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SINAMICS G120C compact converters
0.55 kW to 132 kW (0.75 hp to 150 hp)

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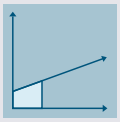
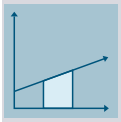
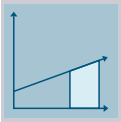
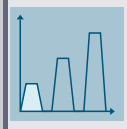
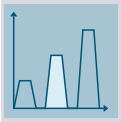
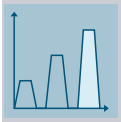
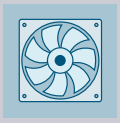
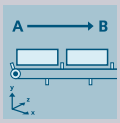
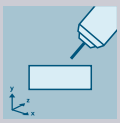
Introduction

Application

Use	Requirements for torque accuracy/speed accuracy/position accuracy/coordination of axes/functionality					
	Continuous motion			Non-continuous motion		
	Basic	Medium	High	Basic	Medium	High
						
Pumping, ventilating, compressing	Centrifugal pumps Radial / axial fans Compressors	Centrifugal pumps Radial / axial fans Compressors	Eccentric screw pumps	Hydraulic pumps Metering pumps	Hydraulic pumps Metering pumps	Descaling pumps Hydraulic pumps
	V20 **G120C** G120X	G120X G130/G150 G180 [1] DCM	G220 S120	G120/G220	S110	S120
Moving 	Conveyor belts Roller conveyors Chain conveyors	Conveyor belts Roller conveyors Chain conveyors Lifting/lowering devices Elevators Escalators/moving walkways Indoor cranes Marine drives Cable railways	Elevators Container cranes Mining hoists Excavators for open-cast mining Test bays	Acceleration conveyors Storage and retrieval machines	Acceleration conveyors Storage and retrieval machines Cross cutters Reel changers	Storage and retrieval machines Robotics Pick & place Rotary indexing tables Cross cutters Roll feeds Engagers/ disengagers
	V20 G115D **G120C** ET 200pro FC-2 [2]	G120/G220 G120D G130/G150 G180 [1]	G220 S120 S150 DCM	V90 S200 G120/G220 G120D	S110 S210 DCM	S120 S210 DCM
Processing 	Mills Mixers Kneaders Crushers Agitators Centrifuges	Mills Mixers Kneaders Crushers Agitators Centrifuges Extruders Rotary furnaces	Extruders Winders/unwinders Lead/follower drives Calenders Main press drives Printing machines	Tubular bagging machines Single-axis motion control such as • Position profiles • Path profiles	Tubular bagging machines Single-axis motion control such as • Position profiles • Path profiles	Servo presses Rolling mill drives Multi-axis motion control such as • Multi-axis positioning • Cams • Interpolations
	V20 **G120C**	G120/G220 G130/G150 G180 [1]	G220 S120 S150 DCM	V90 S200 G120/G220	S110 S210	S120 S210 DCM
Machining 	Main drives for • Turning • Milling • Drilling	Main drives for • Drilling • Sawing	Main drives for • Turning • Milling • Drilling • Gear cutting • Grinding	Axis drives for • Turning • Milling • Drilling	Axis drives for • Drilling • Sawing	Axis drives for • Turning • Milling • Drilling • Lasering • Gear cutting • Grinding • Nibbling and punching
	S110	S110 S120	S120	S110	S110 S120	S120

SINAMICS G120C compact converters continuously control the speed of three-phase asynchronous (induction) motors and can be used in a wide range of industrial areas. They are generally suitable for applications involving conveyor belts, mixers, extruders, pumps, fans, compressors and basic handling machines.

Practical application examples and descriptions are available on the internet at www.siemens.com/sinamics-applications

More information

You may also be interested in these frequency converters:

- More performance for the control cabinet in IP20 degree of protection ⇒ SINAMICS G120
- Higher degree of protection for power ratings up to 7.5 kW ⇒ SINAMICS G115D, SINAMICS G120D (Catalog D 31.2)
- With positioning function in the control cabinet in IP20 degree of protection ⇒ SINAMICS G120, SINAMICS S110
- With positioning function for distributed drive solutions in IP65 degree of protection ⇒ SINAMICS G120D (Catalog D 31.2)
- For HVAC, water and wastewater applications in the infrastructure sector for power range 0.75 kW to 630 kW ⇒ SINAMICS G120X (Catalog D 31.5)

[1] Industry-specific converters.

[2] Information on the SIMATIC ET 200pro FC-2 frequency converter is available in Catalog D 31.2 and at: www.siemens.com/et200pro-fc

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Overview

SINAMICS G120C, frame sizes FSAA to FSF, with Intelligent Operator Panel IOP-2

SINAMICS G120C compact converters offer a well-balanced combination of features to address a wide range of applications. They are compact, rugged devices that are easy to operate and can be optionally equipped with a basic or advanced operator panel.

SINAMICS G120C converters are especially suitable when it comes to meeting the requirements of system integrators, OEMs and distributors regarding high productivity and tailored performance.

Benefits

- Compact design
- Frame size FSAA allows easy DIN rail mounting
- Side-by-side design
- High power density, low envelope dimensions
- Simple installation in the tightest space
- Low space requirement
- Use in small control cabinets, close to the machine
- Optimized parameter set
- Optimized commissioning
- Compact Operating Instructions
- BOP-2 or IOP-2 Operator Panels can be used
- Integrated USB connection
- Simple and fast software parameter assignment
- Simple to use during commissioning and in operation
- Minimized training costs, existing SINAMICS know-how can be used
- High degree of service friendliness, simple maintenance
- Plug-in terminals
- Cloning function using BOP-2, IOP-2, or memory card
- Operating hours counter for "drive on" and "motor on"
- Fast mechanical installation
- Intuitive standard commissioning
- Component of Totally Integrated Automation
- Energy-efficient, sensorless vector control
- Automatic flux reduction with V/f ECO
- Integrated energy saving computer
- Safety Integrated (STO)
- Communication versions with PROFINET / EtherNet/IP, PROFIBUS DP, USS/Modbus RTU
- Wireless commissioning, operation and diagnostics via mobile device or laptop thanks to the optional SINAMICS G120 Smart Access
- Varnished modules
- Operation up to an ambient temperature of 60 °C

Extended warranty

For SINAMICS G120C, Siemens offers an optional extension of warranty up to 5½ years via **Service Protect:**

- Free for the first 6 months after registering the product at: www.siemens.com/serviceprotect
- Subject to a charge for a further 3 or 5 years

You can find detailed information here:
https://support.industry.siemens.com/cs/ww/en/sc/4842

Concerning standard warranty please ask your partner at Siemens. Your partner can be found in our Personal Contacts Database at:
www.siemens.com/automation-contact

Siemens EcoTech Profile (SEP) for SINAMICS G120C

Siemens introduces a new label: Siemens EcoTech. It is an environmental declaration for products based on product-specific evaluations of sustainability relevant KPIs.

To provide maximum transparency, the Siemens EcoTech Profile (SEP) were created for all Siemens EcoTech products.

It is a Siemens-created, standardized product data sheet which gives insight about the product performance in environmental relevant criteria as well as about interpretation and comparison of data against an existing norm, standard or predecessor product.

You can find more information on the internet at:
https://sieportal.siemens.com/su/blQ7T
www.siemens.com/SiemensEcoTech

Siemens
EcoTech

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Design

SINAMICS G120C is a compact converter for control cabinet mounting in IP20 degree of protection where the Control Unit (CU) and Power Module (PM) function units are combined in one device.

The compact mechanical design and the high power density allow these devices to be installed in machine control enclosures and control cabinets for maximum space utilization. The SINAMICS G120C compact converter can be butt-mounted directly, without derating at temperatures up to 40 °C (104 °F).

SINAMICS G120C, frame size FSAA with BOP-2

SINAMICS G120C can be integrated into the widest range of applications, either using the integrated digital and analog inputs or via the integrated fieldbus interface (available in USS, Modbus RTU, PROFIBUS, PROFINET, EtherNet/IP versions). Especially the product versions with integrated PROFIBUS/PROFINET interface make full integration into the Siemens TIA family possible, therefore allowing the advantages of the seamless TIA product family to be fully utilized. SINAMICS G120C devices are preset in the factory so that they can be immediately connected to PROFIBUS or PROFINET fieldbus systems without parameterization.

Wireless commissioning, operation and diagnostics via mobile device or laptop thanks to the optional web server module SINAMICS G120 Smart Access enabling user-friendly operation and easy access to the converter, even if this is installed in areas difficult to access.

SINAMICS G120C is also equipped with the safety function STO (Safe Torque Off) as standard, which is used to safely stop drives. As a consequence, machine manufacturers can simply comply with current machinery directives with minimum associated costs.

SINAMICS G120C can control asynchronous (induction) motors in the power range from 0.37 kW up to 132 kW (0.5 hp to 200 hp). Reliable and efficient motor operation is achieved by using state-of-the-art IGBT technology combined with vector control. The extensive range of functions integrated in the SINAMICS G120C also offers a high degree of protection for the converter and motor.

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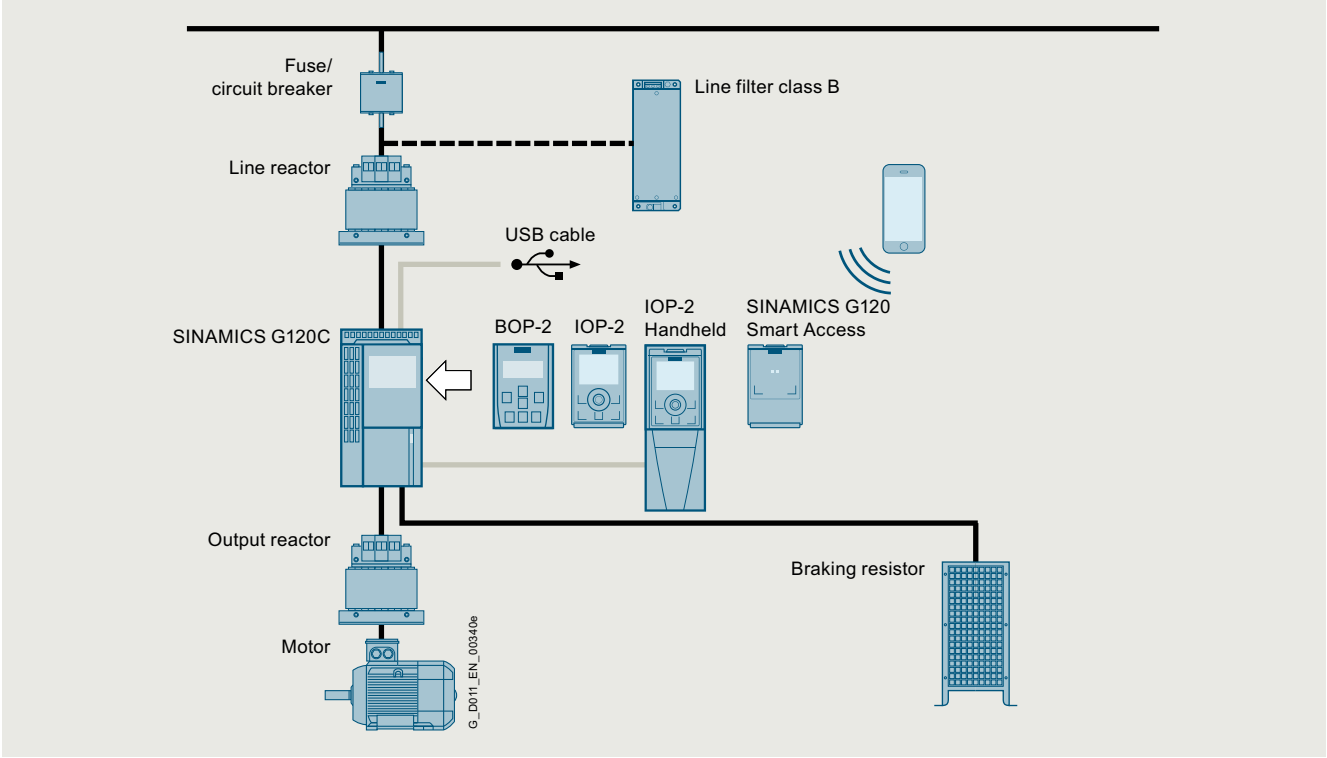
Design



Line-side components

Line filter

SINAMICS G120C can be ordered with or without integrated Class A line filters. Optionally, an external Class B line filter can be used for classifying in a higher interference class.

