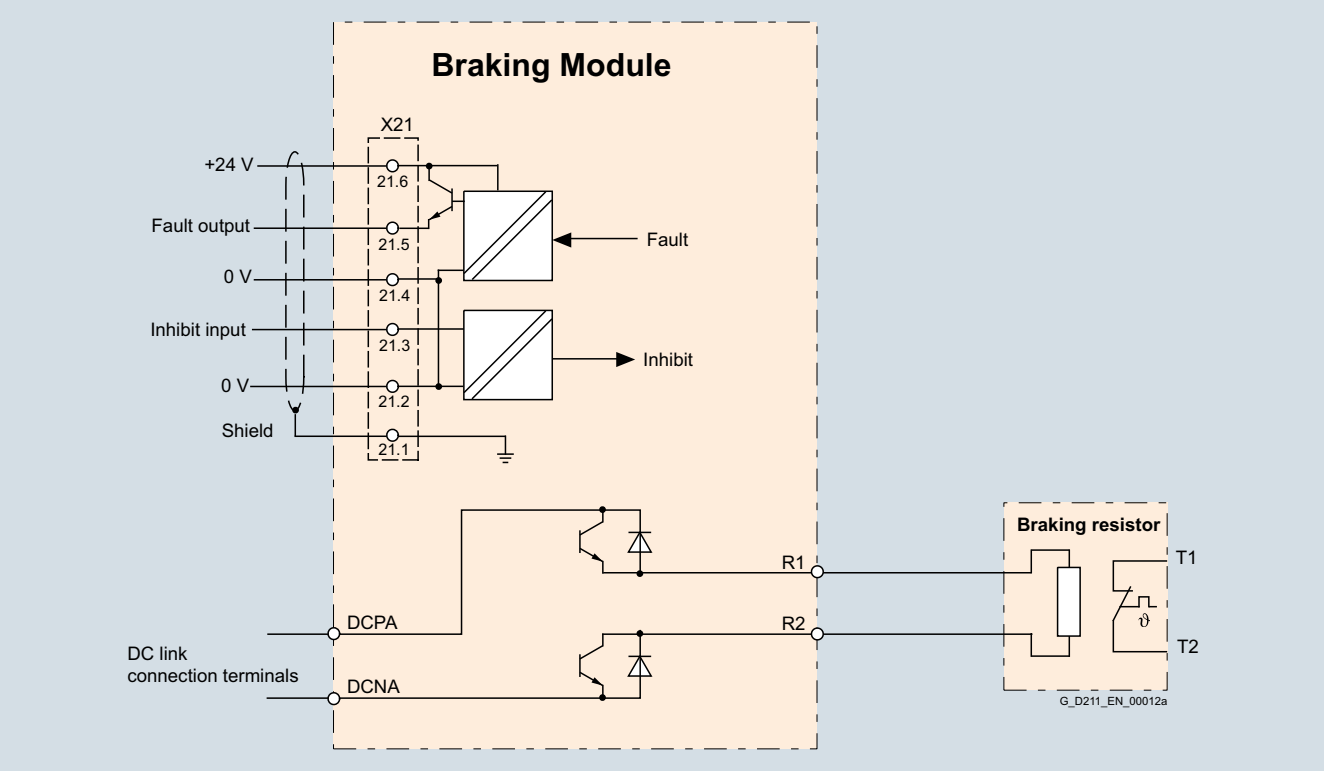
- DC-link connection
- Braking resistor connection
- 1 digital input (block Braking Module / acknowledge error)
- 1 digital output (Braking Module faulty)
- 1 DIP switch for adjusting the activation threshold

Information about Braking Module activation thresholds as well as further configuration information is contained in the SINAMICS Low Voltage Engineering Manual.

Selection and ordering data

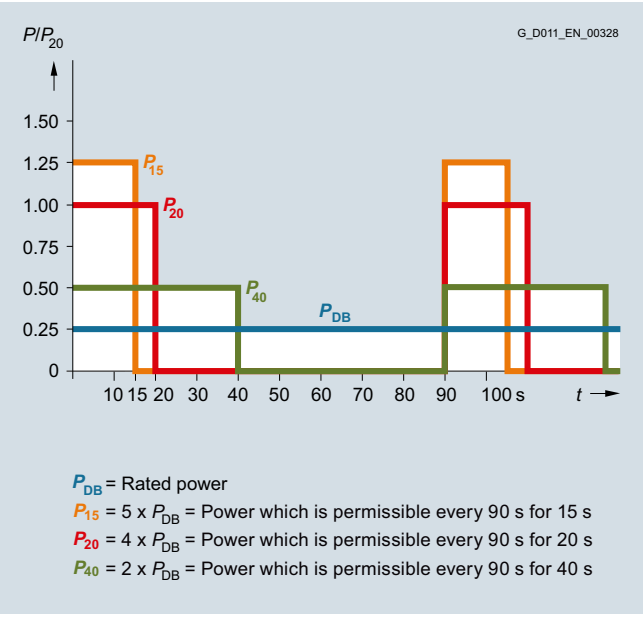
Suitable for Power Module	Type rating of the Power Module at 400 V, 500 V or 690 V	**Braking Module**
	kW	Article No.
380 ... 480 V 3 AC		
6SL3310-1GE32-1AA3	110	**6SL3300-1AE31-3AA0**
6SL3310-1GE32-6AA3	132	
6SL3310-1GE33-1AA3	160	**6SL3300-1AE32-5AA0**
6SL3310-1GE33-8AA3	200	
6SL3310-1GE35-0AA3	250	
6SL3310-1GE36-1AA3	315	**6SL3300-1AE32-5BA0**
6SL3310-1GE37-5AA3	400	
6SL3310-1GE38-4AA3	450	
6SL3310-1GE41-0AA3	560	
500 ... 600 V 3 AC		
6SL3310-1GF31-8AA3	110	**6SL3300-1AF32-5AA0**
6SL3310-1GF32-2AA3	132	
6SL3310-1GF32-6AA3	160	
6SL3310-1GF33-3AA3	200	
6SL3310-1GF34-1AA3	250	**6SL3300-1AF32-5BA0**
6SL3310-1GF34-7AA3	315	
6SL3310-1GF35-8AA3	400	
6SL3310-1GF37-4AA3	500	
6SL3310-1GF38-1AA3	560	
660 ... 690 V 3 AC		
6SL3310-1GH28-5AA3	75	**6SL3300-1AH31-3AA0**
6SL3310-1GH31-0AA3	90	
6SL3310-1GH31-2AA3	110	
6SL3310-1GH31-5AA3	132	
6SL3310-1GH31-8AA3	160	**6SL3300-1AH32-5AA0**
6SL3310-1GH32-2AA3	200	
6SL3310-1GH32-6AA3	250	
6SL3310-1GH33-3AA3	315	
6SL3310-1GH34-1AA3	400	**6SL3300-1AH32-5BA0**
6SL3310-1GH34-7AA3	450	
6SL3310-1GH35-8AA3	560	
6SL3310-1GH37-4AA3	710	
6SL3310-1GH38-1AA3	800	

Integration



Connection diagram for Braking Module

Characteristic curves

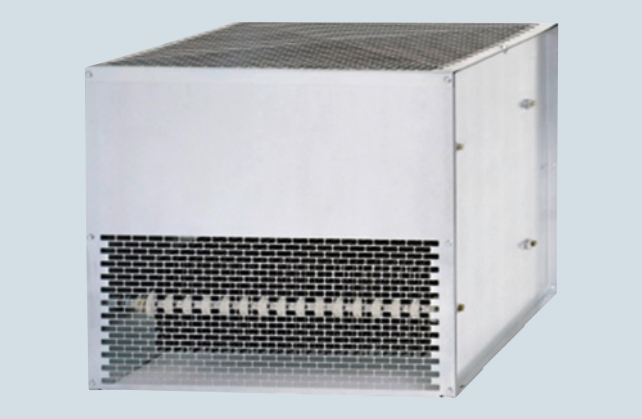


Load diagram for Braking Modules and braking resistor

Technical specifications

		Braking Module				
		6SL3300-1AE31-3AA0	6SL3300-1AE32-5AA0 6SL3300-1AE32-5BA0	6SL3300-1AF32-5AA0 6SL3300-1AF32-5BA0	6SL3300-1AH31-3AA0	6SL3300-1AH32-5AA0 6SL3300-1AH32-5BA0
Line voltage		**380 ... 480 V 3 AC**		**500 ... 600 V 3 AC**	**660 ... 690 V 3 AC**	
Rated power P_{DB}	kW	25	50	50	25	50
Peak power P_{15}	kW	125	250	250	125	250
Power P_{20}	kW	100	200	200	100	200
Power P_{40}	kW	50	100	100	50	100
Activation thresholds (adjustable via DIP switch)	V	774 (factory setting) or 673	774 (factory setting) or 673	967 (factory setting) or 841	1158 (factory setting) or 1070	1158 (factory setting) or 1070
Digital inputs						
• Voltage	V	24	24	24	24	24
• Low level (an open digital input is interpreted • as "low")	V	-3 ... +5	-3 ... +5	-3 ... +5	-3 ... +5	-3 ... +5
• High level	V	15 ... 30	15 ... 30	15 ... 30	15 ... 30	15 ... 30
• Current consumption at 24 V DC, typ.	mA	10	10	10	10	10
• Conductor cross section, max. (IEC)	mm^2	1.5	1.5	1.5	1.5	1.5
Digital outputs (continued short-circuit-proof)						
• Voltage	V	24	24	24	24	24
• Load current per digital output, max.	mA	500	500	500	500	500
• Conductor cross section, max. (IEC)	mm^2	1.5	1.5	1.5	1.5	1.5
Design conforms to		UL and IEC	UL and IEC	UL and IEC	IEC	IEC
R1/R2 connection		M8 nut	M8 nut	M8 nut	M8 nut	M8 nut
• Conductor cross section, max. (IEC)	mm^2	35	50	50	35	50
Weight, approx.	kg	3.6	7.3 (6SL3300-1AE32-5AA0) 7.5 (6SL3300-1AE32-5BA0)	7.3 (6SL3300-1AF32-5AA0) 7.5 (6SL3300-1AF32-5BA0)	3.6	7.3 (6SL3300-1AH32-5AA0) 7.5 (6SL3300-1AH32-5BA0)
Approvals, according to		cULus	cULus	cULus	–	–
Braking Module 6SL3300-.....-.AA0						
Suitable for Power Module		6SL3310-1GE32-1AA3 (110 kW) 6SL3310-1GE32-6AA3 (132 kW)	6SL3310-1GE33-1AA3 (160 kW) 6SL3310-1GE33-8AA3 (200 kW) 6SL3310-1GE35-0AA3 (250 kW)	6SL3310-1GF31-8AA3 (110 kW) 6SL3310-1GF32-2AA3 (132 kW) 6SL3310-1GF32-6AA3 (160 kW) 6SL3310-1GF33-3AA3 (200 kW)	6SL3310-1GH28-5AA3 (75 kW) 6SL3310-1GH31-0AA3 (90 kW) 6SL3310-1GH31-2AA3 (110 kW) 6SL3310-1GH31-5AA3 (132 kW)	6SL3310-1GH31-8AA3 (160 kW) 6SL3310-1GH32-2AA3 (200 kW) 6SL3310-1GH32-6AA3 (250 kW) 6SL3310-1GH33-3AA3 (315 kW)
Braking Module 6SL3300-.....-.BA0						
Suitable for Power Module		–	6SL3310-1GE36-1AA3 (315 kW) 6SL3310-1GE37-5AA3 (400 kW) 6SL3310-1GE38-4AA3 (450 kW) 6SL3310-1GE41-0AA3 (560 kW)	6SL3310-1GF34-1AA3 (250 kW) 6SL3310-1GF34-7AA3 (315 kW) 6SL3310-1GF35-8AA3 (400 kW) 6SL3310-1GF37-4AA3 (500 kW) 6SL3310-1GF38-1AA3 (560 kW)	–	6SL3310-1GH34-1AA3 (400 kW) 6SL3310-1GH34-7AA3 (450 kW) 6SL3310-1GH35-8AA3 (560 kW) 6SL3310-1GH37-4AA3 (710 kW) 6SL3310-1GH38-1AA3 (800 kW)

Overview



Excess energy in the DC link is dissipated via the braking resistor.

The braking resistor is connected to a Braking Module. The braking resistor is positioned outside the cabinet or switchgear room. This enables the resulting heat loss around the Power Modules to be dissipated. This reduces the level of air conditioning required.

Two braking resistors with different rated and peak power values are available for the devices.

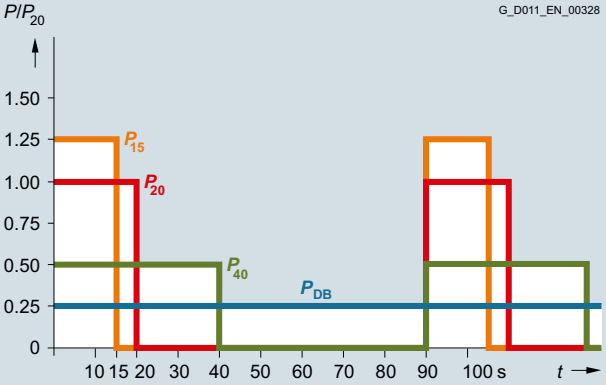
The braking resistor is monitored on the basis of the duty factor. A temperature switch (NC contact) is also fitted. This responds when the maximum permissible temperature is exceeded and can be evaluated by a controller. The maximum permissible cable length between the Braking Module and braking resistor is 100 m.

Information about possible duty cycles of the braking resistors as well as other configuration information is contained in the SINAMICS Low Voltage Engineering Manual.

