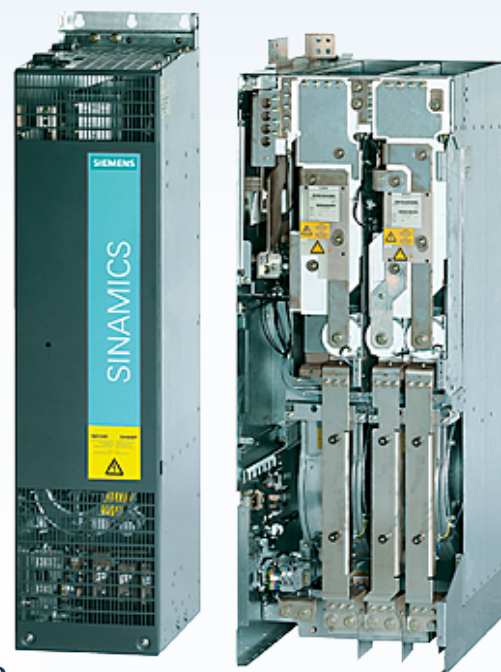




# Siemens Sinamics G130 Drive converter chassis units



**SINAMICS G130** chassis units have been designed for variable-speed drives in machine building and plant construction.

SINAMICS G130 provides a modular drive system for machine builders and plant constructors which permits a drive solution tailored to their applications.

SINAMICS G130 consists of two modular, stand-alone components:

- Power Module
- Control Unit

The units can be located separately or combined together. The power module contains a space for the control unit.

The user-friendly AOP30 operator panel is available for start-up and local operation. Predefined interfaces, either via a terminal block or PROFIBUS, facilitate drive start-up and control. The interfaces of the control unit can be supplemented by additional modules.

To find out stock ability and delivery time to your region, please contact our manager.



[info@eltra-trade.com](mailto:info@eltra-trade.com)

# SINAMICS G130

## Drive converter chassis units



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# SINAMICS G130

## Drive converter chassis units

75 kW to 800 kW

### Overview



SINAMICS G130 drive converter chassis units in frame sizes FX + HX

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

The SINAMICS G130 drive converter chassis 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, and additional actual speed value encoders are therefore superfluous.

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 takes place 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 either a PROFIBUS or a PROFINET interface is available as standard. There is also the option to expand the interface using 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 PROFINET and the CAN protocol.



### 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. The design of replaceable components is based on the principle that they must be quick and easy to change. In addition, the "SparesOnWeb" Internet tool makes it easy to view the spare parts that are available for the system components ordered.
- Can be easily integrated in automation solutions by means of a standard communications interface as well as a range of analog and digital interfaces.
- Easy commissioning and parameterization using interactive menus on the AOP30 Advanced Operator Panel with graphic LCD and plain-text display, or from a PC using the STARTER commissioning tool (→Tools and configuration).
- Preset software functions make it easier to tailor 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

### Documentation

The documentation for the various drive units consists of the following parts:

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

The documentation is supplied as standard with the CU Kit on CD-ROM. The documentation is available in English, French, German, Italian and Spanish.

### Design

The SINAMICS G130 drive converter chassis unit provides machine builders and plant constructors with a modular drive system that can be tailored to specific applications.

SINAMICS G130 drive converter chassis units consist of two modular, stand-alone components:

- Power Module and
- 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 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 Module or the TM31 Terminal Module.

If further customer interfaces are needed to communicate with the drive, an external 24 V supply must be provided.

The two figures in the following pages are helpful when it comes to assembling the required converter components correctly.

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.

#### Varnished PCBs

The following converter components are equipped as standard with varnished PCBs:

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

# SINAMICS G130

## Drive converter chassis units

75 kW to 800 kW

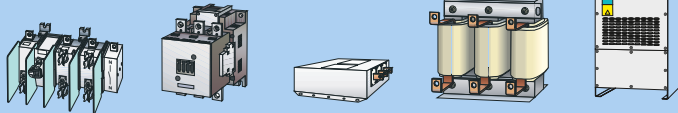
Design (continued)

4

### 3 AC supply

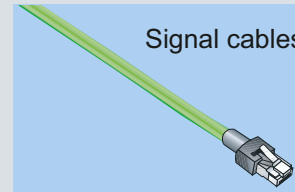
#### Line-side power components e.g.

- Switch disconnectors
- Line contactors
- Line filters
- Line reactors
- Line harmonics filters



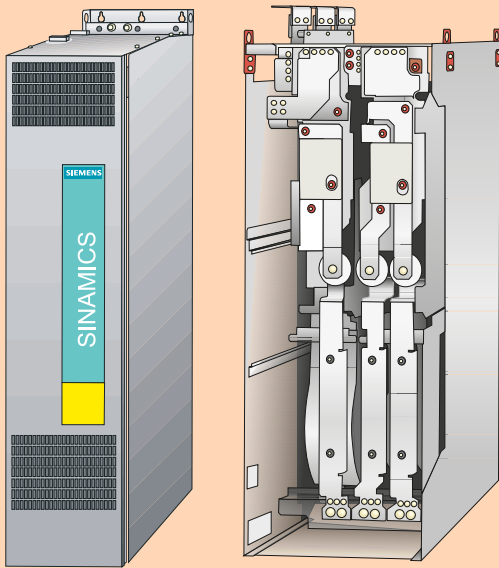
### Connection system

#### Signal cables



### SINAMICS G130 components

#### Power Modules

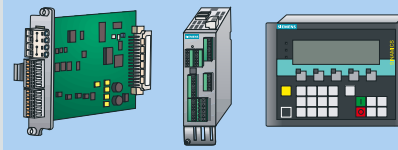


#### Control Unit Kit

CU320-2 Control Unit  
with CompactFlash card

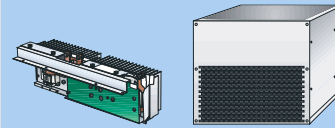
#### Supplementary system components e.g.

- Terminal Board
- Terminal Module
- Sensor Module
- Advanced Operator Panel
- PROFINET board
- CANopen board



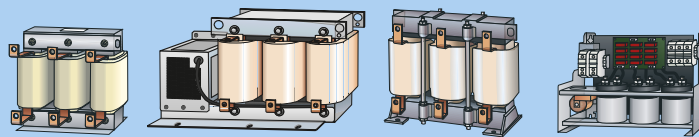
#### DC link components

Braking Modules  
with braking resistors

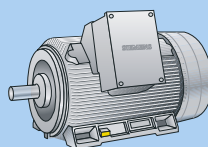


#### Motor-side power components

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



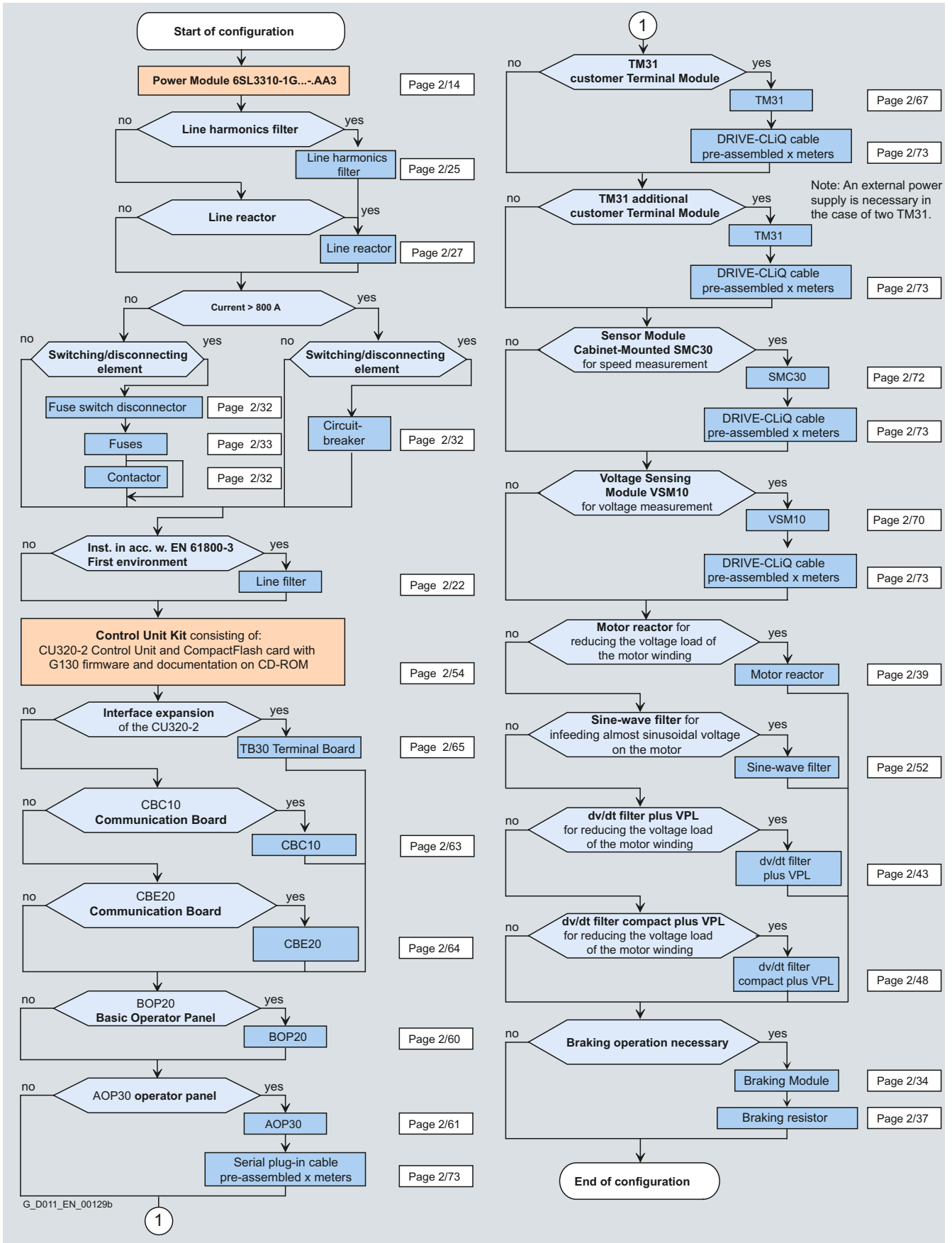
### Motors



G\_D011\_EN\_001630

Design (continued)

5



### Function

#### Communication with higher-level control and customer Terminal Module

A communications interface on the CU320-2 Control Unit, the TM31 Terminal Module, the TB30 Terminal Board and expansions for supporting PROFINET and CANopen are provided as standard as the customer control interface.

This customer Terminal Module can be used to connect the system to the higher-level controller using analog and digital signals, or to connect additional units.

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

The SINAMICS Low Voltage Engineering Manual contains additional information and is stored as a PDF file on the CD-ROM included with the catalog.

#### Open-loop and closed-loop control functions

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

#### Software and protective functions

The software functions available as standard are described below:

Software and protective functions	Description
<b>Setpoint input</b>	The setpoint can be input both internally and externally. It is applied internally as a fixed setpoint, motorized potentiometer setpoint or jog setpoint and externally via the communications interface or an analog input on the customer Terminal Module. The internal fixed setpoint and the motorized potentiometer setpoint can be switched over or adjusted using control commands via all interfaces.
<b>Motor identification</b>	The automatic motor identification function makes commissioning faster and easier and optimizes closed-loop control of the drive.
<b>Ramp-function generator</b>	A convenient ramp-function generator with separately adjustable ramping 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.
<b>V<sub>dc max</sub> controller</b>	The V <sub>dc max</sub> 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.
<b>Kinetic buffering (KIP)</b>	For supply voltage dips the kinetic energy of the rotating drive is used to buffer the DC link and therefore prevents fault trips. The drive 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 trip threshold. When the line supply recovers within this time, the drive is again accelerated up to its setpoint speed.
<b>Automatic restart <sup>1)</sup></b>	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.
<b>Flying restart <sup>1)</sup></b>	The "Flying restart" function allows the converter to be switched to a motor that is still turning.
<b>Technology controller</b>	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, whereby the differentiator can be switched to the control deviation channel or the actual value channel (factory setting). The P, I, and D components can be set separately.
<b>Free function blocks</b>	Using the freely programmable function blocks, it is easy to implement logic and arithmetic functions for controlling the SINAMICS G130 unit. The blocks can be programmed by means of an operator panel or the STARTER commissioning tool.
<b>Drive Control Chart (DCC)</b>	Drive Control Chart (DCC) is an additional tool for the easy configuration of process-oriented 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 graphical configuration and a clear representation of control loop structures as well as a high degree of reusability of existing diagrams. DCC is an add-on to the STARTER commissioning tool (→Tools and configuration).
<b>Pt detection for motor protection</b>	A motor model stored in the converter software calculates the motor temperature based on the current speed and load. More exact sensing of the temperature, which also takes into account the influence of the ambient temperature, is possible by means of direct temperature sensing using KTY84 sensors in the motor winding.
<b>Motor temperature evaluation</b>	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 shutdown. When a PTC thermistor is connected, the system reaction to triggering of the thermistor (alarm or shutdown) can be defined.
<b>Motor blocking protection</b>	A blocked motor is recognized and protected against thermal overloading by shutting down.
<b>Power unit protection</b>	<b>Description</b>
<b>Ground fault monitoring at output end</b>	A ground fault on the output side is detected by an aggregate current monitor and results in shutdown in grounded-neutral systems.
<b>Electronic short-circuit protection at output end</b>	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".
<b>Thermal overload protection</b>	An alarm is issued first when the overtemperature threshold responds. If the temperature rises further, the unit 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.

<sup>1)</sup> Factory setting: not activated (can be programmed)



### Function (continued)

#### Safety Integrated functions

The integrated safety functions of SINAMICS provide highly-effective application-oriented protection for personnel and machinery.

SINAMICS G130 offers the following Safety Integrated functions as standard (terms as defined in IEC 61800-5-2):

- Safe Torque Off (STO)
- Safe Stop 1 (SS1)

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

#### Legal framework

Machine manufacturers and plant construction companies must ensure that their machines or plants cannot cause danger as a result of electric shock, heat or radiation or hazards caused by functional faults. In Europe, for example, compliance with the machinery directive is legally stipulated by the EU industrial safety directive.

In order to ensure compliance with this directive, it is recommended that the corresponding harmonized European standards are applied. This initiates the assumption of conformity and gives manufacturers and operators the legal security when complying with both national regulations and EU directives. The machine manufacturer uses the CE marking to document the compliance with all relevant directives and regulations in the free movement of goods.

#### Safety-related standards

Functional safety is specified in various standards. EN ISO 12100 and EN ISO 14121-1, for example, are concerned with the design and risk assessment of machines. Functional and safety-related requirements of control systems with relevance to safety are defined in EN 62061 (applicable only to electrical and electronic control systems) and EN ISO 13849-1. This will replace EN 954-1 – which is still being commonly used – at the end of 2011.

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

- EN 954-1: Categories B, 1 ... 4
- EN ISO 13849-1: Performance Level PL a ... e
- EN 62061: Safety Integrity Level SIL 1 ... 3

#### Safety functions integrated in the drive with SINAMICS

The safety functions integrated in SINAMICS satisfy the requirements of:

- Category 3 according to EN 954-1 or EN ISO 13849-1
- Safety Integrity Level (SIL) 2 according to EN 61508
- Performance Level (PL) d according to EN ISO 13849-1

In addition, the Safety Integrated functions of SINAMICS are generally certified by independent institutes. An up-to-date list of certified components is available on request from your local Siemens office.

#### Basic Functions and Extended Functions

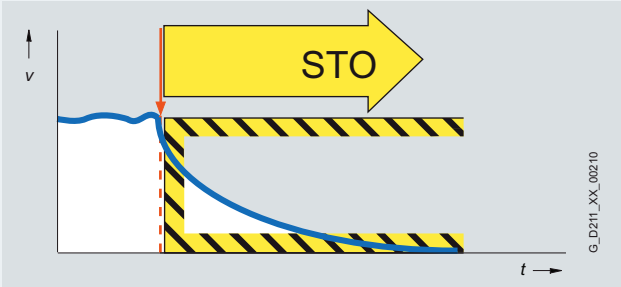
The Safety Integrated functions of the SINAMICS drive system are grouped into basic functions and extended functions.

The above mentioned Basic Functions STO and SS1 are included in the standard scope of SINAMICS G130 and do not require a license. Extended Functions, which will require a license, are presently still not available for SINAMICS G130.

The Safety Integrated functions are either activated via a terminal at the Control Unit and at the power unit, or via PROFIBUS or PROFINET with the PROFIsafe profile.

An encoder is not required to use Basic Functions.

The Safety Integrated functions currently available in SINAMICS G130 are subsequently described in more detail (terms as defined in IEC 61800-5-2):

Safety Integrated	Description
<b>Safe Torque Off (STO)</b>	<p><u>Function description</u></p> <p>This function is a mechanism that prevents the drive from restarting unexpectedly, in accordance with EN 60204-1, Section 5.4. Safe Torque Off disables the drive pulses and disconnects the power supply to the motor (corresponds to Stop Category 0 of EN 60204-1). The drive is reliably torque-free. This state is monitored internally in the drive.</p> <p><u>Application, customer benefits</u></p> <p>STO has the immediate effect that the drive cannot supply any torque-generating energy. STO can be used wherever the drive will reach a standstill by itself due to the load torque or friction in a sufficiently short time or when "coasting down" of the drive will not have any relevance for safety.</p> 

### Function (continued)

#### Safety Integrated

#### Description

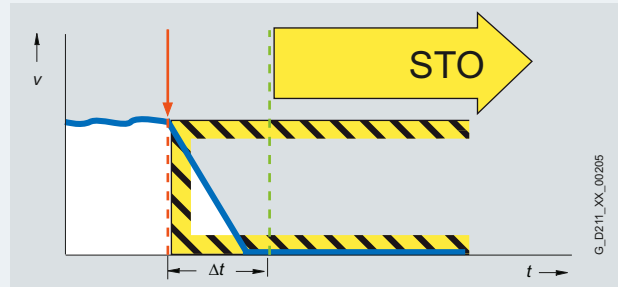
##### Safe Stop 1 (SS1)

##### Function description

The Safe Stop 1 function can safely stop the drive in accordance with EN 60204-1, Stop Category 1. When the SS1 function is selected, the drive independently brakes along a quick stop ramp (OFF3) and automatically activates Safe Torque Off when the parameterized safety delay time  $\Delta t$  has expired.

##### Application, customer benefits

With this integrated self-braking function, complex external monitoring devices are not required. It is often possible to also eliminate mechanical brakes which wear – or to lessen the load on them, so that maintenance costs and the stresses on the machine can be reduced. Safe Stop 1 is employed for applications which require monitored braking, e.g. on centrifuges or conveyor vehicles.



### Technical data

The most important directives and standards are listed below. These are used as basis for the SINAMICS drive system 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: Legal guidelines of the EU member states concerning electrical equipment for use within specified voltage limits
2004/108/EC	EMC directive: Legal guidelines of the EU member states for electromagnetic compatibility

#### European Standards

EN 954-1	Safety of machinery – Safety-related parts of controls Part 1: General design principles
EN ISO 13849-1	Safety of machinery – Safety-related parts of controls 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 requirements
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 low-voltage adjustable frequency AC power drive systems
EN 61800-3	Adjustable speed electrical power drive systems Part 3: EMC requirements and specific test methods
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, <a href="http://www.ul.com">http://www.ul.com</a> ) according to UL and CSA standards
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Test symbol:

(→ Appendix, Approvals)

#### Technical data (continued)

##### General technical data

Electrical data			
Line voltages and output 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	
Types of supplies	Grounded TN/TT systems or ungrounded IT systems (a grounded phase conductor is not permissible in 690 V systems)		
Line frequency	47 ... 63 Hz		
Output frequency	0 ... 300 Hz		
Power factor			
- Fundamental mode	> 0.96		
- Total	0.75 ... 0.93		
Efficiency	> 98 %		
Overvoltage category	III to EN 61800-5-1		
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	• Rated power 1.1 ... 447 kW	65 kA	
	• Rated power 448 ... 671 kW	84 kA	
	• Rated power 672 ... 1193 kW	170 kA	
	• Rated power >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)		
Skipped speed ranges	4, programmable		
Setpoint resolution	0.001 rpm digital 12 bit analog		
Braking operation	By means of additional Braking Modules and braking resistors		
Mechanical data			
Degree of protection	IP00 or IP20 dependent on type		
Protection class	I acc. to EN 61800-5-1		
Touch protection	EN 50274 / BGV A3		
Type of cooling	Forced air cooling AF acc. to EN 60146		
Ambient conditions	Storage	Transport	Operation
Ambient temperature	-25 ... +55 °C	-25 ... +70 °C from <u>-40 °C</u> for 24 hours	<u>0 ... +40 °C</u> up to +55 °C see derating data
Relative humidity (condensation not permissible)	<u>5 ... 95 %</u> Class 1K4 acc. to EN 60721-3-1	5 ... 95 % at 40 °C Class 2K3 acc. to EN 60721-3-2	<u>5 ... 95 %</u> Class 3K3 acc. to EN 60721-3-3
Environmental class/harmful chemical substances	Class 1C2 acc. to EN 60721-3-1	Class 2C2 acc. to EN 60721-3-2	Class 3C2 acc. to EN 60721-3-3
Organic/biological influences	Class 1B1 acc. to EN 60721-3-1	Class 2B1 acc. to EN 60721-3-2	Class 3B1 acc. to EN 60721-3-3
Pollution degree	2 acc. 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 <u>5 ... 9 Hz</u>	<u>3.1 mm</u> at 5 ... 9 Hz	0.075 mm at 10 ... 58 Hz
- Acceleration	5 m/s <sup>2</sup> at > <u>9 ... 200 Hz</u> Class 1M2 in acc. with EN 60721-3-1	<u>10 m/s<sup>2</sup></u> at > 9 ... 200 Hz Class 2M2 to EN 60721-3-2	10 m/s <sup>2</sup> at > 58 ... 200 Hz -
Shock load			
- Acceleration	40 m/s <sup>2</sup> at 22 ms Class 1M2 in acc. with EN 60721-3-1	100 m/s <sup>2</sup> at 11 ms Class 2M2 to EN 60721-3-2	100 m/s <sup>2</sup> at 11 ms Class 3M4 to EN 60721-3-3
Compliance with standards			
CE Label	Acc. to EMC Directive No. 2004/108/EC and Low-Voltage Directive No. 2006/95/EC		
Radio interference suppression	The SINAMICS G130 converter systems are not designed for connection to the public power network ("first environment"). RFI suppression is compliant with the EMC product standard for variable-speed drives EN 61800-3, "Second environment" (industrial networks). The equipment can cause electromagnetic interference when it is connected to the public network. However, if supplementary measures are taken (e.g. → line filter), it can also be operated in the "first environment". <sup>1)</sup>		
Approvals	cULus		

Deviations from the specified classes are underlined.