Line reactors

Line reactors smooth the current drawn by the converter and thus reduce harmonic components in the line current. Through the reduction of the current harmonics, the thermal load on the power components in the rectifier and in the DC link capacitors is reduced as well as the harmonic effects on the supply. The use of a line reactor increases the service life of the converter. A DC link reactor is integrated in frame sizes FSD to FSF, and therefore no line reactor is required.

Recommended line-side overcurrent protection devices

Overcurrent protection devices are absolutely necessary for the operation of the converters. The table listed in the section "Recommended line-side overcurrent protection devices" provides recommendations according to IEC and UL regulations, depending on the area of application. Recommendations on further overcurrent protection devices are available at:
https://support.industry.siemens.com/cs/document/109750343

More information about the listed Siemens fuses is available in Catalog LV 10 as well as SiePortal.

DC link components

Braking resistors

Excess energy in the DC link is dissipated in the braking resistor. The braking resistors are designed for use with the SINAMICS G120C. This has an integrated braking chopper (electronic switch). For the electromagnetically compatible connection of an optionally connectable braking resistor, the corresponding shield connection kit is to be ordered for frame sizes FSD to FSF.

Load-side power components

Output reactors

Output reactors reduce the rate of voltage rise (dv/dt) and the height of the current peaks, and enable longer motor cables to be connected.

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Design

Supplementary system components

IOP-2 Intelligent Operator Panel

Graphics-based, user-friendly and powerful operator panel for commissioning and diagnostics as well as local operator control and monitoring of SINAMICS G120C.

BOP-2 Basic Operator Panel

A 2-line display to provide support when commissioning and troubleshooting the drive. The drive can be locally controlled.

Memory card

The parameter settings for a converter can be stored on the SINAMICS SD memory card. When service is required, e.g. after the converter has been replaced and the data have been downloaded from the memory card, the drive system is immediately ready for use again. The associated memory card holder is integrated in the converter.

SINAMICS G120 Smart Access

Wireless commissioning, operation and diagnostics via mobile device or laptop thanks to the optional web server module SINAMICS G120 Smart Access enabling user-friendly operation and easy access to the converter, even if this is installed in areas difficult to access.

PC converter connection kit 2

For controlling and commissioning a converter directly from a PC if the STARTER commissioning tool or SINAMICS Startdrive has been installed on the PC.

Shield connection kits

A shield connection kit is included in the scope of delivery for frame sizes FSAA to FSC.
A set of shield plates is included in the scope of delivery for the motor and signal cables corresponding to the frame size for the frame sizes FSD to FSF. For the electromagnetically compatible connection of an optionally connectable braking resistor, the corresponding shield connection kit is to be ordered for frame sizes FSD to FSF.

Additional options

Further selected accessories are available from "Siemens Product Partner for Drives Options":
www.siemens.com/drives-options-partner

Spare parts

Shield connection kits

A shield connection kit is supplied as standard with frame sizes FSAA to FSC. These shield connection kits can also be ordered as spare parts.
A set of shield plates is included in the scope of delivery for the motor and signal cables corresponding to the frame size for the frame sizes FSD to FSF. For the electromagnetically compatible connection of an optionally connectable braking resistor, the corresponding shield connection kit is to be ordered for frame sizes FSD to FSF.

Spare parts kit

This kit comprises four I/O terminals, one RS485 terminal, two pairs of Control Unit doors (1 × PN and 1 × other communication versions) and one blanking cover.

Set of connectors

A set of connectors for the line feeder cable, braking resistor and motor cable can be ordered corresponding to the frame size of the SINAMICS G120C converter.

Roof-mounted fan

A roof-mounted fan (at the top of the device) comprising a pre-assembled unit with holder and fan can be ordered corresponding to the frame size of the SINAMICS G120C.

Fan unit

A replacement fan (at the rear of the device; heat sink) comprising a pre-assembled unit with holder and fan can be ordered corresponding to the frame size of the SINAMICS G120C.

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Configuration

The following electronic configuring aids and engineering tools are available for SINAMICS G120C compact converters:

SINAMICS DriveSim Designer (firmware V4.7 SP13 or higher)

SINAMICS DriveSim Designer provides easy-to-use models for PROFIdrive-enabled SINAMICS converters, so you can create a digital twin of your drive.

More information is provided on the internet at:
www.siemens.com/drive-virtualization

Siemens Product Configurator

The Siemens Product Configurator can be used on the internet without requiring any installation. The Siemens Product Configurator can be found in SiePortal at the following address:
www.siemens.com/spc

SIZER for Siemens Drives engineering tool (integrated into TIA Selection Tool)

The SIZER for Siemens Drives engineering tool makes it easy to configure the SINAMICS converter family. It provides support when selecting the hardware and firmware components necessary to implement a drive task. SIZER for Siemens Drives is designed to support configuring of the entire drive system.

You can find further information on the SIZER for Siemens Drives engineering tool in the section Engineering tools.

The SIZER for Siemens Drives engineering tool is available free on the internet at:
www.siemens.com/sizer

STARTER commissioning tool

The STARTER commissioning tool allows menu-prompted commissioning, optimization and diagnostics as well as the TIA functionality. Apart from the SINAMICS drives, STARTER is also suitable for MICROMASTER 4 devices.

You can find further information on the STARTER commissioning tool in the section Engineering tools.

More information about the STARTER commissioning tool is available on the internet at
www.siemens.com/starter

SINAMICS Startdrive commissioning tool

SINAMICS Startdrive is a tool integrated into the TIA Portal for configuring, commissioning and diagnostics of the SINAMICS converter family. SINAMICS Startdrive (V16 update 4 and higher) can be used to implement converter tasks with most of the SINAMICS G and SINAMICS S converter series. The commissioning tool has been optimized in terms of simplicity, ease of use, and consistent use of the benefits of the TIA Portal to provide a uniform working environment for PLC, HMI and drives.

You can find further information on the SINAMICS Startdrive commissioning tool in the section Engineering tools.

The SINAMICS Startdrive commissioning tool is available free on the internet at:
www.siemens.com/startdrive

Drive ES engineering system

Drive ES is the engineering system that can be used to integrate the communication, configuration and data management functions of Siemens drive technology into the SIMATIC automation world easily, efficiently and cost-effectively. The Drive ES PCS software package is available for SINAMICS.

You can find further information on the Drive ES engineering system in the section Engineering tools.

More information about the Drive ES engineering system is available on the internet at
www.siemens.com/drive-es

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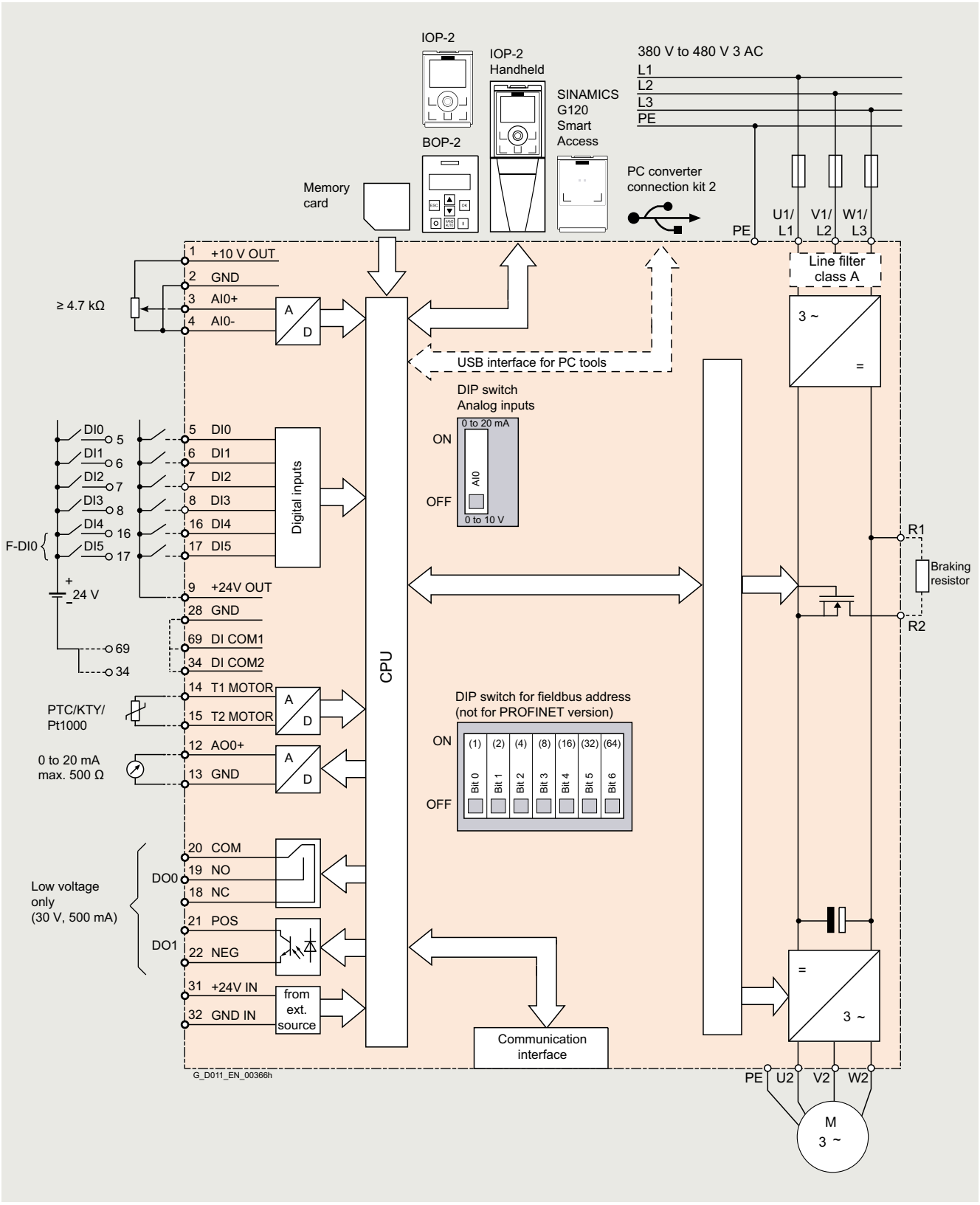
Integration