Selection and ordering data

P_{DB} rated power kW	Suitable for Braking Module	**Braking resistor** Article No.
Line voltage 380 ... 480 V 3 AC		
25	6SL3300-1AE31-3AA0	**6SL3000-1BE31-3AA0**
50	6SL3300-1AE32-5.A0	**6SL3000-1BE32-5AA0**
Line voltage 500 ... 600 V 3 AC		
50	6SL3300-1AF32-5.A0	**6SL3000-1BF32-5AA0**
Line voltage 660 ... 690 V 3 AC		
25	6SL3300-1AH31-3AA0	**6SL3000-1BH31-3AA0**
50	6SL3300-1AH32-5.A0	**6SL3000-1BH32-5AA0**

Characteristic curves



P_{DB} = Rated power
P_{15} = 5 x P_{DB} = Power which is permissible every 90 s for 15 s
P_{20} = 4 x P_{DB} = Power which is permissible every 90 s for 20 s
P_{40} = 2 x P_{DB} = Power which is permissible every 90 s for 40 s

Load diagram for Braking Modules and braking resistor

Technical specifications

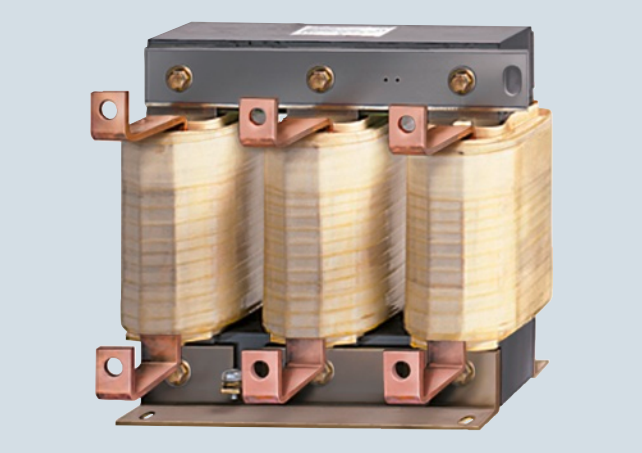
Line voltage 380 ... 480 V 3 AC		**Braking resistor** 6SL3000-1BE31-3AA0	6SL3000-1BE32-5AA0
Resistance	Ω	4.4 (±7.5%)	2.2 (±7.5%)
P_{DB} rated power (continuous braking power)	kW	25	50
P_{15} power	kW	125	250
P_{20} power	kW	100	200
P_{40} power	kW	50	100
Current, max.	A	189	378
Conductor cross section, max. (IEC)	mm^2	50	70
Power connection		M10 stud	M10 stud
Degree of protection		IP20	IP20
Dimensions			
• Width	mm	740	810
• Height	mm	600	1325
• Depth	mm	486	486
Weight, approx.	kg	50	120
Approvals, according to		cURus	cURus
Suitable for Braking Module		6SL3300-1AE31-3AA	6SL3300-1AE32-5.A0

Technical specifications (continued)

Line voltage 500 ... 600 V 3 AC		Braking resistor 6SL3000-1BF32-5AA0
Resistance	Ω	3.4 (±7.5%)
P_{DB} rated power (continuous braking power)	kW	50
P_{15} power	kW	250
P_{20} power	kW	200
P_{40} power	kW	100
Current, max.	A	255
Conductor cross section, max. (IEC)	mm^2	70
Power connection		M10 stud
Degree of protection		IP20
Dimensions		
• Width	mm	810
• Height	mm	1325
• Depth	mm	486
Weight, approx.	kg	120
Approvals, according to		cURus
Suitable for Braking Module		6SL3300-1AF32-5.A0

Line voltage 660 ... 690 V 3 AC		Braking resistor 6SL3000-1BH31-3AA0	6SL3000-1BH32-5AA0
Resistance	Ω	9.8 (±7.5%)	4.9 (±7.5%)
P_{DB} rated power (continuous braking power)	kW	25	50
P_{15} power	kW	125	250
P_{20} power	kW	100	200
P_{40} power	kW	50	100
Current, max.	A	125	255
Conductor cross section, max. (IEC)	mm^2	50	70
Power connection		M10 stud	M10 stud
Degree of protection		IP20	IP20
Dimensions			
• Width	mm	740	810
• Height	mm	600	1325
• Depth	mm	486	486
Weight, approx.	kg	50	120
Approvals, according to		cURus	cURus
Suitable for Braking Module		6SL3300-1AH31-3AA0	6SL3300-1AH32-5.A0

Overview



Motor reactors reduce the voltage load on the motor windings by reducing the voltage gradients at the motor terminals that occur during converter operation. At the same time, the capacitive charge/discharge currents that place an additional load on the converter output when long motor cables are used, are reduced. The maximum permissible output frequency when a motor reactor is used is 150 Hz.

The motor reactor must be installed as close as possible to the Power Module.

Selection and ordering data

Suitable for Power Module	Type rating of the Power Module at 400 V, 500 V or 690 V kW	**Motor reactor** Article No.
380 ... 480 V 3 AC		
6SL3310-1GE32-1AA3	110	**6SL3000-2BE32-1AA0**
6SL3310-1GE32-6AA3	132	**6SL3000-2BE32-6AA0**
6SL3310-1GE33-1AA3	160	**6SL3000-2BE33-2AA0**
6SL3310-1GE33-8AA3	200	**6SL3000-2BE33-8AA0**
6SL3310-1GE35-0AA3	250	**6SL3000-2BE35-0AA0**
6SL3310-1GE36-1AA3	315	**6SL3000-2AE36-1AA0**
6SL3310-1GE37-5AA3	400	**6SL3000-2AE38-4AA0**
6SL3310-1GE38-4AA3	450	
6SL3310-1GE41-0AA3	560	**6SL3000-2AE41-0AA0**
500 ... 600 V 3 AC		
6SL3310-1GF31-8AA3	110	**6SL3000-2AH31-8AA0**
6SL3310-1GF32-2AA3	132	**6SL3000-2AH32-4AA0**
6SL3310-1GF32-6AA3	160	**6SL3000-2AH32-6AA0**
6SL3310-1GF33-3AA3	200	**6SL3000-2AH33-6AA0**
6SL3310-1GF34-1AA3	250	**6SL3000-2AH34-5AA0**
6SL3310-1GF34-7AA3	315	**6SL3000-2AH34-7AA0**
6SL3310-1GF35-8AA3	400	**6SL3000-2AH35-8AA0**
6SL3310-1GF37-4AA3	500	**6SL3000-2AH38-1AA0**
6SL3310-1GF38-1AA3	560	
660 ... 690 V 3 AC		
6SL3310-1GH28-5AA3	75	**6SL3000-2AH31-0AA0**
6SL3310-1GH31-0AA3	90	
6SL3310-1GH31-2AA3	110	**6SL3000-2AH31-5AA0**
6SL3310-1GH31-5AA3	132	
6SL3310-1GH31-8AA3	160	**6SL3000-2AH31-8AA0**
6SL3310-1GH32-2AA3	200	**6SL3000-2AH32-4AA0**
6SL3310-1GH32-6AA3	250	**6SL3000-2AH32-6AA0**
6SL3310-1GH33-3AA3	315	**6SL3000-2AH33-6AA0**
6SL3310-1GH34-1AA3	400	**6SL3000-2AH34-5AA0**
6SL3310-1GH34-7AA3	450	**6SL3000-2AH34-7AA0**
6SL3310-1GH35-8AA3	560	**6SL3000-2AH35-8AA0**
6SL3310-1GH37-4AA3	710	**6SL3000-2AH38-1AA0**
6SL3310-1GH38-1AA3	800	

Technical specifications

Line voltage 380 ... 480 V 3 AC		Motor reactor (for pulse frequencies of 2 kHz to 4 kHz)				
		6SL3000-2BE32-1AA0	6SL3000-2BE32-6AA0	6SL3000-2BE33-2AA0	6SL3000-2BE33-8AA0	6SL3000-2BE35-0AA0
Rated current	A	210	260	310	380	490
Power loss						
• At 50 Hz	kW	0.436	0.454	0.422	0.477	0.448
• At 150 Hz	kW	0.486	0.5	0.47	0.5	0.5
Load connection		1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M12
PE connection		M8 screw	M8 screw	M8 screw	M8 screw	M8 screw
Cable length, max. between motor reactor and motor [1]						
• Shielded	m	300	300	300	300	300
• Unshielded	m	450	450	450	450	450
Degree of protection		IP00	IP00	IP00	IP00	IP00
Dimensions						
• Width	mm	300	300	300	300	300
• Height	mm	285	315	285	285	365
• Depth	mm	257	277	257	277	277
Weight, approx.	kg	60	66	62	73	100
Approvals, according to		cURus	cURus	cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GE32-1AA3 (110 kW)	6SL3310-1GE32-6AA3 (132 kW)	6SL3310-1GE33-1AA3 (160 kW)	6SL3310-1GE33-8AA3 (200 kW)	6SL3310-1GE35-0AA3 (250 kW)

Line voltage 380 ... 480 V 3 AC		Motor reactor (for pulse frequencies of 1.25 kHz to 2.5 kHz)			
		6SL3000-2AE36-1AA0	6SL3000-2AE38-4AA0		6SL3000-2AE41-0AA0
Rated current	A	605	840	840	985
Power loss					
• At 50 Hz	kW	0.798	0.75	0.834	0.939
• At 150 Hz	kW	0.9	0.84	0.943	1.062
Load connection		1 × hole for M12	1 × hole for M12	1 × hole for M12	1 × hole for M12
PE connection		M10 screw	M10 screw	M10 screw	M10 screw
Cable length, max. between motor reactor and motor [1]					
• Shielded	m	300	300	300	300
• Unshielded	m	450	450	450	450
Degree of protection		IP00	IP00	IP00	IP00
Dimensions					
• Width	mm	410	410	410	410
• Height	mm	392	392	392	392
• Depth	mm	292	292	292	302
Weight, approx.	kg	130	140	140	146
Approvals, according to		cURus	cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GE36-1AA3 (315 kW)	6SL3310-1GE37-5AA3 (400 kW)	6SL3310-1GE38-4AA3 (450 kW)	6SL3310-1GE41-0AA3 (560 kW)

Technical specifications (continued)

Line voltage 500 ... 600 V 3 AC		Motor reactor (for pulse frequencies of 1.25 kHz to 2.5 kHz)				
		6SL3000-2AH31-8AA0	6SL3000-2AH32-4AA0	6SL3000-2AH32-6AA0	6SL3000-2AH33-6AA0	6SL3000-2AH34-5AA0
Rated current	A	175	215	260	330	410
Power loss						
• At 50 Hz	kW	0.357	0.376	0.389	0.4	0.481
• At 150 Hz	kW	0.403	0.425	0.441	0.454	0.545
Load connection		1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M10
PE connection		M8 screw	M8 screw	M8 screw	M8 screw	M8 screw
Cable length, max. between motor reactor and motor [1]						
• Shielded	m	300	300	300	300	300
• Unshielded	m	450	450	450	450	450
Degree of protection		IP00	IP00	IP00	IP00	IP00
Dimensions						
• Width	mm	300	300	300	300	350
• Height	mm	285	285	285	285	330
• Depth	mm	212	212	212	212	215
Weight, approx.	kg	34	34	40	43	56
Approvals, according to		cURus	cURus	cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GF31-8AA3 (110 kW)	6SL3310-1GF32-2AA3 (132 kW)	6SL3310-1GF32-6AA3 (160 kW)	6SL3310-1GF33-3AA3 (200 kW)	6SL3310-1GF34-1AA3 (250 kW)

Line voltage 500 ... 600 V 3 AC		Motor reactor (for pulse frequencies of 1.25 kHz to 2.5 kHz)			
		6SL3000-2AH34-7AA0	6SL3000-2AH35-8AA0	6SL3000-2AH38-1AA0	
Rated current	A	465	575	810	810
Power loss					
• At 50 Hz	kW	0.631	0.705	0.78	0.877
• At 150 Hz	kW	0.723	0.801	0.91	1.003
Load connection		1 × hole for M12	1 × hole for M12	1 × hole for M12	1 × hole for M12
PE connection		M8 screw	M8 screw	M8 screw	M8 screw
Cable length, max. between motor reactor and motor [1]					
• Shielded	m	300	300	300	300
• Unshielded	m	450	450	450	450
Degree of protection		IP00	IP00	IP00	IP00
Dimensions					
• Width	mm	410	410	410	410
• Height	mm	392	392	392	392
• Depth	mm	292	292	279	279
Weight, approx.	kg	80	80	146	146
Approvals, according to		cURus	cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GF34-7AA3 (315 kW)	6SL3310-1GF35-8AA3 (400 kW)	6SL3310-1GF37-4AA3 (500 kW)	6SL3310-1GF38-1AA3 (560 kW)

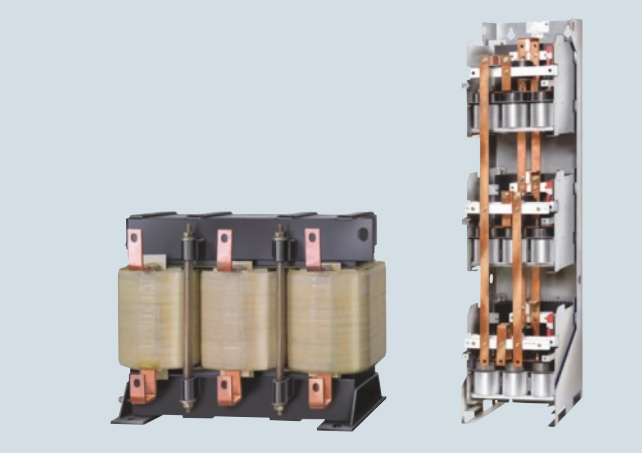
Technical specifications (continued)

Line voltage 660 ... 690 V 3 AC		Motor reactor (for pulse frequencies of 1.25 kHz to 2.5 kHz)						
		6SL3000-2AH31-0AA0		6SL3000-2AH31-5AA0		6SL3000-2AH31-8AA0	6SL3000-2AH32-4AA0	6SL3000-2AH32-6AA0
Rated current	A	100	100	150	150	175	215	260
Power loss								
• At 50 Hz	kW	0.215	0.269	0.237	0.296	0.357	0.376	0.389
• At 150 Hz	kW	0.26	0.3	0.26	0.332	0.403	0.425	0.441
Load connection		1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M10
PE connection		M8 screw	M8 screw	M8 screw	M8 screw	M8 screw	M8 screw	M8 screw
Cable length, max. between motor reactor and motor [1]								
• Shielded	m	300	300	300	300	300	300	300
• Unshielded	m	450	450	450	450	450	450	450
Degree of protection		IP00	IP00	IP00	IP00	IP00	IP00	IP00
Dimensions								
• Width	mm	270	270	270	270	300	300	300
• Height	mm	248	248	248	248	285	285	285
• Depth	mm	200	200	200	200	212	212	212
Weight, approx.	kg	26	26	26	26	33	35	40
Approvals, according to		–	–	–	–	–	–	–
Suitable for Power Module		6SL3310-1GH28-5AA3 (75 kW)	6SL3310-1GH31-0AA3 (90 kW)	6SL3310-1GH31-2AA3 (110 kW)	6SL3310-1GH31-5AA3 (132 kW)	6SL3310-1GH31-8AA3 (160 kW)	6SL3310-1GH32-2AA3 (200 kW)	6SL3310-1GH32-6AA3 (250 kW)

Line voltage 660 ... 690 V 3 AC		Motor reactor (for pulse frequencies of 1.25 kHz to 2.5 kHz)					
		6SL3000-2AH33-6AA0	6SL3000-2AH34-5AA0	6SL3000-2AH34-7AA0	6SL3000-2AH35-8AA0	6SL3000-2AH38-1AA0	
Rated current	A	330	410	465	575	810	810
Power loss							
• At 50 Hz	kW	0.4	0.481	0.631	0.705	0.78	0.877
• At 150 Hz	kW	0.454	0.545	0.723	0.801	0.91	1.003
Load connection		1 × hole for M10	1 × hole for M10	1 × hole for M12	1 × hole for M12	1 × hole for M12	1 × hole for M12
PE connection		M8 screw	M8 screw	M8 screw	M8 screw	M8 screw	M8 screw
Cable length, max. between motor reactor and motor [1]							
• Shielded	m	300	300	300	300	300	300
• Unshielded	m	450	450	450	450	450	450
Degree of protection		IP00	IP00	IP00	IP00	IP00	IP00
Dimensions							
• Width	mm	300	350	410	410	410	410
• Height	mm	285	330	392	392	392	392
• Depth	mm	212	215	292	292	279	279
Weight, approx.	kg	43	56	80	80	146	146
Approvals, according to		–	–	–	–	–	–
Suitable for Power Module		6SL3310-1GH33-3AA3 (315 kW)	6SL3310-1GH34-1AA3 (400 kW)	6SL3310-1GH34-7AA3 (450 kW)	6SL3310-1GH35-8AA3 (560 kW)	6SL3310-1GH37-4AA3 (710 kW)	6SL3310-1GH38-1AA3 (800 kW)

[1] Longer cable lengths for specific configurations are available on request.