<sup>1)</sup> Applies to cable lengths < 100 m.

### Characteristic curves

#### Derating data

SINAMICS G130 chassis 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.

For 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 should be taken into consideration that with increasing height, the air pressure decreases and therefore the air density. 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 one hand, to reduce the ambient temperature and on the other hand, to lower heat loss in the chassis unit by reducing the output current, whereby ambient temperatures lower than 40 °C may be offset to compensate.

The following table specifies the permissible output current as a function of the installation altitude and ambient temperature (the permissible compensation between installation altitude and the ambient temperatures < 40 °C – air intake temperature at the entry to the chassis unit – has been taken into account in the specified values).

The values apply under the precondition that a cooling air flow through the units is guaranteed as stated in the technical data.

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. The SINAMICS Low Voltage Engineering Manual contains additional information on this topic and is available as a PDF file on the CD-ROM included with the catalog.

Installation altitude above sea level m	Current derating factor (as a % of the rated current) at an ambient ambient/intake air temperature of							
	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 %							

Current-derating factors for chassis units as a function of the ambient/intake air temperature and the installation altitude.



#### Characteristic curves (continued)

##### Current derating as a function of pulse frequency

To reduce motor noise or to increase output frequency, the pulse frequency can be increased relative to the factory setting. 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 data.

The SINAMICS Low Voltage Engineering Manual contains additional information and is available as a PDF file on the CD-ROM included with Catalog D 11.

Order No.	Type rating	Output current at 2 kHz A	Derating factor at pulse frequency	
	kW		2.5 kHz	at 4 kHz
<b>380 ... 480 V 3 AC</b>				
6SL3310-1GE32-1AA3	110	210	95 %	82 %
6SL3310-1GE32-6AA3	132	260	95 %	83 %
6SL3310-1GE33-1AA3	160	310	97 %	88 %
6SL3310-1GE33-8AA3	200	380	96 %	87 %
6SL3310-1GE35-0AA3	250	490	94 %	78 %

Derating factor of the output current as a function of the pulse frequency for units with a rated pulse frequency of 2 kHz

Order No.	Type rating	Output current at 1.25 kHz A	Derating factor at pulse frequency		
	kW		2.0 kHz	2.5 kHz	at 4 kHz
<b>380 ... 480 V 3 AC</b>					
6SL3310-1GE36-1AA3	315	605	83 %	72 %	64 %
6SL3310-1GE37-5AA3	400	745	83 %	72 %	64 %
6SL3310-1GE38-4AA3	450	840	87 %	79 %	64 %
6SL3310-1GE41-0AA3	560	985	92 %	87 %	70 %
<b>500 ... 600 V 3 AC</b>					
6SL3310-1GF31-8AA3	110	175	92 %	87 %	70 %
6SL3310-1GF32-2AA3	132	215	92 %	87 %	70 %
6SL3310-1GF32-6AA3	160	260	92 %	88 %	71 %
6SL3310-1GF33-3AA3	200	330	89 %	82 %	65 %
6SL3310-1GF34-1AA3	250	410	89 %	82 %	65 %
6SL3310-1GF34-7AA3	315	465	92 %	87 %	67 %
6SL3310-1GF35-8AA3	400	575	91 %	85 %	64 %
6SL3310-1GF37-4AA3	500	735	87 %	79 %	64 %
6SL3310-1GF38-1AA3	560	810	83 %	72 %	61 %
<b>660 ... 690 V 3 AC</b>					
6SL3310-1GH28-5AA3	75	85	93 %	89 %	71 %
6SL3310-1GH31-0AA3	90	100	92 %	88 %	71 %
6SL3310-1GH31-2AA3	110	120	92 %	88 %	71 %
6SL3310-1GH31-5AA3	132	150	90 %	84 %	66 %
6SL3310-1GH31-8AA3	160	175	92 %	87 %	70 %
6SL3310-1GH32-2AA3	200	215	92 %	87 %	70 %
6SL3310-1GH32-6AA3	250	260	92 %	88 %	71 %
6SL3310-1GH33-3AA3	315	330	89 %	82 %	65 %
6SL3310-1GH34-1AA3	400	410	89 %	82 %	65 %
6SL3310-1GH34-7AA3	450	465	92 %	87 %	67 %
6SL3310-1GH35-8AA3	560	575	91 %	85 %	64 %
6SL3310-1GH37-4AA3	710	735	87 %	79 %	64 %
6SL3310-1GH38-1AA3	800	810	83 %	72 %	61 %

Derating factor of the output current as a function of the pulse frequency for units with a rated pulse frequency of 1.25 kHz

### Characteristic curves (continued)

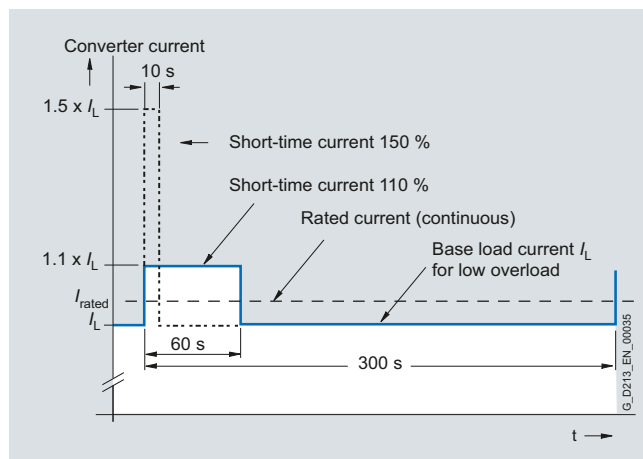
#### Overload capability

SINAMICS G130 drive converter chassis units are equipped with an overload reserve to deal with breakaway torques, for example. If larger surge loads occur, this must be taken into account when configuring. In the case of drives with overload requirements, the appropriate base load current must, therefore, be used as a basis for the required load.

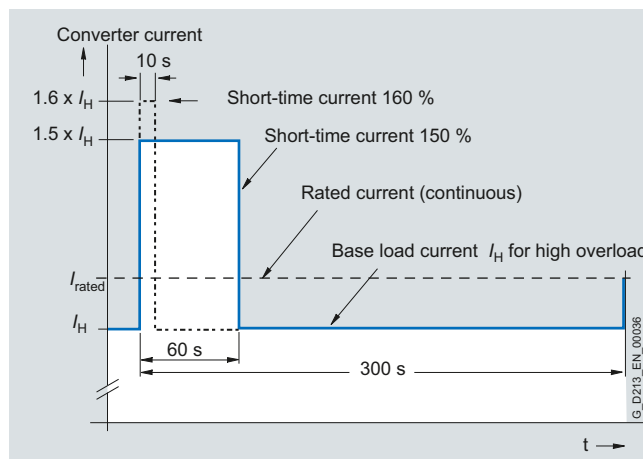
The criterion for overload is that the drive is operated with its base-load current before and after the overload occurs on the basis of a duty cycle duration of 300 s.

The base load current  $I_L$  for a small overload 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

# SINAMICS G130

## Drive converter chassis units

### Power Modules

#### Overview



The Power Module contains

- the line-side 6-pulse rectifier
- the capacitors for the voltage-source DC link
- the IGBT-based inverter
- the associated gating and monitoring electronics
- the precharging circuit for the DC link
- the control and power supply for the fans in the Power Module.

#### Design

The Power Module features the following interfaces as standard:

- Connecting lugs for the line supply
- Connecting lugs for the motor feeder
- Connecting lugs for the Braking Module
- Connecting lugs for dv/dt filters plus VPL
- Connecting lugs for dv/dt filters compact plus VPL
- Connection for external 24 V supply
- 3 DRIVE-CLiQ sockets
- 24 V voltage outputs (max. 2.5 A) for the supply of the
  - CU320-2 Control Unit (control module), of the
  - AOP30 operator panel
  - additional DRIVE-CLiQ components
- 1 temperature sensor input (KTY84-130, PTC or PT100)
- PE/protective conductor connection

#### Selection and ordering data

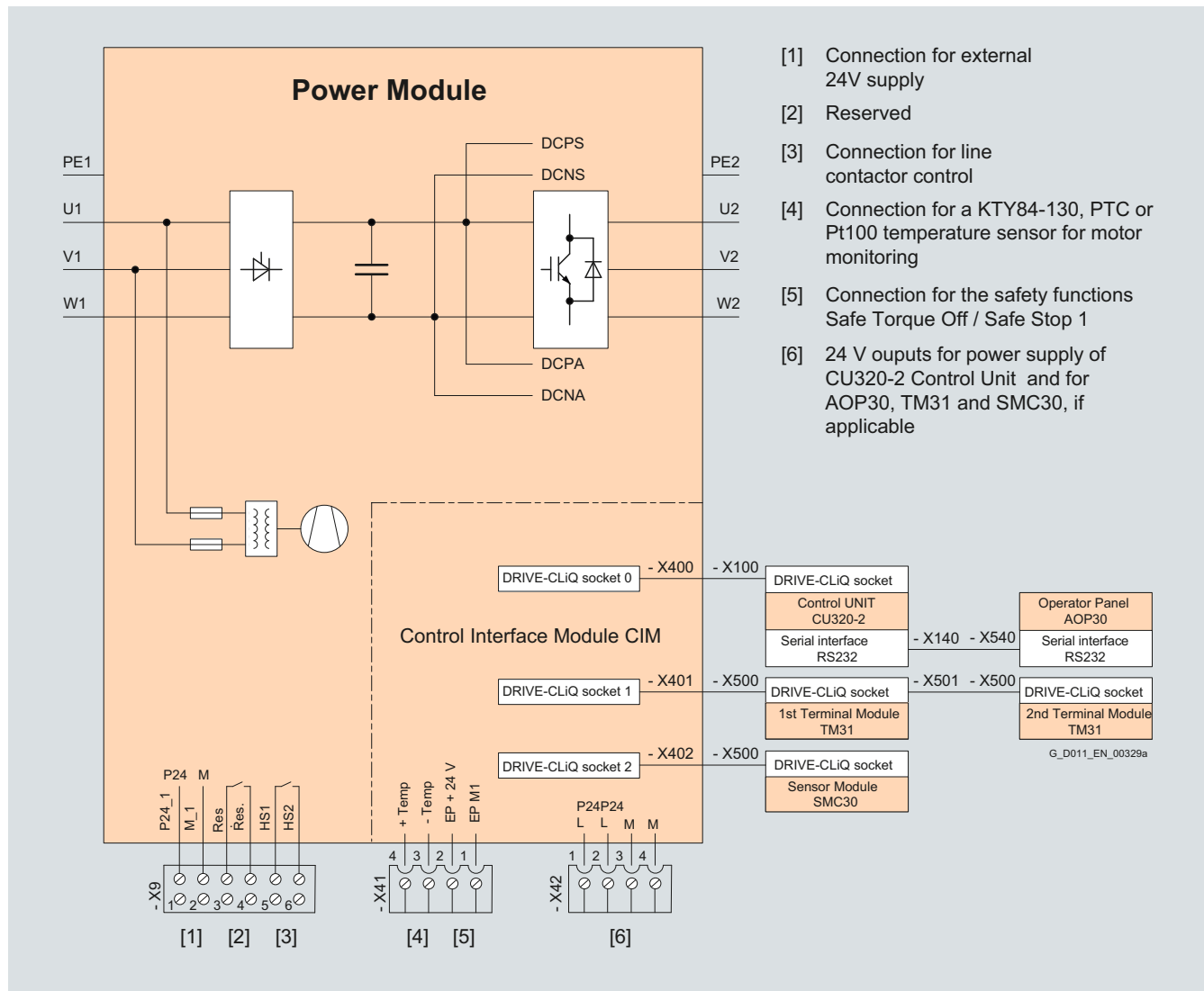
Type rating		Rated output current A	Power Module Order No.
at 400 V, 500 V or 690 V	at 60 Hz/ 460 V or 575 V		
kW	hp		
<b>380 ... 480 V 3 AC</b>			
110	150	210	<b>6SL3310-1GE32-1AA3</b>
132	200	260	<b>6SL3310-1GE32-6AA3</b>
160	250	310	<b>6SL3310-1GE33-1AA3</b>
200	300	380	<b>6SL3310-1GE33-8AA3</b>
250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

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

#### Integration

The Power Module communicates with the CU320-2 Control Unit via DRIVE-CLiQ (a fast serial interface) and receives its control information via this route. The DRIVE-CLiQ cable required for this is included in the scope of delivery of the Power Module.

DRIVE-CLiQ cables for establishing connections with other DRIVE-CLiQ devices can be ordered pre-assembled and cut to length as required (→ Signal cables).



Connection diagram for Power Module

#### Technical data

Line voltage 380 ... 480 V 3 AC	Power Modules					
	6SL3310-1GE32-1AA3	6SL3310-1GE32-6AA3	6SL3310-1GE33-1AA3	6SL3310-1GE33-8AA3	6SL3310-1GE35-0AA3	
<b>Type rating</b>						
• at $I_L$ at 50 Hz 400 V <sup>1)</sup>	kW	110	132	160	200	250
• at $I_H$ at 50 Hz 400 V <sup>1)</sup>	kW	90	110	132	160	200
• at $I_L$ at 60 Hz 460 V <sup>2)</sup>	hp	150	200	250	300	400
• at $I_H$ at 60 Hz 460 V <sup>2)</sup>	hp	150	200	200	250	350
<b>Output current</b>						
• Rated current $I_{rated}$	A	210	260	310	380	490
• Base load current $I_L$ <sup>3)</sup>	A	205	250	302	370	477
• Base load current $I_H$ <sup>4)</sup>	A	178	233	277	340	438
<b>Input current</b>						
• 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 <sup>5)</sup>	A	0.8	0.8	0.9	0.9	0.9
<b>Power loss</b>	kW	2.46	3.27	4.00	4.54	5.78
<b>Cooling-air demand</b>	m <sup>3</sup> /s	0.17	0.23	0.36	0.36	0.36
<b>Cable length, max.</b> between Power Module and motor <sup>6)</sup>						
• shielded	m	300	300	300	300	300
• unshielded	m	450	450	450	450	450
<b>Degree of protection</b>						
		IP20	IP20	IP20	IP20	IP20
<b>Sound pressure level <math>L_{pA}</math></b> (1 m) at 50/60 Hz						
	dB	64/67	64/67	69/73	69/73	69/73
<b>Line connection U1, V1, W1</b>						
		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 × 185	2 × 185	2 × 240	2 × 240	2 × 240
<b>Motor connection U2/T1, V2/T2, W2/T3</b>						
		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 × 185	2 × 185	2 × 240	2 × 240	2 × 240
<b>PE1/GND connection</b>						
		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 × 185	2 × 185	2 × 240	2 × 240	2 × 240
<b>PE2/GND connection</b>						
		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 × 185	2 × 185	2 × 240	2 × 240	2 × 240
<b>Dimensions</b>						
• Width	mm	326	326	326	326	326
• Height	mm	1400	1400	1533	1533	1533
• Depth	mm	356	356	545	545	545
<b>Weight, approx.</b>	kg	104	104	176	176	176
<b>Conformity</b>		CE	CE	CE	CE	CE
<b>Approvals, acc. to</b>		cULus	cULus	cULus	cULus	cULus
<b>Frame size</b>		FX	FX	GX	GX	GX

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

<sup>1)</sup> Rated power of a typ. 6-pole standard induction motor based on  $I_L$  or  $I_H$  with 400 V 3 AC 50 Hz.

<sup>2)</sup> Rated power of a typ. 6-pole standard induction motor based on  $I_L$  or  $I_H$  with 460 V 3 AC 60 Hz.

<sup>3)</sup> The base load current  $I_L$  is based on a duty cycle of 110 % for 60 s or 150 % for 10 s with a duty cycle duration of 300 s. See technical data (→ Overload capability).

<sup>4)</sup> The base load current  $I_H$  is based on a duty cycle of 150 % for 60 s or 160 % for 10 s with a duty cycle duration of 300 s. See technical data (→ Overload capability).

<sup>5)</sup> 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 if the line voltage fails.

<sup>6)</sup> Longer cable lengths for specific configurations are available on request.



#### Technical data (continued)

Line voltage 380 ... 480 V 3 AC		Power Modules			
		6SL3310-1GE36-1AA3	6SL3310-1GE37-5AA3	6SL3310-1GE38-4AA3	6SL3310-1GE41-0AA3
<b>Type rating</b>					
• at $I_L$ at 50 Hz 400 V <sup>1)</sup>	kW	315	400	450	560
• at $I_H$ at 50 Hz 400 V <sup>1)</sup>	kW	250	315	400	450
• at $I_L$ at 60 Hz 460 V <sup>2)</sup>	hp	500	600	700	800
• at $I_H$ at 60 Hz 460 V <sup>2)</sup>	hp	350	450	600	700
<b>Output current</b>					
• Rated current $I_{rated}$	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
<b>Input current</b>					
• Rated input current	A	629	775	873	1024
• Input current, max.	A	967	1188	1344	1573
• Current requirement, 24 V DC auxiliary power supply <sup>5)</sup>	A	1.0	1.0	1.0	1.25
<b>Power loss</b>	kW	7.8	9.1	9.6	13.8
<b>Cooling-air demand</b>	m <sup>3</sup> /s	0.78	0.78	0.78	1.48
<b>Cable length, max.</b> between Power Module and motor <sup>6)</sup>					
• shielded	m	300	300	300	300
• unshielded	m	450	450	450	450
<b>Degree of protection</b>		IP00	IP00	IP00	IP00
<b>Sound pressure level <math>L_{pA}</math></b> (1 m) at 50/60 Hz	dB	70/73	70/73	70/73	72/75
<b>Line connection U1, V1, W1</b>		M12 screw	M12 screw	M12 screw	M12 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	4 × 240	4 × 240	4 × 240	6 × 240
<b>Motor connection U2/T1, V2/T2, W2/T3</b>		M12 screw	M12 screw	M12 screw	M12 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	4 × 240	4 × 240	4 × 240	6 × 240
<b>PE1/GND connection</b>		M12 screw	M12 screw	M12 screw	M12 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 × 240	2 × 240	2 × 240	4 × 240
<b>PE2/GND connection</b>		2 × M12 screws	2 × M12 screws	2 × M12 screws	3 × M12 screws
Conductor cross section, max. (IEC)	mm <sup>2</sup>	4 × 240	4 × 240	4 × 240	6 × 240
<b>Dimensions</b>					
• Width	mm	503	503	503	909
• Height	mm	1506	1506	1506	1510
• Depth	mm	540	540	540	540
<b>Weight, approx.</b>	kg	294	294	294	530
<b>Conformity</b>		CE	CE	CE	CE
<b>Approvals, acc. to</b>		cULus	cULus	cULus	cULus
<b>Frame size</b>		HX	HX	HX	JX

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

- Rated power of a typ. 6-pole standard induction motor based on  $I_L$  or  $I_H$  with 400 V 3 AC 50 Hz.
- Rated power of a typ. 6-pole standard induction motor based on  $I_L$  or  $I_H$  with 460 V 3 AC 60 Hz.
- The base load current  $I_L$  is based on a duty cycle of 110 % for 60 s or 150 % for 10 s with a duty cycle duration of 300 s. See technical data (→ Overload capability).