Connection example for SINAMICS G120C

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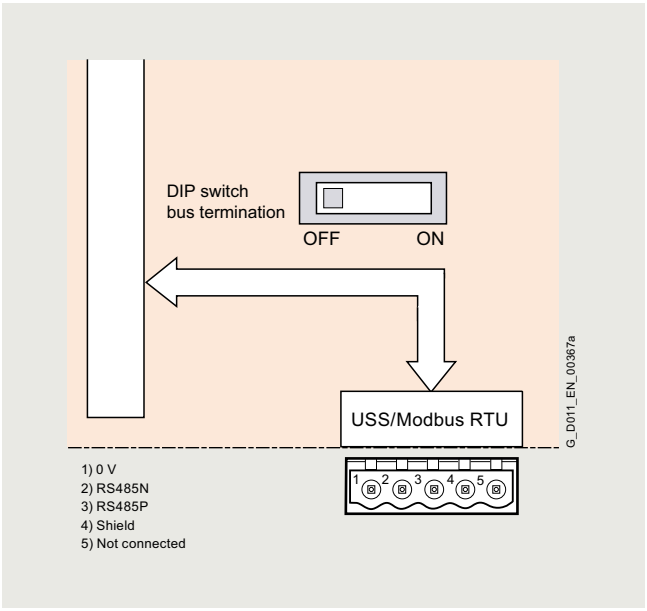
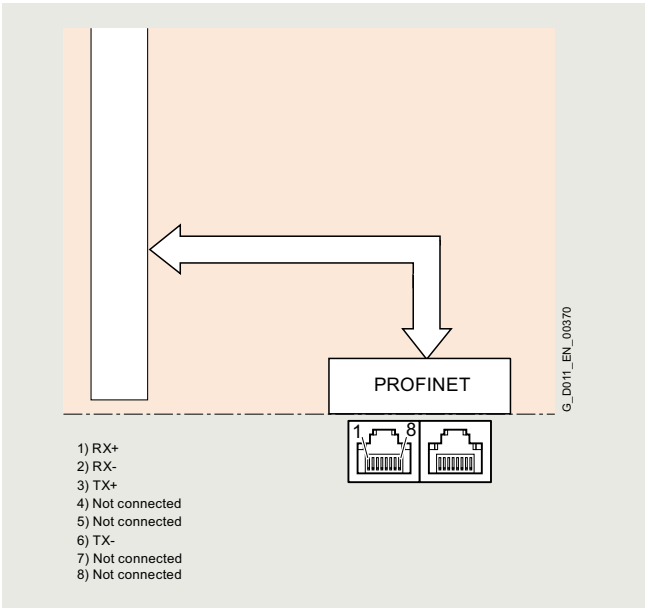
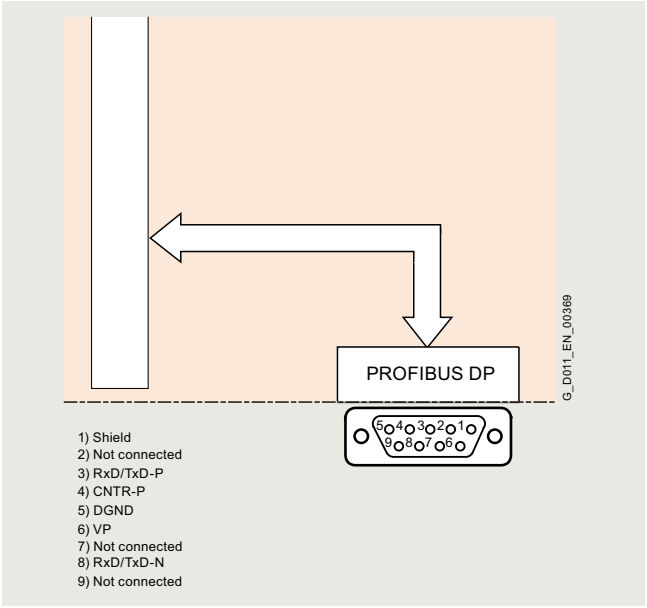
Integration



USS/Modbus RTU communication interface



PROFINET, EtherNet/IP communication interface



PROFIBUS DP communication interface

8

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Integration

Available optional power and DC link components

The following line-side components, DC link components and load-side power components are optionally available in the appropriate frames sizes:

	Frame size					
	FSAA, FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**
Line-side components						
Line filter class A	**F**	**F**	**F**	**F**	**F**	**F**
Line filter class B	**U**	**U**	**U**	–	–	–
Line reactor	**S** [1]	**S**	**S**	**I**	**I**	**I**
DC link components						
Braking resistor	**S** [1]	**S**	**S**	**S**	**S**	**S**
Load-side power components						
Output reactor	**S** [1]	**S**	**S**	**S**	**S**	**S**

U = Base component
S = Lateral mounting
I = Integrated
F = Converter available with and without integrated filter class A
– = Not possible

Maximum permissible cable lengths from the motor to the converter when using output reactors or line filters

The following load-side power components are optionally available in the appropriate frame sizes and result in the following maximum cable lengths, if necessary in combination with line filters for complying with EMC requirements:

	Maximum permissible motor cable lengths (shielded/unshielded) in m (ft)						
	FSAA	**FSA**	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**
Without optional power components							
• Versions without integrated line filter	**150** [2]**/150 (492** [2]**)/492)**	**150/150 (492/492)**	**150/150 (492/492)**	**150/150 (492/492)**	**200/300 (656/984)**	**200/300 (656/984)**	**300/450 (984/1476)**
• Versions with integrated line filter class A	**50/100 (164/328)**	**50/100 (164/328)**	**50/100 (164/328)**	**50/100 (164/328)**	**200/300 (656/984)**	**200/300 (656/984)**	**300/450 (984/1476)**
With optional output reactor							
• At 380 ... 415 V 3 AC	**150/225 (492/738)**	**150/225 (492/738)**	**150/225 (492/738)**	**150/225 (492/738)**	**200/300 (656/984)** [5]	**200/300 (656/984)** [5]	**300/450 (984/1476)** [5]
• At 440 ... 480 V 3 AC	**100/150 (328/492)**	**100/150 (328/492)**	**100/150 (328/492)**	**100/150 (328/492)**	**200/300 (656/984)** [5]	**200/300 (656/984)** [5]	**300/450 (984/1476)** [5]
With integrated line filter class A According to EN 55011 to comply with radio interference emissions according to EN 61800-3 EMC Category C2	**25** [3]**/– (82** [3]**)/–)**	**25** [3]**/– (82** [3]**)/–)**	**25** [3]**/– (82** [3]**)/–)**	**25** [4]**– (82** [4]**)/–)**	**150/– (492/–)**	**150/– (492/–)**	**150/– (492/–)**
With optional, external line filter class B According to EN 55011 to comply with cable-conducted radio interference emissions according to EN 61800-3 EMC Category C1 [6], **together with versions without integrated line filters**	**50/– (164/–)**	**25/– (82/–)**	**50/– (164/–)**	**50/– (164/–)**	–	–	–
With optional, external line filter class B According to EN 55011 **and output reactor** to comply with radio interference emissions according to EN 61800-3 EMC Category C2 [6], **together with versions without integrated line filters**							
• At 380 ... 415 V 3 AC	**150/– (492/–)**	**150/– (492/–)**	**150/– (492/–)**	**150/– (492/–)**	–	–	–
• At 440 ... 480 V 3 AC	**100/– (328/–)**	**100/– (328/–)**	**100/– (328/–)**	**100/– (328/–)**	–	–	–

[1] Line reactors, braking resistors and output reactors that are suitable for base mounting are also available for SINAMICS G120C, frame size FSAA, 0.55 kW to 2.2 kW. For 2.2 kW, operation of the line reactor, braking resistor and output reactor that are suitable for base mounting is only permitted for operating the converter with rated power of 1.5 kW based on high overload (HO).
More information is available in the operating instructions on the internet at: www.siemens.com/sinamics-g120c/documentation

[2] For SINAMICS G120C frame size FSAA 2.2 kW with low-capacitance CY cable 150 m (492 ft) (shielded) – otherwise 125 m (410 ft) (shielded).

[3] With low-capacitance CY cable 50 m (164 ft) (shielded).

[4] With low-capacitance CY cable 100 m (328 ft) (shielded).

[5] For frame sizes FSD to FSF the maximum permissible cable lengths are not increased with an output reactor. By means of the output reactor, the loading of the motor windings is reduced by lower rates of voltage rise (*dv/dt*). By means of two output reactors connected in series, the maximum permissible cable lengths for frame sizes FSD and FSE are increased to 350 m (1148 ft) (shielded) and 525 m (1723 ft) (unshielded), and for frame size FSF to 525 m (1723 ft) (shielded) and 800 m (2625 ft) (unshielded).

[6] More information is available in the operating instructions on the internet at: www.siemens.com/sinamics-g120c/documentation

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Selection and ordering data

The article number is selected corresponding to

- the required motor power or the motor current required and the overload requirements of the application,
- the necessary EMC classification and
- the required integrated fieldbus interface