Overview



dv/dt filter 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 in accordance with the limit value curve according to IEC/TS 60034-17: 2006:

- < 1000 V at U_{line} < 575 V
- < 1250 V at 660 V < U_{line} < 690 V

Standard motors with standard insulation and without insulated bearings with a supply voltage of up to 690 V can be used for converter operation if a dv/dt filter plus VPL is used.

dv/dt filters plus VPL are designed for the following maximum motor cable lengths:

- Shielded cables: 300 m (e.g. Protodur NYCWY)
- Unshielded cables: 450 m (e.g. Protodur NYY)

For shorter cable lengths (100 m shielded, 150 m unshielded), refer to dv/dt filter compact plus VPL.

Notice:

The max. permissible cable length between the dv/dt filter and Power Module is 5 m.

Design

The dv/dt filter plus VPL consists of two components, which are also supplied as separate mechanical units:

- dv/dt reactor
- Voltage limiting network, which cuts-off the voltage peaks and feeds the energy back to the DC link.

Selection and ordering data

Suitable for Power Module	Type rating of the Power Module at 400 V, 500 V or 690 V	**dv/dt filter plus VPL**
	kW	Article No.
380 ... 480 V 3 AC		
6SL3310-1GE32-1AA3	110	**6SL3000-2DE32-6AA0**
6SL3310-1GE32-6AA3	132	
6SL3310-1GE33-1AA3	160	**6SL3000-2DE35-0AA0**
6SL3310-1GE33-8AA3	200	
6SL3310-1GE35-0AA3	250	
6SL3310-1GE36-1AA3	315	**6SL3000-2DE38-4AA0**
6SL3310-1GE37-5AA3	400	
6SL3310-1GE38-4AA3	450	
6SL3310-1GE41-0AA3	560	**6SL3000-2DE41-4AA0**
500 ... 600 V 3 AC		
6SL3310-1GF31-8AA3	110	**6SL3000-2DH32-2AA0**
6SL3310-1GF32-2AA3	132	
6SL3310-1GF32-6AA3	160	**6SL3000-2DH33-3AA0**
6SL3310-1GF33-3AA3	200	
6SL3310-1GF34-1AA3	250	**6SL3000-2DH34-1AA0**
6SL3310-1GF34-7AA3	315	**6SL3000-2DH35-8AA0**
6SL3310-1GF35-8AA3	400	
6SL3310-1GF37-4AA3	500	**6SL3000-2DH38-1AA0**
6SL3310-1GF38-1AA3	560	
660 ... 690 V 3 AC		
6SL3310-1GH28-5AA3	75	**6SL3000-2DH31-0AA0**
6SL3310-1GH31-0AA3	90	
6SL3310-1GH31-2AA3	110	**6SL3000-2DH31-5AA0**
6SL3310-1GH31-5AA3	132	
6SL3310-1GH31-8AA3	160	**6SL3000-2DH32-2AA0**
6SL3310-1GH32-2AA3	200	
6SL3310-1GH32-6AA3	250	**6SL3000-2DH33-3AA0**
6SL3310-1GH33-3AA3	315	
6SL3310-1GH34-1AA3	400	**6SL3000-2DH34-1AA0**
6SL3310-1GH34-7AA3	450	**6SL3000-2DH35-8AA0**
6SL3310-1GH35-8AA3	560	
6SL3310-1GH37-4AA3	710	**6SL3000-2DH38-1AA0**
6SL3310-1GH38-1AA3	800	

For further information on dv/dt filters, please refer to the SINAMICS Low Voltage Engineering Manual.

Technical specifications

Line voltage 380 ... 480 V 3 AC		dv/dt filter plus VPL			
		6SL3000-2DE32-6AA0	6SL3000-2DE35-0AA0	6SL3000-2DE38-4AA0	6SL3000-2DE41-4AA0
$I_{th\ max}$	A	260	490	840	1405
Degree of protection		IP00	IP00	IP00	IP00
Cable length, max. between dv/dt filter and motor [1]					
• Shielded	m	300	300	300	300
• Unshielded	m	450	450	450	450
Approvals, according to		cURus	cURus	cURus	cURus
dv/dt reactor					
Power loss					
• At 50 Hz	kW	0.701	0.874	1.106	1.111
• At 60 Hz	kW	0.729	0.904	1.115	1.154
• At 150 Hz	kW	0.78	0.963	1.226	1.23
Connections					
• To Power Module		1 × hole for M10	1 × hole for M12	1 × hole for M12	2 × holes for M12
• To load		1 × hole for M10	1 × hole for M12	1 × hole for M12	2 × holes for M12
• PE		M6 screw	M6 screw	M6 screw	M6 screw
Dimensions					
• Width	mm	410	460	460	445
• Height	mm	370	370	385	385
• Depth	mm	229	275	312	312
Weight, approx.	kg	66	122	149	158
Voltage Peak Limiter (VPL)					
Power loss					
• At 50 Hz	kW	0.029	0.042	0.077	0.134
• At 60 Hz	kW	0.027	0.039	0.072	0.125
• At 150 Hz	kW	0.025	0.036	0.066	0.114
Connections					
• To dv/dt reactor		M8 nut	70 mm^2 terminals	1 × hole for M8	1 × hole for M10
• To DC link		M8 nut	70 mm^2 terminals	1 × hole for M8	1 × hole for M10
• PE		M8 stud	35 mm^2 terminals	M8 stud	M8 stud
Dimensions					
• Width	mm	263	392	309	309
• Height	mm	265	285	1312.5	1312.5
• Depth	mm	188	210	400	400
Weight, approx.	kg	6	16	48	72
Suitable for Power Module		6SL3310-1GE32-1AA3 (110 kW) 6SL3310-1GE32-6AA3 (132 kW)	6SL3310-1GE33-1AA3 (160 kW) 6SL3310-1GE33-8AA3 (200 kW) 6SL3310-1GE35-0AA3 (250 kW)	6SL3310-1GE36-1AA3 (315 kW) 6SL3310-1GE37-5AA3 (400 kW) 6SL3310-1GE38-4AA3 (450 kW)	6SL3310-1GE41-0AA3 (560 kW)

Note: Two dv/dt reactors are required for Power Modules with a type rating of 560 kW.
The listed technical specifications refer to one dv/dt reactor.

[1] Longer cable lengths for specific configurations are available on request.

Technical specifications (continued)

Line voltage 500 ... 600 V 3 AC		dv/dt filter plus VPL				
		6SL3000-2DH32-2AA0	6SL3000-2DH33-3AA0	6SL3000-2DH34-1AA0	6SL3000-2DH35-8AA0	6SL3000-2DH38-1AA0
$I_{th\ max}$	A	215	330	410	575	810
Degree of protection		IP00	IP00	IP00	IP00	IP00
Cable length, max. between dv/dt filter and motor [1]						
• Shielded	m	300	300	300	300	300
• Unshielded	m	450	450	450	450	450
Approvals, according to		cURus	cURus	cURus	cURus	cURus
dv/dt reactor						
Power loss						
• At 50 Hz	kW	0.578	0.595	0.786	0.862	0.828
• At 60 Hz	kW	0.604	0.62	0.826	0.902	0.867
• At 150 Hz	kW	0.645	0.661	0.884	0.964	0.927
Connections						
• To Power Module		1 × hole for M10	1 × hole for M10	1 × hole for M12	1 × hole for M12	2 × holes for M12
• To load		1 × hole for M10	1 × hole for M10	1 × hole for M12	1 × hole for M12	2 × holes for M12
• PE		M6 screw	M6 screw	M6 screw	M6 screw	M6 screw
Dimensions						
• Width	mm	460	460	460	460	445
• Height	mm	360	360	385	385	385
• Depth	mm	275	275	312	312	312
Weight, approx.	kg	83	135	147	172	160
Voltage Peak Limiter (VPL)						
Power loss						
• At 50 Hz	kW	0.032	0.042	0.051	0.063	0.106
• At 60 Hz	kW	0.03	0.039	0.048	0.059	0.1
• At 150 Hz	kW	0.027	0.036	0.043	0.054	0.091
Connections						
• To dv/dt reactor		70 mm^2 terminals	70 mm^2 terminals	1 × hole for M8	1 × hole for M8	1 × hole for M10
• To DC link		70 mm^2 terminals	70 mm^2 terminals	1 × hole for M8	1 × hole for M8	1 × hole for M10
• PE		35 mm^2 terminals	35 mm^2 terminals	M8 stud	M8 stud	M8 stud
Dimensions						
• Width	mm	392	392	309	309	309
• Height	mm	285	285	1312.5	1312.5	1312.5
• Depth	mm	210	210	400	400	400
Weight, approx.	kg	16	16	48	48	72
Suitable for Power Module		6SL3310-1GF31-8AA3 (110 kW) 6SL3310-1GF32-2AA3 (132 kW)	6SL3310-1GF32-6AA3 (160 kW) 6SL3310-1GF33-3AA3 (200 kW)	6SL3310-1GF34-1AA3 (250 kW)	6SL3310-1GF34-7AA3 (315 kW) 6SL3310-1GF35-8AA3 (400 kW)	6SL3310-1GF37-4AA3 (500 kW) 6SL3310-1GF38-1AA3 (560 kW)

Note: Two dv/dt reactors are required for Power Modules with a type rating of 500 kW and 560 kW.
The listed technical specifications refer to one dv/dt reactor.

[1] Longer cable lengths for specific configurations are available on request.

Technical specifications (continued)

Line voltage 660 ... 690 V 3 AC		dv/dt filter plus VPL			
		6SL3000-2DH31-0AA0	6SL3000-2DH31-5AA0	6SL3000-2DH32-2AA0	6SL3000-2DH33-3AA0
$I_{th\ max}$	A	100	150	215	330
Degree of protection		IP00	IP00	IP00	IP00
Cable length, max. between dv/dt filter and motor [1]					
• Shielded	m	300	300	300	300
• Unshielded	m	450	450	450	450
Approvals, according to		cURus	cURus	cURus	cURus
dv/dt reactor					
Power loss					
• At 50 Hz	kW	0.49	0.389	0.578	0.595
• At 60 Hz	kW	0.508	0.408	0.604	0.62
• At 150 Hz	kW	0.541	0.436	0.645	0.661
Connections					
• To Power Module		1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M10
• To load		1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M10
• PE		M6 screw	M6 screw	M6 screw	M6 screw
Dimensions					
• Width	mm	350	350	460	460
• Height	mm	320	320	360	360
• Depth	mm	227	227	275	275
Weight, approx.	kg	48	50	83	135
Voltage Peak Limiter (VPL)					
Power loss					
• At 50 Hz	kW	0.016	0.02	0.032	0.042
• At 60 Hz	kW	0.015	0.019	0.03	0.039
• At 150 Hz	kW	0.013	0.018	0.027	0.036
Connections					
• To dv/dt reactor		M8 nut	M8 nut	70 mm^2 terminals	70 mm^2 terminals
• To DC link		M8 nut	M8 nut	70 mm^2 terminals	70 mm^2 terminals
• PE		M8 stud	M8 stud	35 mm^2 terminals	35 mm^2 terminals
Dimensions					
• Width	mm	263	263	392	392
• Height	mm	265	265	285	285
• Depth	mm	188	188	210	210
Weight, approx.	kg	6	6	16	16
Suitable for Power Module		6SL3310-1GH28-5AA3 (75 kW) 6SL3310-1GH31-0AA3 (90 kW)	6SL3310-1GH31-2AA3 (110 kW) 6SL3310-1GH31-5AA3 (132 kW)	6SL3310-1GH31-8AA3 (160 kW) 6SL3310-1GH32-2AA3 (200 kW)	6SL3310-1GH32-6AA3 (250 kW) 6SL3310-1GH33-3AA3 (315 kW)

[1] Longer cable lengths for specific configurations are available on request.

