

SINAMICS G120C compact inverters

0.55 kW to 132 kW (0.75 hp to 150 hp)

SINAMICS G120C compact inverters

Overview



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

SINAMICS G120C compact inverters 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 inverters 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
- Coated modules
- Operation up to an ambient temperature of 60 °C

Design

SINAMICS G120C is a compact inverter 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 inverter 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 inverter, 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.

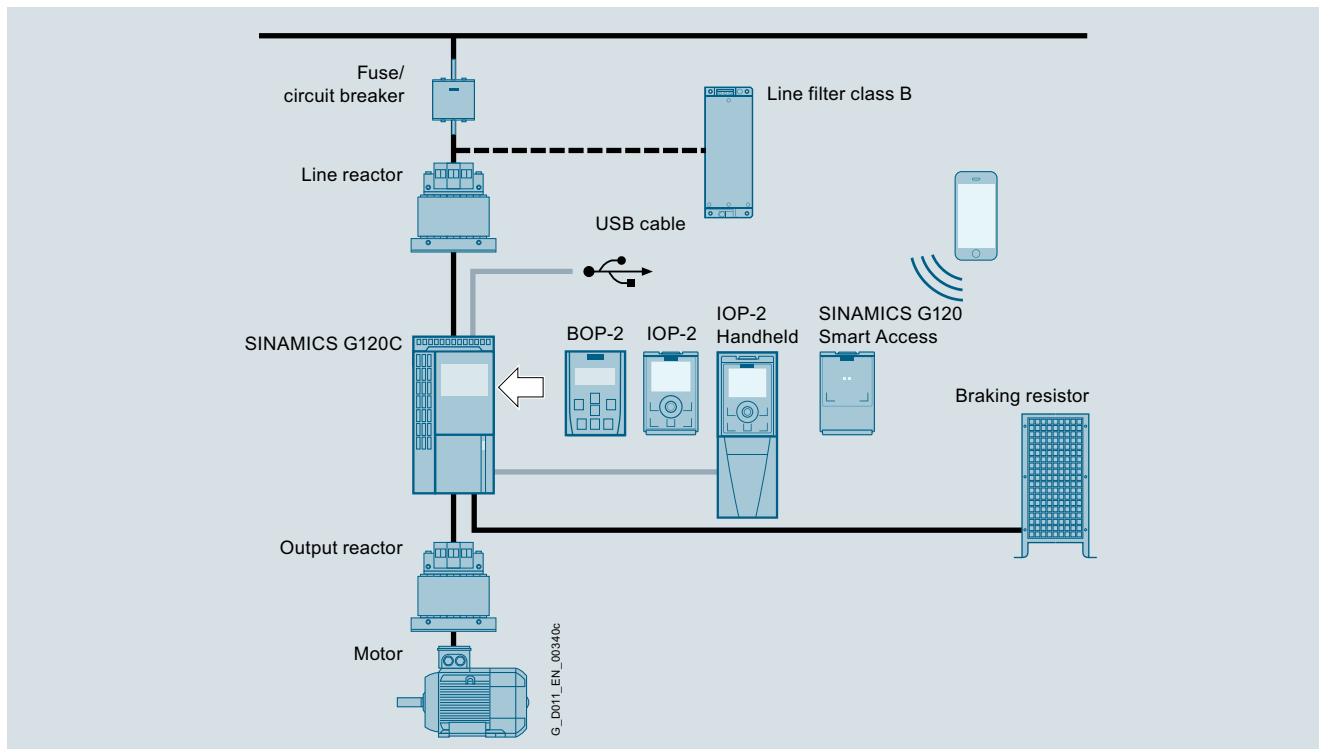
SINAMICS G120C can control asynchronous (induction) motors in the power range from 0.37 kW up to 132 kW (0.5 hp to 200 hp). Reliable and efficient motor operation is achieved by using state-of-the-art IGBT technology combined with vector control. The extensive range of functions integrated in the SINAMICS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

SINAMICS G120C compact inverters

0.55 kW to 132 kW (0.75 hp to 150 hp)

SINAMICS G120C compact inverters

Design (continued)



Line-side components

Line filters

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 inverter 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 inverter. 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 inverters. 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 in the Industry Mall.

