

## SINAMICS G120C compact inverters 0.55 kW to 18.5 kW (0.75 hp to 25 hp)



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## SINAMICS G120C compact inverters

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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  |
|  |  |  |   |  |  |   |
| <b>Pumping, ventilating, compressing</b> | Centrifugal pumps<br>Radial / axial fans<br>Compressors  | Centrifugal pumps<br>Radial / axial fans<br>Compressors  | Eccentric screw pumps   | Hydraulic pumps<br>Metering pumps  | Hydraulic pumps<br>Metering pumps  | Descaling pumps<br>Hydraulic pumps  |
|  | V20<br>G110<br><b>G120C</b><br>G120P   | G120P<br>G130/G150<br>G180 <sup>1)</sup>   | S120  | G120   | S110   | S120  |
| <b>Moving</b>                            | Conveyor belts<br>Roller conveyors<br>Chain conveyors  | Conveyor belts<br>Roller conveyors<br>Chain conveyors<br>Lifting/lowering devices<br>Elevators<br>Escalators/moving walkways<br>Indoor cranes<br>Marine drives<br>Cable railways | Elevators<br>Container cranes<br>Mining hoists<br>Excavators for open-cast mining<br>Test bays                | Acceleration conveyors<br>Storage and retrieval machines   | Acceleration conveyors<br>Storage and retrieval machines<br>Cross cutters<br>Reel changers               | Storage and retrieval machines<br>Robotics<br>Pick & place<br>Rotary indexing tables<br>Cross cutters<br>Roll feeds<br>Engagers/disengagers |
|  | V20<br>G110<br>G110D<br>G110M<br><b>G120C</b>  | G120<br>G120D<br>G130/G150<br>G180 <sup>1)</sup>   | S120<br>S150<br>DCM   | V90<br>G120<br>G120D   | S110<br>DCM  | S120<br>DCM   |
| <b>Processing</b>                        | Mills<br>Mixers<br>Kneaders<br>Crushers<br>Agitators<br>Centrifuges                                  | Mills<br>Mixers<br>Kneaders<br>Crushers<br>Agitators<br>Centrifuges<br>Extruders<br>Rotary furnaces  | Extruders<br>Winders/unwinders<br>Lead/follower drives<br>Calenders<br>Main press drives<br>Printing machines | Tubular bagging machines<br>Single-axis motion control such as<br>• Position profiles<br>• Path profiles | Tubular bagging machines<br>Single-axis motion control such as<br>• Position profiles<br>• Path profiles | Servo presses<br>Rolling mill drives<br>Multi-axis motion control such as<br>• Multi-axis positioning<br>• Cams<br>• Interpolations         |
|  | V20<br><b>G120C</b>  | G120<br>G130/G150<br>G180 <sup>1)</sup>  | S120<br>S150<br>DCM   | V90<br>G120  | S110   | S120<br>DCM   |
| <b>Machining</b>                         | Main drives for<br>• Turning<br>• Milling<br>• Drilling  | Main drives for<br>• Drilling<br>• Sawing  | Main drives for<br>• Turning<br>• Milling<br>• Drilling<br>• Gear cutting<br>• Grinding                       | Axis drives for<br>• Turning<br>• Milling<br>• Drilling  | Axis drives for<br>• Drilling<br>• Sawing  | Axis drives for<br>• Turning<br>• Milling<br>• Drilling<br>• Lasering<br>• Gear cutting<br>• Grinding<br>• Nibbling and punching            |
|  | S110   | S110<br>S120   | S120  | S110   | S110<br>S120   | S120  |

SINAMICS G120C compact inverters 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](http://www.siemens.com/sinamics-applications)

### More information

You may also be interested in these drives:

- More performance in the control cabinet in IP20 degree of protection ⇒ SINAMICS G120
- Higher degree of protection for power ratings up to 7.5 kW (10 hp) ⇒ SINAMICS G110M, SINAMICS G110D, SINAMICS G120D
- With positioning function in the control cabinet in IP20 degree of protection ⇒ SINAMICS G120, SINAMICS S110
- With a positioning function for distributed drive solutions in IP65 degree of protection ⇒ SINAMICS G120D

<sup>1)</sup> Industry-specific inverters.

## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

### SINAMICS G120C compact inverters

#### Overview



SINAMICS G120C frame sizes FSA, FSA, FSB and FSC with mounted blanking cover

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
- 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
- Getting Started document
- BOP-2 or IOP 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 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)
- Communications versions with PROFINET / EtherNet/IP, PROFIBUS DP, USS/Modbus RTU
- Coated modules
- Operation up to an ambient temperature of 60 °C (140 °F)

#### 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.



SINAMICS G120C, frame size FSA 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 and/or PROFINET fieldbus systems without parameterization.

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.

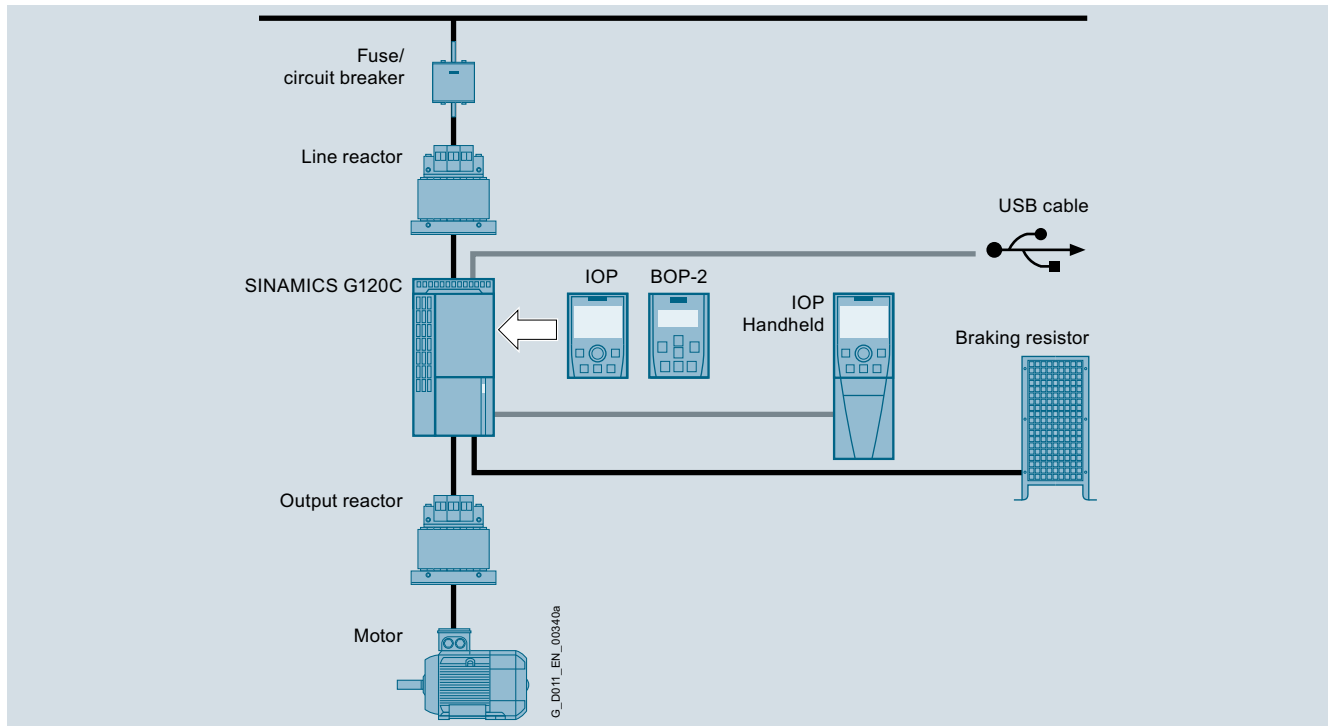
SINAMICS G120C can control asynchronous (induction) motors in the power range from 0.37 kW up to 18.5 kW (0.5 hp up to 25 hp). Reliable and efficient motor operation is achieved by using state-of-the-art IGBT technology combined with vector control. The extensive range of functions integrated in the SINAMICS G120C also offers a high degree of protection for the inverter and motor.

## SINAMICS G120C compact inverters

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### SINAMICS G120C compact inverters

#### Design



#### Line-side components

##### 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.

##### Recommended line-side power components

Standard fuses can be used for the SINAMICS G120C. These must be dimensioned to comply with local regulations. In this chapter, you will find recommended components such as fuses and circuit breakers in compliance with IEC and UL regulations.

#### DC link components

##### Braking resistors

The excess energy of the DC link is dissipated using the braking resistor. The braking resistors are designed for use with the SINAMICS G120C. This has an integrated brake chopper (electronic switch).

#### 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.

#### Supplementary system components

##### Intelligent Operator Panel IOP

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

##### Basic Operator Panel BOP-2

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.

##### 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.

#### Spare parts

##### Shield plates

A set of shield plates is included in the scope of delivery for the motor and signal cables corresponding to the frame size of the SINAMICS G120C, and can also be ordered as spare parts.

##### Spare Parts Kit

This kit comprises 4 sets of I/O terminals, 1 RS485 terminal, 2 sets of Control Unit doors (1 × PN and 1 × other communication versions) and 1 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 on DVD-ROM – contains over 100 000 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](http://www.siemens.com/dt-configurator)

### **SIZER for Siemens Drives engineering tool**

The SIZER for Siemens Drives engineering tool makes it easy to engineer the SINAMICS and MICROMASTER 4 drive families. 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 chapter [Engineering tools](#).

The SIZER for Siemens Drives engineering tool is available free on the Internet at  
[www.siemens.com/sizer](http://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 chapter [Engineering tools](#).