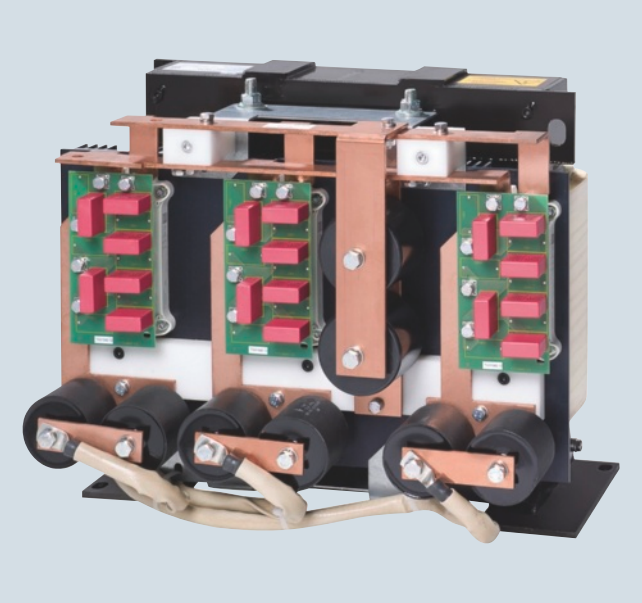
Technical specifications (continued)

Line voltage 660 ... 690 V 3 AC		dv/dt filter plus VPL		
		6SL3000-2DH34-1AA0	6SL3000-2DH35-8AA0	6SL3000-2DH38-1AA0
$I_{th\ max}$	A	410	575	810
Degree of protection		IP00	IP00	IP00
Cable length, max. between dv/dt filter and motor [1]				
• Shielded	m	300	300	300
• Unshielded	m	450	450	450
Approvals, according to		cURus	cURus	cURus
dv/dt reactor				
Power loss				
• At 50 Hz	kW	0.786	0.862	0.828
• At 60 Hz	kW	0.826	0.902	0.867
• At 150 Hz	kW	0.884	0.964	0.927
Connections				
• To Power Module		1 × hole for M12	1 × hole for M12	2 × holes for M12
• To load		1 × hole for M12	1 × hole for M12	2 × holes for M12
• PE		M6 screw	M6 screw	M6 screw
Dimensions				
• Width	mm	460	460	445
• Height	mm	385	385	385
• Depth	mm	312	312	312
Weight, approx.	kg	147	172	160
Voltage Peak Limiter (VPL)				
Power loss				
• At 50 Hz	kW	0.051	0.063	0.106
• At 60 Hz	kW	0.048	0.059	0.1
• At 150 Hz	kW	0.043	0.054	0.091
Connections				
• To dv/dt reactor		1 × hole for M8	1 × hole for M8	1 × hole for M10
• To DC link		1 × hole for M8	1 × hole for M8	1 × hole for M10
• PE		M8 stud	M8 stud	M8 stud
Dimensions				
• Width	mm	309	309	309
• Height	mm	1312.5	1312.5	1312.5
• Depth	mm	400	400	400
Weight, approx.	kg	48	48	72
Suitable for Power Module		6SL3310-1GH34-1AA3 (400 kW)	6SL3310-1GH34-7AA3 (450 kW) 6SL3310-1GH35-8AA3 (560 kW)	6SL3310-1GH37-4AA3 (710 kW) 6SL3310-1GH38-1AA3 (800 kW)

Note: Two dv/dt reactors are required for Power Modules with a type rating of 710 kW and 800 kW.
The listed technical specifications refer to one dv/dt reactor.

[1] Longer cable lengths for specific configurations are available on request.

Overview



dv/dt filters compact plus VPL (**V**oltage **P**eak **L**imiter) limit the voltage rate-of-rise dv/dt to values of < 1600 V/µs and the typical voltage peaks to the following values in accordance with the limit value curve A according to IEC 60034-25: 2007:

- < 1150 V at U_{line} < 575 V
- < 1400 V at 660 V < U_{line} < 690 V

Standard motors with standard insulation and without insulated bearings with a supply voltage of up to 690 V can be used for converter operation if a dv/dt filter compact plus VPL is used.

dv/dt filters compact plus VPL are designed for the following maximum motor cable lengths:

- Shielded cables: 100 m (e.g. Protodur NYCWY)
- Unshielded cables: 150 m (e.g. Protodur NYY)

For longer cable lengths (> 100 m shielded, > 150 m unshielded) refer to dv/dt filter plus VPL.

Notice:

- The max. permissible cable length between the dv/dt filter and Power Module is 5 m.
- Operation with output frequencies < 10 Hz is permissible for max. 5 min.

Design

The dv/dt filter compact plus VPL consists of two components, which are supplied together as a compact mechanical unit:

- dv/dt reactor
- Voltage limiting network, which cuts-off the voltage peaks and feeds the energy back to the DC link.

Selection and ordering data

Suitable for Power Module	Type rating of the Power Module at 400 V, 500 V or 690 V kW	**dv/dt filter compact plus VPL** Article No.
380 ... 480 V 3 AC		
6SL3310-1GE32-1AA3	110	**6SL3000-2DE32-6EA0**
6SL3310-1GE32-6AA3	132	
6SL3310-1GE33-1AA3	160	**6SL3000-2DE35-0EA0**
6SL3310-1GE33-8AA3	200	
6SL3310-1GE35-0AA3	250	
6SL3310-1GE36-1AA3	315	**6SL3000-2DE38-4EA0**
6SL3310-1GE37-5AA3	400	
6SL3310-1GE38-4AA3	450	
6SL3310-1GE41-0AA3	560	**6SL3000-2DE41-4EA0**
500 ... 600 V 3 AC		
6SL3310-1GF31-8AA3	110	**6SL3000-2DG32-2EA0**
6SL3310-1GF32-2AA3	132	
6SL3310-1GF32-6AA3	160	**6SL3000-2DG33-3EA0**
6SL3310-1GF33-3AA3	200	
6SL3310-1GF34-1AA3	250	**6SL3000-2DG34-1EA0**
6SL3310-1GF34-7AA3	315	**6SL3000-2DG35-8EA0**
6SL3310-1GF35-8AA3	400	
6SL3310-1GF37-4AA3	500	**6SL3000-2DG38-1EA0**
6SL3310-1GF38-1AA3	560	
660 ... 690 V3 AC		
6SL3310-1GH28-5AA3	75	**6SL3000-2DG31-0EA0**
6SL3310-1GH31-0AA3	90	
6SL3310-1GH31-2AA3	110	**6SL3000-2DG31-5EA0**
6SL3310-1GH31-5AA3	132	
6SL3310-1GH31-8AA3	160	**6SL3000-2DG32-2EA0**
6SL3310-1GH32-2AA3	200	
6SL3310-1GH32-6AA3	250	**6SL3000-2DG33-3EA0**
6SL3310-1GH33-3AA3	315	
6SL3310-1GH34-1AA3	400	**6SL3000-2DG34-1EA0**
6SL3310-1GH34-7AA3	450	**6SL3000-2DG35-8EA0**
6SL3310-1GH35-8AA3	560	
6SL3310-1GH37-4AA3	710	**6SL3000-2DG38-1EA0**
6SL3310-1GH38-1AA3	800	

For further information on dv/dt filters compact, please refer to the SINAMICS Low Voltage Engineering Manual.

Technical specifications

Line voltage 380 ... 480 V 3 AC		**dv/dt filter compact plus VPL**			
		6SL3000-2DE32-6EA0	6SL3000-2DE35-0EA0	6SL3000-2DE38-4EA0	6SL3000-2DE41-1EA0
Rated current	A	260	490	840	1405
$I_{th\ max}$	A	260	490	840	1405
Power loss, max.					
• At 50 Hz 400 V	kW	0.21	0.29	0.518	Reactor: 1.027 VPL: 0.127 Total: 1.154
• At 60 Hz 460 V	kW	0.215	0.296	0.529	Reactor: 1.077 VPL: 0.12 Total: 1.197
• At 150 Hz 400 V	kW	0.255	0.344	0.609	Reactor: 1.354 VPL: 0.09 Total: 1.444
Power connection, input and output side		Hole for M10	Hole for M10	Hole for M12	2 x elongated holes, 14 x 18 mm
• Conductor cross section, max. (IEC)		Provided for busbar connection	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
DC-link connection, DCPS, DCNS		Threaded socket M8	Threaded socket M8	Hole for M8	Hole for M8
• Conductor cross section, max. (IEC)	mm^2	16	25	50	95
PE/GND connection		Threaded socket M6	Threaded socket M6	Threaded socket M6	Threaded socket M6 (reactor and VPL)
Cable length, max. between dv/dt filter and motor					
• Shielded	m	100	100	100	100
• Unshielded	m	150	150	150	150
Degree of protection		IP00	IP00	IP00	IP00
Dimensions					
• Width	mm	310	350	440	Reactor: 430 VPL: 277
• Height	mm	283	317	369	Reactor: 385 VPL: 360
• Depth	mm	238	260	311	Reactor: 323 VPL: 291
Weight, approx.	kg	41	61	103	Reactor: 168.8 VPL: 19.2 Total: 188
Approvals, according to		cURus	cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GE32-1AA3 (110 kW) 6SL3310-1GE32-6AA3 (132 kW)	6SL3310-1GE33-1AA3 (160 kW) 6SL3310-1GE33-8AA3 (200 kW) 6SL3310-1GE35-0AA3 (250 kW)	6SL3310-1GE36-1AA3 (315 kW) 6SL3310-1GE37-5AA3 (400 kW) 6SL3310-1GE38-4AA3 (450 kW)	6SL3310-1GE41-0AA3 (560 kW)

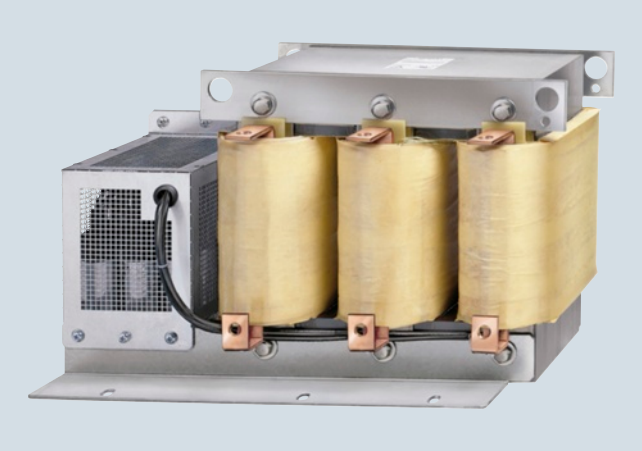
Technical specifications (continued)

Line voltage 500 ... 690 V 3 AC		dv/dt filter compact plus VPL			
		6SL3000-2DG31-0EA0	6SL3000-2DG31-5EA0	6SL3000-2DG32-2EA0	6SL3000-2DG33-3EA0
Rated current	A	100	150	215	330
$I_{th\ max}$	A	100	150	215	330
Power loss, max.					
• At 50 Hz 500/690 V	kW	0.227	0.27	0.305	0.385
• At 60 Hz 575 V	kW	0.236	0.279	0.316	0.399
• At 150 Hz 500/690 V	kW	0.287	0.335	0.372	0.48
Power connection, input and output side		Hole for M10	Hole for M10	Hole for M10	Hole for M10
• Conductor cross section, max. (IEC)		Provided for busbar connection	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
DC-link connection, DCPS, DCNS		Threaded socket M8	Threaded socket M8	Hole for M8	Hole for M8
• Conductor cross section, max. (IEC)	mm^2	16	16	25	25
PE/GND connection		Threaded socket M6	Threaded socket M6	Threaded socket M6	Threaded socket M6
Cable length, max. between dv/dt filter and motor					
• Shielded	m	100	100	100	100
• Unshielded	m	150	150	150	150
Degree of protection		IP00	IP00	IP00	IP00
Dimensions					
• Width	mm	310	310	350	350
• Height	mm	283	283	317	317
• Depth	mm	238	238	260	260
Weight, approx.	kg	34	36	51	6
Approvals, according to		cURus	cURus	cURus	cURus
Suitable for Power Module					
• 500 ... 600 V 3 AC		–	–	6SL3310-1GF31-8AA3 (110 kW)	6SL3310-1GF32-6AA3 (160 kW)
				6SL3310-1GF32-2AA3 (132 kW)	6SL3310-1GF33-3AA3 (200 kW)
• 660 ... 690 V 3 AC		6SL3310-1GH28-5AA3 (75 kW)	6SL3310-1GH31-2AA3 (110 kW)	6SL3310-1GH31-8AA3 (160 kW)	6SL3310-1GH32-6AA3 (250 kW)
		6SL3310-1GH31-0AA3 (90 kW)	6SL3310-1GH31-5AA3 (132 kW)	6SL3310-1GH32-2AA3 (200 kW)	6SL3310-1GH33-3AA3 (315 kW)

Technical specifications (continued)

Line voltage 500 ... 690 V 3 AC		dv/dt filter compact plus VPL		
		6SL3000-2DG34-1EA0	6SL3000-2DG35-8EA0	6SL3000-2DG38-1EA0
Rated current	A	410	575	810
$I_{th\ max}$	A	410	575	810
Power loss, max.				
• At 50 Hz 500/690 V	kW	0.55	0.571	Reactor: 0.88 VPL: 0.084 Total: 0.964
• At 60 Hz 575 V	kW	0.568	0.586	Reactor: 0.918 VPL: 0.08 Total: 0.998
• At 150 Hz 500/690 V	kW	0.678	0.689	Reactor: 1.137 VPL: 0.059 Total: 1.196
Power connection, input and output side		Hole for M12	Hole for M12	2 x elongated holes, 14 x 18 mm
• Conductor cross section, max. (IEC)		Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
DC-link connection, DCPS, DCNS		Hole for M8	Hole for M8	Hole for M8
• Conductor cross section, max. (IEC)	mm^2	50	50	95
PE/GND connection		Threaded socket M6	Threaded socket M6	Threaded socket M6 (reactor and VPL)
Cable length, max. between dv/dt filter and motor				
• Shielded	m	100	100	100
• Unshielded	m	150	150	150
Degree of protection		IP00	IP00	IP00
Dimensions				
• Width	mm	440	440	Reactor: 430 VPL: 277
• Height	mm	369	369	Reactor: 385 VPL: 360
• Depth	mm	311	311	Reactor: 323 VPL: 291
Weight, approx.	kg	87	100	Reactor: 171.2 VPL: 18.8 Total: 190
Approvals, according to		cURus	cURus	cURus
Suitable for Power Module				
• 500 ... 600 V 3 AC		6SL3310-1GF34-1AA3 (250 kW)	6SL3310-1GF34-7AA3 (315 kW) 6SL3310-1GF35-8AA3 (400 kW)	6SL3310-1GF37-4AA3 (500 kW) 6SL3310-1GF38-1AA3 (560 kW)
• 660 ... 690 V 3 AC		6SL3310-1GH34-1AA3 (400 kW)	6SL3310-1GH34-7AA3 (450 kW) 6SL3310-1GH35-8AA3 (560 kW)	6SL3310-1GH37-4AA3 (710 kW) 6SL3310-1GH38-1AA3 (800 kW)

Overview



Sine-wave filters are available in the voltage range 380 V to 480 V up to a type rating of 250 kW, and in the voltage range 500 V to 600 V up to a type rating of 132 kW.

The sine-wave filter at the converter output supplies almost perfect sinusoidal voltages on the motor so that standard motors can be used without special cables or power derating. Standard cables can be used.

Note the following when a sine-wave filter is used:

- The output frequency is limited to max. 150 Hz (at 380 to 480 V) and 115 Hz (at 500 to 600 V).
- The maximum output voltage is limited to approx. 85% of the input voltage.
- Maximum permissible motor cable lengths:
  - Unshielded cable: 450 m
  - Shielded cable: 300 m
- During commissioning, the pulse frequency is increased to double the factory setting. This induces current derating, which must be applied to the built-in units' rated currents listed in the technical specifications.

Note:

The reduced voltage at the motor terminals compared to the rated motor voltage means that the motor reaches the field weakening range earlier.

The sine-wave filter may be operated only when the motor is connected; sine-wave filters are not no-load-proof!