- The base load current  $I_H$  is based on a duty cycle of 150 % for 60 s or 160 % for 10 s with a duty cycle duration of 300 s. See technical data (→ Overload capability).
- 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 if the line voltage fails.
- Longer cable lengths for specific configurations are available on request.

#### Technical data (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	
<b>Type rating</b>						
• at $I_L$ at 50 Hz 500 V <sup>1)</sup>	kW	110	132	160	200	250
• at $I_H$ at 50 Hz 500 V <sup>1)</sup>	kW	90	110	132	160	200
• at $I_L$ at 60 Hz 575 V <sup>2)</sup>	hp	150	200	250	300	400
• at $I_H$ at 60 Hz 575 V <sup>2)</sup>	hp	150	200	200	250	350
<b>Output current</b>						
• Rated current $I_{rated}$	A	175	215	260	330	410
• Base load current $I_L$ <sup>3)</sup>	A	171	208	250	320	400
• Base load current $I_H$ <sup>4)</sup>	A	157	192	233	280	367
<b>Input current</b>						
• 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 <sup>5)</sup>	A	0.9	0.9	0.9	0.9	1.0
<b>Power loss</b>	kW	3	3.4	3.9	4.9	6.4
<b>Cooling-air demand</b>	m <sup>3</sup> /s	0.36	0.36	0.36	0.36	0.78
<b>Cable length, max. between Power Module and motor <sup>6)</sup></b>						
• shielded	m	300	300	300	300	300
• unshielded	m	450	450	450	450	450
<b>Degree of protection</b>						
		IP20	IP20	IP20	IP20	IP00
<b>Sound pressure level <math>L_{pA}</math> (1 m) at 50/60 Hz</b>						
	dB	69/73	69/73	69/73	69/73	70/73
<b>Line connection U1, V1, W1</b>						
		M10 screw	M10 screw	M10 screw	M10 screw	M12 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 x 240	2 x 240	2 x 240	2 x 240	4 x 240
<b>Motor connection U2/T1, V2/T2, W2/T3</b>						
		M10 screw	M10 screw	M10 screw	M10 screw	M12 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 x 240	2 x 240	2 x 240	2 x 240	4 x 240
<b>PE1/GND connection</b>						
		M10 screw	M10 screw	M10 screw	M10 screw	M12 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
<b>PE2/GND connection</b>						
		M10 screw	M10 screw	M10 screw	M10 screw	2 x M12 screws
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 x 240	2 x 240	2 x 240	2 x 240	4 x 240
<b>Dimensions</b>						
• Width	mm	326	326	326	326	503
• Height	mm	1533	1533	1533	1533	1506
• Depth	mm	545	545	545	545	540
<b>Weight, approx.</b>	kg	176	176	176	176	294
<b>Conformity</b>		CE	CE	CE	CE	CE
<b>Approvals, acc. to</b>		cULus	cULus	cULus	cULus	cULus
<b>Frame size</b>		GX	GX	GX	GX	HX

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

<sup>1)</sup> Rated power of a typ. 6-pole standard induction motor based on  $I_L$  or  $I_H$  with 500 V 3 AC 50 Hz.

<sup>2)</sup> Rated power of a typ. 6-pole standard induction motor based on  $I_L$  or  $I_H$  with 575 V 3 AC 60 Hz.

<sup>3)</sup> The base load current  $I_L$  is based on a duty cycle of 110 % for 60 s or 150 % for 10 s with a duty cycle duration of 300 s. See technical data (→ Overload capability).

<sup>4)</sup> The base load current  $I_H$  is based on a duty cycle of 150 % for 60 s or 160 % for 10 s with a duty cycle duration of 300 s. See technical data (→ Overload capability).

<sup>5)</sup> 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 if the line voltage fails.

<sup>6)</sup> Longer cable lengths for specific configurations are available on request.

#### Technical data (continued)

Line voltage 500 ... 600 V 3 AC		Power Modules			
		6SL3310-1GF34-7AA3	6SL3310-1GF35-8AA3	6SL3310-1GF37-4AA3	6SL3310-1GF38-1AA3
<b>Type rating</b>					
• at $I_L$ at 50 Hz 500 V <sup>1)</sup>	kW	315	400	500	560
• at $I_H$ at 50 Hz 500 V <sup>1)</sup>	kW	250	315	450	500
• at $I_L$ at 60 Hz 575 V <sup>2)</sup>	hp	450	600	700	800
• at $I_H$ at 60 Hz 575 V <sup>2)</sup>	hp	450	500	700	700
<b>Output current</b>					
• Rated current $I_{rated}$	A	465	575	735	810
• Base load current $I_L$ <sup>3)</sup>	A	452	560	710	790
• Base load current $I_H$ <sup>4)</sup>	A	416	514	657	724
<b>Input current</b>					
• Rated input current	A	483	598	764	842
• Input current, max.	A	740	918	1164	1295
• Current requirement, 24 V DC auxiliary power supply <sup>5)</sup>	A	1.0	1.0	1.25	1.25
<b>Power loss</b>	kW	7.3	8.1	12.0	13.3
<b>Cooling-air demand</b>	m <sup>3</sup> /s	0.78	0.78	1.48	1.48
<b>Cable length, max.</b> between Power Module and motor <sup>6)</sup>					
• shielded	m	300	300	300	300
• unshielded	m	450	450	450	450
<b>Degree of protection</b>		IP00	IP00	IP00	IP00
<b>Sound pressure level <math>L_{pA}</math></b> (1 m) at 50/60 Hz		dB 70/73	70/73	73/75	73/75
<b>Line connection U1, V1, W1</b>		M12 screw	M12 screw	M12 screw	M12 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	4 x 240	4 x 240	6 x 240	6 x 240
<b>Motor connection U2/T1, V2/T2, W2/T3</b>		M12 screw	M12 screw	M12 screw	M12 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	4 x 240	4 x 240	6 x 240	6 x 240
<b>PE1/GND connection</b>		M12 screw	M12 screw	2 x M12 screws	2 x M12 screws
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 x 240	2 x 240	4 x 240	4 x 240
<b>PE2/GND connection</b>		2 x M12 screws	2 x M12 screws	3 x M12 screws	3 x M12 screws
Conductor cross section, max. (IEC)	mm <sup>2</sup>	4 x 240	4 x 240	6 x 240	6 x 240
<b>Dimensions</b>					
• Width	mm	503	503	909	909
• Height	mm	1506	1506	1510	1510
• Depth	mm	540	540	540	540
<b>Weight, approx.</b>	kg	294	294	530	530
<b>Conformity</b>		CE	CE	CE	CE
<b>Approvals, acc. to</b>		cULus	cULus	cULus	cULus
<b>Frame size</b>		HX	HX	JX	JX

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

<sup>1)</sup> Rated power of a typ. 6-pole standard induction motor based on  $I_L$  or  $I_H$  with 500 V 3 AC 50 Hz.

<sup>2)</sup> Rated power of a typ. 6-pole standard induction motor based on  $I_L$  or  $I_H$  with 575 V 3 AC 60 Hz.

<sup>3)</sup> The base load current  $I_L$  is based on a duty cycle of 110 % for 60 s or 150 % for 10 s with a duty cycle duration of 300 s. See technical data (→ Overload capability).

<sup>4)</sup> The base load current  $I_H$  is based on a duty cycle of 150 % for 60 s or 160 % for 10 s with a duty cycle duration of 300 s. See technical data (→ Overload capability).

<sup>5)</sup> 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 if the line voltage fails.

<sup>6)</sup> Longer cable lengths for specific configurations are available on request.

#### Technical data (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
<b>Type rating</b>							
• at $I_L$ at 50 Hz 690 V <sup>1)</sup>	kW	75	90	110	132	160	200
• at $I_H$ at 50 Hz 690 V <sup>1)</sup>	kW	55	75	90	110	132	160
<b>Output current</b>							
• Rated current $I_{rated}$	A	85	100	120	150	175	215
• Base load current $I_L$ <sup>2)</sup>	A	80	95	115	142	171	208
• Base load current $I_H$ <sup>3)</sup>	A	76	89	107	134	157	192
<b>Input current</b>							
• 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 <sup>4)</sup>	A	0.8	0.8	0.8	0.8	0.9	0.9
<b>Power loss</b>	kW	1.5	1.8	2.4	2.5	3.8	4.8
<b>Cooling-air demand</b>	m <sup>3</sup> /s	0.17	0.17	0.17	0.17	0.36	0.36
<b>Cable length, max.</b> between Power Module and motor <sup>5)</sup>							
• shielded	m	300	300	300	300	300	300
• unshielded	m	450	450	450	450	450	450
<b>Degree of protection</b>		IP20	IP20	IP20	IP20	IP20	IP20
<b>Sound pressure level <math>L_{pA}</math></b> (1 m) at 50/60 Hz	dB	64/67	64/67	64/67	64/67	69/73	69/73
<b>Line connection U1, V1, W1</b>		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 x 185	2 x 185	2 x 185	2 x 185	2 x 240	2 x 240
<b>Motor connection U2/T1, V2/T2, W2/T3</b>		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 x 185	2 x 185	2 x 185	2 x 185	2 x 240	2 x 240
<b>PE1/GND connection</b>		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 x 185	2 x 185	2 x 185	2 x 185	2 x 240	2 x 240
<b>PE2/GND connection</b>		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 x 185	2 x 185	2 x 185	2 x 185	2 x 240	2 x 240
<b>Dimensions</b>							
• Width	mm	326	326	326	326	326	326
• Height	mm	1400	1400	1400	1400	1533	1533
• Depth	mm	356	356	356	356	545	545
<b>Weight, approx.</b>	kg	104	104	104	104	176	176
<b>Conformity</b>		CE	CE	CE	CE	CE	CE
<b>Approvals, acc. to</b>		-	-	-	-	-	-
<b>Frame size</b>		FX	FX	FX	FX	GX	GX

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

<sup>1)</sup> Rated power of a typ. 6-pole standard induction motor based on  $I_L$  or  $I_H$  with 690 V 3 AC 50 Hz.

<sup>2)</sup> The base load current  $I_L$  is based on a duty cycle of 110 % for 60 s or 150 % for 10 s with a duty cycle duration of 300 s.

<sup>3)</sup> The base load current  $I_H$  is based on a duty cycle of 150 % for 60 s or 160 % for 10 s with a duty cycle duration of 300 s. See technical data (→ Overload capability).

<sup>4)</sup> 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 if the line voltage fails.

<sup>5)</sup> Longer cable lengths for specific configurations are available on request.

#### Technical data (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	
<b>Type rating</b>								
• at $I_L$ at 50 Hz 690 V <sup>1)</sup>	kW	<b>250</b>	<b>315</b>	<b>400</b>	<b>450</b>	<b>560</b>	<b>710</b>	<b>800</b>
• at $I_H$ at 50 Hz 690 V <sup>1)</sup>	kW	200	250	315	400	500	560	710
<b>Output current</b>								
• Rated current $I_{rated}$	A	260	330	410	465	575	735	810
• Base load current $I_L$ <sup>2)</sup>	A	250	320	400	452	560	710	790
• Base load current $I_H$ <sup>3)</sup>	A	233	280	367	416	514	657	724
<b>Input current</b>								
• 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 <sup>4)</sup>	A	0.9	0.9	1.0	1.0	1.0	1.25	1.25
<b>Power loss</b>	kW	5	5.8	7.5	8.5	10.3	12.8	13.9
<b>Cooling-air demand</b>	m <sup>3</sup> /s	0.36	0.36	0.78	0.78	0.78	1.48	1.48
<b>Cable length, max.</b> between Power Module and motor <sup>5)</sup>								
• shielded	m	300	300	300	300	300	300	300
• unshielded	m	450	450	450	450	450	450	450
<b>Degree of protection</b>		IP20	IP20	IP00	IP00	IP00	IP00	IP00
<b>Sound pressure level <math>L_{pA}</math></b> (1 m) at 50/60 Hz	dB	69/73	69/73	70/73	70/73	70/73	73/75	73/75
<b>Line connection U1, V1, W1</b>		M10 screw	M10 screw	2 x M12 screws	2 x M12 screws	2 x M12 screws	3 x M12 screws	3 x M12 screws
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 x 240	2 x 240	4 x 240	4 x 240	4 x 240	6 x 240	6 x 240
<b>Motor connection U2/T1, V2/T2, W2/T3</b>		M10 screw	M10 screw	2 x M12 screws	2 x M12 screws	2 x M12 screws	3 x M12 screws	3 x M12 screws
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 x 240	2 x 240	4 x 240	4 x 240	4 x 240	6 x 240	6 x 240
<b>PE1/GND connection</b>		M10 screw	M10 screw	M12 screw	M12 screw	M12 screw	2 x M12 screws	2 x M12 screws
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240	4 x 240	4 x 240
<b>PE2/GND connection</b>		M10 screw	M10 screw	2 x M12 screws	2 x M12 screws	2 x M12 screws	3 x M12 screws	3 x M12 screws
Conductor cross section, max. (IEC)	mm <sup>2</sup>	2 x 240	2 x 240	4 x 240	4 x 240	4 x 240	6 x 240	6 x 240
<b>Dimensions</b>								
• 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
<b>Weight, approx.</b>	kg	176	176	294	294	294	530	530
<b>Conformity</b>		CE	CE	CE	CE	CE	CE	CE
<b>Approvals, acc. to</b>		-	-	-	-	-	-	-
<b>Frame size</b>		GX	GX	HX	HX	HX	JX	JX

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

<sup>1)</sup> Rated power of a typ. 6-pole standard induction motor based on  $I_L$  or  $I_H$  with 690 V 3 AC 50 Hz.

<sup>2)</sup> The base load current  $I_L$  is based on a duty cycle of 110 % for 60 s or 150 % for 10 s with a duty cycle duration of 300 s.

<sup>3)</sup> The base load current  $I_H$  is based on a duty cycle of 150 % for 60 s or 160 % for 10 s with a duty cycle duration of 300 s. See technical data (→ Overload capability).

<sup>4)</sup> 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 if the line voltage fails.

<sup>5)</sup> Longer cable lengths for specific configurations are available on request.



# SINAMICS G130

## Drive converter chassis units

### Line-side power components Line filters

#### Overview

Line-side power components are used to protect the connected components against transient or continuous overvoltages and ensure that prescribed limit values are adhered to.



To limit the emitted interference, the drive 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 the line filter also meet the limits for use in the first environment (Category C2) as specified in EN 61800-3. <sup>1)</sup>

SINAMICS G130 units 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. When combined with a plant design rigorously based on the EMC design directives, the limit values at the installation site will conform to the requirements for the first environment.

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

#### Selection and ordering data

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

The SINAMICS Low Voltage Engineering Manual contains additional information on the line filters as well as EMC-compliant plant/system design – and is available as a PDF file on the CD-ROM included with the Catalog D 11.

<sup>1)</sup> Applies to cable lengths < 100 m.

#### Technical data

Line voltage 380 ... 480 V 3 AC		Line filter			
		6SL3000-0BE32-5AA0	6SL3000-0BE34-4AA0	6SL3000-0BE36-0AA0	6SL3000-0BE41-2AA0
<b>Rated current</b>	A	250	440	600	1200
<b>Power loss</b>	kW	0.049	0.049	0.055	0.137
<b>Line/load connection</b>		1 x hole for M10	1 x hole for M10	1 x hole for M10	1 x hole for M12
Conductor cross section, max. (IEC)	mm <sup>2</sup>	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
<b>PE connection</b>		Hole for M8	Hole for M8	Hole for M10	Hole for M10
<b>Degree of protection</b>		IP00	IP00	IP00	IP00
<b>Dimensions</b>					
• Width	mm	360	360	400	425
• Height	mm	240	240	265	265
• Depth	mm	116	116	140	145
<b>Weight, approx.</b>	kg	12.3	12.3	19	25.8
<b>Approvals, acc. to</b>		cURus	cURus	cURus	cURus
<b>Suitable for Power Module</b>		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
<b>Rated current</b>	A	250	440	600	1200
<b>Power loss</b>	kW	0.049	0.049	0.055	0.137
<b>Line/load connection</b>		1 x hole for M10	1 x hole for M10	1 x hole for M10	1 x hole for M12
Conductor cross section, max. (IEC)	mm <sup>2</sup>	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
<b>PE connection</b>		Hole for M8	Hole for M8	Hole for M10	Hole for M10
<b>Degree of protection</b>		IP00	IP00	IP00	IP00
<b>Dimensions</b>					
• Width	mm	360	360	400	425
• Height	mm	240	240	265	265
• Depth	mm	116	116	140	145
<b>Weight, approx.</b>	kg	12.3	12.3	19	25.2
<b>Approvals, acc. to</b>		cURus	cURus	cURus	cURus
<b>Suitable for Power Module</b>		6SL3310-1GF31-8AA3 (110 kW) 6SL3310-1GF32-2AA3 (132 kW)	6SL3310-1GF32-6AA3 (160 kW) 6SL3310-1GF33-3AA3 (200 kW) 6SL3310-1GE34-1AA3 (250 kW)	6SL3310-1GF34-7AA3 (315 kW)	6SL3310-1GF35-8AA3 (400 kW) 6SL3310-1GF37-4AA3 (500 kW) 6SL3310-1GF38-1AA3 (560 kW)

# SINAMICS G130

## Drive converter chassis units

### Line-side power components Line filters

#### Technical data (continued)

Line voltage 660 ... 690 V 3 AC		Line filter			
		6SL3000-0BG32-5AA0	6SL3000-0BG34-4AA0	6SL3000-0BG36-0AA0	6SL3000-0BG41-2AA0
<b>Rated current</b>	A	250	440	600	1200
<b>Power loss</b>	kW	0.049	0.049	0.055	0.137
<b>Line/load connection</b>		1 x hole for M10	1 x hole for M10	1 x hole for M10	1 x hole for M12
Conductor cross section, max. (IEC)	mm <sup>2</sup>	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
<b>PE connection</b>		Hole for M8	Hole for M8	Hole for M10	Hole for M10
<b>Degree of protection</b>		IP00	IP00	IP00	IP00
<b>Dimensions</b>					
• Width	mm	360	360	400	425
• Height	mm	240	240	265	265
• Depth	mm	116	116	140	145
<b>Weight, approx.</b>	kg	12.3	12.3	19	25.2
<b>Approvals, acc. to</b>		cURus	cURus	cURus	cURus
<b>Suitable for Power Module</b>		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)	6SL3310-1GH34-7AA3 (450 kW)	6SL3310-1GH35-8AA3 (560 kW) 6SL3310-1GH37-4AA3 (710 kW) 6SL3310-1GH38-1AA3 (800 kW)

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#### Overview



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

They render the converter compliant with every stringent limit value specified in standard IEEE 519-1992.

#### Design

Line Harmonics Filters are supplied as stand-alone components in a rugged housing. They are installed between the customer-end low-voltage distribution panel and the converter. The voltage is disconnected and fused in the customer-end 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 purpose of monitoring thermal overloads (as a result of insufficient cooling air being fed in, for example).

**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 Order No.
<b>380 ... 480 V 3 AC</b>		
6SL3310-1GE33-1AA3	160	<b>6SL3000-OJE36-1AA0</b>
6SL3310-1GE33-8AA3	200	
6SL3310-1GE35-0AA3	250	
6SL3310-1GE36-1AA3	315	
6SL3310-1GE37-5AA3	400	<b>6SL3000-OJE38-4AA0</b>
6SL3310-1GE38-4AA3	450	
6SL3310-1GE41-0AA3	560	<b>6SL3000-OJE41-0AA0</b>
<b>500 ... 600 V 3 AC</b>		
6SL3310-1GF31-8AA3	110	<b>6SL3000-OJH33-3AA0</b>
6SL3310-1GF32-2AA3	132	
6SL3310-1GF32-6AA3	160	
6SL3310-1GF33-3AA3	200	
6SL3310-1GF34-1AA3	250	<b>6SL3000-OJH34-7AA0</b>
6SL3310-1GF34-7AA3	315	
6SL3310-1GF35-8AA3	400	<b>6SL3000-OJH35-8AA0</b>
6SL3310-1GF37-4AA3	500	<b>6SL3000-OJH38-1AA0</b>
6SL3310-1GF38-1AA3	560	
<b>660 ... 690 V 3 AC</b>		
6SL3310-1GH31-8AA3	160	<b>6SL3000-OJH33-3AA0</b>
6SL3310-1GH32-2AA3	200	
6SL3310-1GH32-6AA3	250	
6SL3310-1GH33-3AA3	315	
6SL3310-1GH34-1AA3	400	<b>6SL3000-OJH34-7AA0</b>
6SL3310-1GH34-7AA3	450	
6SL3310-1GH35-8AA3	560	<b>6SL3000-OJH35-8AA0</b>
6SL3310-1GH37-4AA3	710	<b>6SL3000-OJH38-1AA0</b>
6SL3310-1GH38-1AA3	800	

The SINAMICS Low Voltage Engineering Manual contains additional information about the line harmonics filters, which is available as a PDF file on the CD-ROM included with the catalog.

