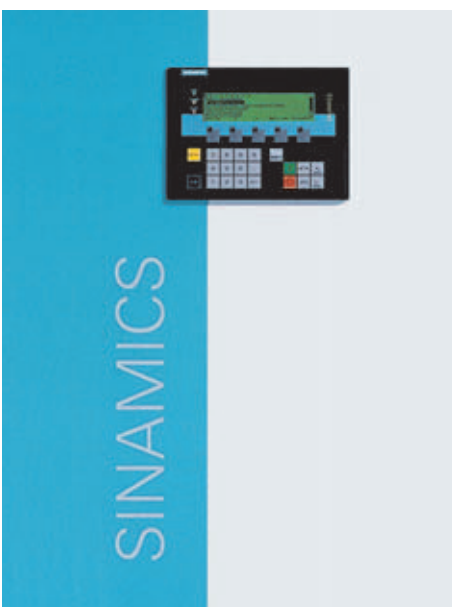


SINAMICS G150

Drive converter cabinet units

3



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SINAMICS G150

Drive converter cabinet units

SINAMICS G150 cabinet units

Overview



SINAMICS G150 drive converter cabinet units, versions A and C

SINAMICS G150 drive converter cabinet units are designed for use in variable-speed drives in machine construction and plant engineering.

They have been specially tuned to the requirements of drives with quadratic and constant load characteristics, with medium performance requirements and without regenerative feedback.

The control accuracy of the sensorless Vector Control is suitable for most applications, and additional actual speed value encoders are therefore superfluous.

However, the SINAMICS G150 converters are optionally available with an encoder evaluator in order to handle applications that require an encoder for plant-specific reasons.

SINAMICS G150 drive converter cabinet units offer an economic drive solution that can be matched to customers' specific requirements by adding from the wide range of available components and options.

There are two versions of the drive converter cabinet units:

■ Version A

All available line connection components, such as the main switch, circuit-breakers, main contactor, line fuses, line filters, motor components, and additional monitoring devices, can be installed as required. This version is also available with power units connected in parallel.

■ Version C

This offers an extremely space-optimized structure without line-side components. This version can be used, for example, when line connection components are accommodated in a central low-voltage distribution panel (MCC) on the plant side.

The SINAMICS G150 drive converter cabinet units are available for the following voltages and power ranges:

Line voltage	Power	Power units connected in parallel (version A only)
380 V to 480 V 3 AC	110 kW to 560 kW	630 kW to 900 kW
500 V to 600 V 3 AC	110 kW to 560 kW	630 kW to 1000 kW
660 V to 690 V 3 AC	75 kW to 800 kW	1000 kW to 1500 kW

Degrees of protection are IP20 (standard) and, as an option, IP21, IP23 and IP54.

Global use

SINAMICS G150 drive converter cabinet units are manufactured in compliance with relevant international standards and regulations, and are therefore suitable for global use (→ Technical data).

SINAMICS G150

Drive converter cabinet units

75 kW to 1500 kW

Benefits

- Particularly quiet and compact converters due to the use of state-of-the-art IGBT power semiconductors and an innovative cooling concept
- All unit modules are easily accessible, making them extremely service-friendly
- Can be easily integrated into automation solutions due to PROFIBUS interface supplied as standard and various analog and digital interfaces
- Increase in plant availability since individual modules and power components can be replaced quickly and easily
- Easy commissioning and parameterization using interactive menus on the user-friendly AOP30 operator panel with graphical LCD and plain-text display.

Application

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

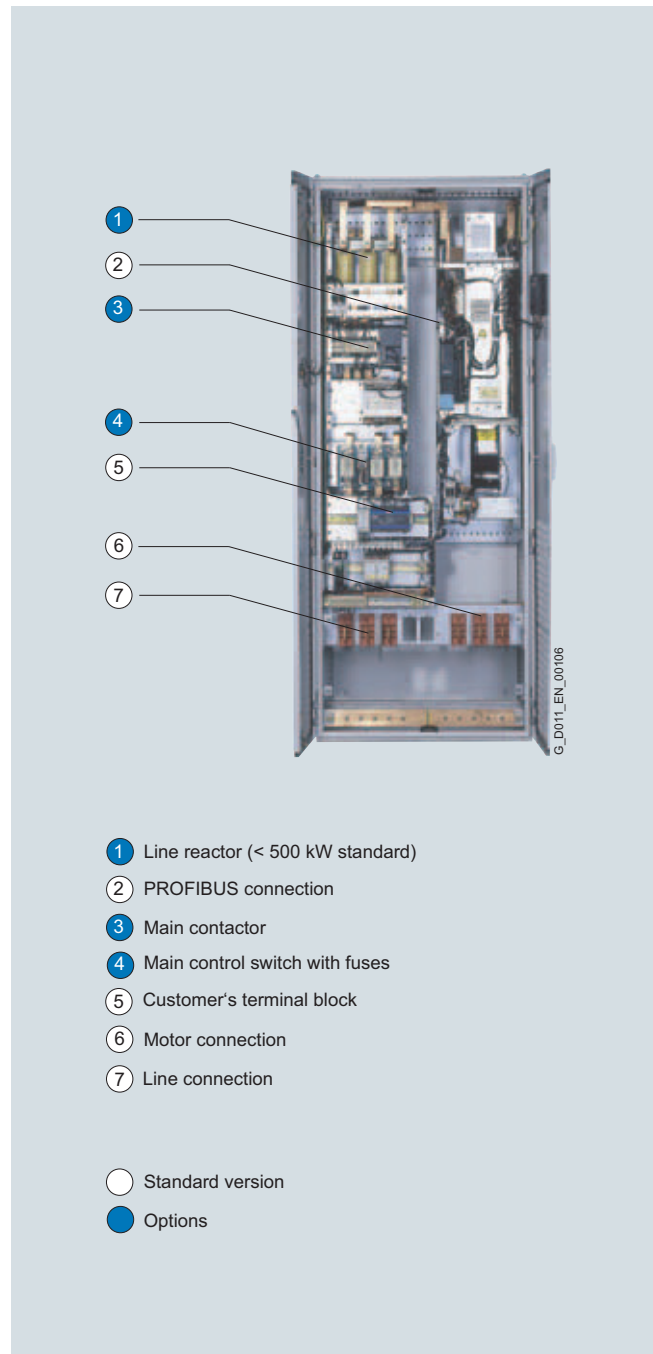
This means the following applications, in particular:

- pumps and fans
- compressors
- extruders and mixers
- mills.