Additional information about the STARTER commissioning tool is available on the Internet at  
[www.siemens.com/starter](http://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 chapter [Engineering tools](#).

The SINAMICS Startdrive commissioning tool is available free on the Internet at  
[www.siemens.com/startdrive](http://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 and Drive ES PCS.

You can find further information about the Drive ES engineering system in the chapter [Engineering tools](#).

Additional information about the Drive ES engineering system is available on the Internet at  
[www.siemens.com/drive-es](http://www.siemens.com/drive-es)

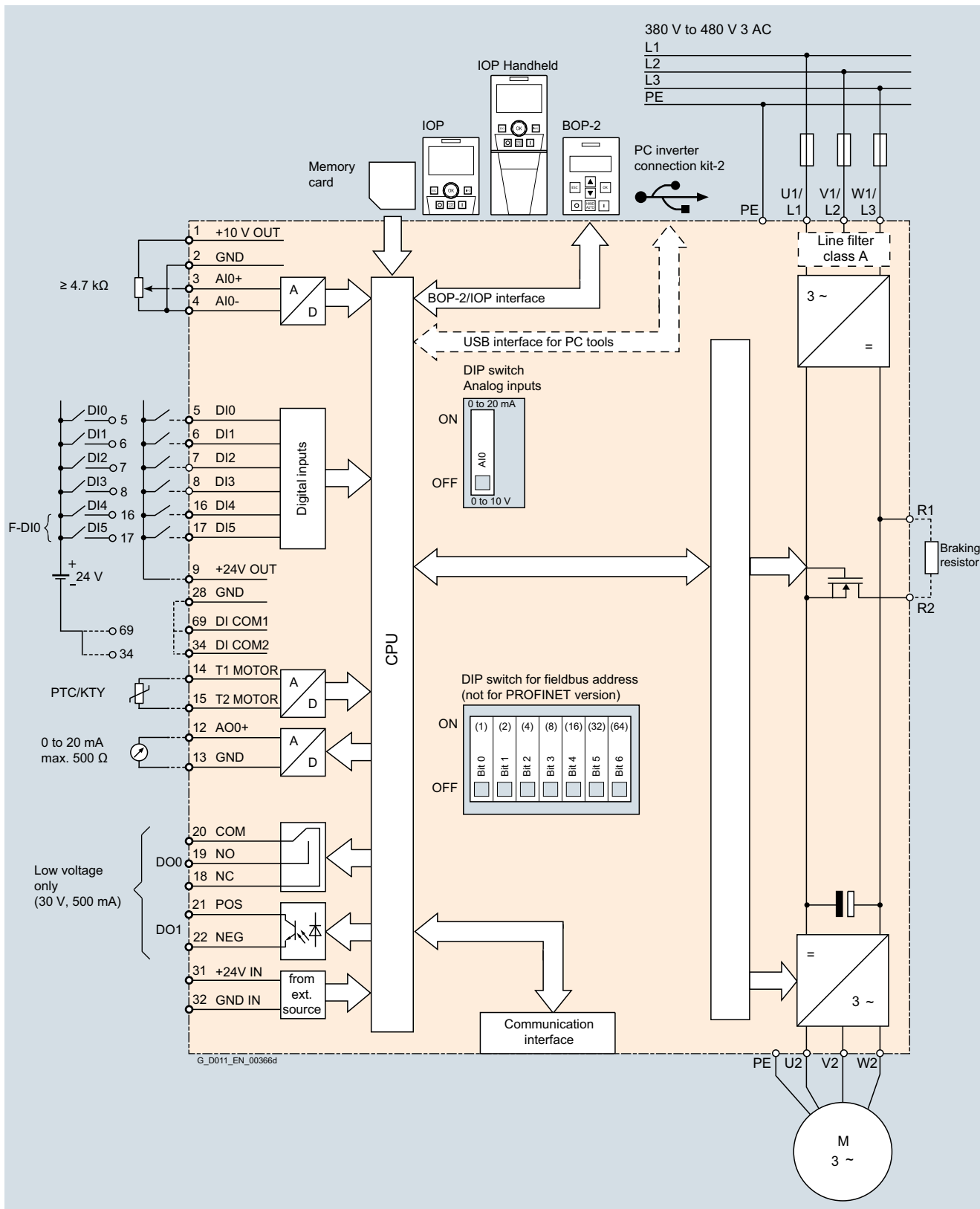
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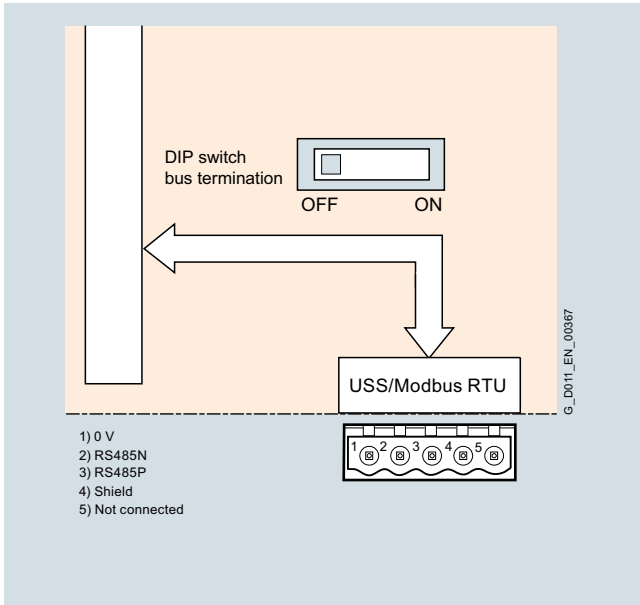
### Integration