Rated power [1]		Base-load current I_L [2]	Base-load current I_H [3]	Frame size	Version	SINAMICS G120C without line filter	SINAMICS G120C with integrated line filter class A
kW	hp	A	A			Article No.	Article No.
380 ... 480 V 3 AC							
0.55	0.75	1.7	1.3	FSAA	USS, Modbus RTU	**6SL3210-1KE11-8UB2**	**6SL3210-1KE11-8AB2**
					PROFIBUS DP	**6SL3210-1KE11-8UP2**	**6SL3210-1KE11-8AP2**
					PROFINET, EtherNet/IP	**6SL3210-1KE11-8UF2**	**6SL3210-1KE11-8AF2**
0.75	1	2.2	1.7	FSAA	USS, Modbus RTU	**6SL3210-1KE12-3UB2**	**6SL3210-1KE12-3AB2**
					PROFIBUS DP	**6SL3210-1KE12-3UP2**	**6SL3210-1KE12-3AP2**
					PROFINET, EtherNet/IP	**6SL3210-1KE12-3UF2**	**6SL3210-1KE12-3AF2**
1.1	1.5	3.1	2.2	FSAA	USS, Modbus RTU	**6SL3210-1KE13-2UB2**	**6SL3210-1KE13-2AB2**
					PROFIBUS DP	**6SL3210-1KE13-2UP2**	**6SL3210-1KE13-2AP2**
					PROFINET, EtherNet/IP	**6SL3210-1KE13-2UF2**	**6SL3210-1KE13-2AF2**
1.5	2	4.1	3.1	FSAA	USS, Modbus RTU	**6SL3210-1KE14-3UB2**	**6SL3210-1KE14-3AB2**
					PROFIBUS DP	**6SL3210-1KE14-3UP2**	**6SL3210-1KE14-3AP2**
					PROFINET, EtherNet/IP	**6SL3210-1KE14-3UF2**	**6SL3210-1KE14-3AF2**
2.2	3	5.6	4.1	FSAA	USS, Modbus RTU	**6SL3210-1KE15-8UB2**	**6SL3210-1KE15-8AB2**
					PROFIBUS DP	**6SL3210-1KE15-8UP2**	**6SL3210-1KE15-8AP2**
					PROFINET, EtherNet/IP	**6SL3210-1KE15-8UF2**	**6SL3210-1KE15-8AF2**
3	4	7.3	5.6	FSA	USS, Modbus RTU	**6SL3210-1KE17-5UB1**	**6SL3210-1KE17-5AB1**
					PROFIBUS DP	**6SL3210-1KE17-5UP1**	**6SL3210-1KE17-5AP1**
					PROFINET, EtherNet/IP	**6SL3210-1KE17-5UF1**	**6SL3210-1KE17-5AF1**
4	5	8.8	7.3	FSA	USS, Modbus RTU	**6SL3210-1KE18-8UB1**	**6SL3210-1KE18-8AB1**
					PROFIBUS DP	**6SL3210-1KE18-8UP1**	**6SL3210-1KE18-8AP1**
					PROFINET, EtherNet/IP	**6SL3210-1KE18-8UF1**	**6SL3210-1KE18-8AF1**
5.5	7.5	12.5	8.8	FSB	USS, Modbus RTU	**6SL3210-1KE21-3UB1**	**6SL3210-1KE21-3AB1**
					PROFIBUS DP	**6SL3210-1KE21-3UP1**	**6SL3210-1KE21-3AP1**
					PROFINET, EtherNet/IP	**6SL3210-1KE21-3UF1**	**6SL3210-1KE21-3AF1**
7.5	10	16.5	12.5	FSB	USS, Modbus RTU	**6SL3210-1KE21-7UB1**	**6SL3210-1KE21-7AB1**
					PROFIBUS DP	**6SL3210-1KE21-7UP1**	**6SL3210-1KE21-7AP1**
					PROFINET, EtherNet/IP	**6SL3210-1KE21-7UF1**	**6SL3210-1KE21-7AF1**
11	15	25	16.5	FSC	USS, Modbus RTU	**6SL3210-1KE22-6UB1**	**6SL3210-1KE22-6AB1**
					PROFIBUS DP	**6SL3210-1KE22-6UP1**	**6SL3210-1KE22-6AP1**
					PROFINET, EtherNet/IP	**6SL3210-1KE22-6UF1**	**6SL3210-1KE22-6AF1**
15	20	31	25	FSC	USS, Modbus RTU	**6SL3210-1KE23-2UB1**	**6SL3210-1KE23-2AB1**
					PROFIBUS DP	**6SL3210-1KE23-2UP1**	**6SL3210-1KE23-2AP1**
					PROFINET, EtherNet/IP	**6SL3210-1KE23-2UF1**	**6SL3210-1KE23-2AF1**
18.5	25	37	31	FSC	USS, Modbus RTU	**6SL3210-1KE23-8UB1**	**6SL3210-1KE23-8AB1**
					PROFIBUS DP	**6SL3210-1KE23-8UP1**	**6SL3210-1KE23-8AP1**
					PROFINET, EtherNet/IP	**6SL3210-1KE23-8UF1**	**6SL3210-1KE23-8AF1**
22	25	43	37	FSD	PROFINET, EtherNet/IP	**6SL3210-1KE24-4UF1**	**6SL3210-1KE24-4AF1**
30	30	58	43	FSD	PROFINET, EtherNet/IP	**6SL3210-1KE26-0UF1**	**6SL3210-1KE26-0AF1**
37	40	68	58	FSD	PROFINET, EtherNet/IP	**6SL3210-1KE27-0UF1**	**6SL3210-1KE27-0AF1**
45	50	82.5	68	FSD	PROFINET, EtherNet/IP	**6SL3210-1KE28-4UF1**	**6SL3210-1KE28-4AF1**
55	60	103	83	FSE	PROFINET, EtherNet/IP	**6SL3210-1KE31-1UF1**	**6SL3210-1KE31-1AF1**
75	75	136	103	FSF	PROFINET, EtherNet/IP	**6SL3210-1KE31-4UF1**	**6SL3210-1KE31-4AF1**
90	100	164	136	FSF	PROFINET, EtherNet/IP	**6SL3210-1KE31-7UF1**	**6SL3210-1KE31-7AF1**
110	125	201	164	FSF	PROFINET, EtherNet/IP	**6SL3210-1KE32-1UF1**	**6SL3210-1KE32-1AF1**
132	150	237	201	FSF	PROFINET, EtherNet/IP	**6SL3210-1KE32-4UF1**	**6SL3210-1KE32-4AF1**

[1] The rated power of the device based on the rated output current I_L and a rated input voltage of 400 V 3 AC. The rated power is specified on the device rating plate.

[2] The base-load current I_L is based on the duty cycle for low overload (LO). The current value is specified on the device rating plate.

[3] The base-load current I_H is based on the duty cycle for high overload (HO). The current value is not specified on the device rating plate.

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Selection and ordering data

Optional firmware memory cards for SINAMICS G120C

Description	Article No.
SINAMICS SD card **512 MB + firmware V4.7 SP13** (Multicard V4.7 SP13)	**6SL3054-7TG00-2BA0**
SINAMICS SD card **512 MB + firmware V4.7 SP14** (Multicard V4.7 SP14)	**6SL3054-7TH00-2BA0**

More information on firmware V4.7 SP14:
https://support.industry.siemens.com/cs/document/109817231

For an overview and more information on all available firmware versions, see
https://support.industry.siemens.com/cs/document/67364620

Notes:

SINAMICS G120C compact converters with frame size FSAA can be operated as of firmware V4.7 SP3.
SINAMICS G120C compact converters with frame sizes FSD to FSF can be operated as of firmware V4.7 SP6.

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Technical specifications

Unless explicitly specified otherwise, the following technical specifications are valid for all SINAMICS G120C compact converters.

General technical specifications	
Mechanical specifications	
Vibratory load	
• Transport acc. to IEC 60721-3-2: 1997 [1]	Class 2M3
• Operation acc. to IEC 60721-3-3: 2002	Class 3M1
Shock load	
• Transport acc. to IEC 60721-3-2: 1997 [1]	Class 2M3
• Operation acc. to IEC 60721-3-3: 2002	Class 3M2
Degree of protection	IP20/ UL Open Type
Permissible mounting position	Vertical wall mounting
Ambient conditions	
External 24 V supply According to IEC 60204-1	Touch-proof SELV or PELV power supply. The supply voltage must not exceed 60 V DC under single-fault conditions.
Protection class According to IEC 61800-5-1	Class I (with protective grounding conductor)
Humidity, max.	95 % at 40 °C (104 °F), condensation and icing not permissible
Ambient temperature	
• Storage [1] acc. to EN 60068-2-1	-40 ... +70 °C (-40 ... +158 °F)
• Transport [1] acc. to EN 60068-2-1	-40 ... +55 °C (-40 ... +131 °F)
• Operation acc. to EN 60068-2-2	
- Frame sizes FSAA to FSC	-10 ... +40 °C (14 ... 104 °F) without derating
- Frame sizes FSD to FSF	-20 ... +40 °C (-4 ... +104 °F) without derating
- All frame sizes	>40 ... 50 °C (104 ... 122 °F) see derating characteristics
- All frame sizes with Operator Panel	0 ... 50 °C (32 ... 122 °F) see also derating characteristics
Environmental class in operation	
• Harmful chemical substances	Class 3C2 acc. to IEC 60721-3-3: 2002
• Organic/biological pollutants	Class 3B1 acc. to IEC 60721-3-3: 2002
• Degree of pollution	2 acc. to EN 61800
Standards	
Compliance with standards [2]	CE, UKCA, UL, cUL, RCM, SEMI F47, RoHS, EAC
Fail-safe certification	Function: Safe Torque Off (STO)
• According to IEC 61508	SIL 2
• According to ISO 13849-1	PL d and Category 3
CE marking, according to	EMC Directive 2014/30/EU Low Voltage Directive 2014/35/EU Eco-design requirements of EU Directive 2019/1781
EMC Directive [2] According to EN 61800-3	
Interference immunity	The SINAMICS G120C compact converters are tested according to the interference immunity requirements for environments according to Category C3.
Interference emissions	
• Frame sizes FSAA to FSF without integrated line filter	[3]
• Frame sizes FSAA to FSC with integrated line filter class A	Observance of the limit values according to Category C3 Observance of the limit values for conducted interferences and field-conducted interference emissions according to Category C2 [4] [5]
• Frame sizes FSAA to FSC without integrated line filter with optional line filter class B	Observance of the limit values for conducted interferences according to Category C1 and field-conducted interference emissions according to Category C2 [4] [5]
• Frame sizes FSD to FSF with integrated line filter class A	Observance of the limit values according to Category C3 and C2 [4] Note: The EMC product standard EN 61800-3 does not apply directly to a frequency converter but to a PDS (Power Drive System), which comprises the complete circuitry, motor and cables in addition to the converter. The frequency converters on their own do not generally require identification according to the EMC Directive.

[1] In product packaging.

[2] More information is available in the operating instructions on the internet at: www.siemens.com/sinamics-g120c/documentation

[3] Unfiltered devices are designed for operation in IT systems or in conjunction with an RCD. The customer must provide suitable RI suppression equipment to ensure that these devices comply with the limits defined for Category C3 or C2.

[4] Max. permissible cable lengths see Technical specifications for power electronics.

[5] SINAMICS G120C compact converters, frame size FSB, with PROFINET interface (Article No.: 6SL3210-1KE21-.AF1) additionally require a line reactor.