Design

SINAMICS G150 drive converter cabinet units are characterized by their compact, modular and service-friendly design.

A wide range of options is available depending on the cabinet version which permit optimum adaptation of the drive system to the respective requirements (→ Options).



Example of design of a SINAMICS G150 drive converter cabinet unit, version A

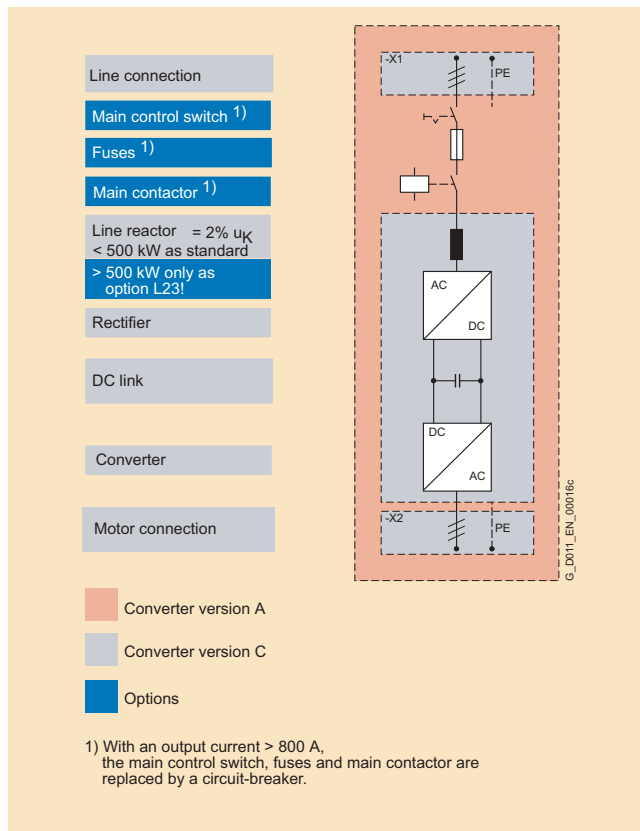
SINAMICS G150

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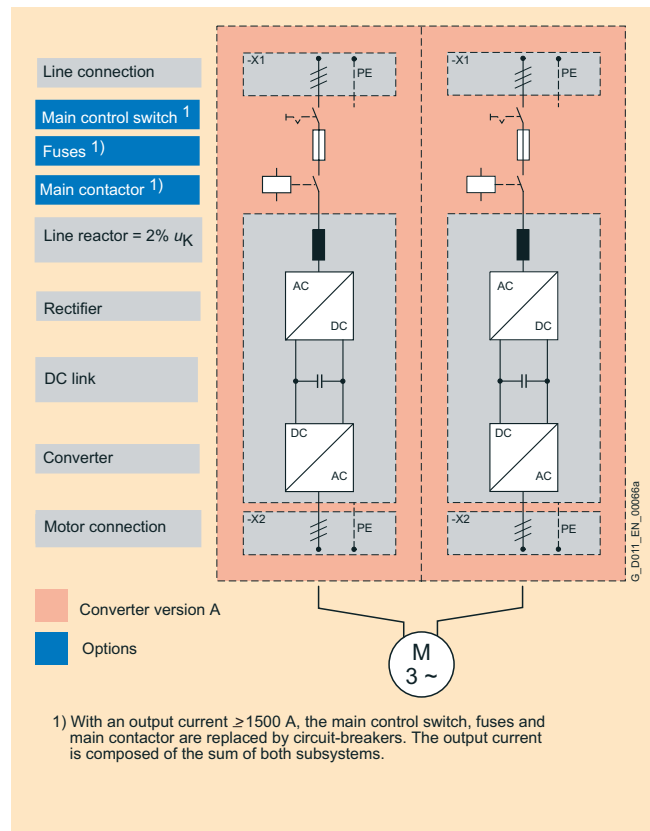
75 kW to 1500 kW

Design (continued)

3



Basic design of a SINAMICS G150 drive converter cabinet unit with a number of version-specific options



Basic design of a SINAMICS G150 drive converter cabinet unit connected in parallel in order to increase power, with a number of version-specific options

Function

AOP30 operator panel



An AOP30 operator panel is located in the cabinet door of the converter for operation, monitoring and commissioning tasks.

The AOP30's two-stage safety concept prevents unintentional or unauthorized changes to settings. Operation of the drive from the operator panel can be disabled by a password ensuring that only parameter values and process variables can be displayed in the panel. The OFF key is factory-set to active but can also be deactivated by the customer. A password can be used to prevent the unauthorized modification of converter parameters.

The user is guided through the screens for commissioning the drive by the menu-driven display. Only 6 motor parameters (which can be found on the motor rating plate) have to be entered when the AOP30 is commissioned for the first time. The control is then optimized automatically to fine-tune the converter to the motor.

English, French, German, Italian and Spanish are stored on the CU320 Control Unit's CompactFlash card as operator panel languages. The desired languages must be downloaded to the AOP30 prior to commissioning. The currently desired language can be selected using parameters.

The following pictures show examples of plain-text displays in various operating phases.

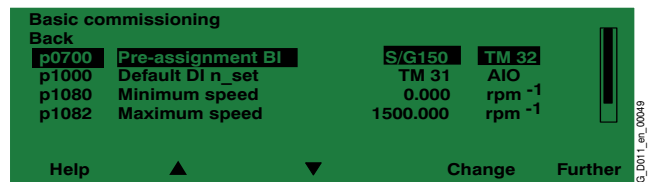
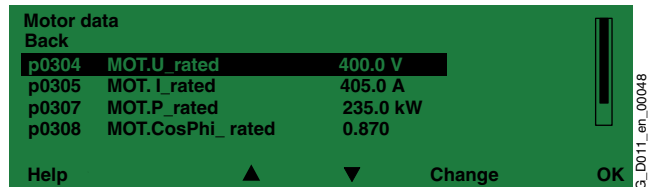
The **initial commissioning** is carried out using the operator panel.