# SINAMICS G130

## Drive converter chassis units

### Line-side power components Line Harmonics Filters

#### Technical data

Line voltage 380 ... 480 V 3 AC		Line Harmonics Filter		
		6SL3000-0JE36-1AA0	6SL3000-0JE38-4AA0	6SL3000-0JE41-0AA0
Rated current <sup>1)</sup>	A	500	700	900
Power loss	kW	3.1	4.5	5.6
<b>Line/load connection</b>				
Conductor cross section, max. (IEC)	mm <sup>2</sup>	4 × 240	4 × 240	4 × 240
PE connection		3 × M12 stud	3 × M12 stud	3 × M12 stud
Degree of protection		IP21	IP21	IP21
<b>Dimensions</b>				
• 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
Conformity		CE	CE	CE
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 <sup>1)</sup>	A	290	400	520	710
Power loss	kW	3.1	4.6	5.7	7.97
<b>Line/load connection</b>					
Conductor cross section, max. (IEC)	mm <sup>2</sup>	4 × 240	4 × 240	4 × 240	4 × 240
PE connection		3 × M12 stud	3 × M12 stud	3 × M12 stud	3 × M12 stud
Degree of protection		IP21	IP21	IP21	IP21
<b>Dimensions</b>					
• 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
Conformity		CE	CE	CE	CE
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)

<sup>1)</sup> 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 relevant Power Module.

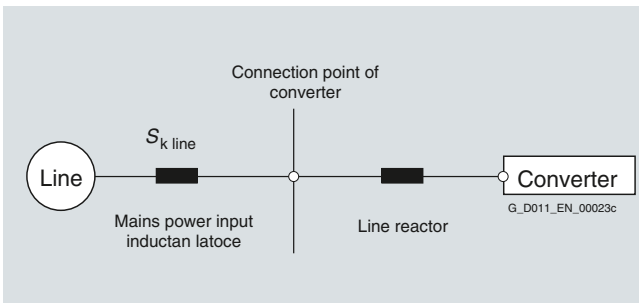


### Overview



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 line harmonics to the permitted values. The harmonic currents are limited by the complete inductance comprising the line reactor and mains supply cable inductance. Line reactors can be omitted if the mains supply cable inductance is increased sufficiently, i.e., the value of RSC must be sufficiently small.

RSC = Relative Short-Circuit power: Ratio of short-circuit power  $S_{k \text{ Line}}$  at the line connection point to fundamental apparent output  $S_{\text{conv}}$  of the connected converters (to EN 61800-5-1/VDE 0160).



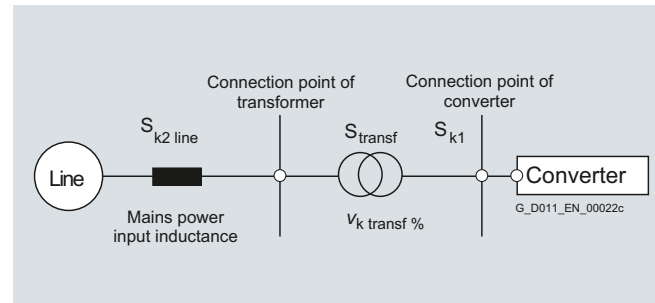
For SINAMICS G130 drive converter chassis units the following applies:

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 is not only required 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 through a transformer with the appropriate rating.

**Notice:** A line reactor is always needed, however, if a line filter is used.



In this case, the line supply short-circuit power  $S_{k1}$  at the converter connection point is approximately:

$$S_{k1} = S_{\text{transf}} / (V_k \text{ transf} + S_{\text{transf}} / S_{k2 \text{ line}})$$

Formula symbol	Meaning
$S_{\text{transf}}$	Transformer power rating
$S_{k \text{ transf}}$	Relative short-circuit power of the transformer
$S_{k2 \text{ line}}$	Short-circuit power of the higher-level voltage level
$V_k$	Relative 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 Order No.
<b>380 ... 480 V 3 AC</b>		
6SL3310-1GE32-1AA3	110	<b>6SL3000-0CE32-3AA0</b>
6SL3310-1GE32-6AA3	132	<b>6SL3000-0CE32-8AA0</b>
6SL3310-1GE33-1AA3	160	<b>6SL3000-0CE33-3AA0</b>
6SL3310-1GE33-8AA3	200	<b>6SL3000-0CE35-1AA0</b>
6SL3310-1GE35-0AA3	250	
6SL3310-1GE36-1AA3	315	<b>6SL3000-0CE36-3AA0</b>
6SL3310-1GE37-5AA3	400	<b>6SL3000-0CE37-7AA0</b>
6SL3310-1GE38-4AA3	450	<b>6SL3000-0CE38-7AA0</b>
6SL3310-1GE41-0AA3	560	<b>6SL3000-0CE41-0AA0</b>
<b>500 ... 600 V 3 AC</b>		
6SL3310-1GF31-8AA3	110	<b>6SL3000-0CH32-2AA0</b>
6SL3310-1GF32-2AA3	132	
6SL3310-1GF32-6AA3	160	<b>6SL3000-0CH32-7AA0</b>
6SL3310-1GF33-3AA3	200	<b>6SL3000-0CH33-4AA0</b>
6SL3310-1GF34-1AA3	250	<b>6SL3000-0CH34-8AA0</b>
6SL3310-1GF34-7AA3	315	
6SL3310-1GF35-8AA3	400	<b>6SL3000-0CH36-0AA0</b>
6SL3310-1GF37-4AA3	500	<b>6SL3000-0CH38-4AA0</b>
6SL3310-1GF38-1AA3	560	
<b>660 ... 690 V 3 AC</b>		
6SL3310-1GH28-5AA3	75	<b>6SL3000-0CH31-1AA0</b>
6SL3310-1GH31-0AA3	90	
6SL3310-1GH31-2AA3	110	<b>6SL3000-0CH31-6AA0</b>
6SL3310-1GH31-5AA3	132	
6SL3310-1GH31-8AA3	160	<b>6SL3000-0CH32-2AA0</b>
6SL3310-1GH32-2AA3	200	
6SL3310-1GH32-6AA3	250	<b>6SL3000-0CH32-7AA0</b>
6SL3310-1GH33-3AA3	315	<b>6SL3000-0CH33-4AA0</b>
6SL3310-1GH34-1AA3	400	<b>6SL3000-0CH34-8AA0</b>
6SL3310-1GH34-7AA3	450	
6SL3310-1GH35-8AA3	560	<b>6SL3000-0CH36-0AA0</b>
6SL3310-1GH37-4AA3	710	<b>6SL3000-0CH38-4AA0</b>
6SL3310-1GH38-1AA3	800	

#### Technical data

Line voltage 380 ... 480 V 3 AC		Line reactor			
		6SL3000-0CE32-3AA0	6SL3000-0CE32-8AA0	6SL3000-0CE33-3AA0	6SL3000-0CE35-1AA0
$I_{thmax}$	A	224	278	331	508
Nominal inductance $L_{rated}$	$\mu$ H	76	62	52	42
Power loss	kW	0.274	0.247	0.267	0.365
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 <sup>2</sup>	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
PE connection		M6 screw	M6 screw	M6 screw	M6 screw
Degree of protection		IP00	IP00	IP00	IP00
<b>Dimensions</b>					
• Width	mm	270	270	270	300
• Height	mm	248	248	248	269
• Depth	mm	200	200	200	212
Weight, approx.	kg	24.5	26.0	27.8	38
Conformity		CE	CE	CE	CE
Approvals, acc. 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
$I_{thmax}$	A	628	773	871	1022
Nominal inductance $L_{rated}$	$\mu$ H	27	22	19	16
Power loss	kW	0.368	0.351	0.458	0.498
Line/load connection		1 × hole for M12	1 × hole for M12	1 × hole for M12	1 × hole for M12
Conductor cross section, max. (IEC)	mm <sup>2</sup>	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
PE connection		M6 screw	M6 screw	M6 screw	M6 screw
Degree of protection		IP00	IP00	IP00	IP00
<b>Dimensions</b>					
• Width	mm	300	300	350	350
• Height	mm	269	269	321	321
• Depth	mm	212	212	212	212
Weight, approx.	kg	41.4	51.3	63.2	69.6
Conformity		CE	CE	CE	CE
Approvals, acc. 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)

# SINAMICS G130

## Drive converter chassis units

### Line-side power components Line reactors

#### Technical data (continued)

Line voltage 500 ... 600 V 3 AC		Line reactor			
		6SL3000-0CH32-2AA0	6SL3000-0CH32-2AA0	6SL3000-0CH32-7AA0	6SL3000-0CH33-4AA0
$I_{thmax}$	A	260	215	270	342
Nominal inductance $L_{rated}$	$\mu$ H	150	150	100	81
Power loss	kW	0.24	0.275	0.277	0.27
Line/load connection		1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M10
Conductor cross section, max. (IEC)	mm <sup>2</sup>	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
PE connection		M6 screw	M6 screw	M6 screw	M6 screw
Degree of protection		IP00	IP00	IP00	IP00
<b>Dimensions</b>					
• 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
Conformity		CE	CE	CE	CE
Approvals, acc. 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)

Line voltage 500 ... 600 V 3 AC		Line reactor		
		6SL3000-0CH34-8AA0	6SL3000-0CH36-0AA0	6SL3000-0CH38-4AA0
$I_{thmax}$	A	482	597	840
Nominal inductance $L_{rated}$	$\mu$ H	65	46	40
Power loss	kW	0.48	0.485	0.618
Line/load connection		1 × hole for M10	1 × hole for M12	1 × hole for M12
Conductor cross section, max. (IEC)	mm <sup>2</sup>	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
PE connection		M6 screw	M6 screw	M6 screw
Degree of protection		IP00	IP00	IP00
<b>Dimensions</b>				
• Width	mm	350	350	410
• Height	mm	321	321	385
• Depth	mm	232	232	224
Weight, approx.	kg	55.6	63.8	98
Conformity		CE	CE	CE
Approvals, acc. 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)

#### Technical data (continued)

Line voltage 660 ... 690 V 3 AC		Line reactor			
		6SL3000-0CH31-1AA0	6SL3000-0CH31-6AA0	6SL3000-0CH32-2AA0	6SL3000-0CH32-7AA0
$I_{thmax}$	A	107	155	230	270
Nominal inductance $L_{rated}$	$\mu$ H	310	220	150	100
Power loss	kW	0.252	0.279	0.275	0.277
Line/load connection		1 × hole for M10	1 × hole for M10	1 × hole for M10	1 × hole for M10
Conductor cross section, max. (IEC)	mm <sup>2</sup>	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
PE connection		M6 screw	M6 screw	M6 screw	M6 screw
Degree of protection		IP00	IP00	IP00	IP00
<b>Dimensions</b>					
• 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
Conformity		CE	CE	CE	CE
Approvals, acc. 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
$I_{thmax}$	A	342	482	597	840
Nominal inductance $L_{rated}$	$\mu$ H	81	65	46	40
Power loss	kW	0.27	0.48	0.485	0.618
Line/load connection		1 × hole for M10	1 × hole for M10	1 × hole for M12	1 × hole for M12
Conductor cross section, max. (IEC)	mm <sup>2</sup>	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection	Provided for busbar connection
PE connection		M6 screw	M6 screw	M6 screw	M6 screw
Degree of protection		IP00	IP00	IP00	IP00
<b>Dimensions</b>					
• 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
Conformity		CE	CE	CE	CE
Approvals, acc. 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)

# SINAMICS G130

## Drive converter chassis units

### Line-side power components Recommended line-side system components

#### Overview

The table below lists recommended ratings for input-end switching and fuse protection elements for compliance with IEC standards.

Additional information about the line contactors, switch disconnectors, fuses and circuit-breakers specified in the table can be found in Catalog LV 10.1.

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

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### Overview (continued)

Type rating (at 400 V, 500 V or 690 V)	Rated input current	Matching Power Module	Cable protection fuse		Cable protection fuse incl. semiconductor protection	
			Type	Rated current A	Type	Rated current A
<b>380 ... 480 V 3 AC</b>						
110	229	6SL3310-1GE32-1AA3	<b>3NA3144</b>	250	<b>3NE1230-2</b>	315
132	284	6SL3310-1GE32-6AA3	<b>3NA3250</b>	300	<b>3NE1331-2</b>	350
160	338	6SL3310-1GE33-1AA3	<b>3NA3254</b>	355	<b>3NE1334-2</b>	500
200	395	6SL3310-1GE33-8AA3	<b>3NA3260</b>	400	<b>3NE1334-2</b>	500
250	509	6SL3310-1GE35-0AA3	<b>3NA3372</b>	630	<b>3NE1436-2</b>	630
315	629	6SL3310-1GE36-1AA3	<b>3NA3475</b>	800	<b>3NE1438-2</b>	800
400	775	6SL3310-1GE37-5AA3	<b>3NA3475</b>	800	<b>3NE1448-2</b>	850
450	873	6SL3310-1GE38-4AA3	<b>3NA3365</b>	2 x 500	<b>3NE1436-2</b>	2 x 630
560	1024	6SL3310-1GE41-0AA3	<b>3NA3472</b>	2 x 630	<b>3NE1437-2</b>	2 x 710
<b>500 ... 600 V 3 AC</b>						
110	191	6SL3310-1GF31-8AA3	<b>3NA3244-6</b>	250	<b>3NE1227-2</b>	250
132	242	6SL3310-1GF32-2AA3	<b>3NA3252-6</b>	315	<b>3NE1230-2</b>	315
160	270	6SL3310-1GF32-6AA3	<b>3NA3354-6</b>	355	<b>3NE1331-2</b>	350
200	343	6SL3310-1GF33-3AA3	<b>3NA3365-6</b>	500	<b>3NE1334-2</b>	500
250	426	6SL3310-1GF34-1AA3	<b>3NA3365-6</b>	500	<b>3NE1334-2</b>	500
315	483	6SL3310-1GF34-7AA3	<b>3NA3252-6</b>	2 x 315	<b>3NE1435-2</b>	560
400	598	6SL3310-1GF35-8AA3	<b>3NA3354-6</b>	2 x 355	<b>3NE1447-2</b>	670
500	764	6SL3310-1GF37-4AA3	<b>3NA3365-6</b>	2 x 500	<b>3NE1448-2</b>	850
560	842	6SL3310-1GF38-1AA3	<b>3NA3365-6</b>	2 x 500	<b>3NE1334-2</b>	2 x 500
<b>660 ... 690 V 3 AC</b>						
75	93	6SL3310-1GH28-5AA3	<b>3NA3132-6</b>	125	<b>3NE1022-2</b>	125
90	109	6SL3310-1GH31-0AA3	<b>3NA3132-6</b>	125	<b>3NE1022-2</b>	125
110	131	6SL3310-1GH31-2AA3	<b>3NA3136-6</b>	160	<b>3NE1224-2</b>	160
132	164	6SL3310-1GH31-5AA3	<b>3NA3240-6</b>	200	<b>3NE1225-2</b>	200
160	191	6SL3310-1GH31-8AA3	<b>3NA3244-6</b>	250	<b>3NE1227-2</b>	250
200	224	6SL3310-1GH32-2AA3	<b>3NA3252-6</b>	315	<b>3NE1230-2</b>	315
250	270	6SL3310-1GH32-6AA3	<b>3NA3354-6</b>	355	<b>3NE1331-2</b>	350
315	343	6SL3310-1GH33-3AA3	<b>3NA3365-6</b>	500	<b>3NE1334-2</b>	500
400	426	6SL3310-1GH34-1AA3	<b>3NA3365-6</b>	500	<b>3NE1334-2</b>	500
450	483	6SL3310-1GH34-7AA3	<b>3NA3252-6</b>	2 x 315	<b>3NE1435-2</b>	560
560	598	6SL3310-1GH35-8AA3	<b>3NA3354-6</b>	2 x 355	<b>3NE1447-2</b>	670
710	764	6SL3310-1GH37-4AA3	<b>3NA3365-6</b>	2 x 500	<b>3NE1448-2</b>	850
800	842	6SL3310-1GH38-1AA3	<b>3NA3365-6</b>	2 x 500	<b>3NE1334-2</b>	2 x 500



#### Overview



A Braking Module and the matching braking resistor are needed by the drive when it brakes or needs to be stopped for a specific reason, e.g. for an Emergency Stop.

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

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

The Braking Module works autonomously from 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, one Braking Module is assigned to each braking resistor.

The activation threshold of the Braking Module can be adjusted using the DIP switch. The braking power values specified in the technical data 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

A Braking Module is always assigned its own dedicated braking resistor.

The Braking Module is connected to the DC link using the busbars or flexible cables supplied with the module.

The Braking Module has the following interfaces as standard:

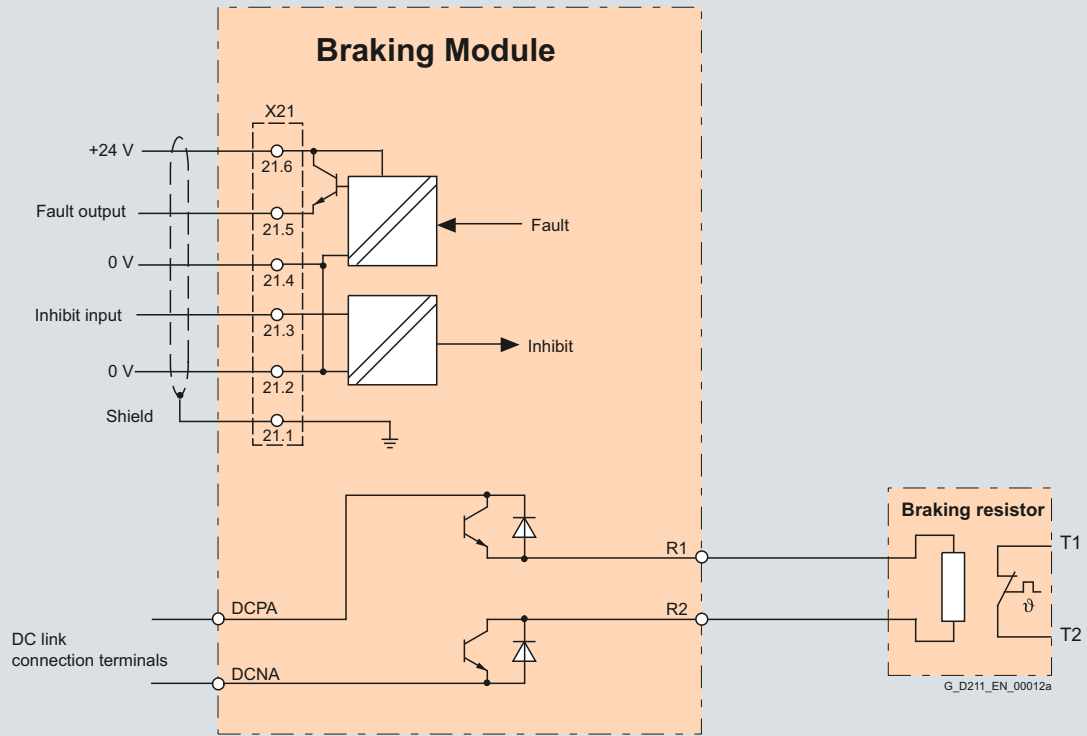
- DC link connection
- Braking resistor connection terminal
- 1 digital input (inhibit Braking Module/acknowledge error)
- 1 digital output (fault in Braking Module)
- 1 DIP switch for adjusting the activation threshold

Information about Braking Module activation thresholds and more detailed configuring instructions is included in the SINAMICS Low Voltage Engineering Manual. The Engineering Manual is stored as a PDF file on the CD-ROM included with the catalog.