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.

Sine-wave filter (for frame size FSAA)

Sine-wave filters limit the rate of voltage rise (dv/dt) and the peak voltages on the motor winding. Similar to an output reactor, they enable the connection of longer motor cables. A sine-wave filter 6SE6400-3TD00-4AD0, suitable for base mounting, is available for SINAMICS G120C, frame size FSAA, 0.55 kW to 2.2 kW. For 2.2 kW, operation of the sine-wave filter that is suitable for base mounting is only permitted for operating the inverter with rated power of 1.5 kW based on high overload (HO).

For technical specifications, see the datasheet on the Internet: <https://support.industry.siemens.com/cs/document/24479847>

Additional information is available in the Operating Instructions on the Internet at:

www.siemens.com/sinamics-g120c/documentation

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 an inverter can be stored on the SINAMICS SD memory card. When service is required, e.g. after the inverter 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 inverter.

SINAMICS G120C compact inverters

0.55 kW to 132 kW (0.75 hp to 150 hp)

SINAMICS G120C compact inverters

Design (continued)

Supplementary system components (continued)

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 inverter, even if this is installed in areas difficult to access.

PC inverter connection kit 2

For controlling and commissioning an inverter 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 inverter.

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.

Configuration

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

Drive Technology Configurator (DT Configurator) within the CA 01

The interactive catalog CA 01 – the offline Industry Mall of Siemens – contains over 100000 products with approximately 5 million possible drive system product variants. The Drive

Technology Configurator (DT Configurator) has been developed to facilitate selection of the correct motor and/or inverter from the wide spectrum of drives. It is integrated as a selection tool in Catalog CA 01.

Online DT Configurator

In addition, the DT Configurator can be used on the Internet without requiring any installation. The DT Configurator can be found in the Siemens Industry Mall at the following address:

www.siemens.com/dt-configurator

SIZER for Siemens Drives engineering tool

The SIZER for Siemens Drives engineering tool makes it easy to configure the SINAMICS drive 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. Apart from the SINAMICS drives, STARTER is also suitable for MICROMASTER 4 devices.

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

Additional 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 for configuring, commissioning, and diagnosing the SINAMICS family of drives and is integrated into the TIA Portal. SINAMICS Startdrive can be used to implement drive tasks with the SINAMICS G110M, SINAMICS G120, SINAMICS G120C, SINAMICS G120D and SINAMICS G120P inverter series. The commissioning tool has been optimized with regard to user friendliness and consistent use of the TIA Portal benefits of a common 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. Two software packages are available for SINAMICS – Drive ES Basic Maintenance and Drive ES PCS.

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

Additional information about the Drive ES engineering system is available on the Internet at