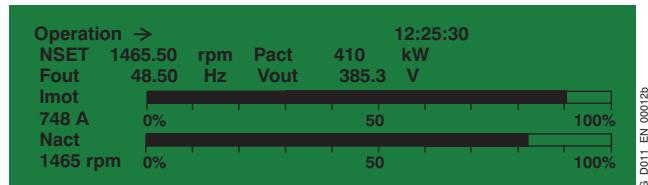
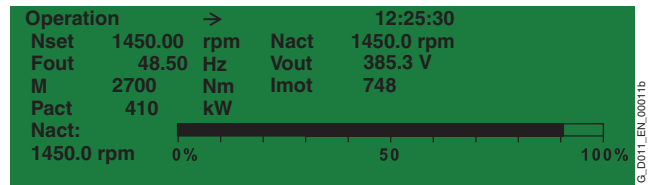
Only 6 motor parameters have to be entered:

power, speed, current, cos phi, voltage and frequency of the motor.

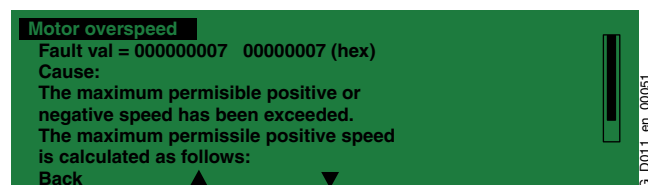
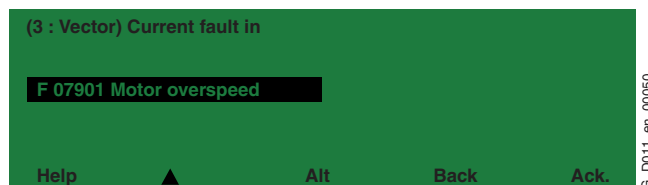
This information can be found on the motor rating plate and is entered into the screens on the display by following a short, menu-driven procedure. The type of motor cooling must be entered in addition.



During **operation**, current data are output on the display as absolute values, such as setpoint and actual values, or it is possible to parameterize up to three process variables as a quasi-analog bar display.



Any **alarms** which occur are signaled by flashing of the yellow "ALARM" LED, **faults** by lighting up of the red "FAULT" LED. There is also an indication of the cause displayed in plain text on the display's status line.



SINAMICS G150

Drive converter cabinet units

75 kW to 1500 kW

Function (continued)

Communication with higher-level control and customer's terminal block

A PROFIBUS interface on the CU320 Control Unit and the TM31 Terminal Module is provided as standard for use as the customer interface.

You can use this customer terminal block 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 is supplied with factory default settings (→ Configuration).

Open-loop and closed-loop control functions

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

Software and protection functions

The software functions available as standard are described below:

Software and protection functions	Description
Setpoint input	The setpoint can be defined internally or externally, internally as a fixed, motorized potentiometer or jog setpoint, externally via the PROFIBUS interface or an analog input of the customer terminal block. The internal fixed setpoint and the motorized potentiometer setpoint can be switched over or adjusted using control commands via all interfaces.
Motor identification	Automatic motor identification permits fast and simple commissioning and optimization of the drive control.
Ramp-function generator	A user-friendly ramp-function generator with separately adjustable ramp-up and ramp-down times, together with adjustable rounding times in the lower and upper speed ranges, improves the control response and therefore prevents mechanical overloading of the drive train. The ramp-down ramps can be parameterized separately for emergency stop.
V_{dc max} controller	The V _{dc max} controller automatically prevents overvoltages in the DC link if the set ramp-down ramp is too short, for example. This can also extend the set ramp-down time.
Kinetic buffering (KIP)	Line voltage failures are bridged to the extent permitted by the kinetic energy of the drive train. The speed drops depending on the moment of inertia and the load torque. The current speed setpoint is resumed when the line voltage returns.
Automatic restart ¹⁾	The automatic restart switches the drive on again when the power is restored after a power failure, and ramps up to the current speed setpoint.
Flying restart ¹⁾	The flying restart permits bumpless connection of the converter to a rotating motor.
Technology controller	The technology controller function module allows simple control functions to be implemented, e.g. level control or volumetric flow control. The technology controller is designed as a PID controller, 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.
Pt detection for motor protection	The motor temperature is calculated in a motor model stored in the converter software, taking into account the current speed and load. More exact detection of the temperature, also taking into account the influence of the ambient temperature, is possible by means of direct temperature detection using KTY84 sensors in the motor winding.
Evaluation of motor temperature	Motor protection by evaluating a KTY84 or PTC temperature sensor. When a KTY84 sensor is connected, the limit values can be set for alarm or shutdown. When connecting a PTC thermistor, the reaction following triggering of it (alarm or shutdown) can be defined.
Motor blocking protection	A blocked motor is recognized and protected against thermal overloading by shutting down.
Power unit protection	
Ground fault monitoring on the output side	A ground fault on the output side is recognized by summation current monitoring and results in shutdown in grounded networks.
Electronic short-circuit protection on output side	A short-circuit (e.g. on the converter output terminals, in the motor cable or in the motor's terminal box) is detected on the output side and the converter switches off with a fault.
Thermal overload protection	A warning message is issued first when the overtemperature threshold responds. If the temperature rises further, either a shutdown is carried out or automatic influencing of the pulse frequency or output current so that a reduction in the thermal load is achieved. Following elimination of the cause of the fault (e.g. improvement in the ventilation), the original operating values are automatically resumed.

1) Factory setting: not activated (can be parameterized)