#### Selection and ordering data

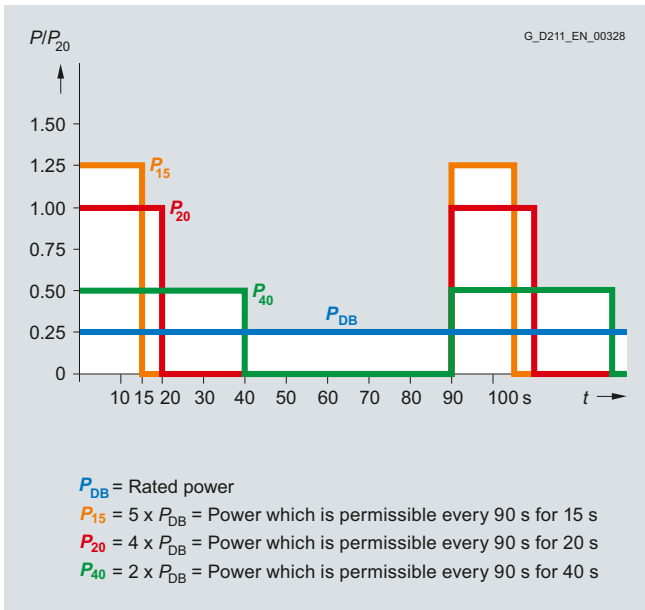
Suitable for Power Module	Type rating of the Power Module at 400 V, 500 V or 690 V kW	Braking Module  Order No.
<b>380 ... 480 V 3 AC</b>		
6SL3310-1GE32-1AA3	110	<b>6SL3300-1AE31-3AA0</b>
6SL3310-1GE32-6AA3	132	
6SL3310-1GE33-1AA3	160	<b>6SL3300-1AE32-5AA0</b>
6SL3310-1GE33-8AA3	200	
6SL3310-1GE35-0AA3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

#### Technical data

		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
<b>Line voltage</b>		<b>3 AC 380 ... 480 V</b>		<b>3 AC 500 ... 600 V</b>	<b>3 AC 660 ... 690 V</b>	
<b>Rated power <math>P_{DB}</math></b>	kW	25	50	50	25	50
<b>Peak power <math>P_{15}</math></b>	kW	125	250	250	125	250
<b>Power <math>P_{20}</math></b>	kW	100	200	200	100	200
<b>Power <math>P_{40}</math></b>	kW	50	100	100	50	100
<b>Activation thresholds</b> (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
<b>Digital inputs</b>						
• 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 <sup>2</sup>	1.5	1.5	1.5	1.5	1.5
<b>Digital outputs</b> (continuously 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 <sup>2</sup>	1.5	1.5	1.5	1.5	1.5
<b>Design conforms to</b>		UL and IEC	UL and IEC	UL and IEC	IEC	IEC
<b>R1/R2 connection</b>		M8 nut	M8 nut	M8 nut	M8 nut	M8 nut
• Conductor cross section, max. (IEC)	mm <sup>2</sup>	35	50	50	35	50
<b>Weight, approx.</b>	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)
<b>Conformity</b>		CE	CE	CE	CE	CE
<b>Approvals, acc. to</b>		cULus	cULus	cULus	-	-
Braking Module		<b>6SL3300-1AE31-3AA0</b>	<b>6SL3300-1AE32-5AA0</b>	<b>6SL3300-1AF32-5AA0</b>	<b>6SL3300-1AH31-3AA0</b>	<b>6SL3300-1AH32-5AA0</b>
<b>Suitable for Power Module</b>		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			<b>6SL3300-1AE32-5BA0</b>	<b>6SL3300-1AF32-5BA0</b>		<b>6SL3300-1AH32-5BA0</b>
<b>Suitable for Power Module</b>			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



The excess energy of 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, thereby allowing a corresponding reduction in the level of air conditioning required.

2 braking resistors with different rated and peak power values are available for the units.

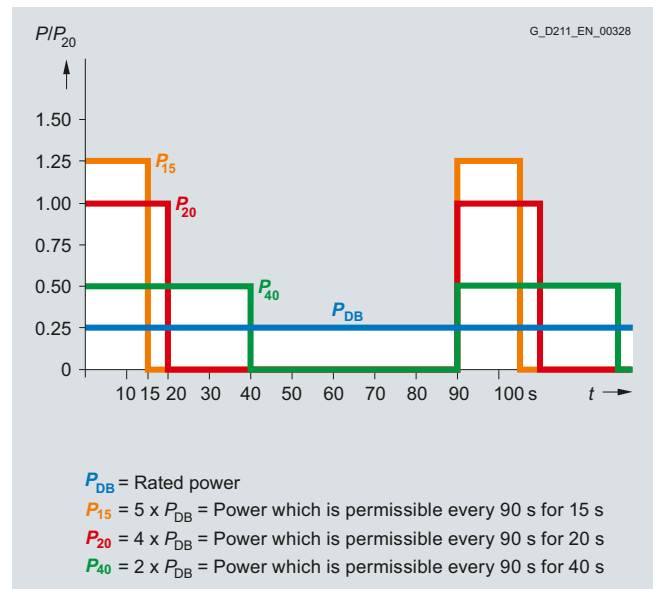
The braking resistor is monitored on the basis of the duty cycle. A temperature switch (NC contact) is also fitted. This responds when the maximum permissible temperature is exceeded and can be evaluated by a controller. The maximum permissible cable length between the Braking Module and braking resistor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

Information on possible load cycles of the braking resistors as well as additional project guidelines are provided in the SINAMICS Low Voltage Engineering Manual, which is available as a PDF file on the CD-ROM included with the catalog.

### Selection and ordering data

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

### Characteristic curves



Load diagram for Braking Modules and braking resistor

### Technical data

Line voltage 380 ... 480 V 3 AC	Braking resistor		
	6SL3000-1BE31-3AA0	6SL3000-1BE32-5AA0	
Resistor	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 <sup>2</sup>	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
Conformity		CE	CE
Approvals, acc. to		cURus	cURus
Suitable for Braking Module		6SL3300-1AE31-3AA	6SL3300-1AE32-5.A0

#### Technical data (continued)

Line voltage 500 ... 600 V 3 AC		Braking resistor <b>6SL3000-1BF32-5AA0</b>	
Resistor	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 <sup>2</sup>	70	
Power connection		M10 stud	
Degree of protection		IP20	
Dimensions			
• Width	mm	810	
• Height	mm	1325	
• Depth	mm	486	
Weight, approx.	kg	120	
Conformity		CE	
Approvals, acc. to		cURus	
Suitable for Braking Module		6SL3300-1AF32-5.A0	

Line voltage 660 ... 690 V 3 AC		Braking resistor <b>6SL3000-1BH31-3AA0</b>		Braking resistor <b>6SL3000-1BH32-5AA0</b>	
Resistor	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 <sup>2</sup>	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	
Conformity		CE		CE	
Approvals, acc. 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 on the motor terminals generated when the converter is used. 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 Order No.
<b>380 ... 480 V 3 AC</b>		
6SL3310-1GE32-1AA3	110	<b>6SL3000-2BE32-1AA0</b>
6SL3310-1GE32-6AA3	132	<b>6SL3000-2BE32-6AA0</b>
6SL3310-1GE33-1AA3	160	<b>6SL3000-2BE33-2AA0</b>
6SL3310-1GE33-8AA3	200	<b>6SL3000-2BE33-8AA0</b>
6SL3310-1GE35-0AA3	250	<b>6SL3000-2BE35-0AA0</b>
6SL3310-1GE36-1AA3	315	<b>6SL3000-2AE36-1AA0</b>
6SL3310-1GE37-5AA3	400	<b>6SL3000-2AE38-4AA0</b>
6SL3310-1GE38-4AA3	450	
6SL3310-1GE41-0AA3	560	<b>6SL3000-2AE41-0AA0</b>
<b>500 ... 600 V 3 AC</b>		
6SL3310-1GF31-8AA3	110	<b>6SL3000-2AH31-8AA0</b>
6SL3310-1GF32-2AA3	132	<b>6SL3000-2AH32-4AA0</b>
6SL3310-1GF32-6AA3	160	<b>6SL3000-2AH32-6AA0</b>
6SL3310-1GF33-3AA3	200	<b>6SL3000-2AH33-6AA0</b>
6SL3310-1GF34-1AA3	250	<b>6SL3000-2AH34-5AA0</b>
6SL3310-1GF34-7AA3	315	<b>6SL3000-2AH34-7AA0</b>
6SL3310-1GF35-8AA3	400	<b>6SL3000-2AH35-8AA0</b>
6SL3310-1GF37-4AA3	500	<b>6SL3000-2AH38-1AA0</b>
6SL3310-1GF38-1AA3	560	
<b>660 ... 690 V 3 AC</b>		
6SL3310-1GH28-5AA3	75	<b>6SL3000-2AH31-0AA0</b>
6SL3310-1GH31-0AA3	90	
6SL3310-1GH31-2AA3	110	<b>6SL3000-2AH31-5AA0</b>
6SL3310-1GH31-5AA3	132	
6SL3310-1GH31-8AA3	160	<b>6SL3000-2AH31-8AA0</b>
6SL3310-1GH32-2AA3	200	<b>6SL3000-2AH32-4AA0</b>
6SL3310-1GH32-6AA3	250	<b>6SL3000-2AH32-6AA0</b>
6SL3310-1GH33-3AA3	315	<b>6SL3000-2AH33-6AA0</b>
6SL3310-1GH34-1AA3	400	<b>6SL3000-2AH34-5AA0</b>
6SL3310-1GH34-7AA3	450	<b>6SL3000-2AH34-7AA0</b>
6SL3310-1GH35-8AA3	560	<b>6SL3000-2AH35-8AA0</b>
6SL3310-1GH37-4AA3	710	<b>6SL3000-2AH38-1AA0</b>
6SL3310-1GH38-1AA3	800	

#### Technical data

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	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
<b>Cable length, max.</b> between motor reactor and motor <sup>1)</sup>						
• shielded	m	300	300	300	300	300
• unshielded	m	450	450	450	450	450
Degree of protection		IP00	IP00	IP00	IP00	IP00
<b>Dimensions</b>						
• 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, acc. 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	745	840	985
Power loss	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
<b>Cable length, max.</b> between motor reactor and motor <sup>1)</sup>					
• shielded	m	300	300	300	300
• unshielded	m	450	450	450	450
Degree of protection		IP00	IP00	IP00	IP00
<b>Dimensions</b>					
• 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, acc. 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)

<sup>1)</sup> Longer cable lengths for specific configurations are available on request.



#### Technical data (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	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
<b>Cable length, max.</b> between motor reactor and motor <sup>1)</sup>						
• shielded	m	300	300	300	300	300
• unshielded	m	450	450	450	450	450
Degree of protection		IP00	IP00	IP00	IP00	IP00
<b>Dimensions</b>						
• 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, acc. 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	735	810
Power loss	kW	0.72	0.8	0.91	1.0
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
<b>Cable length, max.</b> between motor reactor and motor <sup>1)</sup>					
• shielded	m	300	300	300	300
• unshielded	m	450	450	450	450
Degree of protection		IP00	IP00	IP00	IP00
<b>Dimensions</b>					
• 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, acc. 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)

<sup>1)</sup> Longer cable lengths for specific configurations are available on request.

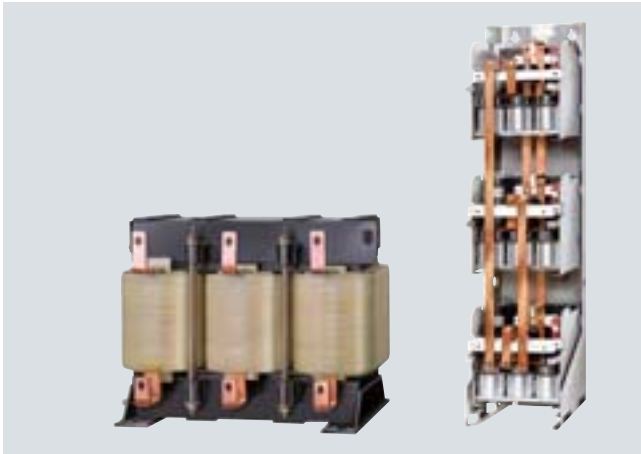
#### Technical data (continued)

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	85	100	120	150	175	215	260
Power loss	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 <sup>1)</sup>								
• 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, acc. 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	735	810
Power loss	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 <sup>1)</sup>							
• 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, acc. 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)

<sup>1)</sup> 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  $< 500 \text{ V}/\mu\text{s}$  and the typical voltage peaks to the following values according to the limit value curve to IEC/TS 60034-17: 2006:

- $< 1000 \text{ V}$  at  $V_{\text{line}} < 575 \text{ V}$
- $< 1250 \text{ V}$  at  $660 \text{ V} < V_{\text{line}} < 690 \text{ V}$ .

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 filter 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) also 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 separately supplied as mechanical units:

- dv/dt reactor
- Voltage limiting network, which cuts-off the voltage peaks and feeds the energy back into 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 plus VPL Order No.
<b>380 ... 480 V 3 AC</b>		
6SL3310-1GE32-1AA3	110	<b>6SL3000-2DE32-6AA0</b>
6SL3310-1GE32-6AA3	132	
6SL3310-1GE33-1AA3	160	<b>6SL3000-2DE35-0AA0</b>
6SL3310-1GE33-8AA3	200	
6SL3310-1GE35-0AA3	250	
6SL3310-1GE36-1AA3	315	<b>6SL3000-2DE38-4AA0</b>
6SL3310-1GE37-5AA3	400	
6SL3310-1GE38-4AA3	450	
6SL3310-1GE41-0AA3	560	<b>6SL3000-2DE41-4AA0</b>
<b>500 ... 600 V 3 AC</b>		
6SL3310-1GF31-8AA3	110	<b>6SL3000-2DH32-2AA0</b>
6SL3310-1GF32-2AA3	132	
6SL3310-1GF32-6AA3	160	<b>6SL3000-2DH33-3AA0</b>
6SL3310-1GF33-3AA3	200	
6SL3310-1GF34-1AA3	250	<b>6SL3000-2DH34-1AA0</b>
6SL3310-1GF34-7AA3	315	<b>6SL3000-2DH35-8AA0</b>
6SL3310-1GF35-8AA3	400	
6SL3310-1GF37-4AA3	500	<b>6SL3000-2DH38-1AA0</b>
6SL3310-1GF38-1AA3	560	
<b>660 ... 690 V 3 AC</b>		
6SL3310-1GH28-5AA3	75	<b>6SL3000-2DH31-0AA0</b>
6SL3310-1GH31-0AA0	90	
6SL3310-1GH31-2AA3	110	<b>6SL3000-2DH31-5AA0</b>
6SL3310-1GH31-5AA3	132	
6SL3310-1GH31-8AA3	160	<b>6SL3000-2DH32-2AA0</b>
6SL3310-1GH32-2AA3	200	
6SL3310-1GH32-6AA3	250	<b>6SL3000-2DH33-3AA0</b>
6SL3310-1GH33-3AA3	315	
6SL3310-1GH34-1AA3	400	<b>6SL3000-2DH34-1AA0</b>
6SL3310-1GH34-7AA3	450	<b>6SL3000-2DH35-8AA0</b>
6SL3310-1GH35-8AA3	560	
6SL3310-1GH37-4AA3	710	<b>6SL3000-2DH38-1AA0</b>
6SL3310-1GH38-1AA3	800	

The SINAMICS Low Voltage Engineering Manual contains additional information about the dv/dt filters, which is available as a PDF file on the CD-ROM included with the catalog.

# SINAMICS G130

## Drive converter chassis units

### Load-side power components dv/dt filters plus VPL

#### Technical data

Line voltage 380 ... 480 V 3 AC		dv/dt filter plus VPL			
		6SL3000- 2DE32-6AA0	6SL3000- 2DE35-0AA0	6SL3000- 2DE38-4AA0	6SL3000- 2DE41-4AA0
$I_{thmax}$	A	260	490	840	1405
<b>Degree of protection</b>		IP00	IP00	IP00	IP00
<b>Cable length, max.</b> between dv/dt filter and motor <sup>1)</sup>					
• shielded	m	300	300	300	300
• unshielded	m	450	450	450	450
<b>Conformity</b>		CE	CE	CE	CE
<b>Approvals, acc. to</b>		cURus	cURus	cURus	cURus
<b>dv/dt reactor</b>					
<b>Power loss</b>	kW	0.78	0.963	1.226	1.23
<b>Connections</b>					
• to Power Module		1 × hole M10	1 × hole M12	1 × hole M12	2 × hole M12
• to load		1 × hole M10	1 × hole M12	1 × hole M12	2 × hole M12
• PE		M6 screw	M6 screw	M6 screw	M6 screw
<b>Dimensions</b>					
• Width	mm	410	460	460	445
• Height	mm	370	370	385	385
• Depth	mm	229	275	312	312
<b>Weight, approx.</b>	kg	66	122	149	158
<b>Voltage Peak Limiter (VPL)</b>					
<b>Power loss</b>	kW	0.104	0.152	0.302	0.525
<b>Connections</b>					
• to dv/dt reactor		M8 nut	70 mm <sup>2</sup> terminals	1 × hole M8	1 × hole M10
• to DC link		M8 nut	70 mm <sup>2</sup> terminals	1 × hole M8	1 × hole M10
• PE		M8 stud	35 mm <sup>2</sup> terminals	M8 stud	M8 stud
<b>Dimensions</b>					
• Width	mm	263	392	309	309
• Height	mm	265	285	1313	1313
• Depth	mm	188	210	400	400
<b>Weight, approx.</b>	kg	6	16	48	72
<b>Suitable for Power Module</b>		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 data refer to one dv/dt reactor.

<sup>1)</sup> Longer cable lengths for specific configurations are available on request.

#### Technical data (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
$I_{thmax}$	A	215	330	410	575	810
<b>Degree of protection</b>		IP00	IP00	IP00	IP00	IP00
<b>Cable length, max.</b> between dv/dt filter and motor <sup>1)</sup>						
• shielded	m	300	300	300	300	300
• unshielded	m	450	450	450	450	450
<b>Conformity</b>		CE	CE	CE	CE	CE
<b>Approvals, acc. to</b>		cURus	cURus	cURus	cURus	cURus
<b>dv/dt reactor</b>						
<b>Power loss</b>	kW	0.645	0.661	0.884	0.964	0.927
<b>Connections</b>						
• to Power Module		1 × hole M10	1 × hole M10	1 × hole M12	1 × hole M12	2 × hole M12
• to load		1 × hole M10	1 × hole M10	1 × hole M12	1 × hole M12	2 × hole M12
• PE		M6 screw	M6 screw	M6 screw	M6 screw	M6 screw
<b>Dimensions</b>						
• Width	mm	460	460	460	460	445
• Height	mm	360	360	385	385	385
• Depth	mm	275	275	312	312	312
<b>Weight, approx.</b>	kg	83	135	147	172	160
<b>Voltage Peak Limiter (VPL)</b>						
<b>Power loss</b>	kW	0.113	0.152	0.189	0.241	0.372
<b>Connections</b>						
• to dv/dt reactor		70 mm <sup>2</sup> terminals	70 mm <sup>2</sup> terminals	1 × hole M8	1 × hole M8	1 × hole M10
• to DC link		70 mm <sup>2</sup> terminals	70 mm <sup>2</sup> terminals	1 × hole M8	1 × hole M8	1 × hole M10
• PE		35 mm <sup>2</sup> terminals	35 mm <sup>2</sup> terminals	M8 stud	M8 stud	M8 stud
<b>Dimensions</b>						
• Width	mm	392	392	309	309	309
• Height	mm	285	285	1313	1313	1313
• Depth	mm	210	210	400	400	400
<b>Weight, approx.</b>	kg	16	16	48	48	72
<b>Suitable for Power Module</b>		6SL3310- 1GF31-8AA3 (110 kW)	6SL3310- 1GF32-6AA3 (160 kW)	6SL3310- 1GF34-1AA3 (250 kW)	6SL3310- 1GF34-7AA3 (315 kW)	6SL3310- 1GF37-4AA3 (500 kW)
		6SL3310- 1GF32-2AA3 (132 kW)	6SL3310- 1GF33-3AA3 (200 kW)		6SL3310- 1GF35-8AA3 (400 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 data refer to one dv/dt reactor.

<sup>1)</sup> Longer cable lengths for specific configurations are available on request.

# SINAMICS G130

## Drive converter chassis units

### Load-side power components dv/dt filters plus VPL

#### Technical data (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
<b>I<sub>thmax</sub></b>	A	100	150	215	330
<b>Degree of protection</b>		IP00	IP00	IP00	IP00
<b>Cable length, max.</b> between dv/dt filter and motor <sup>1)</sup>					
• shielded	m	300	300	300	300
• unshielded	m	450	450	450	450
<b>Conformity</b>		CE	CE	CE	CE
<b>Approvals, acc. to</b>		cURus	cURus	cURus	cURus
<b>dv/dt reactor</b>					
<b>Power loss</b>	kW	0.541	0.436	0.645	0.661
<b>Connections</b>					
• to Power Module		1 × hole M10	1 × hole M10	1 × hole M10	1 × hole M10
• to load		1 × hole M10	1 × hole M10	1 × hole M10	1 × hole M10
• PE		M6 screw	M6 screw	M6 screw	M6 screw
<b>Dimensions</b>					
• Width	mm	350	350	460	460
• Height	mm	320	320	360	360
• Depth	mm	227	227	275	275
<b>Weight, approx.</b>	kg	48	50	83	135
<b>Voltage Peak Limiter (VPL)</b>					
<b>Power loss</b>	kW	0.053	0.071	0.113	0.152
<b>Connections</b>					
• to dv/dt reactor		M8 nut	M8 nut	70 mm <sup>2</sup> terminals	70 mm <sup>2</sup> terminals
• to DC link		M8 nut	M8 nut	70 mm <sup>2</sup> terminals	70 mm <sup>2</sup> terminals
• PE		M8 stud	M8 stud	35 mm <sup>2</sup> terminals	35 mm <sup>2</sup> terminals
<b>Dimensions</b>					
• Width	mm	263	263	392	392
• Height	mm	265	265	285	285
• Depth	mm	188	188	210	210
<b>Weight, approx.</b>	kg	6	6	16	16
<b>Suitable for Power Module</b>		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)

<sup>1)</sup> Longer cable lengths for specific configurations are available on request.