4

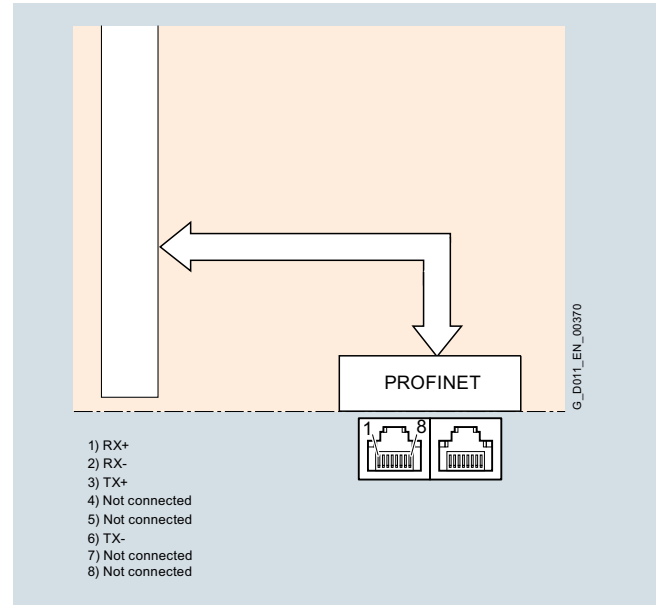


Connection example for SINAMICS G120C

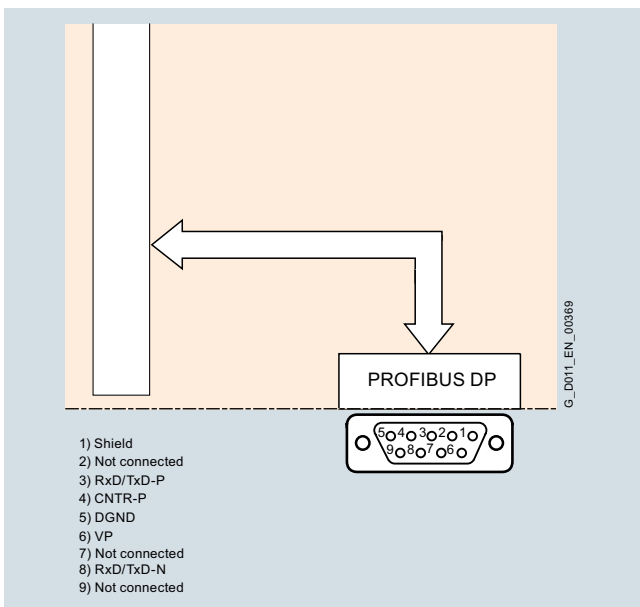
**Integration**



USS/Modbus RTU communication interface



PROFINET, EtherNet/IP communication interface



PROFIBUS DP communication interface

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### 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 <sup>1)</sup> |      | Base-load current $I_L$ <sup>2)</sup> | Base-load current $I_H$ <sup>3)</sup> | Frame size | Version               | SINAMICS G120C without line filter |                           | SINAMICS G120C with integrated line filter class A |                           |
|---------------------------|------|---------------------------------------|---------------------------------------|------------|-----------------------|------------------------------------|---------------------------|--|---------------------------|
| kW                        | hp   |                                       |                                       |            |                       | Article No.                        |                           | Article No.  |                           |
| <b>380 ... 480 V 3 AC</b> |      |                                       |                                       |            |                       |                                    |                           |  |                           |
| 0.55                      | 0.75 | 1.7                                   | 1.3                                   | FSAA       | USS, Modbus RTU       | <b>NEW</b>                         | <b>6SL3210-1KE11-8UB2</b> | <b>NEW</b>   | <b>6SL3210-1KE11-8AB2</b> |
|                           |      |                                       |                                       |            | PROFIBUS DP           | <b>NEW</b>                         | <b>6SL3210-1KE11-8UP2</b> | <b>NEW</b>   | <b>6SL3210-1KE11-8AP2</b> |
|                           |      |                                       |                                       |            | PROFINET, EtherNet/IP | <b>NEW</b>                         | <b>6SL3210-1KE11-8UF2</b> | <b>NEW</b>   | <b>6SL3210-1KE11-8AF2</b> |
| 0.75                      | 1    | 2.2                                   | 1.7                                   | FSAA       | USS, Modbus RTU       | <b>NEW</b>                         | <b>6SL3210-1KE12-3UB2</b> | <b>NEW</b>   | <b>6SL3210-1KE12-3AB2</b> |
|                           |      |                                       |                                       |            | PROFIBUS DP           | <b>NEW</b>                         | <b>6SL3210-1KE12-3UP2</b> | <b>NEW</b>   | <b>6SL3210-1KE12-3AP2</b> |
|                           |      |                                       |                                       |            | PROFINET, EtherNet/IP | <b>NEW</b>                         | <b>6SL3210-1KE12-3UF2</b> | <b>NEW</b>   | <b>6SL3210-1KE12-3AF2</b> |
| 1.1                       | 1.5  | 3.1                                   | 2.2                                   | FSAA       | USS, Modbus RTU       | <b>NEW</b>                         | <b>6SL3210-1KE13-2UB2</b> | <b>NEW</b>   | <b>6SL3210-1KE13-2AB2</b> |
|                           |      |                                       |                                       |            | PROFIBUS DP           | <b>NEW</b>                         | <b>6SL3210-1KE13-2UP2</b> | <b>NEW</b>   | <b>6SL3210-1KE13-2AP2</b> |
|                           |      |                                       |                                       |            | PROFINET, EtherNet/IP | <b>NEW</b>                         | <b>6SL3210-1KE13-2UF2</b> | <b>NEW</b>   | <b>6SL3210-1KE13-2AF2</b> |
| 1.5                       | 2    | 4.1                                   | 3.1                                   | FSAA       | USS, Modbus RTU       | <b>NEW</b>                         | <b>6SL3210-1KE14-3UB2</b> | <b>NEW</b>   | <b>6SL3210-1KE14-3AB2</b> |
|                           |      |                                       |                                       |            | PROFIBUS DP           | <b>NEW</b>                         | <b>6SL3210-1KE14-3UP2</b> | <b>NEW</b>   | <b>6SL3210-1KE14-3AP2</b> |
|                           |      |                                       |                                       |            | PROFINET, EtherNet/IP | <b>NEW</b>                         | <b>6SL3210-1KE14-3UF2</b> | <b>NEW</b>   | <b>6SL3210-1KE14-3AF2</b> |
| 2.2                       | 3    | 5.6                                   | 4.1                                   | FSAA       | USS, Modbus RTU       | <b>NEW</b>                         | <b>6SL3210-1KE15-8UB2</b> | <b>NEW</b>   | <b>6SL3210-1KE15-8AB2</b> |
|                           |      |                                       |                                       |            | PROFIBUS DP           | <b>NEW</b>                         | <b>6SL3210-1KE15-8UP2</b> | <b>NEW</b>   | <b>6SL3210-1KE15-8AP2</b> |
|                           |      |                                       |                                       |            | PROFINET, EtherNet/IP | <b>NEW</b>                         | <b>6SL3210-1KE15-8UF2</b> | <b>NEW</b>   | <b>6SL3210-1KE15-8AF2</b> |
| 3                         | 4    | 7.3                                   | 5.6                                   | FSA        | USS, Modbus RTU       |                                    | <b>6SL3210-1KE17-5UB1</b> |  | <b>6SL3210-1KE17-5AB1</b> |
|                           |      |                                       |                                       |            | PROFIBUS DP           |                                    | <b>6SL3210-1KE17-5UP1</b> |  | <b>6SL3210-1KE17-5AP1</b> |
|                           |      |                                       |                                       |            | PROFINET, EtherNet/IP |                                    | <b>6SL3210-1KE17-5UF1</b> |  | <b>6SL3210-1KE17-5AF1</b> |
| 4                         | 5    | 8.8                                   | 7.3                                   | FSA        | USS, Modbus RTU       |                                    | <b>6SL3210-1KE18-8UB1</b> |  | <b>6SL3210-1KE18-8AB1</b> |
|                           |      |                                       |                                       |            | PROFIBUS DP           |                                    | <b>6SL3210-1KE18-8UP1</b> |  | <b>6SL3210-1KE18-8AP1</b> |
|                           |      |                                       |                                       |            | PROFINET, EtherNet/IP |                                    | <b>6SL3210-1KE18-8UF1</b> |  | <b>6SL3210-1KE18-8AF1</b> |
| 5.5                       | 7.5  | 12.5                                  | 8.8                                   | FSB        | USS, Modbus RTU       |                                    | <b>6SL3210-1KE21-3UB1</b> |  | <b>6SL3210-1KE21-3AB1</b> |
|                           |      |                                       |                                       |            | PROFIBUS DP           |                                    | <b>6SL3210-1KE21-3UP1</b> |  | <b>6SL3210-1KE21-3AP1</b> |
|                           |      |                                       |                                       |            | PROFINET, EtherNet/IP |                                    | <b>6SL3210-1KE21-3UF1</b> |  | <b>6SL3210-1KE21-3AF1</b> |
| 7.5                       | 10   | 16.5                                  | 12.5                                  | FSB        | USS, Modbus RTU       |                                    | <b>6SL3210-1KE21-7UB1</b> |  | <b>6SL3210-1KE21-7AB1</b> |
|                           |      |                                       |                                       |            | PROFIBUS DP           |                                    | <b>6SL3210-1KE21-7UP1</b> |  | <b>6SL3210-1KE21-7AP1</b> |
|                           |      |                                       |                                       |            | PROFINET, EtherNet/IP |                                    | <b>6SL3210-1KE21-7UF1</b> |  | <b>6SL3210-1KE21-7AF1</b> |
| 11                        | 15   | 25                                    | 16.5                                  | FSC        | USS, Modbus RTU       |                                    | <b>6SL3210-1KE22-6UB1</b> |  | <b>6SL3210-1KE22-6AB1</b> |
|                           |      |                                       |                                       |            | PROFIBUS DP           |                                    | <b>6SL3210-1KE22-6UP1</b> |  | <b>6SL3210-1KE22-6AP1</b> |
|                           |      |                                       |                                       |            | PROFINET, EtherNet/IP |                                    | <b>6SL3210-1KE22-6UF1</b> |  | <b>6SL3210-1KE22-6AF1</b> |
| 15                        | 20   | 31                                    | 25                                    | FSC        | USS, Modbus RTU       |                                    | <b>6SL3210-1KE23-2UB1</b> |  | <b>6SL3210-1KE23-2AB1</b> |
|                           |      |                                       |                                       |            | PROFIBUS DP           |                                    | <b>6SL3210-1KE23-2UP1</b> |  | <b>6SL3210-1KE23-2AP1</b> |
|                           |      |                                       |                                       |            | PROFINET, EtherNet/IP |                                    | <b>6SL3210-1KE23-2UF1</b> |  | <b>6SL3210-1KE23-2AF1</b> |
| 18.5                      | 25   | 37                                    | 31                                    | FSC        | USS, Modbus RTU       |                                    | <b>6SL3210-1KE23-8UB1</b> |  | <b>6SL3210-1KE23-8AB1</b> |
|                           |      |                                       |                                       |            | PROFIBUS DP           |                                    | <b>6SL3210-1KE23-8UP1</b> |  | <b>6SL3210-1KE23-8AP1</b> |
|                           |      |                                       |                                       |            | PROFINET, EtherNet/IP |                                    | <b>6SL3210-1KE23-8UF1</b> |  | <b>6SL3210-1KE23-8AF1</b> |

<sup>1)</sup> 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.

<sup>2)</sup> 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.

<sup>3)</sup> 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.



**Selection and ordering data**
**Optional firmware memory cards for SINAMICS G120C**

| Description  | Article No.                   |
|--|-------------------------------|
| <b>SINAMICS SD card<br/>512 MB + firmware V4.6</b><br>(Multicard V4.6)                 | <b>6SL3054-7EG00-2BA0</b>     |
| <b>SINAMICS SD card<br/>512 MB + firmware V4.7</b><br>(Multicard V4.7)                 | <b>6SL3054-7EH00-2BA0</b>     |
| <b>SINAMICS SD card<br/>512 MB + firmware V4.7 SP6 HF1</b><br>(Multicard V4.7 SP6 HF1) | <b>NEW 6SL3054-7TD00-2BA0</b> |

For more information on firmware V4.6:

<https://support.industry.siemens.com/cs/document/67385235>

For more information on firmware V4.7:

<https://support.industry.siemens.com/cs/document/92554110>

For more information on firmware V4.7 SP6 HF1:

<https://support.industry.siemens.com/cs/document/109482094>

Note:

SINAMICS G120C compact inverters, frame size FSAA, can be operated from firmware V4.7 SP3.

## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

### SINAMICS G120C compact inverters

#### Technical specifications

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

| General technical specifications                              |   |
|---|---|
| <b>Mechanical specifications</b>                              |   |
| <b>Vibratory load</b>   |   |
| • Transport acc. to EN 60721-3-2 <sup>1)</sup>                | Class 1M2   |
| • Operation acc. to EN 60721-3-3                              | Class 3M1   |
| <b>Shock load</b>   |   |
| • Transport acc. to EN 60721-3-2 <sup>1)</sup>                | Class 1M2   |
| • Operation acc. to EN 60721-3-3                              | Class 3M2   |
| <b>Degree of protection</b>                                   | IP20/ UL open type  |
| <b>Permissible mounting position</b>                          | Vertical wall mounting  |
| <b>Ambient conditions</b>                                     |   |
| <b>Protection class</b><br>According to EN 61800-5-1          | Class III (PELV1)   |
| <b>Touch protection</b><br>According to EN 61800-5-1          | Class I (with protective conductor system)  |
| <b>Humidity, max.</b>   | 95 % at 40 °C (104 °F), condensation and icing not permissible  |
| <b>Ambient temperature</b>                                    |   |
| • Storage <sup>1)</sup> acc. to EN 60068-2-1                  | -40 ... +70 °C (-40 ... +158 °F)  |
| • Transport <sup>1)</sup> acc. to EN 60068-2-1                | -40 ... +70 °C (-40 ... +158 °F)  |
| • Operation acc. to EN 60068-2-2                              | -10 ... +40 °C (14 ... 104 °F) without derating<br>>40 ... 60 °C (104 ... 140 °F) <a href="#">see derating characteristics</a>  |
| <b>Environmental class in operation</b>                       |   |
| • Harmful chemical substances                                 | Class 3C2 to EN 60721-3-3   |
| • Organic/biological pollutants                               | Class 3B1 to EN 60721-3-3   |
| • Degree of pollution   | 2 acc. to EN 61800  |
| <b>Standards</b>  |   |
| <b>Compliance with standards</b>                              | CE, UL, cUL, C-Tick (RCM)   |
| <b>Fail-safe certification</b>                                |   |
| • According to IEC 61508                                      | Function: Safe Torque Off (STO)<br>SIL 2  |
| • According to EN ISO 13849-1                                 | PL d and Category 3   |
| <b>CE marking, according to</b>                               |   |
|   | EMC Directive 2004/108/EC<br>Low-Voltage Directive 2006/95/EC   |
| <b>EMC Directive <sup>2)</sup></b><br>According to EN 61800-3 |   |
| <b>Interference immunity</b>                                  | The SINAMICS G120C compact inverters are tested according to the interference immunity requirements for environments according to Category C3.  |
| <b>Interference emission</b>                                  |   |
| • Frame sizes FSAA to FSC without integrated line filter      | <sup>3)</sup>   |
| • Frame sizes FSAA to FSC with integrated line filter class A | The inverters comply with the limit values according to Category C3.<br>The inverters comply with the limit values for conducted interference and field-conducted interference emissions according to Category C2. <sup>4) 5)</sup>   |
|   | <b>Note:</b><br>The EMC product standard EN 61800-3 does not apply directly to a frequency inverter but to a PDS (Power Drive System), which comprises the complete circuitry, motor and cables in addition to the inverter. The frequency inverters on their own do not generally require identification according to the EMC Directive. |

<sup>1)</sup> In transport packaging.

<sup>2)</sup> For further general information, [see also chapter SINAMICS G120, section Technical specifications, Compliance with standards.](#)

<sup>3)</sup> Non-filtered 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.

<sup>4)</sup> Max. permissible motor cable length of 25 m (82 ft) (shielded) as standard - with low-capacitance CY cable for frame sizes FSA and FSB 50 m (164 ft) (shielded), for FSC 100 m (328 ft) (shielded).

<sup>5)</sup> SINAMICS G120C compact inverters, frame size FSB, with PROFINET interface (article no.: 6SL3210-1KE21-.AF1) additionally require a line reactor.

# SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

## SINAMICS G120C compact inverters

### Technical specifications

| SINAMICS G120C compact inverter   | USS, Modbus RTU version   | PROFIBUS DP version  | PROFINET, EtherNet/IP version  |
|---|---|--|--|
|   | 6SL3210-1KE...B1<br>6SL3210-1KE...B2  | 6SL3210-1KE...P1<br>6SL3210-1KE...P2   | 6SL3210-1KE...F1<br>6SL3210-1KE...F2   |
| <b>Integrated bus interface</b>   |   |  |  |
| <b>Fieldbus protocols</b>   | <ul style="list-style-type: none"> <li>USS</li> <li>Modbus RTU (switchable using a parameter)</li> </ul>  | PROFIBUS DP  | <ul style="list-style-type: none"> <li>PROFINET</li> <li>EtherNet/IP               <ul style="list-style-type: none"> <li>ODVA AC/DC drive</li> <li>SINAMICS profiles</li> </ul> </li> </ul> |
| <b>Profiles</b>   | –   | <ul style="list-style-type: none"> <li>PROFIdrive Profile V4.1</li> <li>PROFIsafe</li> </ul> | <ul style="list-style-type: none"> <li>PROFIdrive Profile V4.1</li> <li>PROFIsafe</li> <li>PROFIdrive</li> </ul>   |
| <b>Hardware</b>   | Plug-in terminal, insulated, USS: max. 187.5 kbaud<br>Modbus RTU: 19.2 kbaud, Bus terminating resistor that can be switched in  | 9-pin SUB-D socket, insulated, max. 12 Mbit/s<br>Slave address can be set using DIP switches | 2 × RJ45, max. 100 Mbit/s (full duplex), device name can be stored on the device   |
| <b>I/O interfaces</b>   |   |  |  |
| <b>Signal cable cross-section</b>   | 0.15 ... 1.5 (0.01 ... 0.06 in) mm <sup>2</sup> (28 ... 16 AWG)   |  |  |
| <b>Digital inputs – Standard</b>  | 6 isolated inputs<br>Optically isolated;<br>Free reference potential (own potential group)<br>NPN/PNP logic can be selected using the wiring  |  |  |
| <ul style="list-style-type: none"> <li>Switching level: 0 → 1</li> <li>Switching level: 1 → 0</li> <li>Input current, max.</li> </ul> | 11 V<br>5 V<br>15 mA  |  |  |
| <b>Digital inputs, fail-safe</b>  | 1<br>When using the standard digital inputs (DI4+DI5)<br>Safety function: Safe Torque Off (STO)   |  |  |
| <b>Digital outputs</b>  | 1 relay changeover contact<br>30 V DC, 0.5 A (ohmic load)<br>1 transistor<br>30 V DC, 0.5 A (ohmic load)  |  |  |
| <b>Analog inputs</b>  | 1 analog input<br>Differential input<br>Switchable between voltage (-10 ... +10 V) and current (0/4 ... 20 mA) using a DIP switch<br>10-bit resolution<br>Can be used as additional digital input<br>Analog inputs are protected in a voltage range of ± 30 V and have a common-mode voltage in the ± 15 V range. |  |  |
| <ul style="list-style-type: none"> <li>Switching threshold: 0 → 1</li> <li>Switching threshold: 1 → 0</li> </ul>                      | 4 V<br>1.6 V  |  |  |
| <b>Analog outputs</b>   | 1 analog output<br>Non-isolated output<br>Switchable between voltage (0 ... 10 V) and current (0/4 ... 20 mA) using a parameter<br>Voltage mode: 10 V, min. burden 10 kΩ<br>Current mode: 20 mA, max. burden 500 Ω<br>The analog outputs have short circuit protection  |  |  |
| <b>PTC/KTY interface</b>  | 1 motor temperature sensor input<br>Connectable sensors PTC, KTY and bimetal,<br>Accuracy ±5 °C (41 °F)   |  |  |
| <b>Voltage supply for the integrated Control Unit</b>   | 24 V DC via the Power Module or by connecting to an external 20.4 ... 28.8 V DC power supply<br>Typical input current: 500 mA at 24 V DC  |  |  |
| <b>Tool interfaces</b>  |   |  |  |
| <b>Memory card</b>  | Optional<br>SINAMICS SD card  |  |  |
| <b>Operator panels</b>  | Optional<br>Basic Operator Panel BOP-2 or Intelligent Operator Panel IOP  |  |  |
| <b>PC interface</b>   | USB   |  |  |

## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

### SINAMICS G120C compact inverters

#### Technical specifications

| SINAMICS G120C compact inverter  | USS, Modbus RTU version                    | PROFIBUS DP version                  | PROFINET, EtherNet/IP version        |
|--|--|--------------------------------------|--------------------------------------|
|  | 6SL3210-1KE...B1<br>6SL3210-1KE...B2       | 6SL3210-1KE...P1<br>6SL3210-1KE...P2 | 6SL3210-1KE...F1<br>6SL3210-1KE...F2 |
| <b>Open-loop/closed-loop control techniques</b>                        |  |                                      |                                      |
| 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  | –  |                                      |                                      |
| <b>Software functions</b>  |  |                                      |                                      |
| 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)<br>for logical and arithmetic operations    | –  |                                      |                                      |
| Switchable drive data sets (DDS)                                       | ✓ (2)                                      |                                      |                                      |
| Switchable command data sets (CDS)                                     | ✓ (2)                                      |                                      |                                      |
| Flying restart   | ✓  |                                      |                                      |
| Automatic restart<br>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, KTY and bimetal) |                                      |                                      |
| Thermal inverter protection  | ✓  |                                      |                                      |
| Motor identification   | ✓  |                                      |                                      |
| Motor holding brake  | ✓  |                                      |                                      |
| Auto-ramping ( $V_{dcmax}$ controller)                                 | ✓  |                                      |                                      |
| Kinetic buffering ( $V_{dcmin}$ controller)                            | ✓  |                                      |                                      |
| <b>Braking functions</b>   |  |                                      |                                      |
| • DC braking   | ✓  |                                      |                                      |
| • Compound braking   | ✓  |                                      |                                      |
| • Dynamic braking with integrated braking module                       | ✓  |                                      |                                      |