SINAMICS G150

Drive converter cabinet units

75 kW to 1500 kW

Technical data

Electrical data	Simple connection	Parallel connection		
Line voltages and power ranges	<ul style="list-style-type: none"> • 380 V to 480 V 3 AC, $\pm 10\%$ ($-15\% < 1 \text{ min}$) 110 kW to 560 kW • 500 V to 600 V 3 AC, $\pm 10\%$ ($-15\% < 1 \text{ min}$) 110 kW to 560 kW • 660 V to 690 V 3 AC, $\pm 10\%$ ($-15\% < 1 \text{ min}$) 75 kW to 800 kW 	630 kW to 900 kW	630 kW to 1000 kW	1000 kW to 1500 kW
Supply systems	TN/TT systems or isolated systems (IT systems)			
Line frequency	47 Hz to 63 Hz			
Output frequency	0 Hz to 300 Hz ($f > 100 \text{ Hz}$: derating required)			
Power factor				
- Fundamental mode	> 0.98			
- Total	0.93 to 0.96			
Converter efficiency	> 98%			
Control method	Vector Control with and without sensor 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, parameterizable			
Setpoint resolution	0.001 rpm digital, 12 bit analog			
Braking operation	Optional via braking unit			
Mechanical data				
Degree of protection	IP20 (higher degrees of protection up to IP54 optional)			
Protection class ¹⁾	In accordance with EN 50178, Part 1			
Cooling method	Forced air ventilation			
Sound pressure level L_{pA} (1 m)	$\leq 72 \text{ dB}$ at 50 Hz line frequency	$\leq 75 \text{ dB}$		
Shock protection	BGV A3			
Cabinet system	Rittal TS 8, doors with double-barb lock, three-section base plates for cable entry			
Paint finish	RAL 7035 (indoor requirements)			
Compliance with standards				
Standards	¹⁾ EN 50178 ²⁾ EN 60146-1, EN 61800-2, EN 61800-3, EN 60204-1, EN 60529			
CE marking	In accordance with EMC directive No. 89/336/EC and low voltage directive No. 73/23/EC			
RI suppression	In accordance with EMC product standard for variable-speed drives EN 61800-3, "second environment", "first environment" on request			
	Storage	Transport	Operation	
Ambient conditions				
Ambient temperature	-25 °C to +55 °C	-25 °C to +70 °C from <u>-40 °C</u> for 24 hours	<u>0 °C</u> to +40 °C up to +50 °C, see derating data	
Relative humidity ²⁾ (non-condensing)	<u>5% to 95%</u> Class 1K4 to EN 60721-3-1	5% to 95% at 40 °C Class 2K3 to EN 60721-3-2	<u>5% to 95%</u> Class 3K3 to EN 60721-3-3	
Environmental class/harmful chemical substances ²⁾	Class 1C2 to EN 60721-3-1	Class 2C2 to EN 60721-3-2	Class 3C2 to EN 60721-3-3	
Organic/biological influences ²⁾	Class 1B1 to EN 60721-3-1	Class 2B1 to EN 60721-3-2	Class 3B1 to EN 60721-3-3	
Installation altitude	Up to 2000 m above sea level without derating, > 2000 m, see derating data			
Strain resistance				
Vibratory load ²⁾				
- Deflection	1.5 mm at <u>5 Hz</u> to 9 Hz	<u>3.1 mm</u> at <u>5 Hz</u> to 9 Hz	0.075 mm at 10 Hz to 58 Hz	
- Acceleration	5 m/s ² at > 9 Hz to 200 Hz Class 1M2 to EN 60721-3-1	10 m/s ² at > 9 Hz to 200 Hz Class 2M2 to EN 60721-3-2	10 m/s ² at > 58 Hz to 200 Hz -	
Shock load ²⁾				
- Acceleration	40 m/s ² at 22 ms Class 1M2 to EN 60721-3-1	100 m/s ² at 11 ms Class 2M2 to EN 60721-3-2	100 m/s ² at 11 ms Class 3M4 to EN 60721-3-3	

 Deviations from the defined classes are identified by underlining.

1) The EN standard specified is the European edition of international standard IEC 62103.

2) The EN standards specified are the European editions of the international IEC standards with the same designations.

SINAMICS G150

Drive converter cabinet units

75 kW to 1500 kW

Technical data (continued)

Derating data

Compensation of current derating as a function of installation altitude/ambient temperature

If the converters are operated at an **installation altitude > 2000 m** above sea level, the maximum permissible output current can be calculated using the following tables in accordance with the degree of protection selected for the cabinet unit. The specified values already include a permitted correction between installation altitude and ambient temperature (incoming air temperature at the inlet to the drive converter cabinet unit).

Installation altitude above sea level m	Current derating at an ambient temperature of							
	20 °C	25 °C	30 °C	35 °C	40 °C	45 °C	50 °C	
0-2000	100%						95.0%	87.0%
2001-2500	100%				96.3%	91.4%	83.7%	
2501-3000	100%			96.2%	92.5%	87.9%	80.5%	
3001-3500	100%		96.7%	92.3%	88.8%	84.3%	77.3%	
3501-4000	97.8%	92.7%	88.4%	85.0%	80.8%	74.0%		

Current derating depending on ambient temperature (inlet air temperature) and installation altitude for cabinet units with degree of protection IP20, IP21 and IP23

Installation altitude above sea level m	Current derating at an ambient temperature of							
	20 °C	25 °C	30 °C	35 °C	40 °C	45 °C	50 °C	
0-2000	100%					95.0%	87.5%	80.0%
2001-2500	100%			96.3%	91.4%	84.2%	77.0%	
2501-3000	100%		96.2%	92.5%	87.9%	81.0%	74.1%	
3001-3500	100%	96.7%	92.3%	88.8%	84.3%	77.7%	71.1%	
3501-4000	97.8%	92.7%	88.4%	85.0%	80.8%	74.7%	68.0%	

Current derating depending on ambient temperature (inlet air temperature) and installation altitude for cabinet units with degree of protection IP54

Voltage derating as a function of the installation altitude

In addition to the current derating, the voltage derating must be considered in accordance with the following table with **installation altitudes > 2000 m** above sea level

Installation altitude above sea level m	Voltage derating for a rated input voltage of													
	380 V	400 V	420 V	440 V	460 V	480 V	500 V	525 V	550 V	575 V	600 V	660 V	690 V	
0-2000	100%												100%	
2001-2250	100%						96%	100%					97%	96%
2251-2500	100%				98%	94%	100%			98%	94%	98%	94%	
2501-2750	100%			98%	94%	90%	100%		99%	95%	91%	95%	90%	
2751-3000	100%		95%	91%	88%	100%	100%	96%	92%	88%	92%	88%		
3001-3250	100%	97%	93%	89%	85%	100%		98%	93%	89%	85%	89%	85%	
3251-3500	98%	93%	89%	85%	82%	99%	94%	90%	86%	83%	85%	82%		
3501-3750	95%	91%	87%	83%	79%	96%	91%	87%	83%	80%	-	-		
3751-4000	96%	92%	87%	83%	80%	76%	92%	88%	84%	80%	77%	-	-	

Voltage derating depending on installation altitude

SINAMICS G150

Drive converter cabinet units

75 kW to 1500 kW

Technical data (continued)

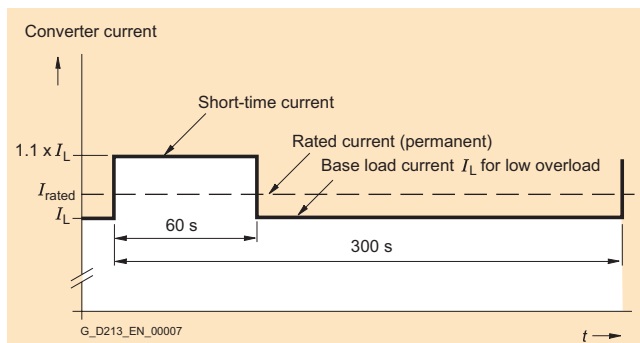
Overload capability

SINAMICS G150 drive converter cabinet 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 drives with overload requirements, the appropriate base load current must therefore be used as a basis for the required load.