For further information on sine-wave filters, please refer to the SINAMICS Low Voltage Engineering Manual.

Selection and ordering data

Suitable for Power Module	Type rating of the Power Module at 400 V or 500 V kW	**Sine-wave filter** Article No.
380 ... 480 V 3 AC		
6SL3310-1GE32-1AA3 6SL3310-1GE32-6AA3	110 132	**6SL3000-2CE32-3AA0**
6SL3310-1GE33-1AA3	160	**6SL3000-2CE32-8AA0**
6SL3310-1GE33-8AA3	200	**6SL3000-2CE33-3AA0**
6SL3310-1GE35-0AA3	250	**6SL3000-2CE34-1AA0**
500 ... 600 V 3 AC		
6SL3310-1GF31-8AA3 6SL3310-1GF32-2AA3	110 132	**6SL3000-2CF31-7AA0**

Technical specifications

Line voltage 380 ... 480 V 3 AC		**Sine-wave filter**			
		6SL3000-2CE32-3AA0	6SL3000-2CE32-8AA0	6SL3000-2CE33-3AA0	6SL3000-2CE34-1AA0
Rated current [1]	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	300	300	300	300
• Unshielded	m	450	450	450	450
Degree of protection		IP00	IP00	IP00	IP00
Dimensions					
• Width	mm	620	620	620	620
• Height	mm	300	300	370	370
• Depth	mm	320	320	360	360
Weight, approx.	kg	124	127	136	198
Approvals, according to		cURus	cURus	cURus	cURus
Suitable for Power Module		6SL3310-1GE32-1AA3 (110 kW) 6SL3310-1GE32-6AA3 (132 kW)	6SL3310-1GE33-1AA3 (160 kW)	6SL3310-1GE33-8AA3 (200 kW)	6SL3310-1GE35-0AA3 (250 kW)

Line voltage 500 ... 600 V 3 AC		**Sine-wave filter**
		6SL3000-2CF31-7AA0
Rated current [2]	A	188
Power loss	kW	0.8
Connections		
• Load		1 × hole for M10
• PE		1 × hole for M10
Cable length, max. between sine-wave filter and motor		
• Shielded	m	300
• Unshielded	m	450
Degree of protection		IP00
Dimensions		
• Width	mm	620
• Height	mm	370
• Depth	mm	360
Weight, approx.	kg	210
Approvals, according to		cURus
Suitable for Power Module		6SL3310-1GF31-8AA3 (110 kW) 6SL3310-1GF32-2AA3 (132 kW)

[1] Output current of the Power Module at an adapted pulse frequency of 4 kHz.

[2] Output current of the Power Module at an adapted pulse frequency of 2.5 kHz.

Overview

The communication, open-loop and closed-loop control functions for the Power Modules are executed in a CU320-2 Control Unit. Communication with the higher-level control system is performed via PROFIBUS DP or PROFINET.

The CU320-2 Control Unit and the associated CompactFlash card can be ordered separately or as Control Unit Kit.
The Control Unit Kit comprises the CU320-2 Control Unit, a CompactFlash card and the stored drive software.

Design

The CU320-2 Control Unit features the following connections and 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 DRIVE-CLiQ sockets for communication with other DRIVE-CLiQ devices, e.g. Power Modules, Terminal Modules
- 12 parameterizable digital inputs (floating)
- 8 parameterizable bidirectional digital inputs/outputs (non-floating)
- 1 serial RS232 interface
- 1 interface for the BOP20 Basic Operator Panel
- 1 slot for the CompactFlash card on which firmware and parameters are stored
- 1 slot to install an option module for the interface expansion
- 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 connection
- 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, e.g. number of terminals.

The status of the CU320-2 Control Unit is indicated via multi-color LEDs.
As the firmware and set parameters are stored on a plug-in CompactFlash card, the Control Unit can be changed without the need for tools.

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**
PROFINET PN Control Unit Kit comprising: • CU320-2 PN Control Unit • CompactFlash card with the latest firmware • STARTER commissioning tool on DVD-ROM	**6SL3040-1GA01-1AA0**
PROFIBUS DP Control Unit Kit comprising: • CU320-2 DP Control Unit • CompactFlash card with the latest firmware • STARTER commissioning tool on DVD-ROM	**6SL3040-1GA00-1AA0**
Accessories	
For CU320-2 PN: **Industrial Ethernet FC**	
• RJ45 plug 145 (1 unit)	**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**
STARTER commissioning tool on DVD-ROM	**6SL3072-0AA00-0AG0**
Accessories for re-ordering	
Dust protection blanking plugs (50 units) for sealing unused DRIVE-CLiQ ports	**6SL3066-4CA00-0AA0**

For further information on the CU320-2 Control Unit, please refer to the SINAMICS Low Voltage Engineering Manual.

Integration

Communication between a CU320-2 Control Unit and the connected components takes place via DRIVE-CLiQ.

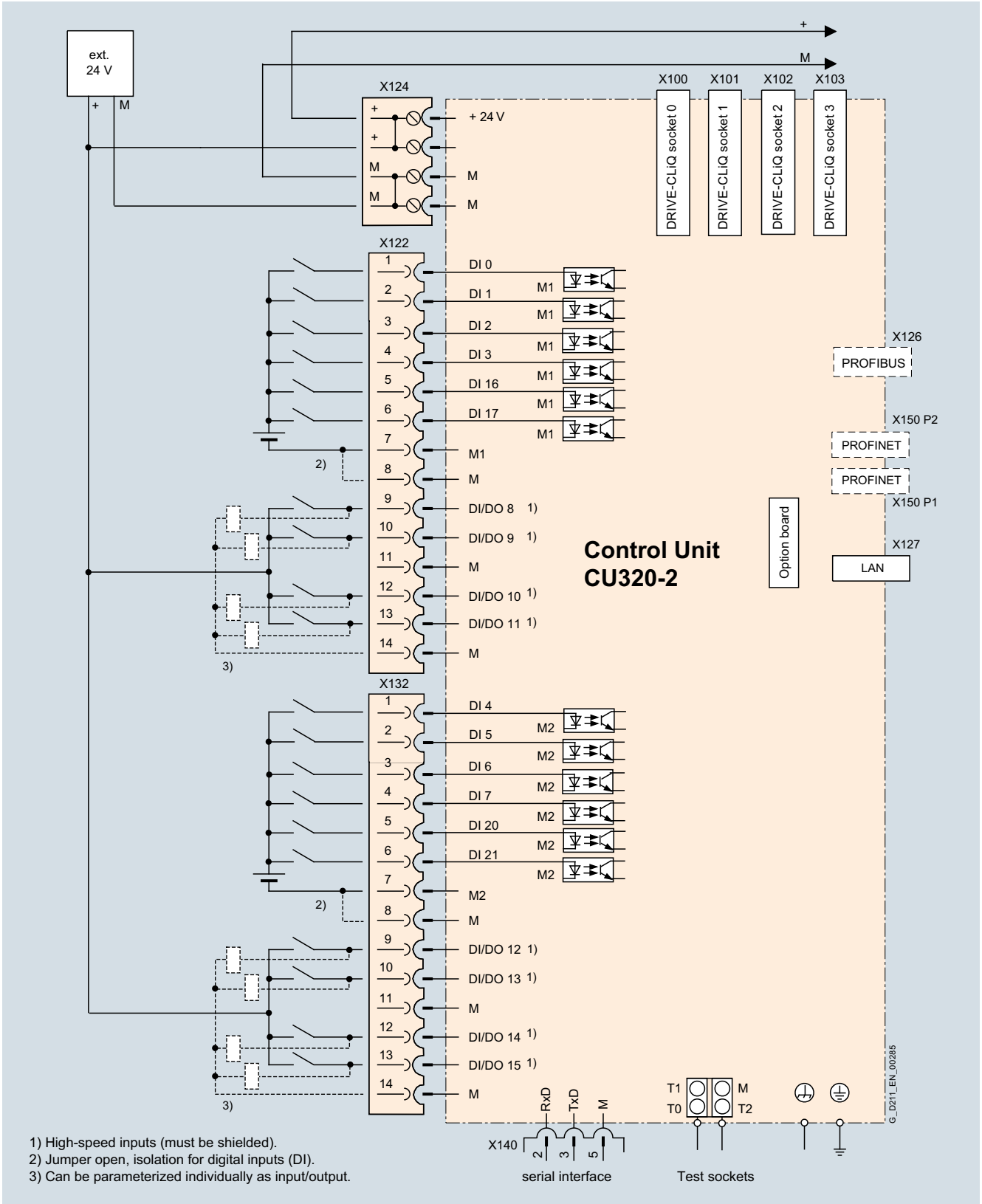
A DRIVE-CLiQ cable for connecting the CU320-2 to the SINAMICS G130 converter is included in the scope of delivery of the Power Module.

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 STARTER commissioning tool and the installed SINAMICS Support Package.

The CU320-2 PN Control Unit requires a CompactFlash card with firmware as of V4.4.
The CU320-2 DP Control Unit requires a CompactFlash card with firmware as of V4.3.

Integration (continued)



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

Connection example of a CU320-2 Control Unit

Technical specifications

CU320-2 Control Unit	6SL3040-1MA0 . -0AA0
Current requirement, max. at 24 V DC, typ. without taking into account 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 according to IEC 61131-2 Type 1	12 floating digital inputs 8 bidirectional non-floating digital inputs/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.	9 mA
• Delay time of digital inputs, approx. [1]	
- L → H	50 µs
- H → L	100 µs
• Delay time of high-speed digital inputs, approx. [1]	
- L → H	5 µs
- H → L	50 µs
• Conductor cross section, max.	1.5 mm^2
Digital outputs (continued short-circuit-proof)	8 bidirectional non-floating digital inputs/outputs
• Voltage	24 V DC
• Load current per digital output, max.	500 mA
• Delay time, typ./max.	
- L → H	150/400 µs
- H → L	75/100 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
• Height	300 mm
• Depth	226 mm
Weight, approx.	2.3 kg
Approvals, according to	cULus

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

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 process the communication, open-loop and closed-loop control functions of the 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.

In addition to the firmware, the CompactFlash card also contains license keys which are required to enable firmware options, e.g. for the Safety Integrated extended functions. The Safety Integrated extended functions must be ordered for each axis via order codes (**F..**) in addition to the article number.

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

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

A PDF guide for the purchase of the license key can be found at the following link at Usage Guide / Demonstration
www.siemens.com/automation/license

Selection and ordering data

Description		Article No.
CompactFlash card for CU320-2 Control Unit without Safety license		**6SL3054-3E□00-1BA0**
CompactFlash card for CU320-2 Control Unit with Safety license		
• For one axis		**6SL3054-3E□00-1BA0-Z F01**
Firmware V4.x		↑
	.3	**D**
	.4	**E**
	.5	**F**
	.6	**G**
	.7	**H**
	.8	**J**
	.9	**K**
Firmware license		
• **Safety Integrated extended functions** option including Certificate of License for one axis for upgrading the license of a CompactFlash card.		**6SL3074-0AA10-0AA0**
• **SINAMICS DCB extension** option Runtime license as of firmware V 4.6 including Certificate of License for upgrading the license of a CompactFlash card (see Section Tools and configuration, Drive Control Chart engineering software).		**6SL3077-0AA00-0AB0**

The current firmware version at the time of printing this catalog is firmware 4.7.

Overview

BOP20 Basic Operator Panel

Faults can be acknowledged, parameters set and diagnostics information read-out (e.g. alarm and fault messages) using the BOP20 Basic Operator Panel.

Design

The BOP20 Basic Operator Panel has a backlit two-line display area and 6 keys.

The integrated plug connector on the rear of the BOP20 Basic Operator Panel provides its power and establishes communication with the Control Unit.

Integration

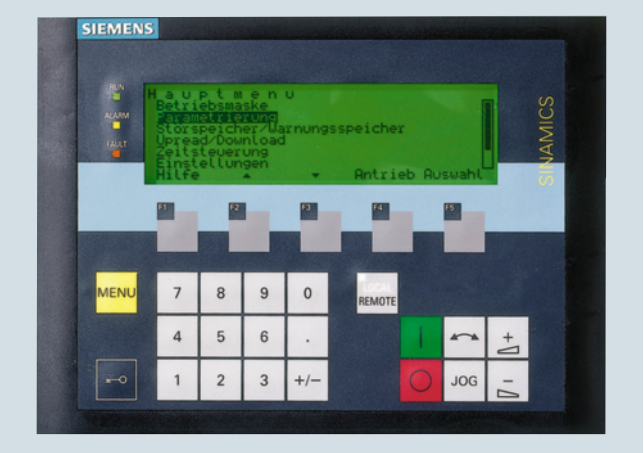
The BOP20 Basic Operator Panel can be snapped onto any CU305, CU310-2 or CU320-2 Control Unit.

CU320-2 Control Unit with attached BOP20 Basic Operator Panel

Selection and ordering data

Description	Article No.
BOP20 Basic Operator Panel	**6SL3055-0AA00-4BA0**

Overview



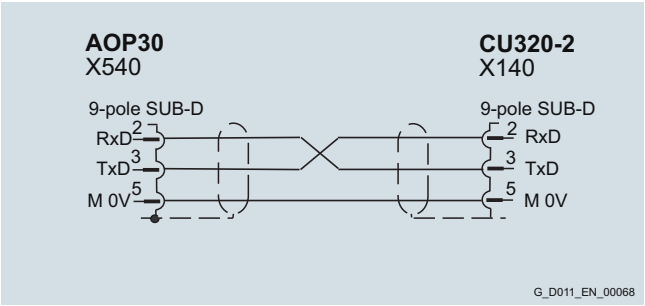
The AOP30 Advanced Operator Panel is an input/output device for converters of the SINAMICS series, preferably for cabinet installation.

It has the following characteristics:

- Graphical backlit LCD display for plain text display and a bar display of process variables
- LEDs for display of the operating states
- Help function describing causes of and remedies for faults and alarms
- Keypad for controlling drives during operation
- Local/remote switchover for selecting the operating location (control priority assigned to operator panel or customer terminal block / communication channel)
- Numeric keypad for input of setpoint or parameter values
- Function keys for guided navigation in the menu
- Two-stage safety strategy to protect against accidental or unauthorized changes to settings.
  - Operation of the drive from the operator panel can be disabled by the keyboard lock so that only parameter values and process variables can be displayed on the operator panel.
  - A password can be used to prevent the unauthorized modification of converter parameters.
- Front panel with degree of protection IP55

The AOP30 and SINAMICS drive communicate via the RS232 serial interface with PPI protocol.