#### Technical data (continued)

Line voltage 660 ... 690 V 3 AC		dv/dt filter plus VPL		
		6SL3000- 2DH34-1AA0	6SL3000- 2DH35-8AA0	6SL3000- 2DH38-1AA0
$I_{thmax}$	A	410	575	810
<b>Degree of protection</b>		IP00	IP00	IP00
<b>Cable length, max.</b> between dv/dt filter and motor <sup>1)</sup>				
• shielded	m	300	300	300
• unshielded	m	450	450	450
<b>Conformity</b>		CE	CE	CE
<b>Approvals, acc. to</b>		cURus	cURus	cURus
<b>dv/dt reactor</b>				
<b>Power loss</b>	kW	0.884	0.964	0.927
<b>Connections</b>				
• to Power Module		1 × hole M12	1 × hole M12	2 × hole M12
• to load		1 × hole M12	1 × hole M12	2 × hole M12
• PE		M6 screw	M6 screw	M6 screw
<b>Dimensions</b>				
• Width	mm	460	460	445
• Height	mm	385	385	385
• Depth	mm	312	312	312
<b>Weight, approx.</b>	kg	147	172	160
<b>Voltage Peak Limiter (VPL)</b>				
<b>Power loss</b>	kW	0.189	0.241	0.372
<b>Connections</b>				
• to dv/dt reactor		1 × hole M8	1 × hole M8	1 × hole M10
• to DC link		1 × hole M8	1 × hole M8	1 × hole M10
• PE		M8 stud	M8 stud	M8 stud
<b>Dimensions</b>				
• Width	mm	309	309	309
• Height	mm	1313	1313	1313
• Depth	mm	400	400	400
<b>Weight, approx.</b>	kg	48	48	72
<b>Suitable for Power Module</b>		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 data refer to one dv/dt reactor.

<sup>1)</sup> Longer cable lengths for specific configurations are available on request.



# SINAMICS G130

## Drive converter chassis units

Load-side power components  
dv/dt filters compact plus VPL

### Overview



dv/dt filter compact plus VPL (**V**oltage **P**eak **L**imiter) limit the voltage rate-of-rise  $dv/dt$  to values  $< 1600 \text{ V}/\mu\text{s}$  and the typical voltage peaks to the following values according to the limit value curve A to IEC 60034-25: 2007:

- $< 1150 \text{ V}$  at  $V_{\text{line}} < 575 \text{ V}$
- $< 1400 \text{ V}$  at  $660 \text{ V} < V_{\text{line}} < 690 \text{ V}$ .

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 filter 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 ( $> 100 \text{ m}$  shielded,  $> 150 \text{ m}$  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  $< 10 \text{ Hz}$  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 into 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 Order No.
<b>380 ... 480 V 3 AC</b>		
6SL3310-1GE32-1AA3	110	<b>6SL3000-2DE32-6EA0</b>
6SL3310-1GE32-6AA3	132	
6SL3310-1GE33-1AA3	160	<b>6SL3000-2DE35-0EA0</b>
6SL3310-1GE33-8AA3	200	
6SL3310-1GE35-0AA3	250	
6SL3310-1GE36-1AA3	315	<b>6SL3000-2DE38-4EA0</b>
6SL3310-1GE37-5AA3	400	
6SL3310-1GE38-4AA3	450	
6SL3310-1GE41-0AA3	560	<b>6SL3000-2DE41-4EA0</b>
<b>500 ... 600 V 3 AC</b>		
6SL3310-1GF31-8AA3	110	<b>6SL3000-2DG32-2EA0</b>
6SL3310-1GF32-2AA3	132	
6SL3310-1GF32-6AA3	160	<b>6SL3000-2DG33-3EA0</b>
6SL3310-1GF33-3AA3	200	
6SL3310-1GF34-1AA3	250	<b>6SL3000-2DG34-1EA0</b>
6SL3310-1GF34-7AA3	315	<b>6SL3000-2DG35-8EA0</b>
6SL3310-1GF35-8AA3	400	
6SL3310-1GF37-4AA3	500	<b>6SL3000-2DG38-1EA0</b>
6SL3310-1GF38-1AA3	560	
<b>660 ... 690 V 3 AC</b>		
6SL3310-1GH28-5AA3	75	<b>6SL3000-2DG31-0EA0</b>
6SL3310-1GH31-0AA3	90	
6SL3310-1GH31-8AA3	110	<b>6SL3000-2DG31-5EA0</b>
6SL3310-1GH32-2AA3	132	
6SL3310-1GH32-6AA3	160	<b>6SL3000-2DG32-2EA0</b>
6SL3310-1GH33-3AA3	200	
6SL3310-1GH34-1AA3	250	<b>6SL3000-2DG33-3EA0</b>
6SL3310-1GH33-3AA3	315	
6SL3310-1GH34-1AA3	400	
6SL3310-1GH34-7AA3	450	<b>6SL3000-2DG34-1EA0</b>
6SL3310-1GH35-8AA3	560	
6SL3310-1GH37-4AA3	710	<b>6SL3000-2DG35-8EA0</b>
6SL3310-1GH38-1AA3	800	

The SINAMICS Low Voltage Engineering Manual contains additional information about the dv/dt filters, which is available as a PDF file on the CD-ROM included with the catalog.

#### Technical data

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
<b>Rated current</b>	A	260	490	840	1405
<b><math>I_{thmax}</math></b>	A	260	490	840	1405
<b>Power loss, max.</b>					
• 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
<b>Power connection,</b> input and output sides		Hole for M10	Hole for M10	Hole for M12	2 x elongated hole, 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
<b>DC link connection,</b> DCPS, DCNS		Threaded socket M8	Threaded socket M8	Hole for M8	Hole for M8
• Conductor cross-section, max. (IEC)		mm <sup>2</sup> 16	25	50	95
<b>PE/GND connection</b>		Threaded socket M6	Threaded socket M6	Threaded socket M6	Threaded socket M6 (reactor and VPL)
<b>Cable length, max.</b> between dv/dt filter and motor					
• shielded		m 100	100	100	100
• unshielded		m 150	150	150	150
<b>Degree of protection</b>		IP00	IP00	IP00	IP00
<b>Dimensions</b>					
• 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
<b>Weight, approx.</b>		kg 41	61	103	Reactor: 168.8 VPL: 19.2 Total: 188
<b>Approvals,</b> acc. to		UL CSA (available soon)	UL CSA (available soon)	UL CSA (available soon)	UL CSA (available soon)
<b>Suitable for Power Module</b>		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)

# SINAMICS G130

## Drive converter chassis units

### Load-side power components dv/dt filters compact plus VPL

#### Technical data (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
<b>Rated current</b>	A	100	150	215	330
<b><math>I_{thmax}</math></b>	A	100	150	215	330
<b>Power loss, max.</b>					
• 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
<b>Power connection,</b> input and output sides		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
<b>DC link connection,</b> DCPS, DCNS		Threaded socket M8	Threaded socket M8	Hole for M8	Hole for M8
• Conductor cross-section, max. (IEC)	mm <sup>2</sup>	16	16	25	25
<b>PE/GND connection</b>		Threaded socket M6	Threaded socket M6	Threaded socket M6	Threaded socket M6
<b>Cable length, max.</b> between dv/dt filter and motor					
• shielded	m	100	100	100	100
• unshielded	m	150	150	150	150
<b>Degree of protection</b>		IP00	IP00	IP00	IP00
<b>Dimensions</b>					
• Width	mm	310	310	350	350
• Height	mm	283	283	317	317
• Depth	mm	238	238	260	260
<b>Weight, approx.</b>	kg	34	36	51	6
<b>Approvals, acc. to</b>		UL CSA (available soon)	UL CSA (available soon)	UL CSA (available soon)	UL CSA (available soon)
<b>Suitable for Power Module</b>					
• 500 ... 600 V 3 AC		-	-	6SL3310-1GF31-8AA3 (110 kW) 6SL3310-1GF32-2AA3 (132 kW)	6SL3310-1GF32-6AA3 (160 kW) 6SL3310-1GF33-3AA3 (200 kW)
• 660 ... 690 V 3 AC		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)

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#### Technical data (continued)

Line voltage 500 ... 690 V 3 AC		dv/dt filter compact plus VPL			
		6SL3000-2DG34-1EA0	6SL3000-2DG35-8EA0	6SL3000-2DG38-1EA0	6SL3000-2DG41-3EA0
<b>Rated current</b>	A	410	575	810	1270
<b><math>I_{thmax}</math></b>	A	410	575	810	1270
<b>Power loss, max.</b>					
• at 50 Hz 500/690 V	kW	0.55	0.571	Reactor: 0.88 VPL: 0.084 Total: 0.964	Reactor: 0.926 VPL: 0.124 Total: 1.055
• at 60 Hz 575 V	kW	0.568	0.586	Reactor: 0.918 VPL: 0.08 Total: 0.998	Reactor: 0.993 VPL: 0.111 Total: 1.104
• at 150 Hz 500/690 V	kW	0.678	0.689	Reactor: 1.37 VPL: 0.059 Total: 1.196	Reactor: 1.23 VPL: 0.089 Total: 1.319
<b>Power connection,</b> input and output sides		Hole for M12	Hole for M12	2 x elongated hole, 14x18 mm	2 x elongated hole, 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
<b>DC link connection,</b> DCPS, DCNS		Hole for M8	Hole for M8	Hole for M8	Hole for M8
• Conductor cross-section, max. (IEC)		mm <sup>2</sup> 50	50	95	95
<b>PE/GND connection</b>		Threaded socket M6	Threaded socket M6	Threaded socket M6 (reactor and VPL)	Threaded socket M6 (reactor and VPL)
<b>Cable length, max.</b> between dv/dt filter and motor					
• shielded	m	100	100	100	100
• unshielded	m	150	150	150	150
<b>Degree of protection</b>		IP00	IP00	IP00	IP00
<b>Dimensions</b>					
• Width	mm	440	440	Reactor: 430 VPL: 277	Reactor: 430 VPL: 277
• Height	mm	369	369	Reactor: 385 VPL: 360	Reactor: 385 VPL: 360
• Depth	mm	311	311	Reactor: 323 VPL: 291	Reactor: 323 VPL: 291
<b>Weight, approx.</b>	kg	87	100	Reactor: 171.2 VPL: 18.8 Total: 190	Reactor: 175.8 VPL: 19.2 Total: 195
<b>Approvals, acc. to</b>		UL CSA (available soon)	UL CSA (available soon)	UL CSA (available soon)	UL CSA (available soon)
<b>Suitable for Power Module</b>					
• 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 power 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. The maximum permissible motor feeder cable length is 300 m. The maximum output frequency is 150 Hz (380 V up to 480 V) or 115 Hz (500 V up to 600 V).

#### Note:

The pulse frequency of the converter must be increased when a sine-wave filter is used. This reduces the power available at the drive converter output (for the derating factor, refer to the SINAMICS Low Voltage Engineering Manual). The modulation depth of the output voltage decreases to approx. 85 % (380 V to 480 V) or approx. 83 % (500 V to 600 V). It should be noted that the reduced voltage at the motor terminals compared to the rated motor voltage means that the motor reaches the field weakening range earlier.

It is only permissible to operate the sine-wave filter when the motor is connected! (Sine-wave filters are not no-load proof).

The SINAMICS Low Voltage Engineering Manual contains additional information about sine-wave filters, which is available as a PDF file on the CD-ROM included with the catalog.

#### Selection and ordering data

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

#### Technical data

Line voltage 380 ... 480 V 3 AC		Sine-wave filter			
		6SL3000-2CE32-3AA0	6SL3000-2CE32-8AA0	6SL3000-2CE33-3AA0	6SL3000-2CE34-1AA0
Rated current	A	225	276	333	408
Power loss	kW	0.6	0.69	0.53	0.7
<b>Connections</b>					
• 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
<b>Max. cable length between sine-wave filter and motor</b>					
• shielded	m	300	300	300	300
• unshielded	m	450	450	450	450
<b>Degree of protection</b>		IP00	IP00	IP00	IP00
<b>Dimensions</b>					
• 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
<b>Conformity</b>		CE	CE	CE	CE
<b>Approvals, acc. to</b>		cURus	cURus	cURus	cURus
<b>Suitable for Power Module</b>		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	A	188
Power loss	kW	0.8
<b>Connections</b>		
• Load		1 hole for M10
• PE		1 hole for M10
<b>Max. cable length between motor reactor and motor</b>		
• shielded	m	300
• unshielded	m	450
<b>Degree of protection</b>		IP00
<b>Dimensions</b>		
• Width	mm	620
• Height	mm	370
• Depth	mm	360
Weight, approx.	kg	210
<b>Conformity</b>		CE
<b>Approvals, acc. to</b>		cURus
<b>Suitable for Power Module</b>		6SL3310-1GF31-8AA3 (110 kW) 6SL3310-1GF32-2AA3 (132 kW)

#### Overview



The communication, open-loop and closed-loop control functions for the chassis units are executed in the CU320-2 DP Control Unit.

The Control Unit Kit, which consists of the CU320-2 DP Control Unit and the drive software installed on the CompactFlash card, provides predefined interfaces that simplify configuring and commissioning. The CompactFlash card is plugged into the CU320-2 DP, and can be quickly replaced in order to upgrade the software.

#### Design

The CU320-2 DP Control Unit features the following connections and interfaces as standard:

- 4 DRIVE-CLiQ sockets for communication with other DRIVE-CLiQ devices, e.g. chassis units or Terminal Modules
- 1 PROFIBUS interface with PROFIdrive profile
- 12 parameterizable digital inputs (floating)
- 8 parameterizable bidirectional digital inputs/digital 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 extension
- 2 rotary coding switches for manually setting the PROFIBUS address
- 1 Ethernet interface for commissioning and diagnostics
- 3 test sockets and one reference ground for commissioning support
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE/protective conductor connection
- 1 ground connection

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

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

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

#### Selection and ordering data

Description	Order No.
<b>Control Unit Kit PROFIBUS DP</b> consisting of: • Control Unit CU320-2 DP • CompactFlash card with the latest firmware • DRIVE-CLiQ cable • 24 V cable to the power supply • Equipment documentation on CD • STARTER commissioning tool on DVD	<b>6SL3040-1GA00-1AA0</b>

#### Accessories

Description	Order No.
<b>PROFIBUS connector</b> without PG/PC connection	<b>6ES7972-0BA42-0XA0</b>
<b>PROFIBUS connector</b> with PG/PC connection	<b>6ES7972-0BB42-0XA0</b>
<b>Dust-proof blanking plugs</b> (50 units) for closing unused DRIVE-CLiQ ports	<b>6SL3066-4CA00-0AA0</b>

The SINAMICS Low Voltage Engineering Manual contains additional information about the CU320-2 DP Control Unit, which is available as a PDF file on the CD-ROM included with Catalog D 11.

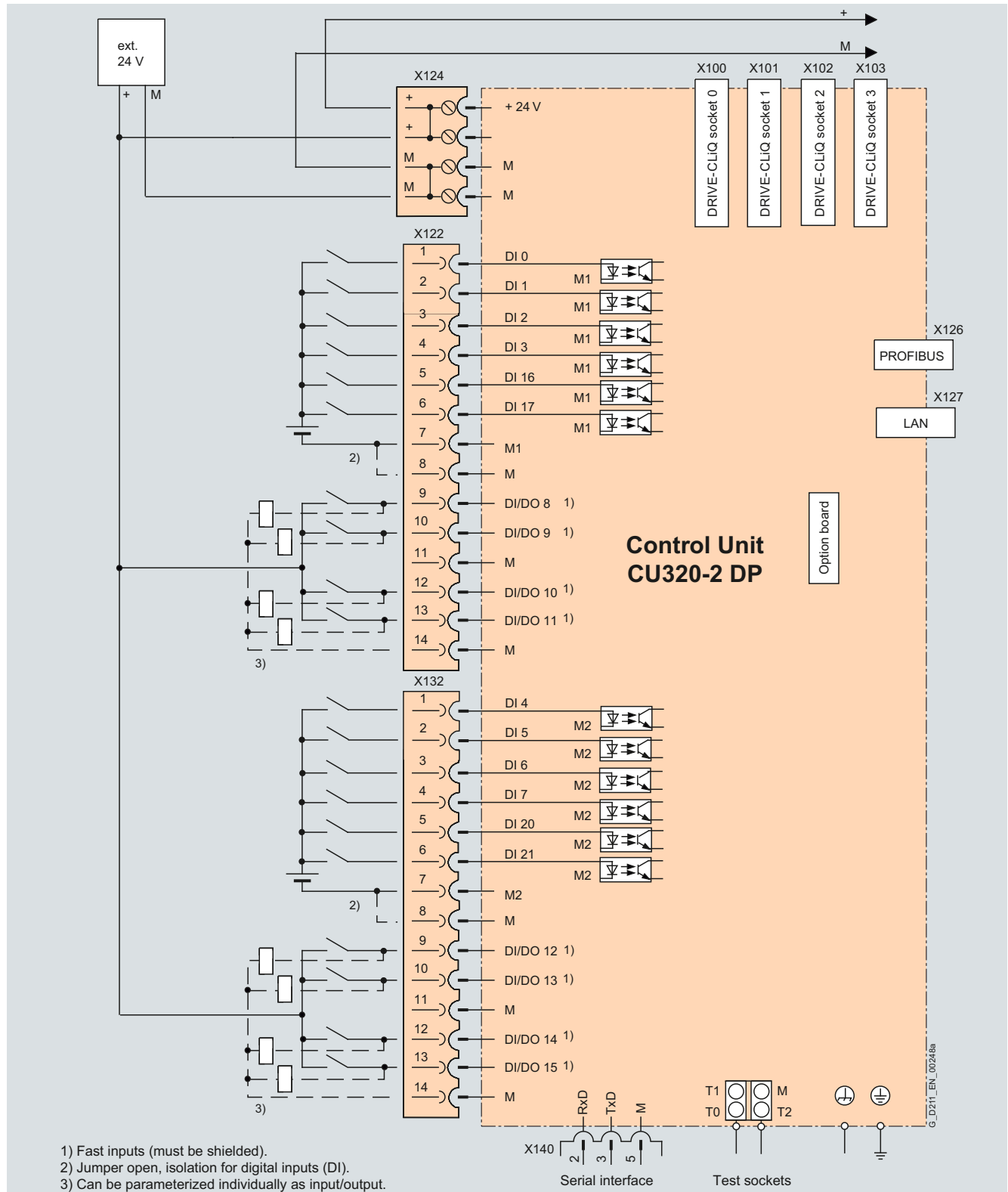


#### Integration

A CU320-2 DP Control Unit communicates with the components connected to it via DRIVE-CLiQ.

A CU320-2 DP Control Unit communicates with the higher-level control system using PROFIBUS and the PROFdrive profile.

A DRIVE-CLiQ cable to connect the CU320-2 DP to the SINAMICS G130 converter is included in the scope of supply of the Power Modules.