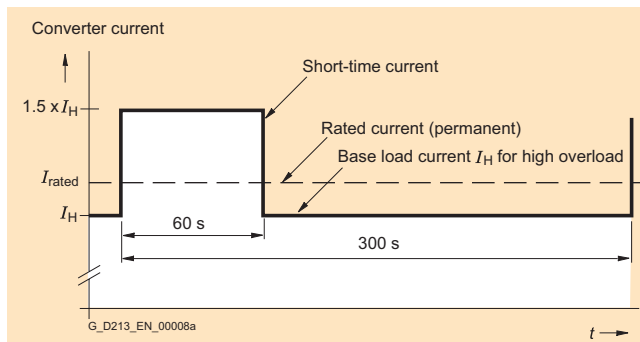
The criterion for overload is that the drive is operated with its base load current before and after the overload occurs, and a load duration of 300 s is assumed here.

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

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



Low overload



High overload

EMC guidelines

The electromagnetic compatibility describes – in accordance with the definition of the EMC directive – “the capability of a device to work satisfactorily in the electromagnetic environment without itself causing electromagnetic interferences which are unacceptable for other devices present in this environment”. To guarantee that the appropriate EMC directives are observed, the devices must demonstrate a sufficiently high noise immunity, and also the emitted interference must be limited to acceptable values.

The EMC requirements for “Variable-speed drive systems” are described in the product standard EN 61800-3. A variable-speed drive system (or power drive system, PDS) consists of the drive converter and the electric motor including cables. The driven machine is not part of the drive system. EN 61800-3 defines different limits depending on the location of the drive system, referred to as the first and second environment.

The **first environment** comprises living accommodation or locations where the drive system is directly connected to the public low-voltage network without an intermediate transformer.

The **second environment** is understood to be all locations outside living areas. These are basically industrial areas which are powered from the medium-voltage network via their own transformers.

Four different categories are defined in EN 61800-3 Ed.2 depending on the location and the power of the drive:

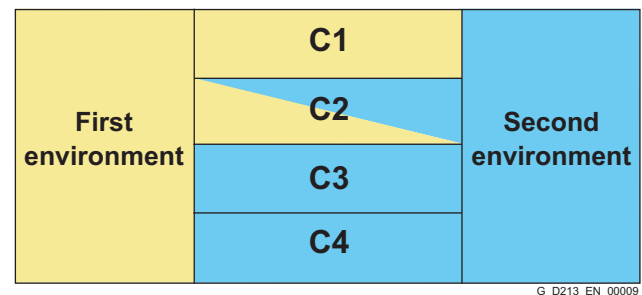
Category C1: Drive systems for rated voltages < 1000 V for unlimited use in the first environment.

Category C2: Stationary drive systems for rated voltages < 1000 V for use in the second environment. Use in the first environment is possible if the drive system is installed and used by qualified personnel. The warning and installation information supplied by the manufacturer must be observed.

Category C3: Drive systems for rated voltages < 1000 V for exclusive use in the second environment.

Category C4: Drive systems for rated voltages ≥ 1000 V or for rated currents ≥ 400 A for use in complex systems in the second environment.

The following graphic shows the assignment of the four categories to the first and second environment:



SINAMICS G150 drive converter cabinet units are almost exclusively used in the second environment (categories C3 and C4).

To limit **emitted interference**, the SINAMICS G150 drive converter cabinet units are equipped as standard with a radio interference suppression filter in accordance with the limit values specified in category C3. This means that they meet the requirements for industrial use. Optional filters are available on request for use in the first environment (category C2).

SINAMICS G150 drive converter cabinet units fulfill the requirements for **noise immunity** defined in EN 61800-3 for the second environment and consequently also the lower noise immunity values in the first environment.

The warning and installation information (part of the device documentation) must be observed.

SINAMICS G150

Drive converter cabinet units

75 kW to 1500 kW

Technical data (continued)

Technical data for simple connection

Line voltage 380 V to 480 V 3 AC		SINAMICS G150 drive converter cabinet units Type 6SL3710-1GE...-....								
		32-1...	32-6...	33-1...	33-8...	35-0...	36-1...	37-5...	38-4...	41-0...
Rated output current I_{rated}	A	210	260	310	380	490	605	745	840	985
Base load current $I_L^{1)}$	A	205	250	302	370	477	590	725	820	960
Base load current $I_H^{2)}$	A	178	233	277	340	438	460	570	700	860
Power for I_L at 400 V	kW	110	132	160	200	250	315	400	450	560
Power for I_H at 400 V	kW	90	110	132	160	200	250	315	400	450
Power for I_L at 60 Hz 460 V	hp	150	200	250	300	400	500	600	600	800
Power for I_H at 60 Hz 460 V	hp	125	150	200	250	350	350	450	500	700
Max. current requirement ³⁾ (at 24 V DC)	A	1.1	1.1	1.35	1.35	1.35	1.4	1.4	1.4	1.5
Rated input current ⁴⁾	A	239	294	348	405	519	639	785	883	1034
Power loss	kW	2.9	3.8	4.4	5.3	6.4	8.2	9.6	10.1	14.4
Cooling air requirement	m ³ /s	0.17	0.23	0.36	0.36	0.36	0.78	0.78	0.78	1.48
Sound pressure level L_{pA} (1 m) at 50/60 Hz	dB	67/68	69/73	69/73	69/73	69/73	70/73	70/73	70/73	72/75
Width for version A/C	mm	800/400	800/400	800/400	1000/400	1000/400	1200/600	1200/600	1200/600	1600/1000
Height ⁵⁾	mm	2000								
Depth	mm	600								
Weight (without options) for version A/C, approx.	kg	320/225	320/225	390/300	480/300	480/300	860/670	865/670	1075/670	1360/980

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

- 1) The base load current I_L is based on a load cycle of 110% for 60 s or 150% for 10 s with a load cycle period of 300 s. See Technical data → Overload capability.
- 2) The base load current I_H is based on a load cycle of 150% for 60 s or 160% for 10 s with a load cycle period of 300 s. See Technical data → Overload capability.
- 3) If the main power supply fails and drive control remains active, the Power Module should be externally supplied with 24 V DC. The following should also be taken into account:
 - CU320: 0.8 A
 - TM31: 0.5 A
 - AOP30: 0.2 A
 - SMC: 0.6 A
 - Current requirement of digital inputs/outputs.
- 4) The currents listed here are based on the rated output current and include 10 A for the external auxiliaries as required for options **L19** or **B03**, for example.
- 5) Version A: The cabinet height is increased by 250 mm for degree of protection IP21, 400 mm for degrees of protection IP23 and IP54, 405 mm for the **M13** and **M78** options.