**Technical specifications**

| General technical specifications of the power electronics                                   |  |
|---|--|
| <b>System operating voltage</b>   | 380 ... 480 V 3 AC +10 % -20 %   |
| <b>Grid requirement</b>   | No restriction   |
| <b>Short-circuit power <math>R_{SC}</math></b>  |  |
| <b>Input frequency</b>  | 47 ... 63 Hz   |
| <b>Output frequency</b>   |  |
| • Control mode V/f  | 0 ... 550 Hz   |
| • Control type Vector   | 0 ... 240 Hz   |
| <b>Pulse frequency</b>  | 4 kHz<br>for higher pulse frequencies up to 16 kHz, <a href="#">see derating data</a>  |
| <b>Power factor <math>\lambda</math></b>  | 0.7 ... 0.85   |
| <b>Offset factor <math>\cos \varphi</math></b>  | $\geq 0.95$  |
| <b>Output voltage, max.</b><br>as % of input voltage  | 95 %   |
| <b>Overload capability</b>  |  |
| • Low overload LO<br>Note:<br>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<br>1.1 × base-load current $I_L$ (i. e. 110 % overload) for 57 s within a cycle time of 300 s  |
| • High overload HO<br>Note:<br>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<br>1.5 × base-load current $I_H$ (i. e. 150 % overload) for 57 s within a cycle time of 300 s  |
| <b>Electromagnetic compatibility</b>  | Devices without line filter <sup>1)</sup><br>Devices with integrated line filter class A according to EN 55011   |
| <b>Cooling</b>  | Air cooling using an integrated fan  |
| <b>Installation altitude</b>  | Up to 1000 m (3281 ft) above sea level without derating,<br>> 1000 m (3281 ft) <a href="#">see derating characteristics</a>  |
| <b>Short Circuit Current Rating (SCCR) <sup>2)</sup>, max. acc. to UL</b>                   | 100 kA<br><a href="#">See recommended line-side components</a> – the value depends on the fuses and circuit breakers used  |
| <b>Protection functions</b>   | <ul style="list-style-type: none"> <li>• Undervoltage</li> <li>• Overvoltage</li> <li>• Overload</li> <li>• Ground fault</li> <li>• Short-circuit</li> <li>• Stall protection</li> <li>• Motor blocking protection</li> <li>• Motor overtemperature</li> <li>• Inverter overtemperature</li> </ul> |

<sup>1)</sup> Non-filtered 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.

<sup>2)</sup> Applies to industrial control panel installations to NEC article 409 or UL 508A.

# SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

## SINAMICS G120C compact inverters

### 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                       |
| <b>Output current</b><br>at 400 V 3 AC                       |  |  |  |  |  |
| • Rated current $I_{rated}$ <sup>1)</sup>                    | A                                      | 1.8                                      | 2.3                                      | 3.2                                      | 4.3                                      |
| • Base-load current $I_L$ <sup>2)</sup>                      | A                                      | 1.7                                      | 2.2                                      | 3.1                                      | 4.1                                      |
| • Base-load current $I_H$ <sup>3)</sup>                      | A                                      | 1.3                                      | 1.7                                      | 2.2                                      | 3.1                                      |
| • Maximum current $I_{max}$                                  | A                                      | 2.6                                      | 3.4                                      | 4.4                                      | 6.2                                      |
| <b>Rated power</b>   |  |  |  |  |  |
| • Based on $I_L$   | kW (hp)                                | 0.55 (0.75)                              | 0.75 (1)                                 | 1.1 (1.5)                                | 1.5 (2)                                  |
| • Based on $I_H$   | kW (hp)                                | 0.37 (0.5)                               | 0.55 (0.75)                              | 0.75 (1)                                 | 1.1 (1.5)                                |
| <b>Rated pulse frequency</b>                                 | kHz                                    | 4  | 4  | 4  | 4  |
| <b>Efficiency <math>\eta</math></b>                          |  | 0.97                                     | 0.97                                     | 0.97                                     | 0.97                                     |
| <b>Power loss <sup>4)</sup></b><br>At rated current          | kW                                     | 0.034                                    | 0.039                                    | 0.049                                    | 0.062                                    |
| <b>Cooling air requirement</b>                               | m <sup>3</sup> /s (ft <sup>3</sup> /s) | 0.005 (0.18)                             | 0.005 (0.18)                             | 0.005 (0.18)                             | 0.005 (0.18)                             |
| <b>Sound pressure level <math>L_{pA}</math></b><br>(1 m)     | dB                                     | <49                                      | <49                                      | <49                                      | <49                                      |
| <b>Rated input current <sup>5)</sup></b>                     |  |  |  |  |  |
| • 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                                      |
| <b>Length of cable to braking resistor, max.</b>             | m (ft)                                 | 15 (49)                                  | 15 (49)                                  | 15 (49)                                  | 15 (49)                                  |
| <b>Line supply connection</b><br>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 <sup>2</sup>                        | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             |
| <b>Motor connection</b><br>U2, V2, W2                        |  | Plug-in screw terminals                  | Plug-in screw terminals                  | Plug-in screw terminals                  | Plug-in screw terminals                  |
| • Conductor cross-section                                    | mm <sup>2</sup>                        | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             |
| <b>Connection for braking resistor</b><br>R1, R2             |  | Plug-in screw terminals                  | Plug-in screw terminals                  | Plug-in screw terminals                  | Plug-in screw terminals                  |
| • Conductor cross-section                                    | mm <sup>2</sup>                        | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             |
| <b>PE connection</b>   |  | On housing with M4 screw                 | On housing with M4 screw                 | On housing with M4 screw                 | On housing with M4 screw                 |
| <b>Motor cable length, max. <sup>6)</sup></b>                |  |  |  |  |  |
| • Without filter, shielded/<br>unshielded                    | m (ft)                                 | 50/100 (164/328)                         | 50/100 (164/328)                         | 50/100 (164/328)                         | 50/100 (164/328)                         |
| • With integrated filter<br>class A, shielded/<br>unshielded | m (ft)                                 | 50/100 (164/328)                         | 50/100 (164/328)                         | 50/100 (164/328)                         | 50/100 (164/328)                         |
| <b>Dimensions</b>  |  |  |  |  |  |
| • 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 (6.1)<br>(PN version: 177.4 (6.98))  | 155 (6.1)<br>(PN version: 177.4 (6.98))  | 155 (6.1)<br>(PN version: 177.4 (6.98))  | 155 (6.1)<br>(PN version: 177.4 (6.98))  |
| - With operator panel  | mm (in)                                | 176 (6.93)<br>(PN version: 198.4 (7.81)) | 176 (6.93)<br>(PN version: 198.4 (7.81)) | 176 (6.93)<br>(PN version: 198.4 (7.81)) | 176 (6.93)<br>(PN version: 198.4 (7.81)) |
| <b>Frame size</b>  |  | FSAA                                     | FSAA                                     | FSAA                                     | FSAA                                     |
| <b>Weight, approx.</b>                                       |  |  |  |  |  |
| • Without filter   | kg (lb)                                | 1.1 (2.43)<br>(PN version: 1.2 (2.65))   | 1.1 (2.43)<br>(PN version: 1.2 (2.65))   | 1.1 (2.43)<br>(PN version: 1.2 (2.65))   | 1.1 (2.43)<br>(PN version: 1.2 (2.65))   |
| • With integrated filter<br>class A                          | kg (lb)                                | 1.3 (2.87)<br>(PN version: 1.4 (3.09))   | 1.3 (2.87)<br>(PN version: 1.4 (3.09))   | 1.3 (2.87)<br>(PN version: 1.4 (3.09))   | 1.3 (2.87)<br>(PN version: 1.4 (3.09))   |

<sup>1)</sup> The rated output current  $I_{rated}$  can be used up to 100 %; however, without overload.

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

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

<sup>4)</sup> Typical values. You can find additional information on the Internet at <https://support.industry.siemens.com/cs/document/94059311>

<sup>5)</sup> 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 inverter 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.

<sup>6)</sup> 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 an inverter 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 (82 ft) (shielded).

# SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

## SINAMICS G120C compact inverters

### 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                       |
| <b>Output current</b><br>at 400 V 3 AC                       |  |  |  |  |  |
| • Rated current $I_{rated}$ <sup>1)</sup>                    | A                                      | 5.8                                      | 7.5                                      | 9  | 13                                       |
| • Base-load current $I_L$ <sup>2)</sup>                      | A                                      | 5.6                                      | 7.3                                      | 8.8                                      | 12.5                                     |
| • Base-load current $I_H$ <sup>3)</sup>                      | A                                      | 4.1                                      | 5.6                                      | 7.3                                      | 8.8                                      |
| • Maximum current $I_{max}$                                  | A                                      | 8.2                                      | 11.2                                     | 14.6                                     | 17.6                                     |
| <b>Rated power</b>   |  |  |  |  |  |
| • Based on $I_L$   | kW (hp)                                | 2.2 (3)                                  | 3 (4)                                    | 4 (5)                                    | 5.5 (7.5)                                |
| • Based on $I_H$   | kW (hp)                                | 1.5 (2)                                  | 2.2 (3)                                  | 3 (4)                                    | 4 (5)                                    |
| <b>Rated pulse frequency</b>                                 | kHz                                    | 4  | 4  | 4  | 4  |
| <b>Efficiency <math>\eta</math></b>                          |  | 0.97                                     | 0.97                                     | 0.97                                     | 0.97                                     |
| <b>Power loss<sup>4)</sup></b><br>At rated current           | kW                                     | 0.073                                    | 0.105                                    | 0.13                                     | 0.177                                    |
| <b>Cooling air requirement</b>                               | m <sup>3</sup> /s (ft <sup>3</sup> /s) | 0.005 (0.18)                             | 0.005 (0.18)                             | 0.005 (0.18)                             | 0.009 (0.32)                             |
| <b>Sound pressure level <math>L_{pA}</math></b><br>(1 m)     | dB                                     | <49                                      | <52                                      | <52                                      | <63                                      |
| <b>Rated input current<sup>5)</sup></b>                      |  |  |  |  |  |
| • 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                                     |
| <b>Length of cable to braking resistor, max.</b>             | m (ft)                                 | 15 (49)                                  | 15 (49)                                  | 15 (49)                                  | 15 (49)                                  |
| <b>Line supply connection</b><br>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 <sup>2</sup>                        | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             | 4 ... 6<br>(12 ... 10 AWG)               |
| <b>Motor connection</b><br>U2, V2, W2                        |  | Plug-in screw terminals                  | Plug-in screw terminals                  | Plug-in screw terminals                  | Plug-in screw terminals                  |
| • Conductor cross-section                                    | mm <sup>2</sup>                        | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             | 4 ... 6<br>(12 ... 10 AWG)               |
| <b>Connection for braking resistor</b><br>R1, R2             |  | Plug-in screw terminals                  | Plug-in screw terminals                  | Plug-in screw terminals                  | Plug-in screw terminals                  |
| • Conductor cross-section                                    | mm <sup>2</sup>                        | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             | 1 ... 2.5<br>(16 ... 14 AWG)             | 4 ... 6<br>(12 ... 10 AWG)               |
| <b>PE connection</b>   |  | On housing with M4 screw                 | On housing with M4 screw                 | On housing with M4 screw                 | On housing with M4 screw                 |
| <b>Motor cable length, max.<sup>6)</sup></b>                 |  |  |  |  |  |
| • Without filter, shielded/<br>unshielded                    | m (ft)                                 | 50/100 (164/328)                         | 150/150 (492/492)                        | 150/150 (492/492)                        | 150/150 (492/492)                        |
| • With integrated filter<br>class A, shielded/<br>unshielded | m (ft)                                 | 50/100 (164/328)                         | 50/100 (164/328)                         | 50/100 (164/328)                         | 50/100 (164/328)                         |
| <b>Dimensions</b>  |  |  |  |  |  |
| • 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 (6.1)<br>(PN version: 177.4 (6.98))  | 203 (7.99)<br>(PN version: 225.4 (8.87)) | 203 (7.99)<br>(PN version: 225.4 (8.87)) | 203 (7.99)<br>(PN version: 225.4 (8.87)) |
| - With operator panel  | mm (in)                                | 176 (6.93)<br>(PN version: 198.4 (7.81)) | 224 (8.82)<br>(PN version: 246.4 (9.70)) | 224 (8.82)<br>(PN version: 246.4 (9.70)) | 224 (8.82)<br>(PN version: 246.4 (9.70)) |
| <b>Frame size</b>  |  | FSAA                                     | FSA                                      | FSA                                      | FSB                                      |
| <b>Weight, approx.</b>                                       |  |  |  |  |  |
| • Without filter   | kg (lb)                                | 1.1 (2.43)<br>(PN version: 1.2 (2.65))   | 1.7 (3.75)                               | 1.7 (3.75)                               | 2.3 (5.07)                               |
| • With integrated filter<br>class A                          | kg (lb)                                | 1.3 (2.87)<br>(PN version: 1.4 (3.09))   | 1.9 (4.19)                               | 1.9 (4.19)                               | 2.5 (5.51)                               |

<sup>1)</sup> The rated output current  $I_{rated}$  can be used up to 100 %; however, without overload.

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

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

<sup>4)</sup> Typical values. You can find additional information on the Internet at <https://support.industry.siemens.com/cs/document/94059311>

<sup>5)</sup> 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 inverter 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.

<sup>6)</sup> 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 an inverter 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 (82 ft) (shielded) as standard - for frame sizes FSA and FSB with low-capacitance CY cable (shielded) it is 50 m (164 ft).

# SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

## SINAMICS G120C compact inverters

### 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                       |
| <b>Output current</b><br>at 400 V 3 AC                       |  |  |  |  |  |
| • Rated current $I_{rated}$ <sup>1)</sup>                    | A                                      | 17                                       | 26                                       | 32                                       | 38                                       |
| • Base-load current $I_L$ <sup>2)</sup>                      | A                                      | 16.5                                     | 25                                       | 31                                       | 37                                       |
| • Base-load current $I_H$ <sup>3)</sup>                      | A                                      | 12.5                                     | 16.5                                     | 25                                       | 31                                       |
| • Maximum current $I_{max}$                                  | A                                      | 25                                       | 33                                       | 50                                       | 62                                       |
| <b>Rated power</b>   |  |  |  |  |  |
| • Based on $I_L$   | kW (hp)                                | 7.5 (10)                                 | 11 (15)                                  | 15 (20)                                  | 18.5 (25)                                |
| • Based on $I_H$   | kW (hp)                                | 5.5 (7.5)                                | 7.5 (10)                                 | 11 (15)                                  | 15 (20)                                  |
| <b>Rated pulse frequency</b>                                 | kHz                                    | 4  | 4  | 4  | 4  |
| <b>Efficiency <math>\eta</math></b>                          |  | 0.97                                     | 0.97                                     | 0.97                                     | 0.97                                     |
| <b>Power loss<sup>4)</sup></b><br>At rated current           | kW                                     | 0.241                                    | 0.306                                    | 0.381                                    | 0.461                                    |
| <b>Cooling air requirement</b>                               | m <sup>3</sup> /s (ft <sup>3</sup> /s) | 0.009 (0.32)                             | 0.018 (0.64)                             | 0.018 (0.64)                             | 0.018 (0.64)                             |
| <b>Sound pressure level <math>L_{pA}</math></b><br>(1 m)     | dB                                     | <63                                      | <66                                      | <66                                      | <66                                      |
| <b>Rated input current<sup>5)</sup></b>                      |  |  |  |  |  |
| • 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                                     |
| <b>Length of cable to braking resistor, max.</b>             | m (ft)                                 | 15 (49)                                  | 15 (49)                                  | 15 (49)                                  | 15 (49)                                  |
| <b>Line supply connection</b><br>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 <sup>2</sup>                        | 4 ... 6<br>(12 ... 10 AWG)               | 6 ... 16<br>(10 ... 5 AWG)               | 6 ... 16<br>(10 ... 5 AWG)               | 6 ... 16<br>(10 ... 5 AWG)               |
| <b>Motor connection</b><br>U2, V2, W2                        |  | Plug-in screw terminals                  | Plug-in screw terminals                  | Plug-in screw terminals                  | Plug-in screw terminals                  |
| • Conductor cross-section                                    | mm <sup>2</sup>                        | 4 ... 6<br>(12 ... 10 AWG)               | 6 ... 16<br>(10 ... 5 AWG)               | 6 ... 16<br>(10 ... 5 AWG)               | 6 ... 16<br>(10 ... 5 AWG)               |
| <b>Connection for braking resistor</b><br>R1, R2             |  | Plug-in screw terminals                  | Plug-in screw terminals                  | Plug-in screw terminals                  | Plug-in screw terminals                  |
| • Conductor cross-section                                    | mm <sup>2</sup>                        | 4 ... 6<br>(12 ... 10 AWG)               | 6 ... 16<br>(10 ... 5 AWG)               | 6 ... 16<br>(10 ... 5 AWG)               | 6 ... 16<br>(10 ... 5 AWG)               |
| <b>PE connection</b>   |  | On housing with M4 screw                 | On housing with M4 screw                 | On housing with M4 screw                 | On housing with M4 screw                 |
| <b>Motor cable length, max.<sup>6)</sup></b>                 |  |  |  |  |  |
| • Without filter, shielded/<br>unshielded                    | m (ft)                                 | 150/150 (492/492)                        | 150/150 (492/492)                        | 150/150 (492/492)                        | 150/150 (492/492)                        |
| • With integrated filter<br>class A, shielded/<br>unshielded | m (ft)                                 | 50/100 (164/328)                         | 50/100 (164/328)                         | 50/100 (164/328)                         | 50/100 (164/328)                         |
| <b>Dimensions</b>  |  |  |  |  |  |
| • 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)<br>(PN version: 225.4 (8.87)) | 203 (7.99)<br>(PN version: 225.4 (8.87)) | 203 (7.99)<br>(PN version: 225.4 (8.87)) | 203 (7.99)<br>(PN version: 225.4 (8.87)) |
| - With operator panel  | mm (in)                                | 224 (8.82)<br>(PN version: 246.4 (9.70)) | 224 (8.82)<br>(PN version: 246.4 (9.70)) | 224 (8.82)<br>(PN version: 246.4 (9.70)) | 224 (8.82)<br>(PN version: 246.4 (9.70)) |
| <b>Frame size</b>  |  | FSB                                      | FSC                                      | FSC                                      | FSC                                      |
| <b>Weight, approx.</b>                                       |  |  |  |  |  |
| • Without filter   | kg (lb)                                | 2.3 (5.07)                               | 4.4 (9.70)                               | 4.4 (9.70)                               | 4.4 (9.70)                               |
| • With integrated filter<br>class A                          | kg (lb)                                | 2.5 (5.51)                               | 4.7 (10.36)                              | 4.7 (10.36)                              | 4.7 (10.36)                              |

<sup>1)</sup> The rated output current  $I_{rated}$  can be used up to 100 %; however, without overload.

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

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

<sup>4)</sup> Typical values. You can find additional information on the Internet at <https://support.industry.siemens.com/cs/document/94059311>

<sup>5)</sup> 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 inverter 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.