The AOP30 may be omitted if the drive is only operated via PROFIBUS, for example, and no local display is required on the cabinet. The AOP30 can then be used simply for commissioning purposes and to obtain diagnostic information, in which case, it is plugged into the RS232 interface on the CU320-2 Control Unit. In this case, an external 24 V power supply (max. current requirement 200 mA) is required.



Assignment of the serial plug-in cable

Design

The AOP30 is an operator panel with graphical display and membrane keyboard. The device can be installed in a cabinet door which is between 2 mm and 4 mm thick.

Features:

- Display with green backlighting, resolution 240 × 64 pixels
- Membrane keyboard with 26 keys
- Connection for a 24 V power supply
- RS232 interface
- Time and date memory with internal battery backup
- 4 LEDs to indicate the operating state of the drive:
  - RUN green
  - ALARM yellow
  - FAULT red
  - Local/Remote green

Function

The current operating states, setpoints and actual values, parameters, indices, faults and alarms are displayed on the display panel.

German, English, French, Italian, Spanish and **Chinese** are stored on the CU320-2 Control Unit CompactFlash card as operator panel languages. The desired language must be downloaded to the AOP30 prior to commissioning. In addition to these preinstalled languages, **Russian** and **Portuguese** (Brazil) are also available for subsequent installation. Further languages are available on request.

Selection and ordering data

Description	Article No.
AOP30 Advanced Operator Panel	**6SL3055-0AA00-4CA5**
Accessories	
RS232 plug-in cable for connecting the AOP30 to the CU320-2	
1 m long	**6FX8002-1AA01-1AB0**
2 m long	**6FX8002-1AA01-1AC0**
3 m long	**6FX8002-1AA01-1AD0**
4 m long	**6FX8002-1AA01-1AE0**
5 m long	**6FX8002-1AA01-1AF0**
6 m long	**6FX8002-1AA01-1AG0**
7 m long	**6FX8002-1AA01-1AH0**
8 m long	**6FX8002-1AA01-1AJ0**
9 m long	**6FX8002-1AA01-1AK0**
10 m long	**6FX8002-1AA01-1BA0**

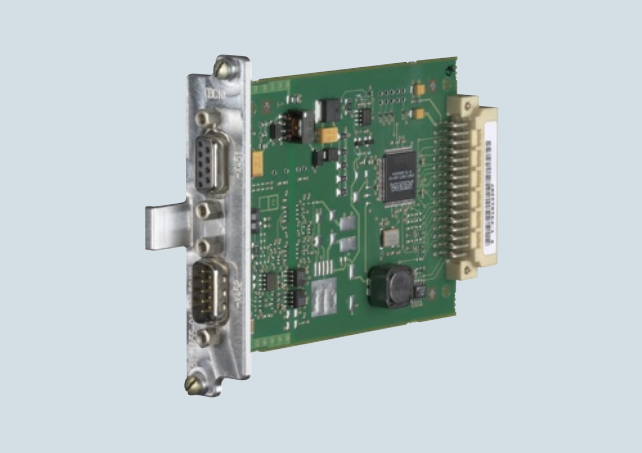
For the SINAMICS G150 and SINAMICS S150, the AOP30 Advanced Operator Panel is installed in the cabinet door as standard.

For the SINAMICS S120 Cabinet Modules, the AOP30 can be ordered as an option by specifying order code **K08**.

Technical specifications

AOP30 Advanced Operator Panel	6SL3055-0AA00-4CA5
Power supply	24 V DC (20.4 ... 28.8 V)
Current requirement • Without backlighting • For max. backlighting	 < 100 mA < 200 mA
Data interface	RS232 interface, PPI protocol
Backup battery	3 V lithium CR2032
Operating temperature	0 ... 55° C
Storage and transport temperature	-25 ... +70° C
Degree of protection	IP20 for the inside of the cabinet IP55 for the outside of the cabinet
Dimensions • Width • Height • Depth	 212 mm 156 mm 31 mm
Weight, approx.	0.55 kg

Overview



CBC10 Communication Board

The CBC10 Communication Board is used to interface the CU320-2 Control Unit (and therefore the drive system) to the CAN (Controller Area Network) protocol. The board's driver software fulfils the standards of the following CANopen specification of the CiA organization (CAN in Automation):

- Communication profiles in accordance with DS 301
- Drive profile in accordance with DSP 402 (in this case Profile Velocity Mode)
- EDS (Electronic Data Sheet) in accordance with DSP 306
- Operational status signaling in accordance with DSP 305

Note:

The CAN address is set on the CU320-2 DP Control Unit by means of the two address switches.
These address switches are not available on the CU320-2 PN Control Unit. In this case, the address can be set by means of parameters.

Integration

The CBC10 Communication Board plugs into the option slot on the CU320-2 Control Unit. Two SUB-D connections for input and output are provided for the CAN interface on the CBC10 Communication Board.

Selection and ordering data

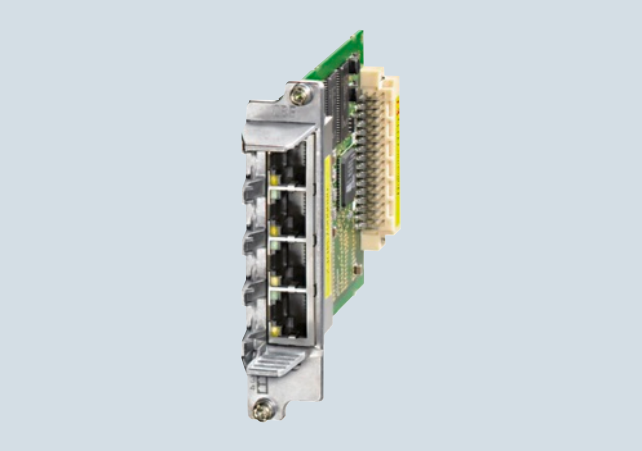
Description	Article No.
CBC10 Communication Board	**6SL3055-0AA00-2CA0**
Accessories	
SUB-D connector 9-pin, female (3 units)	**6FC9341-2AE**
SUB-D connector 9-pin, male (3 units)	**6FC9341-2AF**

For the SINAMICS G150, SINAMICS S150 and SINAMICS S120 Cabinet Modules, the CBC10 Communication Board can be ordered as an option by specifying order code **G20**.

Technical specifications

CBC10 Communication Board	6SL3055-0AA00-2CA0
Power requirement, max. at 24 V DC via CU320-2 Control Unit	0.05 A
Power loss, max.	3 W
Weight, approx.	0.1 kg (0.22 lb)
Approvals, according to	cULus

Overview



The CBE20 Communication Board is required when:

- A SINAMICS G130 or SINAMICS G150 converter, equipped with a CU320-2 DP (PROFIBUS) Control Unit, is to 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 is to be supported

With the CBE20 Communication Board, SINAMICS G130 or SINAMICS G150 is a PROFINET IO device in the sense of PROFINET and offers the following functions:

- PROFINET IO device
- 100 Mbit/s full duplex
- Supports real-time classes of PROFINET IO:
  - RT (Real-Time)
  - IRT (Isochronous Real-Time), minimum send cycle 500 µs
- Connects to controllers as a PROFINET IO device according to the PROFIdrive profile
- Standard TCP/IP communication for engineering processes using the STARTER commissioning tool
- Integrated 4-port switch with four RJ45 sockets based on PROFINET ASICs ERTEC400. The optimum topology (line, star, tree) can therefore be configured without additional external switches.

Integration

The CBE20 Communication Board plugs into the option slot on the CU320-2 Control Unit.

SINAMICS Link

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. 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 CU320-2 and SINAMICS DC Master with CUD

Nodes other than the SINAMICS CU320-2 Control Units and the CUD Control Units of the SINAMICS DC MASTER cannot be integrated into this communication network.

SINAMICS Link is activated by appropriately parameterizing the Control Units of the nodes.

Selection and ordering data

Description	Article No.
CBE20 Communication Board	**6SL3055-0AA00-2EB0**
Accessories	
Industrial Ethernet FC	
• RJ45 plug 145 (1 unit)	**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 SINAMICS G150, the CBE20 Communication Board can be ordered as an option by specifying order code **G33**.

Technical specifications

CBE20 Communication Board	6SL3055-0AA00-2EB0
Current requirement at 24 V DC	0.16 A
Power loss, max.	2.4 W
Weight, approx.	0.1 kg

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 SINAMICS G150 and SINAMICS S150, the TB30 Terminal Board can be ordered as an option by specifying order code **G62**.

Technical specifications

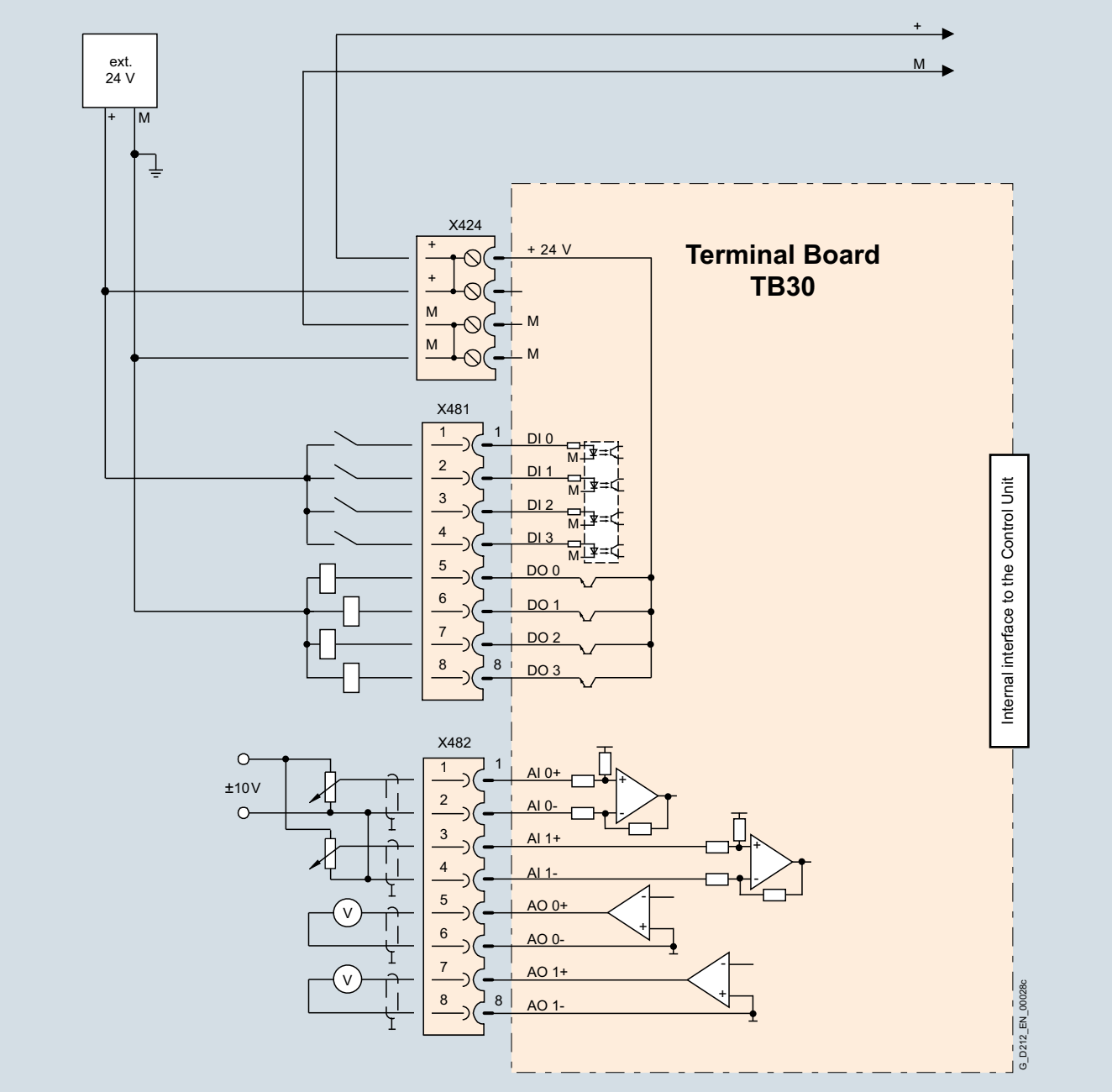
TB30 Terminal Board	6SL3055-0AA00-2TA0
Power requirement, max. at 24 V DC via Control Unit without taking account of digital outputs	0.05 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Digital inputs In accordance with IEC 61131-2 Type 1	
• Voltage	-3 ... +30 V
• Low level (an open digital input is interpreted as "low")	-3 ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC, typ.	10 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]	13 bit + 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 bit + 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)
Approvals, according to	cULus

[1] The specified delay times refer to the hardware. The actual reaction time depends on the time slot 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 $f_a = 1/t_{time\ slot}$ must be at least twice the value of the highest signal frequency f_{max}.

Integration

The TB30 Terminal Board plugs into the option slot on a CU320-2 Control Unit.



Connection example of TB30 Terminal Board

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 (KTY84-130 or PTC)
- 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 connected 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 for strain relief.

Selection and ordering data

Description	Article No.
TM31 Terminal Module Without DRIVE-CLiQ cable	**6SL3055-0AA00-3AA1**
Accessories for re-ordering	
SINAMICS/SINUMERIK/SIMOTION dust-proof 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**.