Version C: The cabinet height is increased by 250 mm for degree of protection IP21, 400 mm for degrees of protection IP23 and IP54.

SINAMICS G150

Drive converter cabinet units

75 kW to 1500 kW

Technical data (continued)

Technical data for simple connection

Line voltage 500 V to 600 V 3 AC		SINAMICS G150 drive converter cabinet units Type 6SL3710-1GF...-....								
		31-8...	32-2...	32-6...	33-3...	34-1...	34-7...	35-8...	37-4...	38-1...
Rated output current I_{rated}	A	175	215	260	330	410	465	575	735	810
Base load current $I_L^{1)}$	A	171	208	250	320	400	452	560	710	790
Base load current $I_H^{2)}$	A	157	192	233	280	367	416	514	657	724
Power for I_L at 500 V	kW	110	132	160	200	250	315	400	500	560
Power for I_H at 500 V	kW	110	132	160	200	250	250	315	450	500
Power for I_L at 60 Hz 575 V	kW	150	200	250	300	400	450	500	700	800
Power for I_H at 60 Hz 575 V	kW	150	200	200	250	350	450	500	600	710
Max. current requirement ³⁾ (at 24 V DC)	A	1.35	1.35	1.35	1.35	1.4	1.4	1.4	1.5	1.5
Rated input current ⁴⁾	A	201	234	280	353	436	493	608	774	852
Power loss	kW	3.8	4.2	5.0	6.1	8.1	7.8	8.7	12.7	14.1
Cooling air requirement	m ³ /s	0.36	0.36	0.36	0.36	0.78	0.78	0.78	1.48	1.48
Sound pressure level L_{pA} (1 m) at 50/60 Hz	dB	69/73	69/73	69/73	69/73	72/75	72/75	72/75	72/75	72/75
Width for version A/C	mm	800/400	800/400	800/400	800/400	1200/600	1200/600	1200/600	1600/1000	1600/1000
Height ⁵⁾	mm	2000								
Depth	mm	600								
Weight (without options) for version A/C, approx.	kg	390/300	390/300	390/300	390/300	860/670	860/670	860/670	1320/940	1360/980

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

- 1) The base load current I_L is based on a load cycle of 110% for 60 s or 150% for 10 s with a load cycle period of 300 s. See Technical data → Overload capability.
- 2) The base load current I_H is based on a load cycle of 150% for 60 s or 160% for 10 s with a load cycle period of 300 s. See Technical data → Overload capability.
- 3) If the main power supply fails and drive control remains active, the Power Module should be externally supplied with 24 V DC. The following should also be taken into account:
 - CU320: 0.8 A
 - TM31: 0.5 A
 - AOP30: 0.2 A
 - SMC: 0.6 A
 - Current requirement of digital inputs/outputs.
- 4) The currents listed here are based on the rated output current and include 10 A for the external auxiliaries as required for options **L19** or **B03**, for example.
- 5) Version A: The cabinet height is increased by 250 mm for degree of protection IP21, 400 mm for degrees of protection IP23 and IP54, 405 mm for the **M13** and **M78** options.

Version C: The cabinet height is increased by 250 mm for degree of protection IP21, 400 mm for degrees of protection IP23 and IP54.

SINAMICS G150

Drive converter cabinet units

75 kW to 1500 kW

Technical data (continued)

Technical data for simple connection

Line voltage 660 V to 690 V 3 AC		SINAMICS G150 drive converter cabinet units													
		Type 6SL3710-1GH...-....													
		28-5...	31-0...	31-2...	31-5...	31-8...	32-2...	32-6...	33-3...	34-1...	34-7...	35-8...	37-4...	38-1...	
Rated output current I_{rated}	A	85	100	120	150	175	215	260	330	410	465	575	735	810	
Base load current $I_L^{1)}$	A	80	95	115	142	171	208	250	320	400	452	560	710	790	
Base load current $I_H^{2)}$	A	76	89	107	134	157	192	233	280	367	416	514	657	724	
Power for I_L at 690 V	kW	75	90	110	132	160	200	250	315	400	450	560	710	800	
Power for I_H at 690 V	kW	55	75	90	110	132	160	200	250	315	400	450	560	710	
Max. current requirement ³⁾ (at 24 V DC)	A	1.1	1.1	1.1	1.1	1.35	1.35	1.35	1.35	1.4	1.4	1.4	1.5	1.5	
Rated input current ⁴⁾	A	103	119	141	174	201	234	280	353	436	493	608	774	852	
Power loss	kW	1.7	2.1	2.7	2.8	3.8	4.2	5.0	6.1	8.1	9.1	10.8	13.5	14.7	
Cooling air requirement	m ³ /s	0.17	0.17	0.17	0.17	0.36	0.36	0.36	0.36	0.78	0.78	0.78	1.48	1.48	
Sound pressure level L_{pA} (1 m) at 50/60 Hz	dB	67/68	67/68	67/68	67/68	69/73	69/73	69/73	69/73	72/75	72/75	72/75	72/75	72/75	
Width for version A/C	mm	800/ 400	800/ 400	800/ 400	800/ 400	800/ 400	800/ 400	800/ 400	800/ 400	1200/ 600	1200/ 600	1200/ 600	1600/ 1000	1600/ 1000	
Height ⁵⁾	mm	2000													
Depth	mm	600													
Weight (without options) for version A/C, approx.	kg	320/ 225	320/ 225	320/ 225	320/ 225	390/ 300	390/ 300	390/ 300	390/ 300	860/ 670	860/ 670	860/ 670	1320/ 940	1360/ 980	

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

- 1) The base load current I_L is based on a load cycle of 110% for 60 s or 150% for 10 s with a load cycle period of 300 s. See Technical data → Overload capability.
- 2) The base load current I_H is based on a load cycle of 150% for 60 s or 160% for 10 s with a load cycle period of 300 s. See Technical data → Overload capability.
- 3) If the main power supply fails and drive control remains active, the Power Module should be externally supplied with 24 V DC. The following should also be taken into account:
 - CU320: 0.8 A
 - TM31: 0.5 A
 - AOP30: 0.2 A
 - SMC: 0.6 A
 - Current requirement of digital inputs/outputs.
- 4) The currents listed here are based on the rated output current and include 10 A for the external auxiliaries as required for options **L19** or **B03**, for example.
- 5) Version A: The cabinet height is increased by 250 mm for degree of protection IP21, 400 mm for degrees of protection IP23 and IP54, 405 mm for the **M13** and **M78** options.
Version C: The cabinet height is increased by 250 mm for degree of protection IP21, 400 mm for degrees of protection IP23 and IP54.