CU320-2 DP Control Unit connection diagram

#### Technical data

##### Control Unit CU320-2 DP

<b>Current requirement, max.</b> at 24 V DC, typ. without taking into account digital outputs, expansion option slot and DRIVE-CLiQ supply	1.0 A
<ul style="list-style-type: none"> <li>• Conductor cross-section, max.</li> </ul>	2.5 mm <sup>2</sup>
<ul style="list-style-type: none"> <li>• Fuse protection, max.</li> </ul>	20 A
<b>Digital inputs</b> in accordance with IEC 61131-2 type 1	12 floating digital inputs 8 bidirectional, non-floating digital inputs/outputs
<ul style="list-style-type: none"> <li>• Voltage</li> </ul>	-3 V ... +30 V
<ul style="list-style-type: none"> <li>• Low level (an open digital input is interpreted as "low")</li> </ul>	-3 V ... +5 V
<ul style="list-style-type: none"> <li>• High level</li> </ul>	15 V ... 30 V
<ul style="list-style-type: none"> <li>• Current consumption at 24 V DC, typ.</li> </ul>	9 mA
<ul style="list-style-type: none"> <li>• Delay time of the digital inputs, approx. <sup>1)</sup> <ul style="list-style-type: none"> <li>- L → H</li> <li>- H → L</li> </ul> </li> </ul>	50 μs 100 μs
<ul style="list-style-type: none"> <li>• Delay time of the fast digital inputs, approx. <sup>1)</sup> <ul style="list-style-type: none"> <li>- L → H</li> <li>- H → L</li> </ul> </li> </ul>	5 μs 50 μs
<ul style="list-style-type: none"> <li>• Conductor cross-section, max.</li> </ul>	1.5 mm <sup>2</sup>
<b>Digital outputs</b> (continuously short-circuit-proof)	8 bidirectional non-floating digital inputs/outputs
<ul style="list-style-type: none"> <li>• Voltage</li> </ul>	24 V DC
<ul style="list-style-type: none"> <li>• Load current per digital output, max.</li> </ul>	500 mA
<ul style="list-style-type: none"> <li>• Delay time, typ. / max.                             <ul style="list-style-type: none"> <li>- L → H</li> <li>- H → L</li> </ul> </li> </ul>	150 μs / 400 μs 75 μs / 100 μs
<ul style="list-style-type: none"> <li>• Conductor cross-section, max.</li> </ul>	1.5 mm <sup>2</sup>
<b>Power loss</b>	24 W
<b>PE connection</b>	M5 screw
<b>Ground connection</b>	M5 screw
<b>Dimensions</b> <ul style="list-style-type: none"> <li>• Width</li> <li>• Height</li> <li>• Depth</li> </ul>	50 mm 300 mm 226 mm
<b>Weight, approx.</b>	2.3 kg
<b>Approvals, acc. to</b>	cULus

<sup>1)</sup> The specified delay times refer to the hardware. The actual reaction time depends on the time slice in which the digital input or output is processed.

#### Overview



The communication, open-loop and closed-loop control functions for the chassis units are executed in the CU320-2 PN Control Unit.

The Control Unit Kit, which consists of the CU320-2 PN Control Unit and the drive software installed on the CompactFlash card, provides predefined interfaces that simplify configuring and commissioning. The CompactFlash card is plugged into the CU320-2 PN and can be quickly replaced in order to upgrade the software.

#### Design

The CU320-2 PN Control Unit features the following connections and interfaces as standard:

- 4 DRIVE-CLiQ sockets for communication with other DRIVE-CLiQ devices, e.g. chassis units or Terminal Modules
- 2 PROFINET interface with PROFIdrive profile
- 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 extension
- 1 Ethernet interface for commissioning and diagnostics
- 3 test sockets and one reference ground for commissioning support
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE/protective conductor connection
- 1 ground connection

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

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

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

#### Selection and ordering data

Description	Order No.
<b>Control Unit Kit PROFINET PN</b>	<b>6SL3040-1GA01-1AA0</b>
consisting of:	
• Control Unit CU320-2 PN	
• CompactFlash card with the latest firmware	
• DRIVE-CLiQ cable	
• 24 V cable to the power supply	
• Equipment documentation on CD	
• STARTER commissioning tool on DVD	

#### Accessories

Description	Order No.
<b>Industrial Ethernet FC</b>	
• RJ45 Plug 145 (1 unit)	<b>6GK1901-1BB30-0AA0</b>
• RJ45 Plug 145 (10 units)	<b>6GK1901-1BB30-0AB0</b>
• Stripping tool	<b>6GK1901-1GA00</b>
• Standard cable GP 2x2	<b>6XV1840-2AH10</b>
• Flexible cable GP 2x2	<b>6XV1870-2B</b>
• Trailing cable GP 2x2	<b>6XV1870-2D</b>
• Trailing cable 2x2	<b>6XV1840-3AH10</b>
• Marine cable 2x2	<b>6XV1840-4AH10</b>
<b>Dust-proof blanking plugs</b>	<b>6SL3066-4CA00-0AA0</b>
(50 units) for closing unused DRIVE-CLiQ ports	

The SINAMICS Low Voltage Engineering Manual contains additional information about the CU320-2 PN Control Unit, which is available as a PDF file on the CD-ROM included with Catalog D 11.

# SINAMICS G130

## Drive converter chassis units

### Control Unit Kit CU320-2 PN (PROFINET)

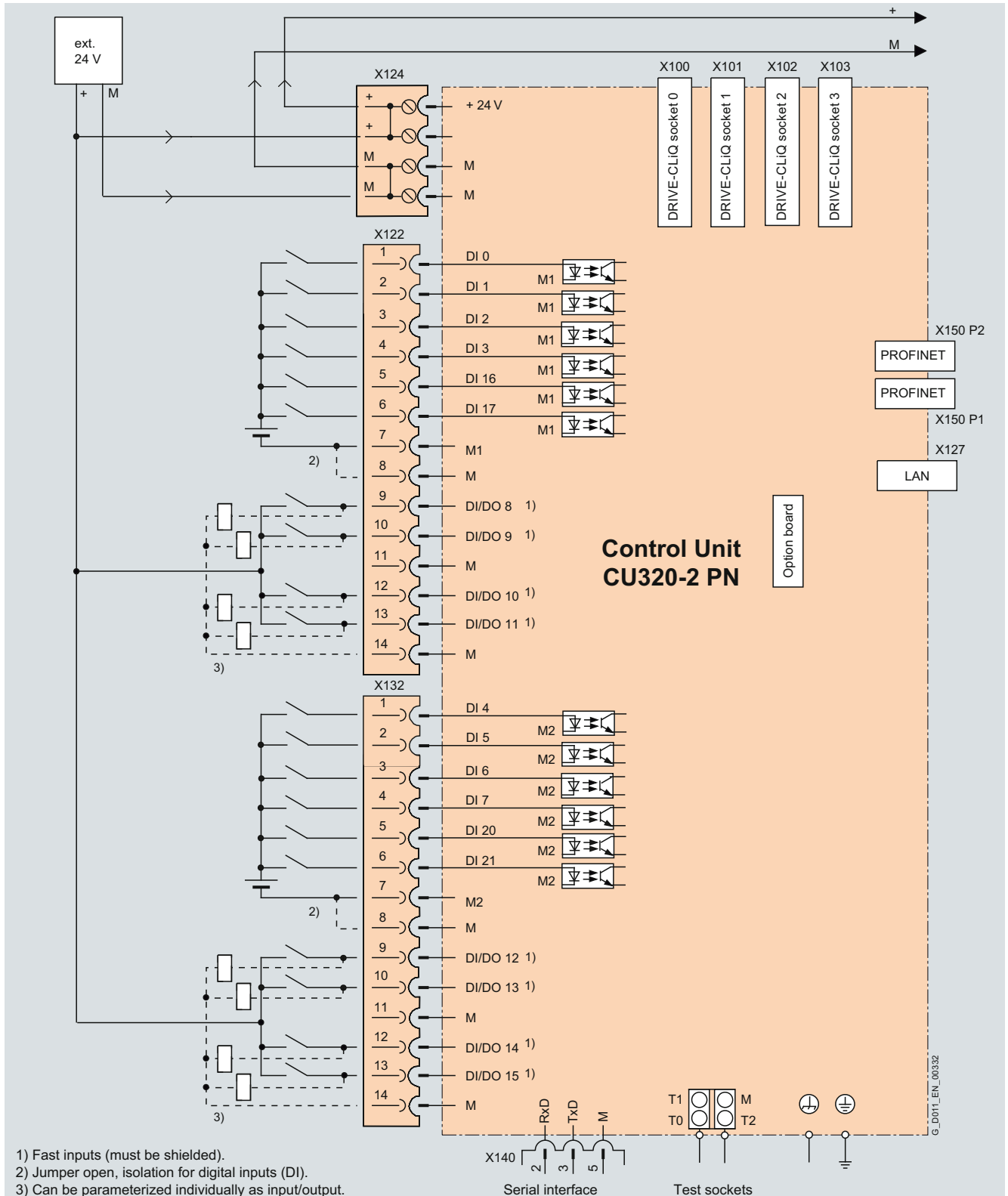
#### Integration

A CU320-2 PN Control Unit communicates with the components connected to it via DRIVE-CLiQ.

A DRIVE-CLiQ cable to connect the CU320-2 PN to the SINAMICS G130 converter is included in the scope of supply of the Power Modules.

A CU320-2 PN Control Unit communicates with the higher-level control system using PROFINET and the PROFIdrive profile.

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

Connection diagram, Control Unit CU320-2 PN

#### Technical data

##### Control Unit CU320-2 PN

<b>Current requirement, max.</b> at 24 V DC, typ. without taking into account digital outputs, expansion option slot and DRIVE-CLiQ supply	1.0 A
• Conductor cross-section, max.	2.5 mm <sup>2</sup>
• Fuse protection, max.	20 A
<b>Digital inputs</b> in accordance with IEC 61131-2 type 1	12 floating digital inputs 8 bidirectional, non-floating digital inputs/outputs
• Voltage	-3 V ... +30 V
• Low level (an open digital input is interpreted as "low")	-3 V ... +5 V
• High level	15 V ... 30 V
• Current consumption at 24 V DC, typ.	9 mA
• Delay time of the digital inputs, approx. <sup>1)</sup>	
- L → H	50 μs
- H → L	100 μs
• Delay time of the fast digital inputs, approx. <sup>1)</sup>	
- L → H	5 μs
- H → L	50 μs
• Conductor cross-section, max.	1.5 mm <sup>2</sup>
<b>Digital outputs</b> (continuously 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 μs / 400 μs
- H → L	75 μs / 100 μs
• Conductor cross-section, max.	1.5 mm <sup>2</sup>
<b>Power loss</b>	24 W
<b>PE connection</b>	M5 screw
<b>Ground connection</b>	M5 screw
<b>Dimensions</b>	
• Width	50 mm
• Height	300 mm
• Depth	226 mm
<b>Weight, approx.</b>	2.3 kg
<b>Approvals, acc. to</b>	cULus

<sup>1)</sup> The specified delay times refer to the hardware. The actual reaction time depends on the time slice in which the digital input or output is processed.

# SINAMICS G130

## Drive converter chassis units

### Supplementary system components BOP20 Basic Operator Panel

#### Overview



BOP20 Basic Operator Panel

The BOP20 Basic Operator Panel can be plugged into the CU320-2 Control Unit and may be used to acknowledge faults, set parameters and read diagnostic information (e.g. alarms and fault messages).

#### Design

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

The integrated plug connector at the rear of the BOP20 Basic Operator Panel is used to connect power to the BOP20 and establish communication with the CU320-2 Control Unit.

#### Integration



CU320-2 Control Unit with inserted BOP20 Basic Operator Panel

#### Selection and ordering data

Description	Order No.
<b>BOP20 Basic Operator Panel</b>	<b>6SL3055-0AA00-4BA0</b>

# SINAMICS G130

## Drive converter chassis units

### Supplementary system components AOP30 Advanced Operator Panel

#### Overview



The user-friendly AOP30 operator panel is an optional input/output device for SINAMICS G130 converters. For SINAMICS G150 drive converter cabinet units, it is fitted in the cabinet door as standard. It can be ordered separately for a SINAMICS G130 converter.

It has the following features and characteristics:

- Graphical LCD display with backlighting for plain text display and a bar display of process variables
- LEDs for display of operating modes
- Help function describing causes of and remedies for faults and alarms
- Keypad for operational control of a drive
- Local/remote switchover for selecting the input point (priority assigned to operator panel or customer Terminal Module/communications channel)
- Numeric keypad for input of setpoint or parameter values
- Function keys for prompted 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 operating panel.
  - A password can be used to prevent the unauthorized modification of converter parameters.
- Front panel with degree of protection IP55

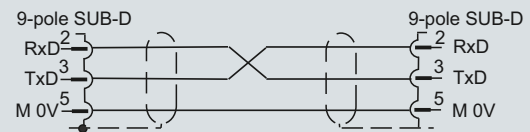
The AOP30 communicates with the SINAMICS drive via the serial RS232 interface and PPI protocol.

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.

An external 24 V power supply (max. power consumption 200 mA) is needed to operate the AOP30. This can be tapped from the Power Module supply.

**AOP30**  
X540

**CU320-2**  
X140



G\_D011\_EN\_00068

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 (thickness: between 2 mm and 4 mm).

Features:

- Display with green backlighting, resolution 240 x 64 pixels
- 26-key membrane keyboard
- Connection for a 24 V power supply
- RS232 interface to the CU320-2
- Time and date memory with internal battery backup
- 4 LEDs to signal 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.

**English, German, French, Italian, Spanish** and **Chinese** are stored on the CU320-2 Control Unit's CompactFlash card as operator panel languages. The desired language must be downloaded to the AOP30 prior to commissioning. **Russian, Polish** and **Czech** are available in addition to these standard panel languages. These can be downloaded free of charge from the Internet under the following link:  
<http://support.automation.siemens.com/>

#### Selection and ordering data

Description	Order No.
<b>AOP30 Advanced Operator Panel</b>	<b>6SL3055-0AA00-4CA4</b>

#### Accessories

RS232 plug-in cable for connecting the AOP30 to the CU320-2	Length m	Order No.
	1	<b>6FX8002-1AA01-1AB0</b>
	2	<b>6FX8002-1AA01-1AC0</b>
	3	<b>6FX8002-1AA01-1AD0</b>
	4	<b>6FX8002-1AA01-1AE0</b>
	5	<b>6FX8002-1AA01-1AF0</b>
	6	<b>6FX8002-1AA01-1AG0</b>
	7	<b>6FX8002-1AA01-1AH0</b>
	8	<b>6FX8002-1AA01-1AJ0</b>
	9	<b>6FX8002-1AA01-1AK0</b>
	10	<b>6FX8002-1AA01-1BA0</b>

#### Technical data

AOP30 Advanced Operator Panel	
<b>Power supply</b>	24 V DC (20.4 V ... 28.8 V)
<b>Current requirement</b>	
• Without backlighting	< 100 mA
• For max. backlighting	< 200 mA
<b>Data interface</b>	RS232/RS485 interface, PPI protocol
<b>Backup battery</b>	3 V lithium CR2032
<b>Operating temperature</b>	0 ... 55 °C
<b>Storage and transport temperature</b>	-25 ... +70 °C
<b>Degree of protection</b>	IP20 from the inside of the cabinet IP55 from the outside of the cabinet
<b>Dimensions</b>	
• Width	212 mm
• Height	156 mm
• Depth	31 mm
<b>Weight</b>	0.55 kg
<b>Approvals, acc. to</b>	cULus, CE



#### Overview



The CBC10 Communication Board is used to interface the CU320-2 Control Unit to the CAN (Controller Area Network) protocol. The board's driver software fulfills 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

#### Design

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

#### Technical data

##### CBC10 Communication Board

<b>Current requirement, max.</b> at 24 V DC via CU320-2 Control Unit	0.05 A
<b>Power loss</b>	< 3 W
<b>Weight, approx.</b>	0.1 kg
<b>Approvals, acc. to</b>	cULus

#### Selection and ordering data

Description	Order No.
<b>CBC10 Communication Board</b>	<b>6SL3055-0AA00-2CA0</b>

#### Accessories

Description	Order No.
<b>SUB-D connector</b> , 9-pin, socket (3 units)	<b>6FC9341-2AE</b>
<b>SUB-D connector</b> , 9-pin, plug connector (3 units)	<b>6FC9341-2AF</b>

#### Overview



The CBE20 Communication Board is required, if

- a SINAMICS G130 or G150 converter, equipped with a Control Unit CU320-2 DP (PROFIBUS), is to be connected to a PROFINET-IO network,
- SINAMICS Link is to be used to directly exchange data between several Control Units CU320-2 DP (PROFIBUS) or CU320-2 PN (PROFINET) without using a higher-level control system.

With the CBE20 Communication Board, SINAMICS G130 or G150 then assumes the function of a PROFINET IO device in the sense of PROFINET and can perform 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  $\mu$ s
- Connects to controls 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 the PROFINET ASIC ERTEC400. The optimum topology (line, star, tree) can therefore be configured without additional external switches.

#### SINAMICS Link

SINAMICS Link can be used to directly exchange data between several Control Units CU320-2 DP (PROFIBUS) or CU320-2 PN (PROFINET) without using a higher-level control system. In this case, the Communication Board CBE20 is required. Potential applications for the SINAMICS Link are:

- Torque distribution with multiple drive systems
- Setpoint cascading with multiple drive systems
- Load distribution on drives coupled by material
- 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 or the CUD Control Units of the SINAMICS DC Master cannot be linked into this communication network.

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

#### Integration

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

#### Technical data

CBE20 Communication Board	
<b>Current requirement</b> at 24 V DC	0.16 A
<b>Ambient temperature, permissible</b>	
• Storage and transport	-40 ... +70 °C
• Operation	0 ... 55 °C
<b>Dimensions</b>	130 mm x 78 mm
<b>Weight, approx.</b>	76 g
<b>Approvals, acc. to</b>	cULus

#### Selection and ordering data

Description	Order No.
<b>CBE20 Communication Board</b>	<b>6SL3055-0AA00-2EB0</b>

#### Accessories

Description	Order No.
<b>Industrial Ethernet FC</b>	
• RJ45 Plug 145 (1 unit)	<b>6GK1901-1BB30-0AA0</b>
• RJ45 Plug 145 (10 units)	<b>6GK1901-1BB30-0AB0</b>
• Stripping tool	<b>6GK1901-1GA00</b>
• Standard cable GP 2x2	<b>6XV1840-2AH10</b>
• Flexible cable GP 2x2	<b>6XV1870-2B</b>
• Trailing cable GP 2x2	<b>6XV1870-2D</b>
• Trailing cable 2x2	<b>6XV1840-3AH10</b>
• Marine cable 2x2	<b>6XV1840-4AH10</b>

For further information about connectors and cables, refer to Catalog IK PI.

#### Overview



The TB30 Terminal Board supports the addition of digital inputs/digital outputs and analog inputs/analog outputs to the CU320-2 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

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

A shield support for the signal cable shield is located on the CU320-2 Control Unit.

#### Selection and ordering data

Description	Order No.
<b>TB30 Terminal Board</b>	<b>6SL3055-0AA00-2TA0</b>

#### Technical data

##### TB30 Terminal Board

<b>Current requirement, max.</b> at 24 V DC via the CU320-2 Control Unit without taking into account the digital outputs	0.05 A
• Conductor cross-section, max.	2.5 mm <sup>2</sup>
• 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 <sup>1)</sup> , approx.	
- L → H	50 μs
- H → L	100 μs
• Conductor cross-section, max.	0.5 mm <sup>2</sup>

##### Digital outputs

(continuously short-circuit-proof)

• Voltage	24 V DC
• Load current per digital output, max.	500 mA
• Delay time of digital outputs <sup>1)</sup> , approx.	150 μs
• Conductor cross-section, max.	0.5 mm <sup>2</sup>

##### Analog inputs

(difference)

• Voltage range (an open analog input is interpreted as 0 V)	-10 ... +10 V
• Internal resistance $R_i$	65 kΩ
• Resolution <sup>2)</sup>	13 bits + sign
• Conductor cross-section, max.	0.5 mm <sup>2</sup>

##### Analog outputs

(continuously short-circuit-proof)

• Voltage range	-10 ... +10 V
• Load current, max.	-3 ... +3 mA
• Resolution	11 bits + sign
• Settling time, approx.	200 μs
• Conductor cross-section, max.	0.5 mm <sup>2</sup>

<b>Power loss</b>	< 3 W
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<b>Weight, approx.</b>	0.1 kg
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<b>Approvals,</b> acc. to	cULus
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<sup>1)</sup> The specified delay times refer to the hardware. The actual reaction time depends on the time slice in which the digital input/output is processed.