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Technical specifications

SINAMICS G120C compact converter	USS, Modbus RTU version 6SL3210-1KE..-..B1 6SL3210-1KE..-..B2	PROFIBUS DP version 6SL3210-1KE..-..P1 6SL3210-1KE..-..P2	PROFINET, EtherNet/IP version 6SL3210-1KE..-..F1 6SL3210-1KE..-..F2
Integrated bus interface			
Fieldbus protocols	• USS • Modbus RTU (switchable using a parameter)	PROFIBUS DP	• PROFINET • EtherNet/IP - ODVA AC/DC drive - SINAMICS profiles
Profiles	–	• PROFIdrive Profile V4.1 • PROFIsafe	• PROFIdrive Profile V4.1 • PROFIsafe • PROFIenergy
Hardware	Plug-in terminal, insulated, USS: max. 187.5 kBaud Modbus RTU: 19.2 kBaud, Bus terminating resistor that can be switched in	9-pin SUB-D socket, insulated, max. 12 Mbit/s Device address can be set using DIP switches	2 × RJ45, max. 100 Mbit/s (full duplex), the device name can be stored on the device
I/O interfaces			
Signal cable cross-section	0.15 ... 1.5 mm^2 (28 ... 16 AWG)		
Digital inputs – Standard	6 isolated inputs Optically isolated; Free reference potential (own potential group) NPN/PNP logic can be selected using the wiring		
• Switching level: 0 → 1	11 V		
• Switching level: 1 → 0	5 V		
Digital inputs, fail-safe	1 When using the standard digital inputs (DI4+DI5) Safety function: Safe Torque Off (STO)		
Digital outputs	1 relay changeover contact 30 V DC, 0.5 A (ohmic load) 1 transistor 30 V DC, 0.5 A (ohmic load)		
Analog inputs	1 analog input Differential input Switchable between voltage (-10 ... +10 V) and current (0/4 ... 20 mA) using a DIP switch 10-bit resolution Can be used as additional digital input Analog inputs are protected in a voltage range of ± 30 V and have a common-mode voltage in the ± 15 V range.		
• Switching threshold: 0 → 1	4 V		
• Switching threshold: 1 → 0	1.6 V		
Analog outputs	1 analog output Non-isolated output Switchable between voltage (0 ... 10 V) and current (0/4 ... 20 mA) using a parameter Voltage mode: 10 V, min. burden 10 kΩ Current mode: 20 mA, max. burden 500 Ω The analog outputs have short-circuit protection		
PTC/KTY interface	1 motor temperature sensor input Connectable sensors PTC, Pt1000, KTY and bimetal, accuracy ±5 °C		
Voltage supply for the integrated Control Unit	24 V DC via the Power Module or by connecting to an external 20.4 ... 28.8 V DC power supply Typical input current: 500 mA at 24 V DC		
Tool interfaces			
Memory card	Optional SINAMICS SD card		
Operator panels	Optional BOP-2 Basic Operator Panel or IOP-2 Intelligent Operator Panel or SINAMICS G120 Smart Access		
PC interface	USB		

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Technical specifications

SINAMICS G120C compact converter	
Open-loop/closed-loop control methods	
V/f linear/quadratic/parameterizable	✓
V/f with flux current control (FCC)	✓
V/f ECO linear/quadratic	✓
Vector control, sensorless	✓
Vector control, with sensor	–
Torque control, sensorless	–
Torque control, with sensor	–
Software functions	
Setpoint input	✓
Fixed frequencies	16, parameterizable
JOG	✓
Digital motorized potentiometer (MOP)	✓
Ramp smoothing	✓
Extended ramp-function generator (with ramp smoothing Off3)	✓
Positioning down ramp	–
Slip compensation	✓
Signal interconnection with BICO technology	✓
Free function blocks (FFB) for logical and arithmetic operations	✓
Switchable drive data sets (DDS)	✓ (2)
Switchable command data sets (CDS)	✓ (2)
Flying restart	✓
Automatic restart after line supply failure or operating fault (AR)	✓
Technology controller (internal PID)	✓
Energy consumption counter	✓
Energy saving computer	✓
Thermal motor protection	✓ (I^2t, sensor: PTC, Pt1000, KTY and bimetal)
Thermal converter protection	✓
Motor identification	✓
Motor holding brake	✓
Auto-ramping (V_{dc_max} controller)	✓
Kinetic buffering (V_{dc_min} controller)	✓
Braking functions	
• DC braking	✓
• Compound braking	✓
• Dynamic braking with integrated braking chopper	✓

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Technical specifications

General technical specifications of the power electronics	
Line voltage	380 ... 480 V 3 AC +10 % -20 %
Line supply requirements **Short-circuit power ratio R_{SC}**	No restriction
Input frequency	47 ... 63 Hz
Output frequency	
• Control mode V/f	0 ... 550 Hz
• Control mode Vector	0 ... 240 Hz
Pulse frequency	4 kHz, 2 kHz for converters with a rated power ≥75 kW Higher pulse frequencies up to 16 kHz see derating data
Power factor λ	
• Frame sizes FSAA to FSC	0.7 ... 0.85
• Frame sizes FSD to FSF	>0.9
Displacement factor cos φ	≥0.95
Efficiency class According to IEC 61800-9-2	IE2
Output voltage, max. as % of input voltage	95 %
Overload capability	
• Low overload LO Note: No reduction in base-load current I_L for use of overload	1.5 × base-load current I_L (i. e. 150 % overload) for 3 s plus 1.1 × base-load current I_L (i. e. 110 % overload) for 57 s within a cycle time of 300 s
• High overload HO Note: No reduction in base-load current I_H for use of overload	2 × base-load current I_H (i. e. 200 % overload) for 3 s plus 1.5 × base-load current I_H (i. e. 150 % overload) for 57 s within a cycle time of 300 s
Cooling	Air cooling using an integrated fan
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, > 1000 m (3281 ft) see derating characteristics
Short Circuit Current Rating (SCCR) [1], max. acc. to UL	100 kA See Recommended line-side overcurrent protection devices – the value depends on the fuses and circuit breakers used
Protection functions	• Undervoltage • Overvoltage • Overload • Ground fault • Short-circuit • Stall protection • Motor blocking protection • Motor overtemperature • Converter overtemperature

Environmental Product Declaration (EPD)

Environmental Product Declarations (EPD) are available as PDFs for this product.

The EPD PDF provides brief and concise information about the ecological properties of a product.

You can find more information on the internet at:
https://support.industry.siemens.com/cs/ww/en/ps/13221/cert?ci=5690

[1] Applies to industrial control panel installations to NEC Article 409 or UL 508A.

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Technical specifications

Line voltage 380 ... 480 V 3 AC		SINAMICS G120C power electronics			
		6SL3210-1KE11-8..2	6SL3210-1KE12-3..2	6SL3210-1KE13-2..2	6SL3210-1KE14-3..2
Output current at 400 V 3 AC					
• Rated current I_N [1]	A	1.8	2.3	3.2	4.3
• Base-load current I_L [2]	A	1.7	2.2	3.1	4.1
• Base-load current I_H [3]	A	1.3	1.7	2.2	3.1
• Maximum current I_{max}	A	2.6	3.4	4.4	6.2
Rated power					
• Based on I_L	kW	0.55	0.75	1.1	1.5
• Based on I_H	kW	0.37	0.55	0.75	1.1
Rated pulse frequency	kHz	4	4	4	4
Efficiency η Acc. to IEC 61800-9-2	%	95.9	96.6	97.0	97.1
Power loss [4] Acc. to IEC 61800-9-2 At rated current	kW	0.034	0.039	0.048	0.060
Cooling air requirement	m^3/s (ft^3/s)	0.005 (0.18)	0.005 (0.18)	0.005 (0.18)	0.005 (0.18)
Sound pressure level L_{pA} (1 m)	dB	<49	<49	<49	<49
Rated input current [5]					
• Based on I_L	A	2.3	2.9	4.1	5.5
• Based on I_H	A	1.9	2.5	3.2	4.5
Length of cable to braking resistor, max.	m (ft)	15 (49)	15 (49)	15 (49)	15 (49)
Line supply connection U1/L1, V1/L2, W1/L3		Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals
• Conductor cross-section	mm^2	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)
Motor connection U2, V2, W2		Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals
• Conductor cross-section	mm^2	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)
Connection for braking resistor R1, R2		Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals
• Conductor cross-section	mm^2	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)
PE connection		On housing with M4 screw	On housing with M4 screw	On housing with M4 screw	On housing with M4 screw
Motor cable length, max. [6]					
• Without filter, shielded/unshielded	m (ft)	150/150 (492/492)	150/150 (492/492)	150/150 (492/492)	150/150 (492/492)
• With integrated filter class A, shielded/unshielded	m (ft)	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)
Dimensions					
• Width	mm (in)	73 (2.87)	73 (2.87)	73 (2.87)	73 (2.87)
• Height	mm (in)	173 (6.81)	173 (6.81)	173 (6.81)	173 (6.81)
• Depth					
- Without operator panel	mm (in)	155 (6.10) (PN version: 160 (6.30))	155 (6.10) (PN version: 160 (6.30))	155 (6.10) (PN version: 160 (6.30))	155 (6.10) (PN version: 160 (6.30))
- With BOP-2/IOP-2	mm (in)	166 (6.54) (PN version: 171 (6.73))	166 (6.54) (PN version: 171 (6.73))	166 (6.54) (PN version: 171 (6.73))	166 (6.54) (PN version: 171 (6.73))
Frame size		FSAA	FSAA	FSAA	FSAA
Weight, approx.					
• Without filter	kg (lb)	1.1 (2.43) (PN version: 1.2 (2.65))	1.1 (2.43) (PN version: 1.2 (2.65))	1.1 (2.43) (PN version: 1.2 (2.65))	1.1 (2.43) (PN version: 1.2 (2.65))
• With integrated filter class A	kg (lb)	1.3 (2.87) (PN version: 1.4 (3.09))	1.3 (2.87) (PN version: 1.4 (3.09))	1.3 (2.87) (PN version: 1.4 (3.09))	1.3 (2.87) (PN version: 1.4 (3.09))

[1] The rated output current I_N can be used up to 100 %; however, without overload.

[2] The base-load current I_L is based on the duty cycle for low overload (LO).

[3] The base-load current I_H is based on the duty cycle for high overload (HO).

[4] Typical values. More information can be found on the internet at https://support.industry.siemens.com/cs/document/94059311

[5] The rated input currents are valid for an input voltage of 400 V 3 AC and a line impedance corresponding to u_K = 1 % (without line reactor). The rated input current based on I_L is stamped on the converter rating plate. In the particular application, the input current depends on the motor load and line impedance. The input current is reduced when using a line reactor.

[6] The maximum motor cable lengths are valid for an input voltage of 400 V 3 AC and operation with a 4 kHz pulse frequency. When a converter with an integrated line filter class A is used to comply with the limits of EN 61800-3 Category C2 for line-conducted interference emission, the maximum permissible motor cable length is 25 m (shielded) as standard – and 50 m with low-capacitance CY cable (shielded).