Technical data (continued)

Technical data for parallel connection

		SINAMICS G150 drive converter cabinet units, version A Type 6SL3710-2G..-....								
		E41-1AA0	E41-4AA0	E41-6AA0	F38-6AA0	F41-1AA0	F41-4AA0	H41-1AA0	H41-4AA0	H41-5AA0
Line voltage		380 V to 480 V 3 AC			500 V to 600 V 3 AC			660 V to 690 V 3 AC		
Rated output current $I_{rated}^{6)}$	A	1120	1380	1560	860	1070	1360	1070	1360	1500
Base load current $I_L^{1) 6)}$	A	1092	1340	1516	836	1036	1314	1036	1314	1462
Base load current $I_H^{2) 6)}$	A	850	1054	1294	770	950	1216	950	1216	1340
Power for I_L at 400 V, 500 V or 690 V	kW	630	710	900	630	710	1000	1000	1350	1500
Power for I_H at 400 V, 500 V or 690 V	kW	500	560	710	560	630	800	900	1200	1350
Power for I_L at 60 Hz 460 V or 575 V	hp	900	1000	1250	800	1000	1250	–	–	–
Power for I_H at 60 Hz 460 V or 575 V	hp	700	800	1000	800	1000	1250	–	–	–
Max. current requirement ³⁾ (at 24 V DC)	A	2.8	2.8	3.0	2.8	2.8	3.0	2.8	2.8	3.0
Rated input current ^{4) 6)}	A	1174	1444	1624	904	1116	1424	1116	1424	1568
Power loss	kW	16.2	19.0	19.9	15.4	17.2	23.8	21.3	26.6	29.0
Cooling air requirement	m ³ /s	1.56			1.56	1.56	2.96	1.56	2.96	2.96
Sound pressure level L_{pA} (1 m) at 50/60 Hz	dB	73/76			75/78			75/78		
Width ⁷⁾	mm	2400			2400	2400	3200	2400	3200	3200
Height ⁵⁾	mm	2000			2000			2000		
Depth	mm	600			600			600		
Weight (without options), approx.	kg	1700	1710	2130	1700	1700	2620	1700	2620	2700

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

- 1) The base load current I_L is based on a load cycle of 110% for 60 s or 150% for 10 s with a load cycle period of 300 s. See Technical data → Overload capability.
- 2) The base load current I_H is based on a load cycle of 150% for 60 s or 160% for 10 s with a load cycle period of 300 s. See Technical data → Overload capability.
- 3) If the main power supply fails and drive control remains active, the Power Module should be externally supplied with 24 V DC. The following should also be taken into account:
 - CU320: 0.8 A
 - TM31: 0.5 A
 - AOP30: 0.2 A
 - SMC: 0.6 A
 - Current requirement of digital inputs/outputs.
- 4) The currents listed here are based on the rated output current and include 10 A for the external auxiliaries as required for options **L19** or **B03**, for example.
- 5) **Version A:** The cabinet height is increased by 250 mm for degree of protection IP21, 400 mm for degrees of protection IP23 and IP54, 405 mm for the **M13** and **M78** options.
- 6) The currents listed here represent the aggregate current of both converter sections.
- 7) The power units connected in parallel are supplied as two transport units.

SINAMICS G150

Drive converter cabinet units

75 kW to 1500 kW

Selection and ordering data

Simple connection

Power		Rated output current		Order No.
				SINAMICS G150 drive converter cabinet units
at 400 V, 500 V or 690 V	at 60 Hz 460 V or 575 V	hp	A	(Order No. supplement, see below)
380 V to 480 V 3 AC				
110	150	210		6SL3710-1GE32-1 A0
132	200	260		6SL3710-1GE32-6 A0
160	250	310		6SL3710-1GE33-1 A0
200	300	380		6SL3710-1GE33-8 A0
250	400	490		6SL3710-1GE35-0 A0
315	500	605		6SL3710-1GE36-1 A0
400	600	745		6SL3710-1GE37-5 A0
450	600	840		6SL3710-1GE38-4 A0
560	800	985		6SL3710-1GE41-0 A0
500 V to 600 V 3 AC				
110	150	175		6SL3710-1GF31-8 A0
132	200	215		6SL3710-1GF32-2 A0
160	250	260		6SL3710-1GF32-6 A0
200	300	330		6SL3710-1GF33-3 A0
250	400	410		6SL3710-1GF34-1 A0
315	450	465		6SL3710-1GF34-7 A0
400	500	575		6SL3710-1GF35-8 A0
500	700	735		6SL3710-1GF37-4 A0
560	800	810		6SL3710-1GF38-1 A0
660 V to 690 V 3 AC				
75		85		6SL3710-1GH28-5 A0
90		100		6SL3710-1GH31-0 A0
110		120		6SL3710-1GH31-2 A0
132		150		6SL3710-1GH31-5 A0
160		175		6SL3710-1GH31-8 A0
200		215		6SL3710-1GH32-2 A0
250		260		6SL3710-1GH32-6 A0
315		330		6SL3710-1GH33-3 A0
400		410		6SL3710-1GH34-1 A0
450		465		6SL3710-1GH34-7 A0
560		575		6SL3710-1GH35-8 A0
710		735		6SL3710-1GH37-4 A0
800		810		6SL3710-1GH38-1 A0

Order No. supplement

Version A with possibility for mounting all available line connection components	A
Version C especially for space-saving mounting	C

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

Parallel connection

Power		Rated output current		Order No.
				SINAMICS G150 drive converter cabinet units, version A
at 400 V, 500 V or 690 V	at 60 Hz 460 V or 575 V	hp	A	
380 V to 480 V 3 AC				
630	900	1120		6SL3710-2GE41-1AA0
710	1000	1380		6SL3710-2GE41-4AA0
900	1250	1560		6SL3710-2GE41-6AA0
500 V to 600 V 3 AC				
630	800	860		6SL3710-2GF38-6AA0
710	1000	1070		6SL3710-2GF41-1AA0
1000	1250	1360		6SL3710-2GF41-4AA0
660 V to 690 V 3 AC				
1000		1070		6SL3710-2GH41-1AA0
1350		1360		6SL3710-2GH41-4AA0
1500		1500		6SL3710-2GH41-5AA0

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

Options

When ordering a converter with options, add “-Z” to the order number of the converter, followed by the order code(s) for the desired option(s).