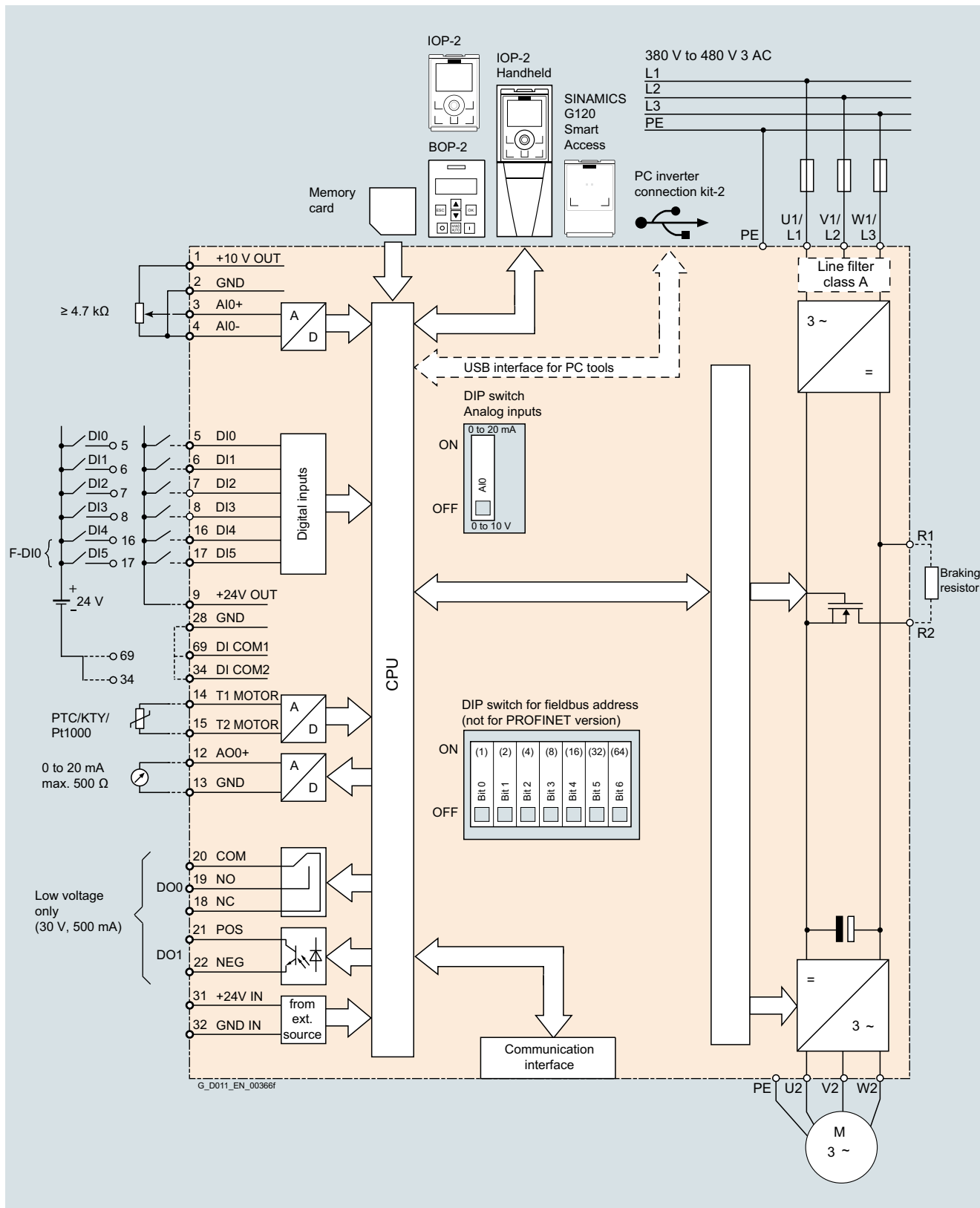
www.siemens.com/drive-es

SINAMICS G120C compact inverters

0.55 kW to 132 kW (0.75 hp to 150 hp)