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Technical specifications

Line voltage 380 ... 480 V 3 AC		SINAMICS G120C power electronics			
		6SL3210-1KE15-8..2	6SL3210-1KE17-5..1	6SL3210-1KE18-8..1	6SL3210-1KE21-3..1
Output current at 400 V 3 AC					
• Rated current I_N [1]	A	5.8	7.5	9	13
• Base-load current I_L [2]	A	5.6	7.3	8.8	12.5
• Base-load current I_H [3]	A	4.1	5.6	7.3	8.8
• Maximum current I_{max}	A	8.2	11.2	14.6	17.6
Rated power					
• Based on I_L	kW	2.2	3	4	5.5
• Based on I_H	kW	1.5	2.2	3	4
Rated pulse frequency	kHz	4	4	4	4
Efficiency η Acc. to IEC 61800-9-2	%	97.4	97.3	97.3	97.5
Power loss [4] Acc. to IEC 61800-9-2 At rated current	kW	0.073	0.098	0.119	0.169
Cooling air requirement	m^3/s (ft^3/s)	0.005 (0.18)	0.005 (0.18)	0.005 (0.18)	0.009 (0.32)
Sound pressure level L_{pA} (1 m)	dB	<49	<52	<52	<63
Rated input current [5]					
• Based on I_L	A	7.4	9.5	11.4	16.5
• Based on I_H	A	6	8.2	10.6	12.8
Length of cable to braking resistor, max.	m (ft)	15 (49)	15 (49)	15 (49)	15 (49)
Line supply connection U1/L1, V1/L2, W1/L3		Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals
• Conductor cross-section	mm^2	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)	4 .. 6 (12 ... 10 AWG)
Motor connection U2, V2, W2		Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals
• Conductor cross-section	mm^2	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)	4 ... 6 (12 ... 10 AWG)
Connection for braking resistor R1, R2		Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals
• Conductor cross-section	mm^2	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)	1 ... 2.5 (18 ... 14 AWG)	4 ... 6 (12 ... 10 AWG)
PE connection		On housing with M4 screw	On housing with M4 screw	On housing with M4 screw	On housing with M4 screw
Motor cable length, max. [6]					
• Without filter, shielded/unshielded	m (ft)	125 [7]/150 (410 [7]/492)	150/150 (492/492)	150/150 (492/492)	150/150 (492/492)
• With integrated filter class A, shielded/unshielded	m (ft)	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)
Dimensions					
• Width	mm (in)	73 (2.87)	73 (2.87)	73 (2.87)	100 (3.94)
• Height	mm (in)	173 (6.81)	196 (7.72)	196 (7.72)	196 (7.72)
• Depth					
- Without operator panel	mm (in)	155 (6.10) (PN version: 160 (6.30))	203 (7.99) (PN version: 200 (7.87))	203 (7.99) (PN version: 200 (7.87))	203 (7.99) (PN version: 205 (8.07))
- With BOP-2/IOP-2	mm (in)	166 (6.54) (PN version: 171 (6.73))	214 (8.43) (PN version: 211 (8.31))	214 (8.43) (PN version: 211 (8.31))	214 (8.43) (PN version: 216 (8.5))
Frame size		FSAA	FSA	FSA	FSB
Weight, approx.					
• Without filter	kg (lb)	1.1 (2.43) (PN version: 1.2 (2.65))	1.7 (3.75)	1.7 (3.75)	2.3 (5.07)
• With integrated filter class A	kg (lb)	1.3 (2.87) (PN version: 1.4 (3.09))	1.9 (4.19)	1.9 (4.19)	2.5 (5.51)

[1] The rated output current I_N can be used up to 100 %; however, without overload.

[2] The base-load current I_L is based on the duty cycle for low overload (LO).

[3] The base-load current I_H is based on the duty cycle for high overload (HO).

[4] Typical values. More information can be found on the internet at https://support.industry.siemens.com/cs/document/94059311

[5] The rated input currents are valid for an input voltage of 400 V 3 AC and a line impedance corresponding to u_K = 1 % (without line reactor). The rated input current based on I_L is stamped on the converter rating plate. In the particular application, the input current depends on the motor load and line impedance. The input current is reduced when using a line reactor.

[6] The maximum motor cable lengths are valid for an input voltage of 400 V 3 AC and operation with a 4 kHz pulse frequency. When a converter with an integrated line filter class A is used to comply with the limits of EN 61800-3 Category C2 for line-conducted interference emissions, the maximum permissible motor cable length is 25 m (shielded) as standard – for frame sizes FSAA to FSB with low-capacitance CY cable (shielded) it is 50 m.

[7] With low-capacitance CY cable 150 m (shielded).

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Technical specifications

Line voltage 380 ... 480 V 3 AC		SINAMICS G120C power electronics			
		6SL3210-1KE21-7..1	6SL3210-1KE22-6..1	6SL3210-1KE23-2..1	6SL3210-1KE23-8..1
Output current at 400 V 3 AC					
• Rated current I_N [1]	A	17	26	32	38
• Base-load current I_L [2]	A	16.5	25	31	37
• Base-load current I_H [3]	A	12.5	16.5	25	31
• Maximum current I_{max}	A	25	33	50	62
Rated power					
• Based on I_L	kW	7.5	11	15	18.5
• Based on I_H	kW	5.5	7.5	11	15
Rated pulse frequency	kHz	4	4	4	4
Efficiency η Acc. to IEC 61800-9-2	%	97.5	97.9	97.9	97.8
Power loss [4] Acc. to IEC 61800-9-2 At rated current	kW	0.228	0.292	0.361	0.434
Cooling air requirement	m^3/s (ft^3/s)	0.009 (0.32)	0.018 (0.64)	0.018 (0.64)	0.018 (0.64)
Sound pressure level L_{pA} (1 m)	dB	<63	<66	<66	<66
Rated input current [5]					
• Based on I_L	A	21.5	33	40.6	48.2
• Based on I_H	A	18.2	24.1	36.4	45.2
Length of cable to braking resistor, max.	m (ft)	15 (49)	15 (49)	15 (49)	15 (49)
Line supply connection U1/L1, V1/L2, W1/L3		Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals
• Conductor cross-section	mm^2	4 ... 6 (12 ... 10 AWG)	6 ... 16 (10 ... 5 AWG)	10 ... 16 (7 ... 5 AWG)	10 ... 16 (7 ... 5 AWG)
Motor connection U2, V2, W2		Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals
• Conductor cross-section	mm^2	4 ... 6 (12 ... 10 AWG)	6 ... 16 (10 ... 5 AWG)	10 ... 16 (7 ... 5 AWG)	10 ... 16 (7 ... 5 AWG)
Connection for braking resistor R1, R2		Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals	Plug-in screw terminals
• Conductor cross-section	mm^2	4 ... 6 (12 ... 10 AWG)	6 ... 16 (10 ... 5 AWG)	10 ... 16 (7 ... 5 AWG)	10 ... 16 (7 ... 5 AWG)
PE connection		On housing with M4 screw	On housing with M4 screw	On housing with M4 screw	On housing with M4 screw
Motor cable length, max. [6]					
• Without filter, shielded/unshielded	m (ft)	150/150 (492/492)	150/150 (492/492)	150/150 (492/492)	150/150 (492/492)
• With integrated filter class A, shielded/unshielded	m (ft)	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)
Dimensions					
• Width	mm (in)	100 (3.94)	140 (5.51)	140 (5.51)	140 (5.51)
• Height	mm (in)	196 (7.72)	295 (11.61)	295 (11.61)	295 (11.61)
• Depth					
- Without operator panel	mm (in)	203 (7.99) (PN version: 205 (8.07))	203 (7.99) (PN version: 205 (8.07))	203 (7.99) (PN version: 205 (8.07))	203 (7.99) (PN version: 205 (8.07))
- With BOP-2/IOP-2	mm (in)	214 (8.43) (PN version: 216 (8.5))	214 (8.43) (PN version: 216 (8.5))	214 (8.43) (PN version: 216 (8.5))	214 (8.43) (PN version: 216 (8.5))
Frame size		FSB	FSC	FSC	FSC
Weight, approx.					
• Without filter	kg (lb)	2.3 (5.07)	4.4 (9.70)	4.4 (9.70)	4.4 (9.70)
• With integrated filter class A	kg (lb)	2.5 (5.51)	4.7 (10.4)	4.7 (10.4)	4.7 (10.4)

1) The rated output current I_N can be used up to 100 %; however, without overload.

2) The base-load current I_L is based on the duty cycle for low overload (LO).

3) The base-load current I_H is based on the duty cycle for high overload (HO).

4) Typical values. More information can be found on the internet at https://support.industry.siemens.com/cs/document/94059311

5) The rated input currents are valid for an input voltage of 400 V 3 AC and a line impedance corresponding to u_K = 1 % (without line reactor). The rated input current based on I_L is stamped on the converter rating plate. In the particular application, the input current depends on the motor load and line impedance. The input current is reduced when using a line reactor.

6) The maximum motor cable lengths are valid for an input voltage of 400 V 3 AC and operation with a 4 kHz pulse frequency. When a converter with an integrated line filter class A is used to comply with the limits of EN 61800-3 Category C2 for line-conducted interference emission, the maximum permissible motor cable length is 25 m (shielded) as standard – with low-capacitance CY cable for frame size FSB 50 m (shielded), for FSC 100 m (shielded).

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Technical specifications

Line voltage 380 ... 480 V 3 AC		SINAMICS G120C power electronics			
		6SL3210-1KE24-4.F1	6SL3210-1KE26-0.F1	6SL3210-1KE27-0.F1	6SL3210-1KE28-4.F1
Output current at 400 V 3 AC					
• Rated current I_N [1]	A	43	58	68	82.5
• Base-load current I_L [2]	A	43	58	68	82.5
• Base-load current I_H [3]	A	37	43	58	68
• Maximum current I_{max}	A	74	87	116	136
Rated power					
• Based on I_L	kW	22	30	37	45
• Based on I_H	kW	18.5	22	30	37
Rated pulse frequency	kHz	4	4	4	4
Efficiency η Acc. to IEC 61800-9-2	%	97.1	96.8	97.1	97.0
Power loss [4] Acc. to IEC 61800-9-2 At rated current	kW	0.696	1.04	1.08	1.40
Cooling air requirement	m^3/s (ft^3/s)	0.055 (1.94)	0.055 (1.94)	0.055 (1.94)	0.055 (1.94)
Sound pressure level L_{pA} (1 m)	dB	71.6	71.6	71.6	71.6
Rated input current [5]					
• Based on I_L	A	41	53	64	76
• Based on I_H	A	39	44	61	69
Length of cable to braking resistor, max.	m (ft)	10 (32.8)	10 (32.8)	10 (32.8)	10 (32.8)
Line supply connection U1/L1, V1/L2, W1/L3		Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	10 ... 35 (20 ... 10 AWG)	10 ... 35 (20 ... 10 AWG)	10 ... 35 (20 ... 10 AWG)	10 ... 35 (20 ... 10 AWG)
Motor connection U2, V2, W2		Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	10 ... 35 (20 ... 10 AWG)	10 ... 35 (20 ... 10 AWG)	10 ... 35 (20 ... 10 AWG)	10 ... 35 (20 ... 10 AWG)
Connection for braking resistor R1, R2		Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	10 ... 35 (20 ... 10 AWG)	10 ... 35 (20 ... 10 AWG)	10 ... 35 (20 ... 10 AWG)	10 ... 35 (20 ... 10 AWG)
PE connection		On housing with M4 screw	On housing with M4 screw	On housing with M4 screw	On housing with M4 screw
Motor cable length, max. [6]					
• Without filter, shielded/unshielded	m (ft)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)
• With integrated filter class A, shielded/unshielded	m (ft)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)
Dimensions					
• Width	mm (in)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)
• Height	mm (in)	472 (18.58)	472 (18.58)	472 (18.58)	472 (18.58)
• Depth					
- Without operator panel	mm (in)	237 (9.33)	237 (9.33)	237 (9.33)	237 (9.33)
- With BOP-2/IOP-2	mm (in)	248 (9.76)	248 (9.76)	248 (9.76)	248 (9.76)
Frame size		FSD	FSD	FSD	FSD
Weight, approx.					
• Without filter	kg (lb)	17 (37.5)	17 (37.5)	18 (39.7)	18 (39.7)
• With integrated filter class A	kg (lb)	19 (41.9)	19 (41.9)	20 (44.1)	20 (44.1)

[1] The rated output current I_N can be used up to 100 %; however, without overload.