Example:
6SL3710-1GE32-1CA0-Z
+M07+D60+...

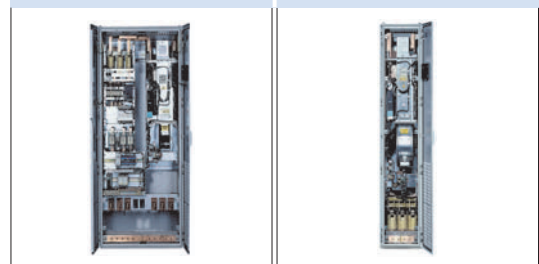
See also ordering examples.

Available options	Order code	for version A	for version C
Line-side options			
Line filter for use in the first environment in accordance with EN 61800-3, category C2 (TN/TT systems)	L00	✓	–
Main contactor (for currents < 800 A)	L13	✓	–
Without line reactor	L22	✓	✓
Line reactor 2%	L23	✓	✓
Main switch (incl. fuses/circuit-breakers)	L26	✓	–
EMC shield bus ¹⁾ (cable connection from below)	M70	✓	✓
PE busbar ¹⁾ (cable connection from below)	M75	✓	✓
Load-side options			
Motor reactor	L08	✓	–
dv/dt filter plus VPL	L10	✓	–
Sinusoidal filter (on request, only for converters up to 200 kW at 380 V to 480 V, up to 132 kW at 500 V to 600 V)	L15	✓	–
EMC shield bus ¹⁾ (cable connection from below)	M70	✓	✓
PE busbar ¹⁾ (cable connection from below)	M75	✓	✓
Motor protection and safety functions			
EMERGENCY STOP button in the cabinet door	L45	✓	–
EMERGENCY STOP category 0, 230 V AC or 24 V DC, uncontrolled stop	L57	✓	–
EMERGENCY STOP category 1, 230 V AC, controlled stop ²⁾	L59	✓	–
EMERGENCY STOP category 1, 24 V DC, controlled stop ²⁾	L60	✓	–
Thermistor motor protection unit with PTB approval (alarm)	L83	✓	–
Thermistor motor protection unit with PTB approval (shutdown)	L84	✓	–
PT100 evaluation unit (for six PT100 sensors)	L86	✓	–
Insulation monitoring	L87	✓	–
Additional shock-hazard protection	M60	✓	✓
Increase in degree of protection			
IP21 degree of protection	M21	✓	✓
IP23 degree of protection	M23	✓	✓
IP54 degree of protection	M54	✓	✓
Mechanical options			
Base 100 mm high, RAL 7022	M06	✓	✓
Cable plinth 200 mm high, RAL 7035	M07	✓	✓
Line connection from above	M13	✓	–
Motor connection from above	M78	✓	–
Top-mounted crane transport assembly for cabinets	M90	✓	✓

✓	possible
–	not supported

- 1) This option is listed for the line-side and load-side options, but is only required once.
- 2) The drive stop requirements must be taken into account with this option. Additional braking units may be required.

The selection matrix must be observed with respect to the combination of options.



Converter version A

Converter version C

SINAMICS G150

Drive converter cabinet units

75 kW to 1500 kW

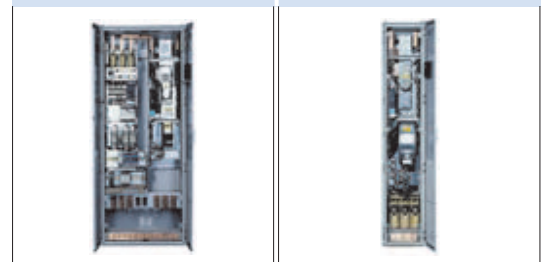
Options (continued)

Available options	Order code	for version A	for version C
Other options			
TM31 customer's terminal block expansion	G61	✓	–
SMC30 Sensor Module Cabinet-Mounted for actual motor speed acquisition	K50	✓	–
Connection for external auxiliary equipment (controlled max. 10 A)	L19	✓	–
Cabinet illumination with service socket	L50	✓	–
Cabinet anti-condensation heating	L55	✓	–
Braking unit 25 kW (P_{20} power: 100 kW)	L61	✓	–
Braking unit 50 kW (P_{20} power: 200 kW)	L62	✓	–
Special cabinet paint finish ³⁾	Y09	✓	✓
Documentation (standard: English/German)			
Plant-specific documentation in DXF format	D02	✓	✓
Plant-specific advance documentation	D14	✓	✓
Documentation in English/French	D58	✓	✓
Documentation in English/Spanish	D60	✓	✓
Documentation in English/Italian	D80	✓	✓
Languages (standard: English/German)			
Rating plate in English/French	T58	✓	✓
Rating plate in English/Spanish	T60	✓	✓
Rating plate in English/Italian	T80	✓	✓
Options specific to chemical industry			
NAMUR terminal block	B00	✓	–
Protective separation for 24 V supply (PELV)	B02	✓	–
Separate output for external auxiliaries (uncontrolled)	B03	✓	–
Options specific to the shipbuilding industry			
Marine version	M66	✓	✓
Individual certificate from Germanische Lloyd (GL)	E11	✓	✓
Individual certificate from Lloyds Register (LR)	E21	✓	✓
Individual certificate from Bureau Veritas (BV)	E31	✓	✓
Individual certificate from Det Norske Veritas (DNV)	E51	✓	✓
Individual certificate from American Bureau of Shipping (ABS)	E61	✓	✓
Individual certificate from Chinese Classification Society (CCS)	E71	✓	✓
Converter acceptance in presence of customer			
Visual inspection	F03	✓	✓
Function test of the converter without motor connected	F71	✓	✓
Function test of the converter with test bay motor (no load)	F75	✓	✓
Insulation test of converter	F77	✓	✓
Customized converter acceptance (on request)	F97	✓	✓

✓ possible
– not supported

3) The order code Y.. requires data in plain text.

The selection matrix must be observed with respect to the combination of options.



Converter version A

Converter version C