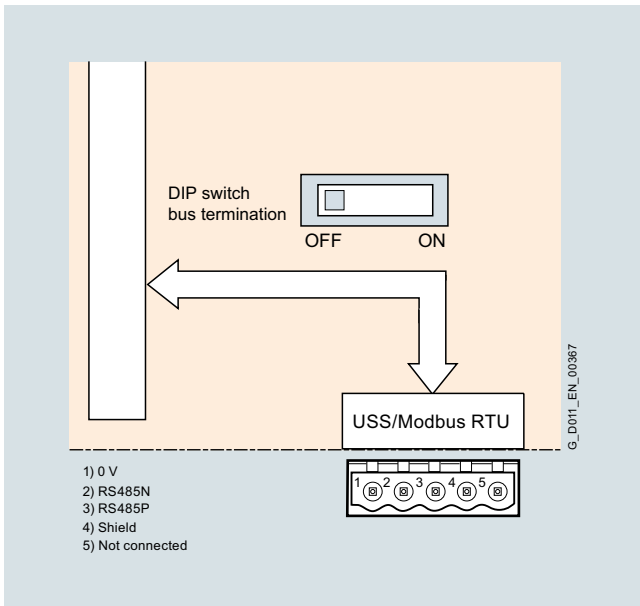
SINAMICS G120C compact inverters

Integration

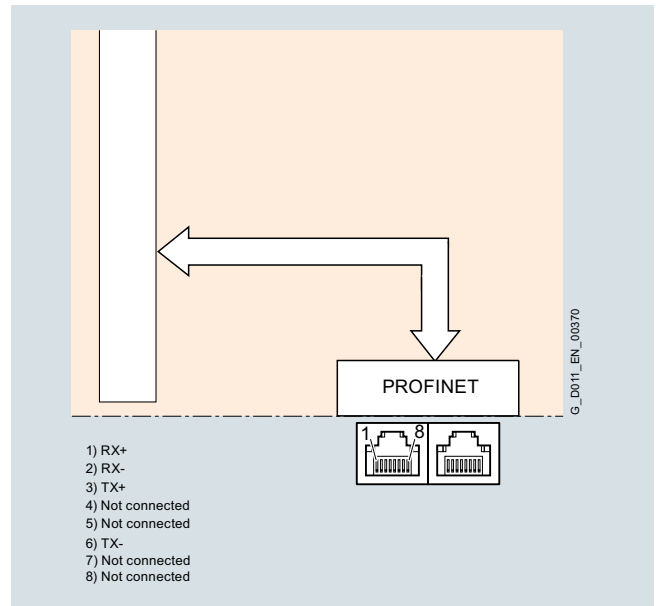


Connection example for SINAMICS G120C

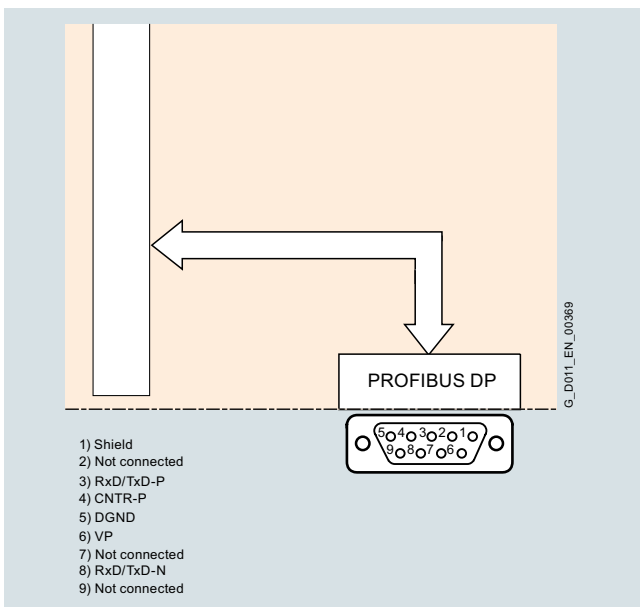
Integration (continued)



USS/Modbus RTU communication interface



PROFINET, EtherNet/IP communication interface



PROFIBUS DP communication interface

SINAMICS G120C compact inverters

0.55 kW to 132 kW (0.75 hp to 150 hp)

SINAMICS G120C compact inverters

Integration (continued)

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					
	FSA, FSA	FSB	FSC	FSD	FSE	FSF
Line-side components						
Line filter class A	F	F	F	F	F	F
Line filter class B	U ¹⁾	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
Sine-wave filter	1)	–	–	–	–	–

U = Base component

I = Integrated

S = Lateral mounting

F = Inverter available with and without integrated filter class A

– = Not possible

Maximum permissible cable lengths from the motor to the inverter 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)						
	FSA	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 filters, line reactors, braking resistors, output reactors and sine-wave filters that are suitable for base mounting are also available for SINAMICS G120C, frame size FSA, 0.55 kW to 2.2 kW. For 2.2 kW, operation of the line reactors, braking resistors, output reactors and sine-wave filters that are suitable for base mounting is only permitted for operating the inverter 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 FSA 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

SINAMICS G120C compact inverters

0.55 kW to 132 kW (0.75 hp to 150 hp)

SINAMICS G120C compact inverters

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	FSA	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	FSA	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	FSA	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	FSA	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	FSA	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.