[2] The base-load current I_L is based on the duty cycle for low overload (LO).

[3] The base-load current I_H is based on the duty cycle for high overload (HO).

[4] Typical values. More information can be found on the internet at https://support.industry.siemens.com/cs/document/94059311

[5] The rated input currents are valid for an input voltage of 400 V 3 AC and a line impedance corresponding to u_K = 1 %. The rated input current based on I_L is stamped on the converter rating plate. In the particular application, the input current depends on the motor load and line impedance.

[6] The maximum motor cable lengths are valid for an input voltage of 400 V 3 AC and operation with a 4 kHz pulse frequency. When a converter with an integrated line filter class A is used to comply with the limits of EN 61800-3 Category C2 for line-conducted interference emissions, the maximum permissible motor cable length is 150 m (shielded) as standard.

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Technical specifications

Line voltage 380 ... 480 V 3 AC		SINAMICS G120C power electronics				
		6SL3210-1KE31-1.F1	6SL3210-1KE31-4.F1	6SL3210-1KE31-7.F1	6SL3210-1KE32-1.F1	6SL3210-1KE32-4.F1
Output current at 400 V 3 AC						
• Rated current I_N [1]	A	103	136	164	201	237
• Base-load current I_L [2]	A	103	136	164	201	237
• Base-load current I_H [3]	A	83	103	136	164	201
• Maximum current I_{max}	A	165	206	272	328	402
Rated power						
• Based on I_L	kW	55	75	90	110	132
• Based on I_H	kW	45	55	75	90	110
Rated pulse frequency	kHz	4	2	2	2	2
Efficiency η Acc. to IEC 61800-9-2	%	97.3	98.0	97.9	98.0	97.8
Power loss [4] Acc. to IEC 61800-9-2 At rated current	kW	1.57	1.52	1.95	2.31	2.89
Cooling air requirement	m^3/s (ft^3/s)	0.083 (2.93)	0.153 (5.40)	0.153 (5.40)	0.153 (5.40)	0.153 (5.40)
Sound pressure level L_{pA} (1 m)	dB	70.6	67.7	67.7	67.7	67.7
Rated input current [5]						
• Based on I_L	A	96	134	156	187	221
• Based on I_H	A	85	112	144	169	207
Length of cable to braking resistor, max.	m (ft)	10 (32.8)	10 (32.8)	10 (32.8)	10 (32.8)	10 (32.8)
Line supply connection U1/L1, V1/L2, W1/L3		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	25 ... 70 (6 ... 3/0 AWG)	35 ... 2×120 (1 ... 2×4/0 AWG)	35 ... 2×120 (1 ... 2×4/0 AWG)	35 ... 2×120 (1 ... 2×4/0 AWG)	35 ... 2×120 (1 ... 2×4/0 AWG)
Motor connection U2, V2, W2		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	25 ... 70 (6 ... 3/0 AWG)	35 ... 2×120 (1 ... 2×4/0 AWG)	35 ... 2×120 (1 ... 2×4/0 AWG)	35 ... 2×120 (1 ... 2×4/0 AWG)	35 ... 2×120 (1 ... 2×4/0 AWG)
Connection for braking resistor R1, R2		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	25 ... 70 (6 ... 3/0 AWG)	35 ... 2×120 (1 ... 2×4/0 AWG)	35 ... 2×120 (1 ... 2×4/0 AWG)	35 ... 2×120 (1 ... 2×4/0 AWG)	35 ... 2×120 (1 ... 2×4/0 AWG)
PE connection		On housing with M4 screw	On housing with M4 screw	On housing with M4 screw	On housing with M4 screw	On housing with M4 screw
Motor cable length, max. [6]						
• Without filter, shielded/unshielded	m (ft)	200/300 (656/984)	300/450 (984/1476)	300/450 (984/1476)	300/450 (984/1476)	300/450 (984/1476)
• With integrated filter class A, shielded/unshielded	m (ft)	200/300 (656/984)	300/450 (984/1476)	300/450 (984/1476)	300/450 (984/1476)	300/450 (984/1476)
Dimensions						
• Width	mm (in)	275 (10.83)	305 (12.01)	305 (12.01)	305 (12.01)	305 (12.01)
• Height	mm (in)	551 (21.69)	708 (27.87)	708 (27.87)	708 (27.87)	708 (27.87)
• Depth						
- Without operator panel	mm (in)	237 (9.33)	357 (14.06)	357 (14.06)	357 (14.06)	357 (14.06)
- With BOP-2/IOP-2	mm (in)	248 (9.76)	368 (14.49)	368 (14.49)	368 (14.49)	368 (14.49)
Frame size		FSE	FSF	FSF	FSF	FSF
Weight, approx.						
• Without filter	kg (lb)	27 (59.5)	59 (130)	59 (130)	62 (137)	62 (137)
• With integrated filter class A	kg (lb)	29 (63.9)	64 (141)	64 (141)	66 (146)	66 (146)

[1] The rated output current I_N can be used up to 100 %; however, without overload.

[2] The base-load current I_L is based on the duty cycle for low overload (LO).

[3] The base-load current I_H is based on the duty cycle for high overload (HO).

[4] Typical values. More information can be found on the internet at https://support.industry.siemens.com/cs/document/94059311

[5] The rated input currents are valid for an input voltage of 400 V 3 AC and a line impedance corresponding to u_K = 1 %. The rated input current based on I_L is stamped on the converter rating plate. In the particular application, the input current depends on the motor load and line impedance.

[6] The maximum motor cable lengths are valid for an input voltage of 400 V 3 AC and operation with a 4 kHz pulse frequency. When a converter with an integrated line filter class A is used to comply with the limits of EN 61800-3 Category C2 for line-conducted interference emissions, the maximum permissible motor cable length is 150 m (shielded) as standard.

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Characteristic curves

Derating data

Pulse frequency

Rated power based on low overload (LO)		**Rated output current in A** for a pulse frequency of							
kW	hp	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
0.55	0.75	1.7	1.7	1.4	1.2	1	0.9	0.8	0.7
0.75	1	2.2	2.2	1.9	1.5	1.3	1.1	1	0.9
1.1	1.5	3.1	3.1	2.6	2.2	1.9	1.6	1.4	1.2
1.5	2	4.1	4.1	3.5	2.9	2.5	2.1	1.8	1.6
2.2	3	5.6	5.6	4.8	3.9	3.4	2.8	2.5	2.2
3	4	7.3	7.3	6.2	5.1	4.4	3.7	3.3	2.9
4	5	8.8	8.8	7.5	6.2	5.3	4.4	4	3.5
5.5	7.5	12.5	12.5	10.6	8.8	7.5	6.3	5.6	5
7.5	10	16.5	16.5	14	11.6	9.9	8.3	7.4	6.6
11	15	25	25	21.3	17.5	15	12.5	11.3	10
15	20	31	31	26.4	21.7	18.6	15.5	14	12.4
18.5	25	37	37	31.5	25.9	22.2	18.5	16.7	14.8
22	25	43	43	36.6	30.1	25.8	21.5	19.4	17.2
30	30	58	58	49.3	40.6	34.8	29	26.1	23.2
37	40	68	68	57.8	47.6	40.8	34	30.6	27.2
45	50	82.5	82.5	70.1	57.8	49.5	41.3	37.1	33
55	60	103	103	87.6	72.1	–	–	–	–
75	75	136	136	115.6	95.2	–	–	–	–
90	100	164	164	139.4	114.8	–	–	–	–
110	125	201	140.7	–	–	–	–	–	–
132	150	237	165.9	–	–	–	–	–	–

The permissible motor cable length depends on the cable type and the pulse frequency.

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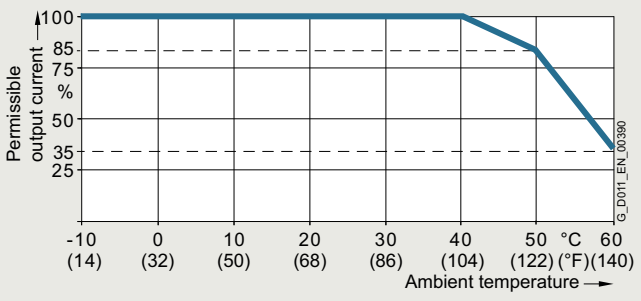
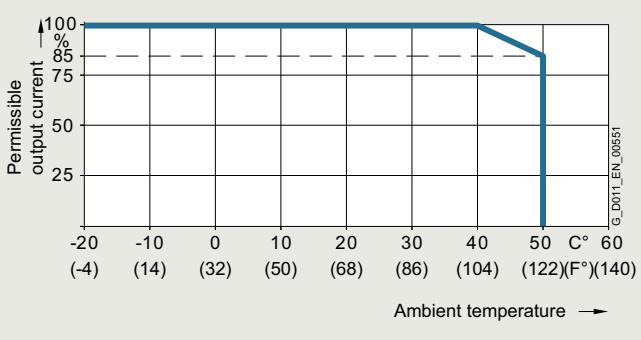
Characteristic curves

Ambient temperature



Permissible output current as a function of the ambient temperature, frame sizes FSAA to FSC



Permissible output current as a function of the ambient temperature, frame sizes FSD to FSF

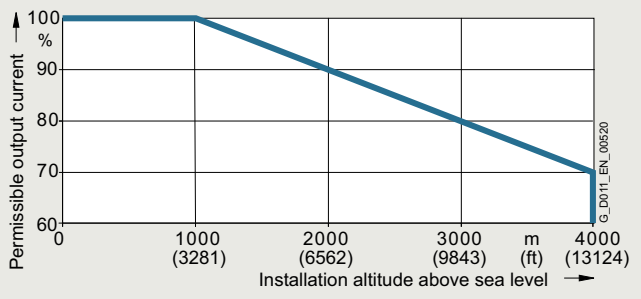
For the frame sizes FSA to FSC, the PROFINET version can be butt-mounted at temperatures up to 55 °C.
The frame sizes FSAA and FSD to FSF can be butt-mounted at temperatures up to 50 °C.