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.	10 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
• Aggregate 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 for outputs in the range -20 ... +20 mA
• Resolution	11 bit + sign
• Conductor cross-section, max.	1.5 mm^2
Relay outputs (changeover 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.	0.87 kg (2 lb)
Approvals, according to	cULus

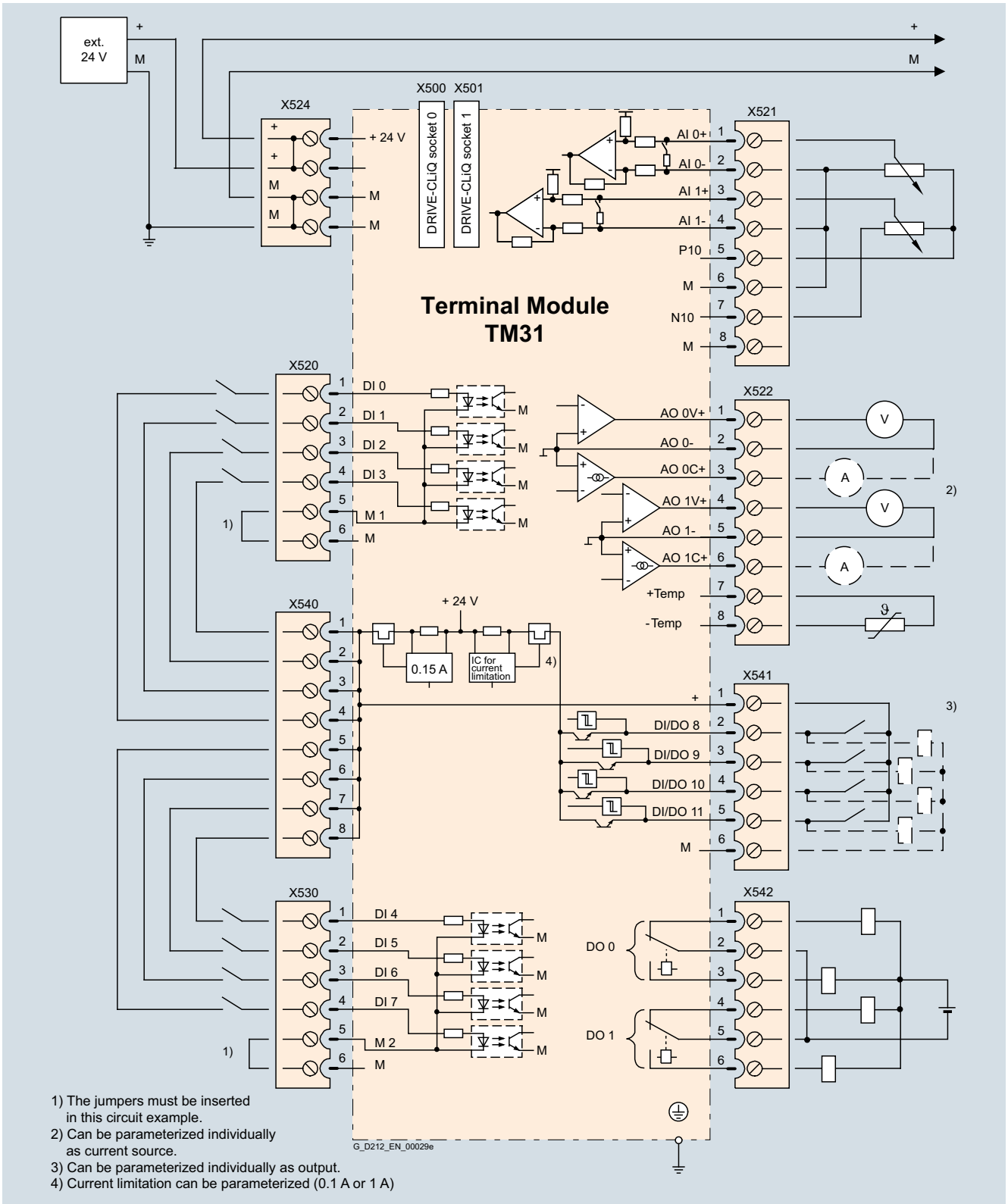
[1] The specified delay times refer to the hardware. The actual reaction time depends on the time slot in which the digital input/output is processed.

[2] If the analog input is to be operated in the signal processing sense with continuously variable input voltage, the sampling frequency $f_a = 1/t_{time\ slot}$ must be at least twice the value of the highest signal frequency f_{max}.

Integration

The TM31 Terminal Module can communicate via DRIVE-CLiQ with the following Control Units.

- CU310-2 Control Unit
- CU320-2 Control Unit
- SINUMERIK Control Unit
- SIMOTION D 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

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 power supply connector
- 1 connection for the 24 V power supply to digital outputs and sensors
- 1 PE (protective earth) 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 connected to the TM54 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 for strain relief.

Pins for connector coding are supplied with the TM54F Terminal Module.

Selection and ordering data

Description	Article No.
TM54F Terminal Module Without DRIVE-CLiQ cable	**6SL3055-0AA00-3BA0**
Accessories for re-ordering	
SINAMICS/SINUMERIK/SIMOTION dust-proof 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**.

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. power 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.	> 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	150 mm (5.91 in)
• Depth	111 mm (4.37 in)
Weight, approx.	0.9 kg (2 lb)
Approvals, according to	cULus
Safety Integrated	According to IEC 61508 SIL 2 and EN ISO 13849-1 PL d and Category 3

Integration

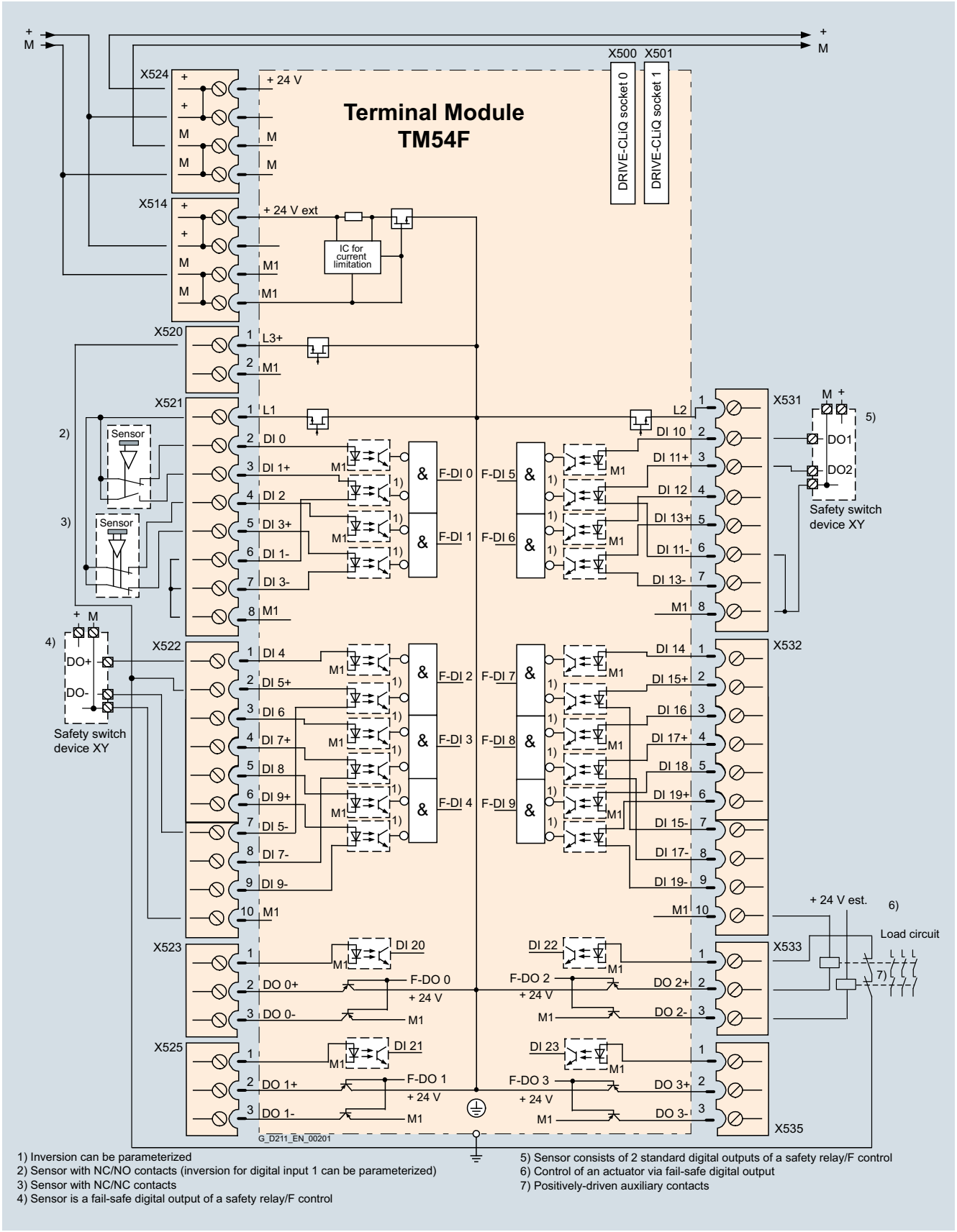
The TM54F Terminal Module can communicate via DRIVE-CLiQ with the following Control Units.

- CU310-2 Control Unit
- CU320-2 Control Unit
- SINUMERIK Control Unit
- SIMOTION D Control Unit or Controller Extension

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

[2] The total current of all fail-safe digital outputs must not exceed 5.33 A.

Integration (continued)



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

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 (-146.2 °F to 482 °F) for the following temperature sensors:

- Pt100 (with monitoring for open-circuit and short-circuit)
- Pt1000 (with monitoring for open-circuit and short-circuit)
- KTY84 (with monitoring for open-circuit and short-circuit)
- PTC (with short-circuit monitoring)
- 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 can be subdivided into 3 groups and evaluated together.

Design

The following are located on the TM150 Terminal Module:

- 6 terminal blocks for max. 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	
SINAMICS/SINUMERIK/SIMOTION dust-proof 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 ... G54**.

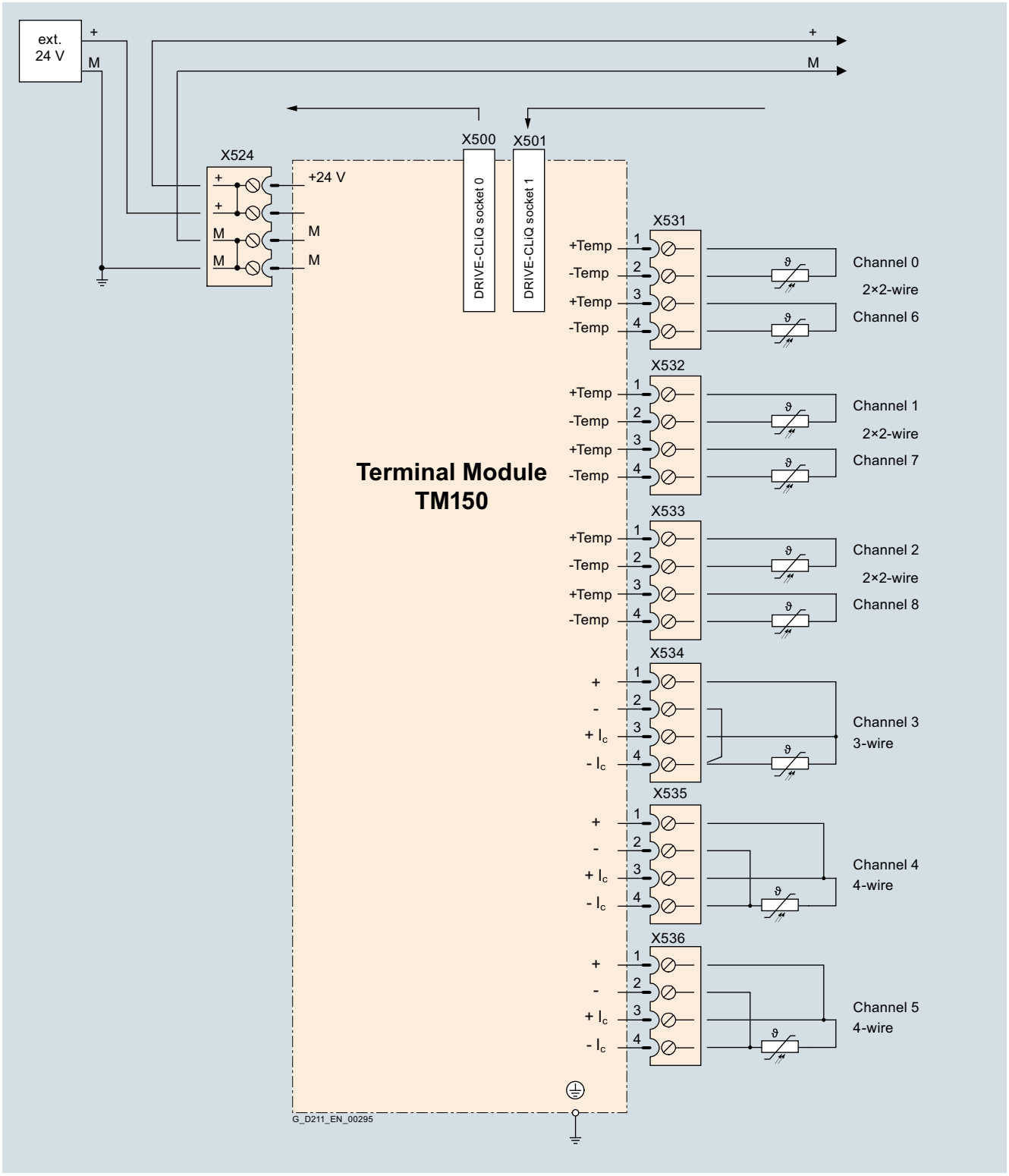
Technical specifications

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	119 mm (4.69 in)
Weight, approx.	0.41 kg (0.90 lb)

Integration

The TM150 Terminal Module can communicate via DRIVE-CLiQ with the following Control Units.

- CU310-2 Control Unit
- CU320-2 Control Unit
- SINAMICS DCM Advanced CUD



Connection example of TM150 Terminal Module

Overview

The VSM10 Voltage Sensing Module enables the line or motor voltage characteristic to be measured precisely. The phase differential voltage can be measured, either grounded (in the delivery state with jumper plugged in) or isolated.

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 interfaces:

- 1 connection for direct voltage sensing up to 690 V
- 1 connection for voltage sensing using voltage transformers, maximum voltage 100 V
- 1 temperature sensor input (KTY84-130 or PTC)
- 1 DRIVE-CLiQ socket
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 plug-in jumper for either grounded (delivery state) or isolated measurement
- 1 PE connection

The status of the VSM10 Voltage Sensing Module is indicated by a two-color LED.

The VSM10 Voltage Sensing Module can be snapped onto a TH 35 mounting rail according to EN 60715 (IEC 60715).