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

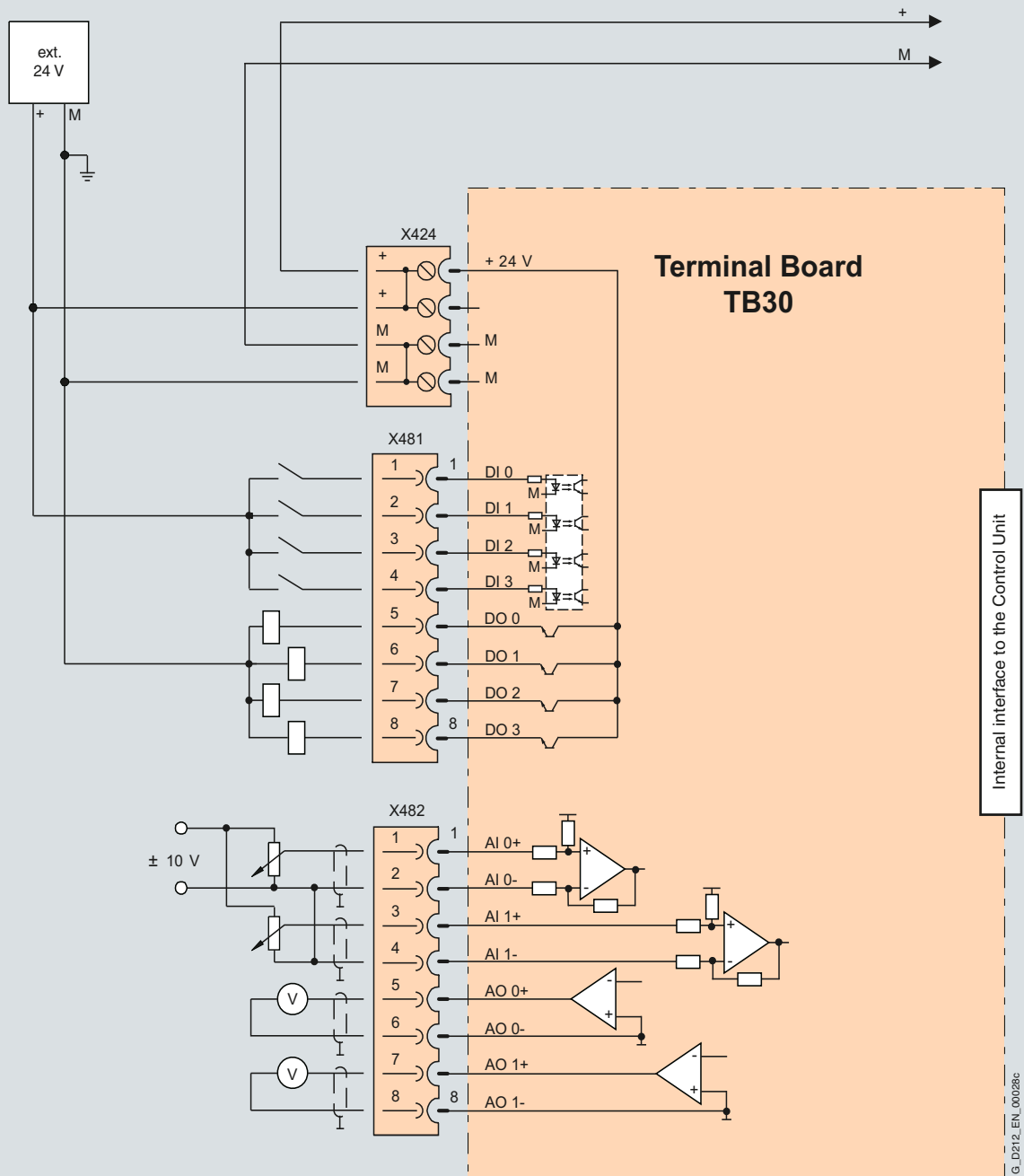
# SINAMICS G130

## Drive converter chassis units

### Supplementary system components TB30 Terminal Board

#### Integration

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Typical connection of TB30 Terminal Board

### Overview



The TM31 Terminal Module can be used to increase the number of available digital inputs and outputs and the number of analog input and outputs within a drive system.

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 TM31 Terminal Module can be snapped onto a TH 35 mounting rail to EN 60715 (IEC 60715).

The signal cable shield can be connected to the TM31 Terminal Module via a shield connection terminal, e.g. Phoenix Contact type SK8 or Weidmüller type KLBÜ CO 1. The shield connection terminal must not be used for strain relief.

The status of the TM31 Terminal Module is indicated via a multi-color LED.

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### Selection and ordering data

Description	Order No.
<b>TM31 Terminal Module</b> (without DRIVE-CLiQ cable)	<b>6SL3055-0AA00-3AA1</b>

#### Technical data

TM31 Terminal Module	
<b>Current requirement, max.</b> at 24 V DC, not taking into account the digital outputs	0.2 A
• Conductor cross-section, max.	2.5 mm <sup>2</sup>
• Fuse protection, max.	20 A
<b>Digital inputs</b> 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 <sup>1)</sup> , approx.	
- L → H	50 μs
- H → L	100 μs
• Conductor cross-section, max.	1.5 mm <sup>2</sup>
<b>Digital outputs</b> (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 <sup>1)</sup>	
- typ.	150 μs at 0.5 A resistive load
- max.	500 μs
• Conductor cross-section, max.	1.5 mm <sup>2</sup>
<b>Analog inputs</b> (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
• As current input	
- Current range	4 ... 20 mA, -20 ... +20 mA, 0 ... 20 mA
- Internal resistance $R_i$	250 Ω
- Resolution <sup>2)</sup>	11 bits + sign
• Conductor cross-section, max.	1.5 mm <sup>2</sup>
<b>Analog outputs</b> (continuously short-circuit-proof)	
• Voltage range	-10 ... +10 V
• Load current, max.	-3 ... +3 mA
• Current range	4 ... 20 mA, -20 ... +20 mA, 0 ... 20 mA
• Load resistance, max.	500 Ω for outputs in the range -20 ... +20 mA
• Resolution	11 bits + sign
• Conductor cross-section, max.	1.5 mm <sup>2</sup>

TM31 Terminal Module	
<b>Relay outputs</b> (changeover contacts)	
• Load current, max.	8 A
• Operating 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 <sup>2</sup>
<b>Power loss</b>	< 5 W
<b>PE connection</b>	M4 screw
<b>Dimensions</b>	
• Width	50 mm
• Height	150 mm
• Depth	111 mm
<b>Weight, approx.</b>	0.87 kg
<b>Approvals, acc. to</b>	cULus

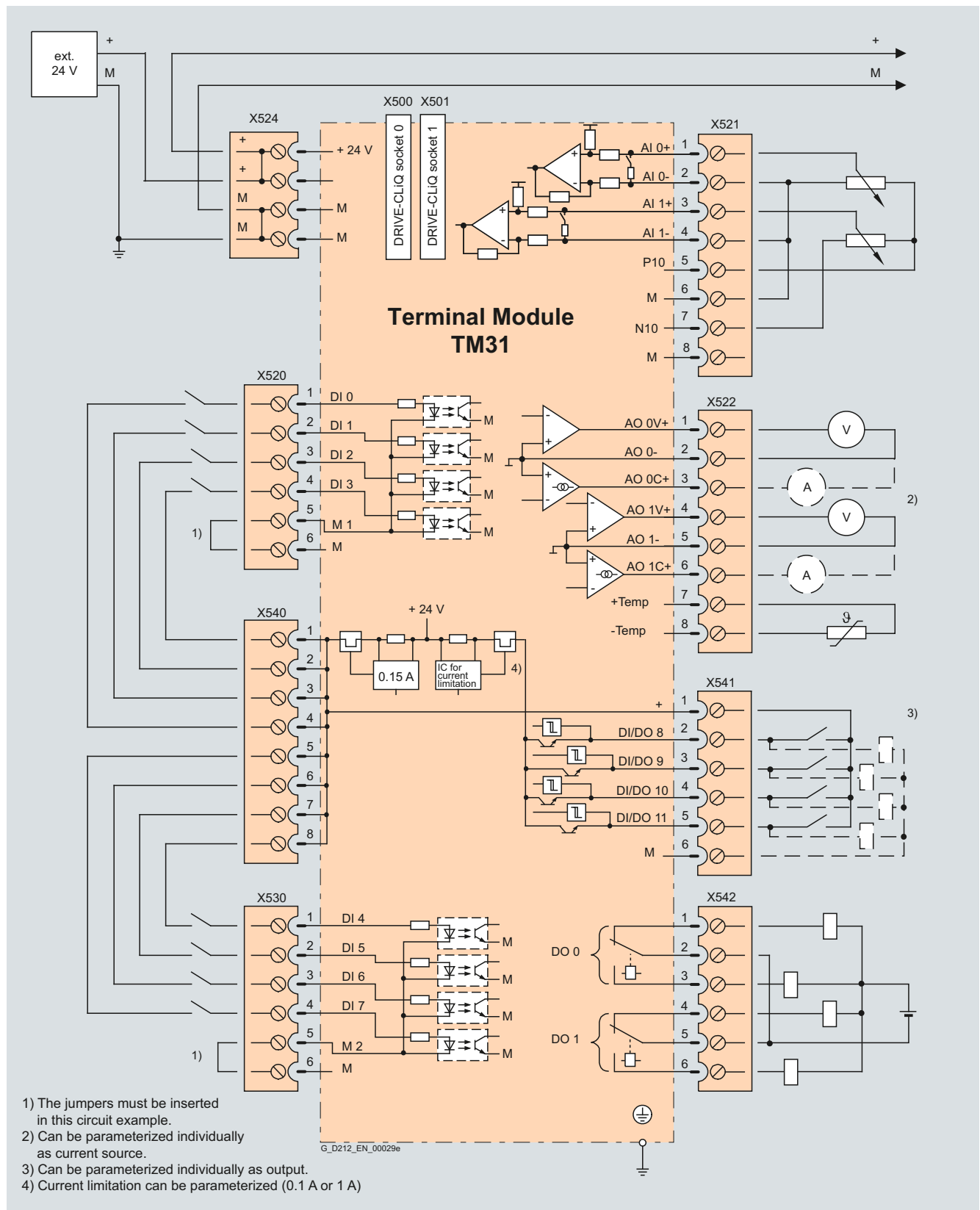
<sup>1)</sup> The specified delay times refer to the hardware. The actual reaction time depends on the time slice in which the digital input/output is processed.

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

#### Integration

The TM31 Terminal Module communicates with the CU320-2 Control Unit via DRIVE-CLiQ.

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Typical connection of TM31 Terminal Module

# SINAMICS G130

## Drive converter chassis units

### Supplementary system components VSM10 Voltage Sensing Module

#### Overview



The VSM10 Voltage Sensing Module reads the voltage waveshape at the motor end. This allows the SINAMICS G130 converter to be connected to a permanent-magnet, synchronous motor without encoder ("flying restart" function).

#### 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 PE/protective conductor connection

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

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

#### Technical data

##### VSM10 Voltage Sensing Module

<b>Current requirement, max.</b> at 24 V DC	0.2 A
• Conductor cross-section, max.	2.5 mm <sup>2</sup>
<b>Power loss, approx.</b>	< 5 W
<b>Voltage sensing</b>	
• Input resistance	
- Terminal X521	> 362 k $\Omega$ /phase
- Terminal X522	> 2.5 M $\Omega$ /phase
<b>2 analog inputs</b> (reserved for monitoring an Active Interface Module in chassis format)	
• Internal resistance (between differential inputs)	approx. 100 k $\Omega$
• Resolution	12 bit
<b>PE connection</b>	M4 screw at the housing
<b>Dimensions</b>	
• Width	50 mm
• Height	150 mm
• Depth	111 mm
<b>Weight, approx.</b>	0.9 kg
<b>Approvals,</b> acc. to	cULus

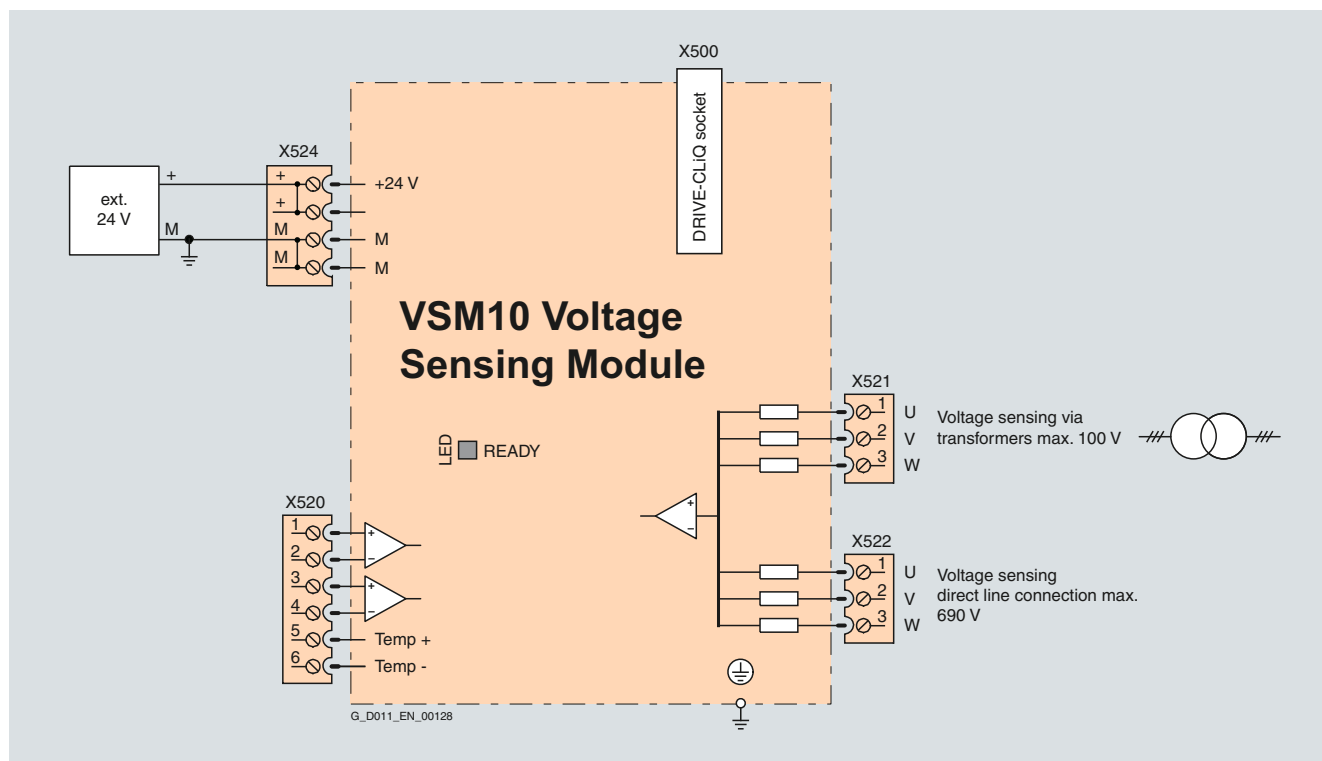
#### Selection and ordering data

Description	Order No.
<b>VSM10 Voltage Sensing Module</b> (without DRIVE-CLiQ cable)	<b>6SL3053-0AA00-3AA0</b>



#### Integration

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



Typical connection of VSM10 Voltage Sensing Module

#### Overview



The SMC30 Sensor Module Cabinet-Mounted can be used to evaluate the encoders 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 and 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 interfaces as standard:

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

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

The SMC30 Sensor Module Cabinet-Mounted can be snapped onto a TH 35 top-hat 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<sup>2</sup>.

The signal cable shield can be connected to the SMC30 Sensor Module Cabinet-Mounted via a shield connection terminal, e.g. Phoenix Contact type SK8 or Weidmüller type KLBÜ CO 1.

#### Integration

The SMC30 Sensor Module Cabinet-Mounted communicates with the CU320-2 Control Unit via DRIVE-CLiQ.

#### Technical data

##### SMC30 Sensor Module Cabinet-Mounted

<b>Current requirement, max.</b> at 24 V DC, not taking an encoder into account	0.2 A
• Conductor cross-section, max.	2.5 mm <sup>2</sup>
• Fuse protection, max.	20 A
<b>Power loss</b>	< 10 W
<b>Encoders which can be evaluated</b>	<ul style="list-style-type: none"> <li>• Incremental encoder TTL/HTL</li> <li>• SSI encoder with TTL/HTL incremental signals</li> <li>• SSI encoder without incremental signals</li> </ul>
• Input impedance	
- TTL	576 Ohm
- 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 ... 250 kBaud
• Limiting frequency	300 kHz
• Resolution absolute position SSI	30 bit
• Cable length, max.	
- TTL encoder	100 m (only bipolar signals permitted) <sup>1)</sup>
- HTL encoder	100 m for unipolar signals 300 m for bipolar signals <sup>1)</sup>
- SSI encoder	100 m
<b>PE connection</b>	M4 screw
<b>Dimensions</b>	
• Width	30 mm
• Height	150 mm
• Depth	111 mm
<b>Weight, approx.</b>	0.45 kg
<b>Approvals, acc. to</b>	cULus

#### Selection and ordering data

Description	Order No.
<b>SMC30 Sensor Module Cabinet-Mounted</b> (without DRIVE-CLiQ cable)	<b>6SL3055-0AA00-5CA2</b>

<sup>1)</sup> Signal cables twisted in pairs and shielded.

# SINAMICS G130

## Drive converter chassis units

### MOTION-CONNECT connection system Signal cables

#### Overview



Communication between the CU320-2 Control Unit, the Power Module and other active SINAMICS components takes place via DRIVE-CLiQ, the drive's internal serial interface. Pre-assembled cables are available for this purpose.

#### MOTION-CONNECT DRIVE-CLiQ cables

Pre-assembled MOTION-CONNECT cables for DRIVE-CLiQ are available pre-cut to length in order to connect the Control Units to the Power Modules and Terminals.

The DRIVE-CLiQ cable needed to connect the Power Module to the Control Unit is supplied as standard with the Power Module.

#### Application

The DRIVE-CLiQ cables are suitable only for wiring DRIVE-CLiQ components which have an external 24 V DC power supply.

#### 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).

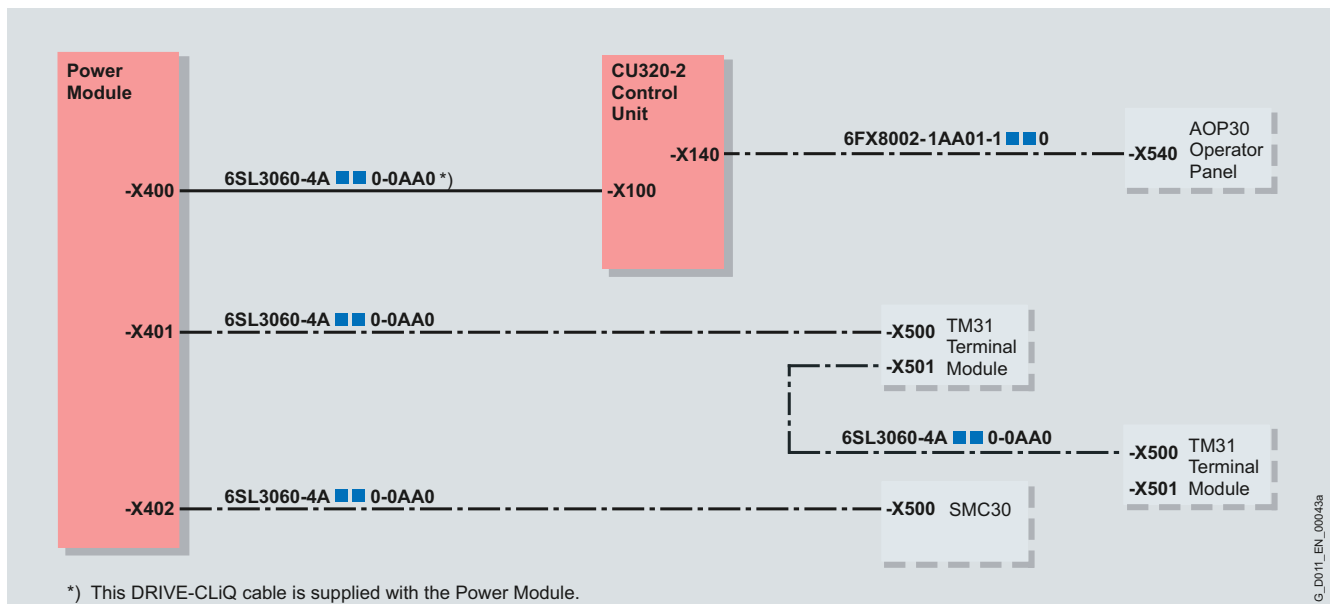
The maximum cable length is 10 m. To guarantee disturbance-free communication, a shielded cable is recommended, and the cable shield should be connected to both connector housings.

#### Selection and ordering data

Signal cable	Length m	Order No.
Pre-assembled DRIVE-CLiQ cable	0.11	<b>6SL3060-4AB00-0AA0</b>
Degree of protection of connector IP20/IP20	0.16	<b>6SL3060-4AD00-0AA0</b>
	0.21	<b>6SL3060-4AF00-0AA0</b>
	0.26	<b>6SL3060-4AH00-0AA0</b>
	0.36	<b>6SL3060-4AM00-0AA0</b>
	0.60	<b>6SL3060-4AU00-0AA0</b>
	0.95	<b>6SL3060-4AA10-0AA0</b>
	1.20	<b>6SL3060-4AW00-0AA0</b>
	1.45	<b>6SL3060-4AF10-0AA0</b>
	2.80	<b>6SL3060-4AJ20-0AA0</b>
	5.00	<b>6SL3060-4AA50-0AA0</b>

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#### Integration



Connection example for a CU320-2 Control Unit

We supply:

- **SINAMICS G150**
- **SINAMICS G180**
- **SINAMICS S120**
- **SINAMICS V90**
- **SINAMICS Perfect Harmony**
- **other Siemens products**

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