Installation altitude

Permissible line supplies as a function of the installation altitude

- Installation altitude up to 2000 m (6562 ft) above sea level
  - Connection to every supply system permitted for the converter
- Installation altitudes between 2000 m (6562 ft) and 4000 m (13124 ft) above sea level
  - Connection only to a TN system with grounded neutral point
  - TN systems with grounded line conductor are not permitted
  - The TN line system with grounded neutral point can also be supplied using an isolation transformer
  - The phase-to-phase voltage does not have to be reduced

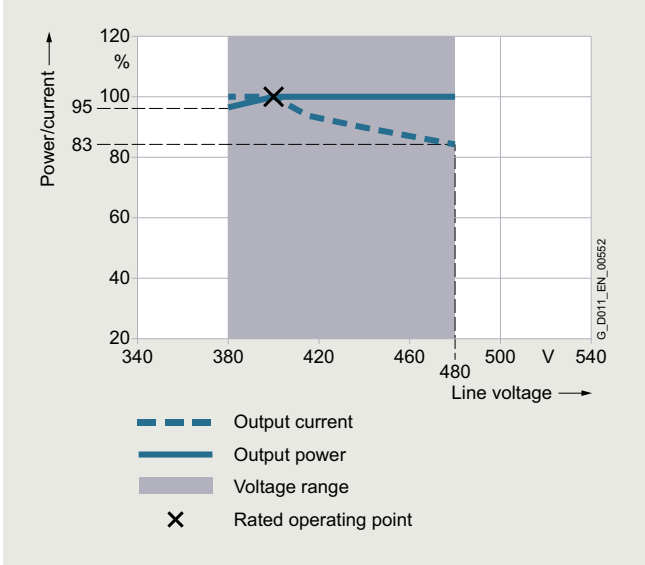
The connected motors, power elements and components must be considered separately.



Permissible output current as a function of the installation altitude, frame sizes FSAA to FSF at 40 °C for low overload (LO)

Current/power derating as a function of the line voltage

The SINAMICS G120C compact converter supplies a constant power in the line voltage range 380 V to 480 V 3 AC. The constant power results in current derating as a function of the line voltage.



Current derating as a function of the line voltage

More information on the derating data of the SINAMICS G120C compact converter can be found in the operating instructions on the internet at:
www.siemens.com/sinamics-g120c/documentation

8

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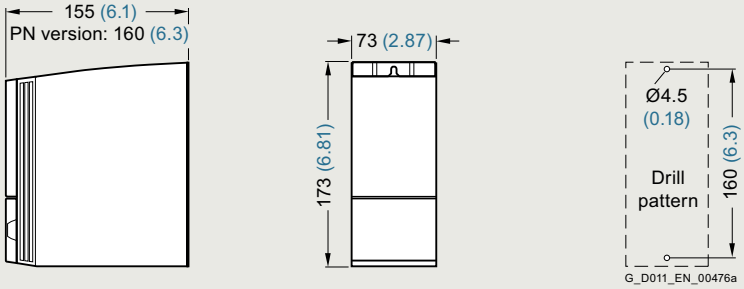
Dimensional drawings



SINAMICS G120C, frame size FSAA

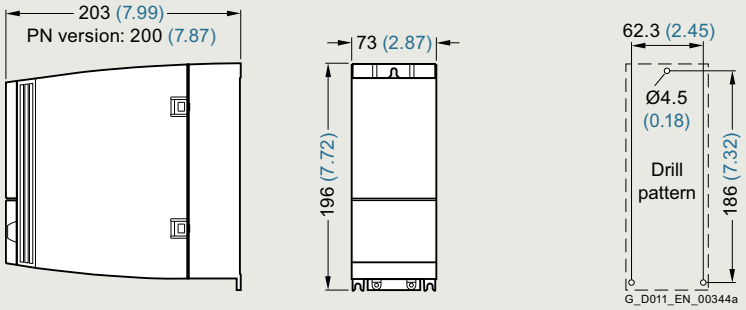
Mounted with 2 M4 bolts, 2 M4 nuts, 2 M4 washers.

When the shield plate is mounted, the drilling pattern is compatible with frame size FSA.

Ventilation clearance required at the top: 80 mm (3.15 inches).
Ventilation clearance required at the bottom: 100 mm (3.94 inches).
Ventilation clearance required at the side: 0 mm (0 inches).

When the BOP-2/IOP-2 is plugged on, the overall depth increases by 11 mm (0.43 inches).

All dimensions in mm (values in brackets are in inches).



SINAMICS G120C, frame size FSA

Mounted with 3 M4 bolts, 3 M4 nuts, 3 M4 washers.

Ventilation clearance required at the top: 80 mm (3.15 inches).
Ventilation clearance required at the bottom: 100 mm (3.94 inches).
Ventilation clearance required at the side: 0 mm (0 inches).

When the BOP-2/IOP-2 is plugged on, the overall depth increases by 11 mm (0.43 inches).

All dimensions in mm (values in brackets are in inches).

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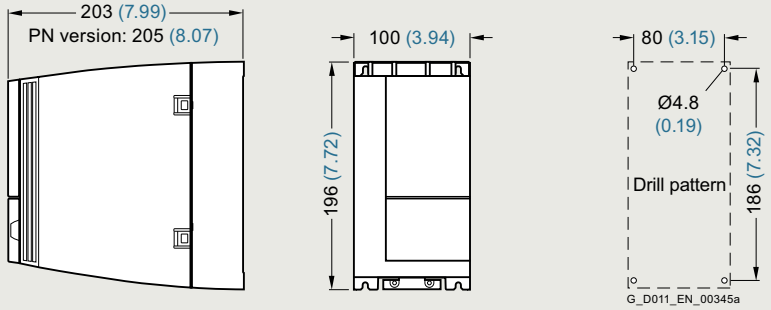
Dimensional drawings



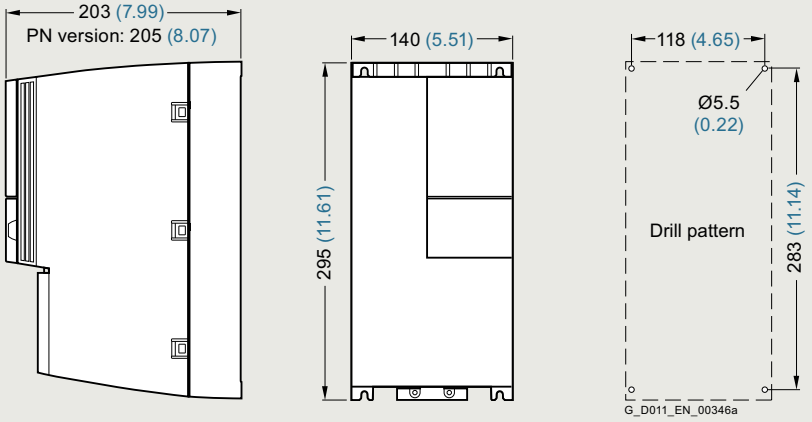
SINAMICS G120C, frame size FSB

Mounted with 4 M4 bolts, 4 M4 nuts, 4 M4 washers.

Ventilation clearance required at the top: 80 mm (3.15 inches).
Ventilation clearance required at the bottom: 100 mm (3.94 inches).
Ventilation clearance required at the side: 0 mm (0 inches).

When the BOP-2/IOP-2 is plugged on, the overall depth increases by 11 mm (0.43 inches).

All dimensions in mm (values in brackets are in inches).



SINAMICS G120C, frame size FSC

Mounted with 4 M5 bolts, 4 M5 nuts, 4 M5 washers.

Ventilation clearance required at the top: 80 mm (3.15 inches).
Ventilation clearance required at the bottom: 100 mm (3.94 inches).
Ventilation clearance required at the side: 0 mm (0 inches).

When the BOP-2/IOP-2 is plugged on, the overall depth increases by 11 mm (0.43 inches).

All dimensions in mm (values in brackets are in inches).

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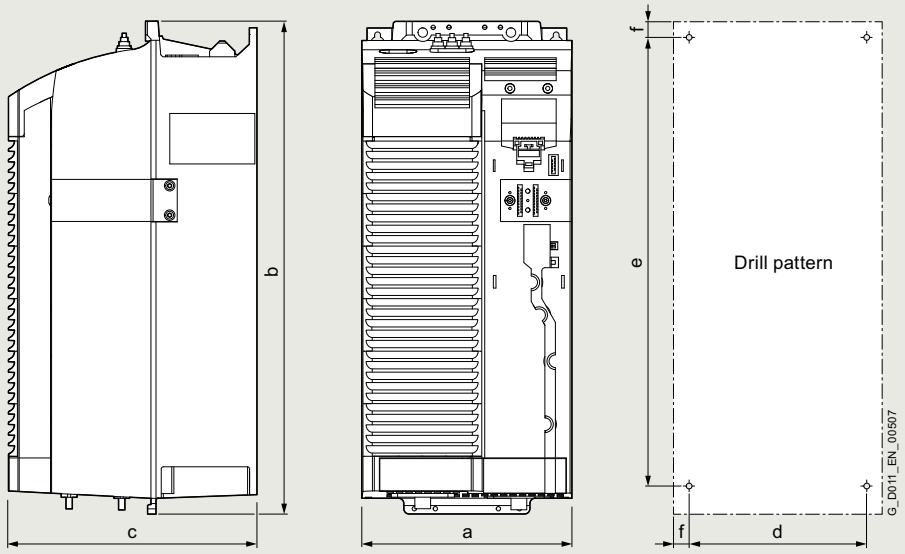
Dimensional drawings



SINAMICS G120C frame sizes FSD to FSF

SINAMICS G120C	Dimensions in mm (inches)			Drilling dimensions in mm (inches)			Cooling clearance in mm (inches)			Mounting
Frame size	a (width)	b (height)	c (depth)	d	e	f	top	bottom	front	With bolts
FSD	200 (7.87)	472 (18.58)	237 (9.33)	170 (6.69)	430 (16.93)	15 (0.59)	300 (11.81)	350 (13.78)	100 (3.94)	4 × M5
FSE	275 (10.83)	551 (21.69)	237 (9.33)	230 (9.06)	509 (20.04)	11 (0.43)	300 (11.81)	350 (13.78)	100 (3.94)	4 x M6
FSF	305 (12.01)	708 (27.87)	357 (14.06)	270 (10.63)	680 (26.77)	13 (0.51)	300 (11.81)	350 (13.78)	100 (3.94)	4 × M8

When the BOP-2/IOP-2 is plugged on, the overall depth increases by 11 mm (0.43 inches).

More information

A hard copy of the Compact Operating Instructions is supplied for SINAMICS G120C. Further documentation, such as Operating Instructions and List Manuals, is available for download free of charge from the internet at:
www.siemens.com/sinamics-g120c/documentation

Detailed information on SINAMICS G120C, the latest technical documentation (brochures, tutorials, dimensional drawings, certificates, manuals and operating instructions) is available on the internet at:
www.siemens.com/sinamics-g120c

In addition, the Siemens Product Configurator can be used on the internet. The Siemens Product Configurator can be found in SiePortal at the following address:
www.siemens.com/spc

Furthermore, the SINAMICS Selector app is a practical tool that helps you find article numbers for SINAMICS V20, SINAMICS V90, SINAMICS G120C, SINAMICS G120P, SINAMICS G120X, SINAMICS G120, SINAMICS G220, SINAMICS S200 and SINAMICS S210 converters in the output range from 0.1 kW to 630 kW quickly and easily. You will find the free downloads for Android and for iOS at the following link:
www.siemens.com/sinamics-selector

Environmental Product Declaration (EPD)

Environmental Product Declarations (EPD) are available as PDFs for this product.

The EPD PDF provides brief and concise information about the ecological properties of a product.

You can find more information on the internet at:
https://support.industry.siemens.com/cs/ww/en/ps/13221/cert?ci=5690