Selection and ordering data

Description	Article No.
VSM10 Voltage Sensing Module Without DRIVE-CLiQ cable	**6SL3053-0AA00-3AA1**

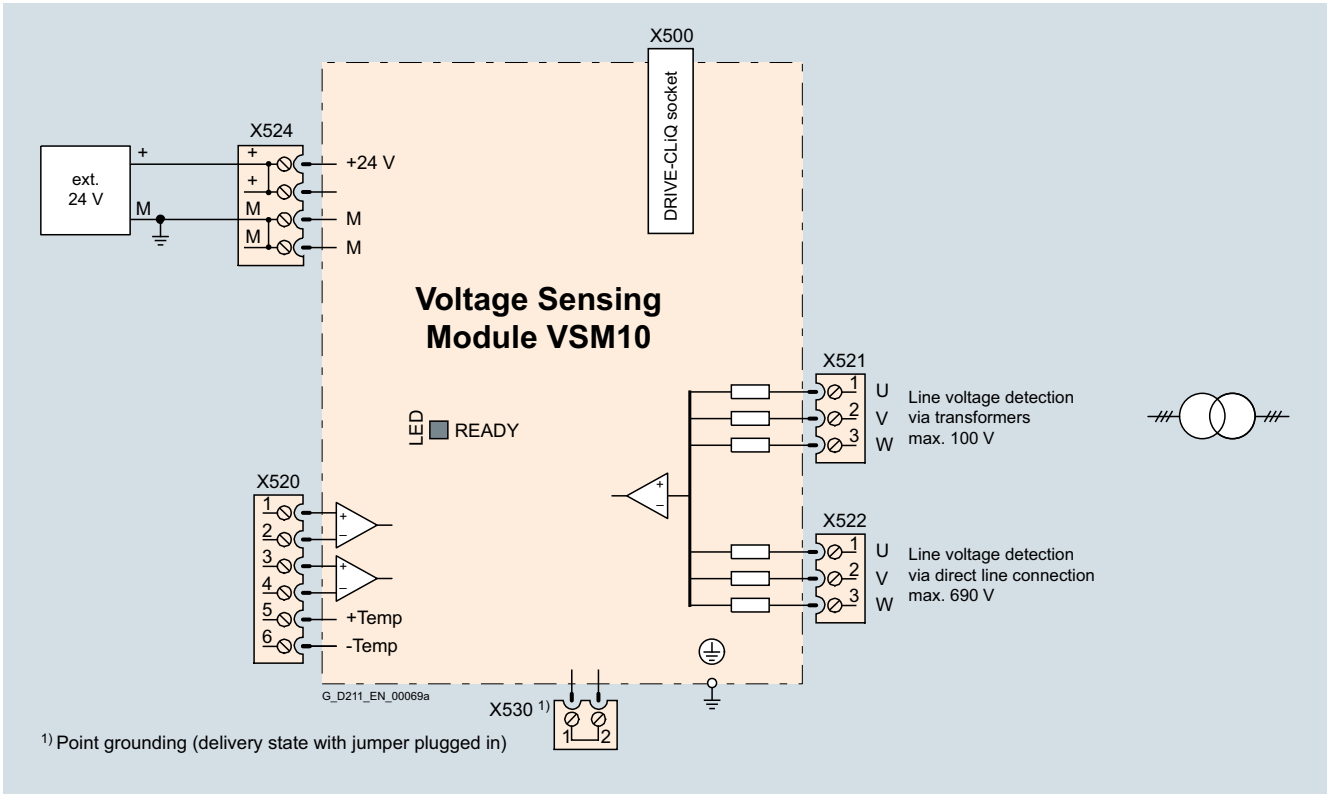
For the SINAMICS G150, the VSM10 Voltage Sensing Module can be ordered as an option with order code **K51** to implement the flying restart function.

Technical specifications

VSM10 Voltage Sensing Module	6SL3053-0AA00-3AA1
Power requirement, max. at 24 V DC	0.2 A
• Conductor cross section, max.	2.5 mm^2
Power loss	< 10 W
Line voltage detection	
• Insulation resistance neutral point - ground when the jumper is not inserted	> 10 MΩ
• Input resistance	
- Terminal X521	> 362 kΩ/phase
- Terminal X522	> 2.5 MΩ/phase
2 analog inputs (reserved for monitoring an Active Interface Module in chassis format)	
• Internal resistance (between differential inputs)	Approx. 100 kΩ
• Resolution	12-bit
PE connection	On housing with M4 screw
Dimensions	
• Width	50 mm
• Height	150 mm
• Depth	111 mm
Weight, approx.	0.9 kg

Integration

The VSM10 Voltage Sensing Module communicates with the CU320-2 Control Unit via DRIVE-CLiQ.



Connection example of a VSM10 Voltage Sensing Module

Overview

Safe Brake Adapter SBA

The Safe Brake Adapter SBA is required to implement a Safe Brake Control (Safety Integrated function "SBC") in conjunction with Motor Modules and Power Modules in chassis format.

The Safe Brake Adapter is available for a 230 V AC brake control voltage.

Design

The Safe Brake Adapter SBA has the following connections and interfaces:

- 1 connection for controlling and transferring feedback from the integrated safety relay (X11)
- 1 connection for controlling the motor brake solenoid (X14)
- 2 connections for supplying power to the brake, either via 24 V DC (X13) or 230 V AC (X12)
- 1 connection for quick de-excitation of the operating solenoid (X15)

The Safe Brake Adapter is designed for attachment to a support rail in accordance with EN 50022

Selection and ordering data

Description	Article No.
Safe Brake Adapter 230 V AC/2 A	**6SL3355-2DX00-1AA0**
Accessories	
Connecting cable for connecting the SBA to the Control Interface Module in the Motor Module/ Power Module	**6SL3060-4DX04-0AA0**

Technical specifications

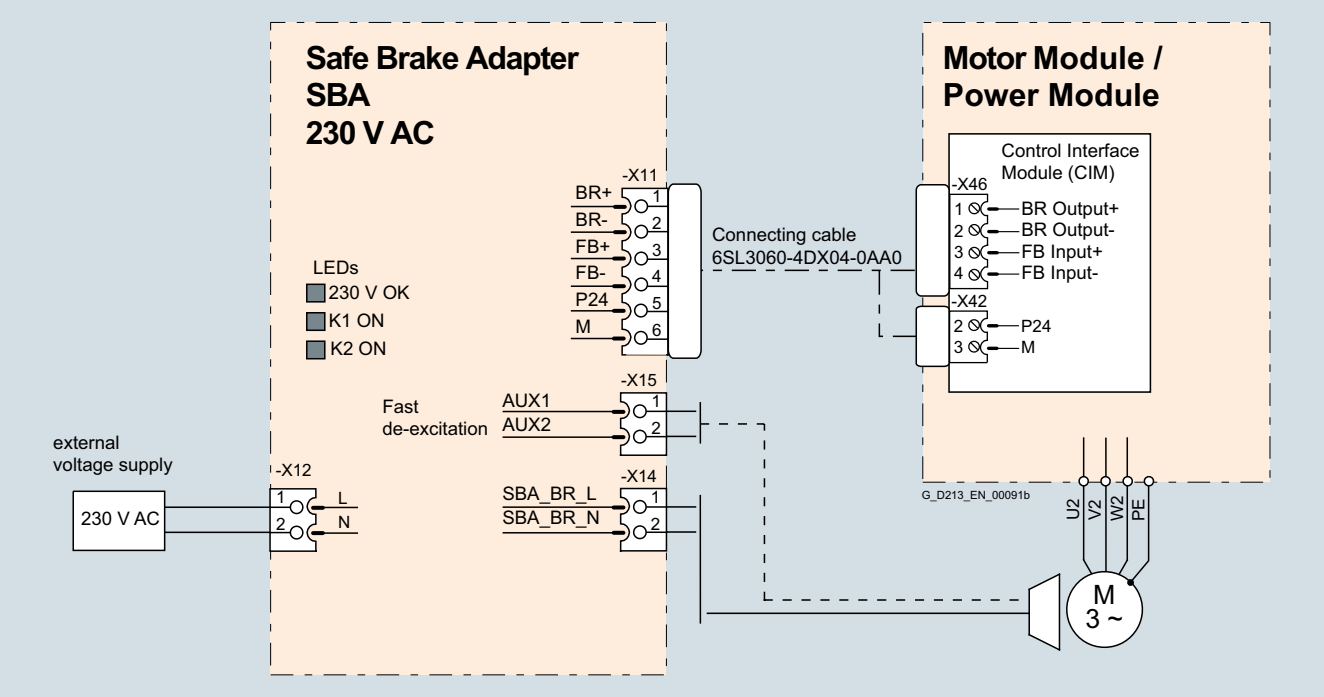
Safe Brake Adapter	6SL3355-2DX00-1AA0
Electronics power supply	
• Supply voltage (via the Control Interface Module)	24 V DC (20.4 ... 28.8 V)
Supply voltage of the motor holding brake	230 V AC
Current consumption, max perm.	
• Motor holding brake	2 A
• Fast de-energization	2 A
Cable length, max.	
• To the Control Interface Module	10 m (32 ft)
• To the brake	300 m (984 ft)
Conductor cross-section	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 SIL 2, EN ISO 13849-1 PL d and Category 3

3

Integration

The control and feedback signal regarding the switching state of the SBA relay is implemented 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.

For SINAMICS S120, the brake supply voltage must be externally supplied at the SBA.



Connection example of a Safe Brake Adapter SBA

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 detected using KTY84-130 or PTC thermistors.

Design

The SMC30 Sensor Module Cabinet-Mounted features the following connections and interfaces as standard:

- 1 encoder connection including motor temperature detection (KTY84-130 or PTC) via SUB-D connector or terminals
- 1 DRIVE-CLiQ interface
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE connection

The status of the SMC30 Sensor Module Cabinet-Mounted is indicated using a multi-color LED.

The SMC30 Sensor Module Cabinet-Mounted can be snapped onto a TH 35 mounting rail 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. type SK8 from Phoenix Contact or type KLBÜ CO 1 from Weidmüller. The shield connection terminal must not be used as a strain relief mechanism.

Integration

SMC30 Sensor Modules Cabinet-Mounted communicate with a Control Unit via DRIVE-CLiQ.

Selection and ordering data

Description	Article No.
SMC30 Sensor Module Cabinet-Mounted Without DRIVE-CLiQ cable	**6SL3055-0AA00-5CA2**

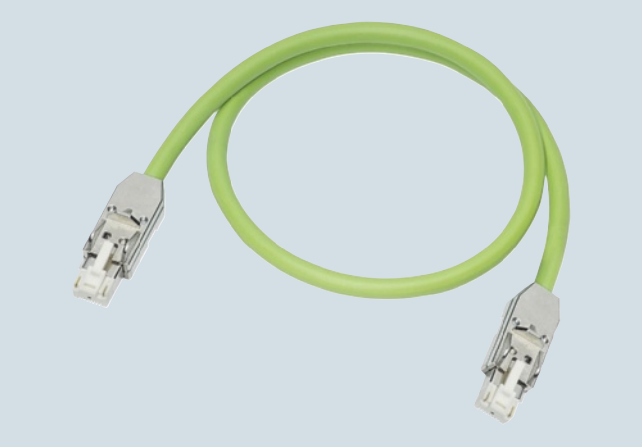
For the SINAMICS S150 and SINAMICS S120 Cabinet Modules, the SMC30 Sensor Module Cabinet-Mounted can be ordered as an option by specifying order code **K50**.

Technical specifications

SMC30 Sensor Module Cabinet-Mounted	6SL3055-0AA00-5CA2
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 TTL/HTL • SSI encoder with TTL/HTL incremental signals • SSI encoder without incremental signals
• Input impedance	
- TTL	570 Ω
- HTL, max.	16 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
• Limiting frequency	300 kHz
• 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)
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 (1 lb)
Approvals, according to	cULus

[1] Signal cables twisted in pairs and shielded.

Overview



Signal cables are required for the DRIVE-CLiQ connection between different components. Signal cables are pre-assembled and are sold by the meter. The following signal cables 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. Cables up to 30 kg or 100 m are supplied as coils; above this, they are supplied on drums.

Application

DRIVE-CLiQ signal cables

DRIVE-CLiQ signal cables 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

MOTION-CONNECT DRIVE-CLiQ signal cables 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

- Power Modules and Sensor Modules
- Power Modules and motors with DRIVE-CLiQ interface

MOTION-CONNECT DRIVE-CLiQ signal cables have 24 V DC cores.

Serial plug-in cable for connecting the AOP30 to the CU320-2

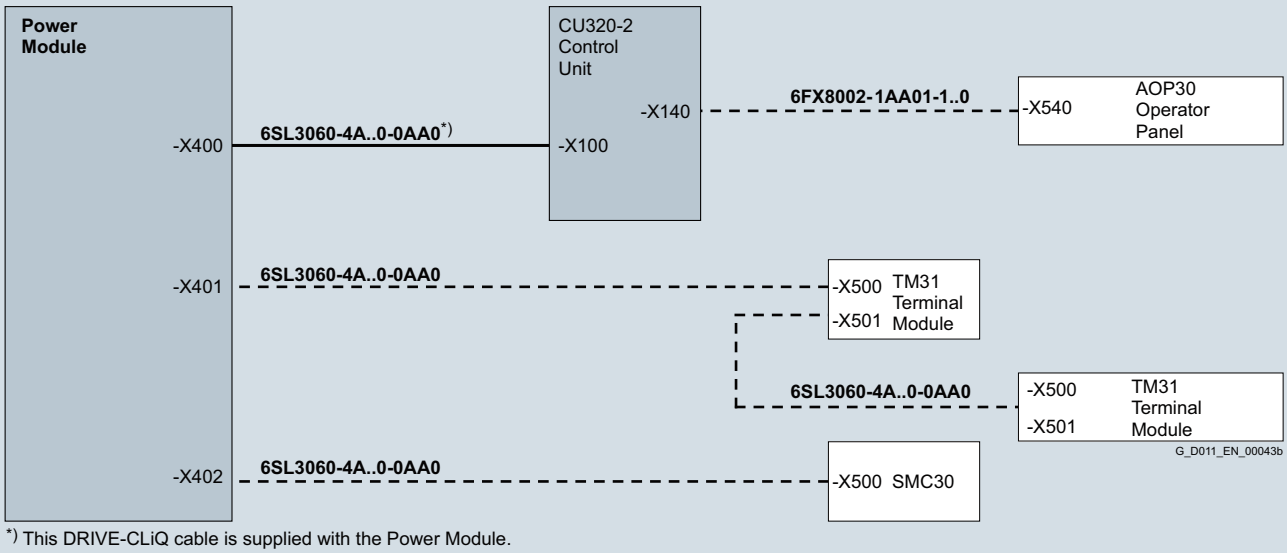
The AOP30 Advanced Operator Panel is connected to the CU320-2 Control Unit via a serial plug-in cable (RS232C cable).

The maximum cable length is 10 m. To guarantee disturbance-free communication, a shielded cable is recommended, and the cable shield should be connected to both connector housings.

Selection and ordering data

Signal cable	Length m	Article No.
Pre-assembled DRIVE-CLiQ signal cables (without 24 V DC cores)	0.11	**6SL3060-4AB00-0AA0**
	0.16	**6SL3060-4AD00-0AA0**
Connectors with degree of protection IP20/IP20	0.21	**6SL3060-4AF00-0AA0**
	0.26	**6SL3060-4AH00-0AA0**
	0.36	**6SL3060-4AM00-0AA0**
	0.6	**6SL3060-4AU00-0AA0**
	0.95	**6SL3060-4AA10-0AA0**
	1.2	**6SL3060-4AW00-0AA0**
	1.45	**6SL3060-4AF10-0AA0**
	2.8	**6SL3060-4AJ20-0AA0**
	5	**6SL3060-4AA50-0AA0**

Integration



*) This DRIVE-CLiQ cable is supplied with the Power Module.

Connection example of a CU320-2 Control Unit