<sup>6)</sup> 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 an inverter 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 (82 ft) (shielded) as standard - with low-capacitance CY cable for frame size FSB 50 m (164 ft) (shielded), for FSC 100 m (328 ft) (shielded).



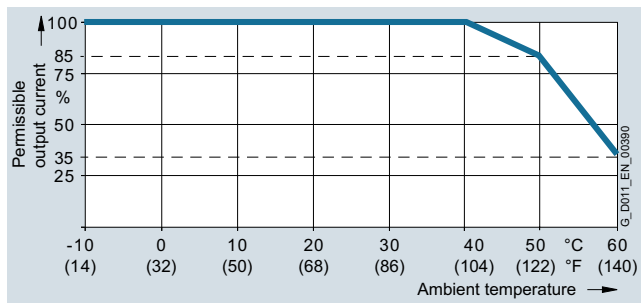
## Characteristic curves

### Derating data

#### Pulse frequency

| Rated power based on low overload (LO) |      | Rated output current in A for a pulse frequency of |       |       |        |        |        |        |
|--|------|--|-------|-------|--------|--------|--------|--------|
| kW                                     | hp   | 4 kHz  | 6 kHz | 8 kHz | 10 kHz | 12 kHz | 14 kHz | 16 kHz |
| 0.55 <sup>1)</sup>                     | 0.75 | 1.7  | 1.4   | 1.2   | 1      | 0.9    | 0.8    | 0.7    |
| 0.75 <sup>1)</sup>                     | 1    | 2.2  | 1.9   | 1.5   | 1.3    | 1.1    | 1      | 0.9    |
| 1.1 <sup>1)</sup>                      | 1.5  | 3.1  | 2.6   | 2.2   | 1.9    | 1.6    | 1.4    | 1.2    |
| 1.5 <sup>1)</sup>                      | 2    | 4.1  | 3.5   | 2.9   | 2.5    | 2.1    | 1.8    | 1.6    |
| 2.2 <sup>1)</sup>                      | 3    | 5.6  | 4.8   | 3.9   | 3.4    | 2.8    | 2.5    | 2.2    |
| 3 <sup>1)</sup>                        | 4    | 7.3  | 6.2   | 5.1   | 4.4    | 3.7    | 3.3    | 2.9    |
| 4 <sup>1)</sup>                        | 5    | 8.8  | 7.5   | 6.2   | 5.3    | 4.4    | 4      | 3.5    |
| 5.5                                    | 7.5  | 12.5   | 10.6  | 8.8   | 7.5    | 6.3    | 5.6    | 5      |
| 7.5                                    | 10   | 16.5   | 14    | 11.6  | 9.9    | 8.3    | 7.4    | 6.6    |
| 11                                     | 15   | 25   | 21.3  | 17.5  | 15     | 12.5   | 11.3   | 10     |
| 15                                     | 20   | 31   | 26.4  | 21.7  | 18.6   | 15.5   | 14     | 12.4   |
| 18.5                                   | 25   | 37   | 31.5  | 25.9  | 22.2   | 18.5   | 16.7   | 14.8   |

#### Ambient temperature



High overload (HO) and low overload (LO)

#### Note:

The PROFINET version can be butt-mounted at temperatures up to 55 °C (131 °F). At temperatures between 55 °C (131 °F) and 60 °C (140 °F), side-by-side mounting is not possible.

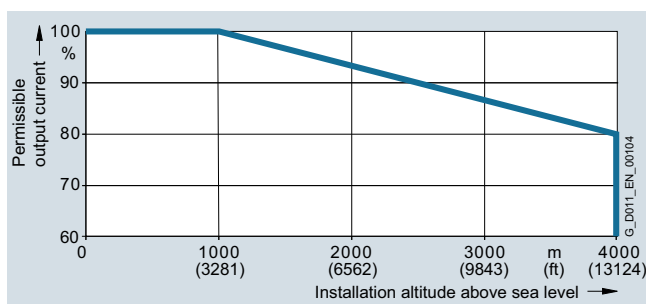
#### Installation altitude

Permissible line supplies depending on the installation altitude

- Installation altitude up to 2000 m (6562 ft) above sea level
  - Connection to every supply system permitted for the inverter
- Installation altitudes between 2000 m (6562 ft) and 4000 m (13124 ft) above sea level
  - Connection 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

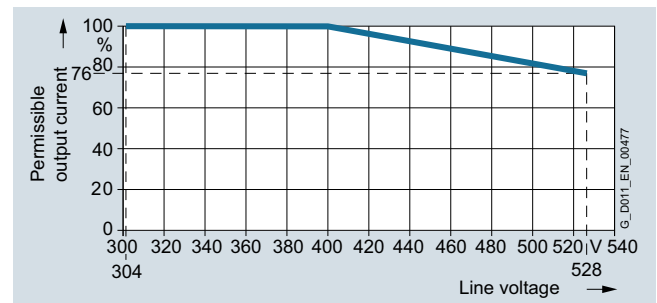
#### Note:

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

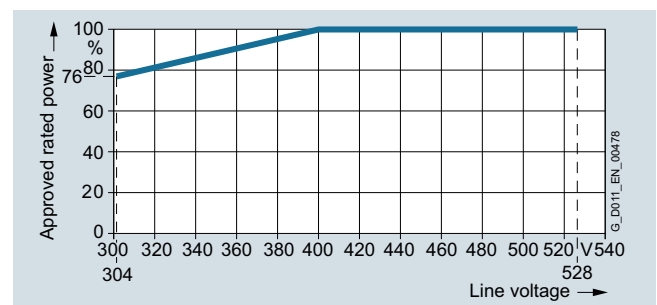


Permissible output current as a function of installation altitude

#### Line voltage



Permissible output current as a function of line voltage

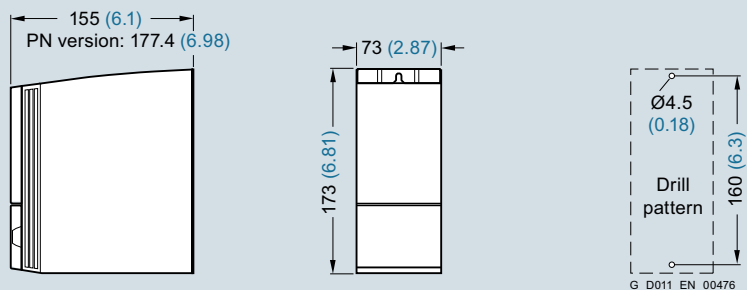


Permissible rated power as a function of line voltage

<sup>1)</sup> The permissible motor cable length depends on the cable type and the pulse frequency.

**SINAMICS G120C compact inverters**

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

**SINAMICS G120C compact inverters****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).

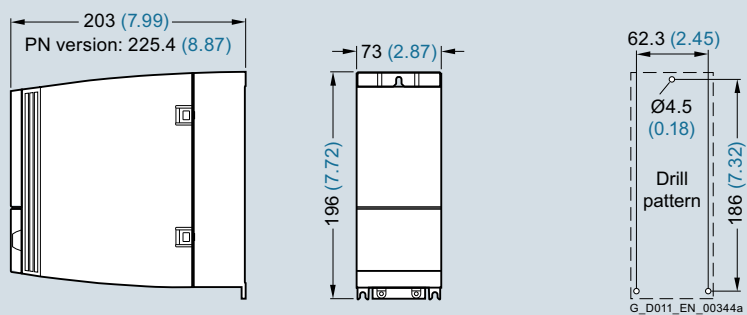
Ventilation clearance required at the bottom: 100 mm (3.94 inches).

Ventilation clearance required at the side: 0 mm (0 inches).

When the IOP is inserted, the mounting depth increases by 21 mm (0.83 inches).

When the BOP-2 is inserted, the mounting 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 studs, 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 IOP is inserted, the mounting depth increases by 21 mm (0.83 inches).

When the BOP-2 is inserted, the mounting depth increases by 11 mm (0.43 inches).

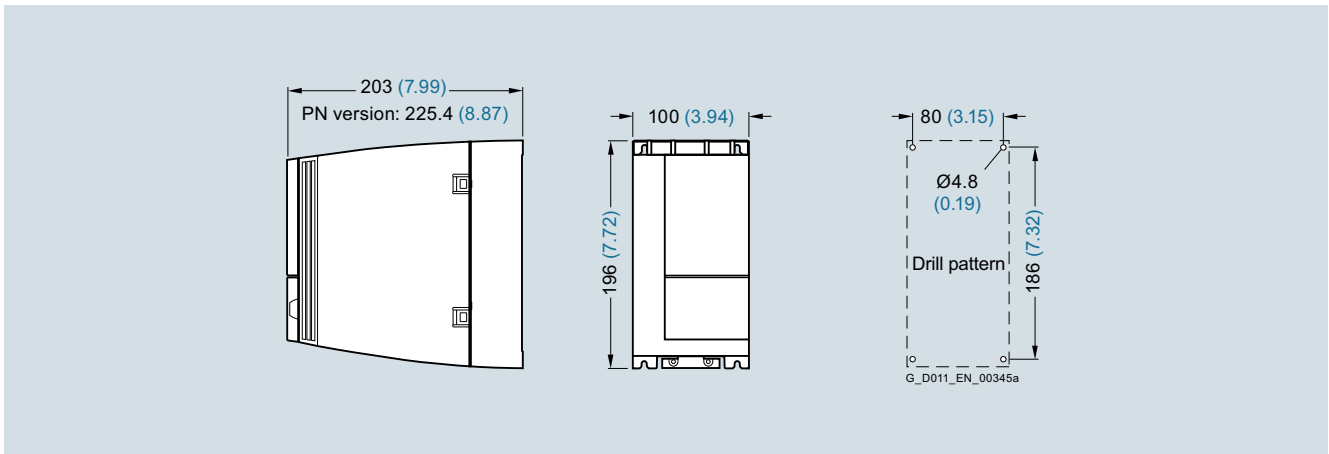
All dimensions in mm (values in brackets are in inches).

## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

### SINAMICS G120C compact inverters

#### Dimensional drawings



SINAMICS G120C, frame size FSB

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

Ventilation clearance required at the top: 80 mm (3.15 inches).

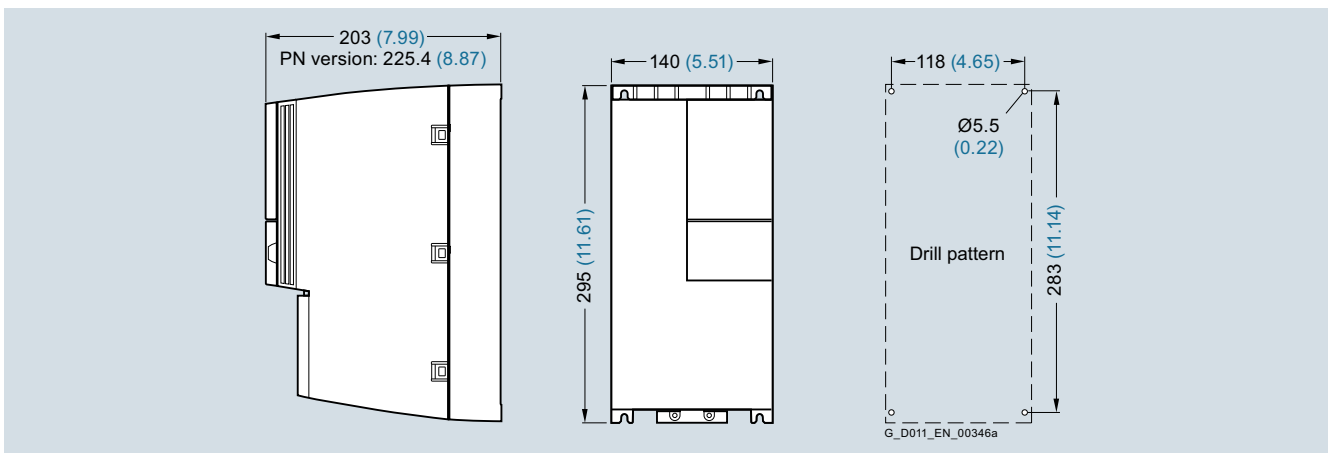
Ventilation clearance required at the bottom: 100 mm (3.94 inches).

Ventilation clearance required at the side: 0 mm (0 inches).

When the IOP is inserted, the mounting depth increases by 21 mm (0.83 inches).

When the BOP-2 is inserted, the mounting 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 studs, 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 IOP is inserted, the mounting depth increases by 21 mm (0.83 inches).

When the BOP-2 is inserted, the mounting depth increases by 11 mm (0.43 inches).

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

#### More information

Detailed information on SINAMICS G120C, the latest technical documentation (catalogs, dimensional drawings, certificates, manuals and operating instructions), are available on the Internet at:

[www.siemens.com/sinamics-g120c](http://www.siemens.com/sinamics-g120c)

You can find information offline about SINAMICS G120C on the DVD-ROM CA 01 in the Drive Technology Configurator (DT Configurator).

The DT Configurator can also be used on the Internet, i.e. it does not need to be installed on a PC. The DT Configurator can be found in the Siemens Industry Mall at the following address:

[www.siemens.com/dt-configurator](http://www.siemens.com/dt-configurator)

## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

Line-side components > Line reactors

### Overview



Line reactor for SINAMICS G120C, frame size FSB

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.

If the ratio of the rated inverter power to the line supply short-circuit power is less than 1 %, then it is recommended to use a line reactor to reduce the current peaks.

### Selection and ordering data

| Rated power                            |      | SINAMICS G120C      |               | Line reactor              |
|--|------|---------------------|---------------|---------------------------|
| kW                                     | hp   | Type<br>6SL3210-... | Frame<br>size | Article No.               |
| <b>Line voltage 380 ... 480 V 3 AC</b> |      |                     |               |                           |
| 0.55                                   | 0.75 | 1KE11-8..2          | FSA           | <b>6SL3203-0CE13-2AA0</b> |
| 0.75                                   | 1    | 1KE12-3..2          |               |                           |
| 1.1                                    | 1.5  | 1KE13-2..2          |               |                           |
| 1.5                                    | 2    | 1KE14-3..2          | FSA           | <b>6SL3203-0CE21-0AA0</b> |
| 2.2                                    | 3    | 1KE15-8..2          |               |                           |
| 3                                      | 4    | 1KE17-5..1          | FSA           |                           |
| 4                                      | 5    | 1KE18-8..1          |               | <b>6SL3203-0CE21-8AA0</b> |
| 5.5                                    | 7.5  | 1KE21-3..1          | FSB           |                           |
| 7.5                                    | 10   | 1KE21-7..1          |               |                           |
| 11                                     | 15   | 1KE22-6..1          | FSC           | <b>6SL3203-0CE23-8AA0</b> |
| 15                                     | 20   | 1KE23-2..1          |               |                           |
| 18.5                                   | 25   | 1KE23-8..1          |               |                           |

### Technical specifications

| Line voltage 380 ... 480 V 3 AC                                      |                 | Line reactor   |  |  |  |
|--|-----------------|--|--|--|--|
|  |                 | 6SL3203-0CE13-2AA0   | 6SL3203-0CE21-0AA0   | 6SL3203-0CE21-8AA0                       | 6SL3203-0CE23-8AA0   |
| <b>Rated current</b>   | A               | 4  | 11.3   | 22.3                                     | 47   |
| <b>Power loss</b><br>at 50/60 Hz                                     | W               | 23/26  | 36/40  | 53/59                                    | 88/97  |
| <b>Line supply/load connection</b><br>1L1, 1L2, 1L3<br>2L1, 2L2, 2L3 |                 | Screw terminals  | Screw terminals  | Screw terminals                          | Screw terminals  |
| • Conductor cross-section  | mm <sup>2</sup> | 4  | 4  | 10                                       | 16   |
| <b>PE connection</b>   |                 | M4 × 8; U washer;<br>spring lock washer                        | M4 × 8; U washer;<br>spring lock washer  | M5 × 10; U washer;<br>spring lock washer | M5 × 10; U washer;<br>spring lock washer                       |
| <b>Degree of protection</b>  |                 | IP20   | IP20   | IP20                                     | IP20   |
| <b>Dimensions</b>  |                 |  |  |  |  |
| • Width  | mm (in)         | 125 (4.92)   | 125 (4.92)   | 125 (4.92)                               | 190 (7.48)   |
| • Height   | mm (in)         | 120 (4.72)   | 140 (5.51)   | 145 (5.71)                               | 220 (8.66)   |
| • Depth  | mm (in)         | 71 (2.80)  | 71 (2.80)  | 91 (3.58)                                | 91 (3.58)  |
| <b>Weight, approx.</b>   | kg (lb)         | 1.1 (2.4)  | 2.1 (4.6)  | 2.95 (6.5)                               | 7.8 (17.2)   |
| <b>Suitable for<br/>SINAMICS G120C</b>                               | Type            | 6SL3210-1KE11-8..2<br>6SL3210-1KE12-3..2<br>6SL3210-1KE13-2..2 | FSA<br>6SL3210-1KE14-3..2<br>6SL3210-1KE15-8..2<br>FSA<br>6SL3210-1KE17-5..1<br>6SL3210-1KE18-8..1 | 6SL3210-1KE21-3..1<br>6SL3210-1KE21-7..1 | 6SL3210-1KE22-6..1<br>6SL3210-1KE23-2..1<br>6SL3210-1KE23-8..1 |
| • Frame size   |                 | FSA  | FSA/FSA  | FSB                                      | FSC  |

## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

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

#### Selection and ordering data

The following table lists recommendations for additional line-side components, such as fuses and circuit breakers.

Note for use in compliance with IEC standards:

Type 3NA3 fuses and type 3RV circuit breakers are recommended for European countries. The values in the table take into account the overload capability of the inverter.

Notes for use in compliance with UL regulations:

Fuses for use in North America must be UL-certified, class J, T, CC, G or CF fuses with a rated voltage of 600 V AC.

#### Short Circuit Current Rating (SCCR)

according to UL

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

- SINAMICS G120C: 100 kA (the value depends on the fuses and circuit breakers used)

Notes regarding installations in Canada:

Overvoltage protection devices in accordance with overvoltage category III and with the following ratings must be connected on the line side of the inverter:

- Rated voltage 480 V (phase-phase) and 480 V (phase-ground)
- Voltage limit 4 kV (phase-phase) and 6 kV (phase-ground)

All overvoltage protection devices used must comply with Canadian standards for industrial installations.

Further information, particularly regarding use in accordance with UL guidelines, is available at

<https://support.industry.siemens.com/cs/document/109478990>

Additional information about the listed fuses and circuit breakers can be found in Catalogs LV 10, IC 10 and IC 10 AO.

| Rated power                            |             | SINAMICS G120C   |            | IEC-compliant |                |                      | UL/cUL-compliant       |         |
|--|-------------|------------------|------------|---------------|----------------|----------------------|------------------------|---------|
| kW                                     | hp          | Type 6SL3210-... | Frame size | Fuse          |                | Circuit breaker      | Fuse type              |         |
|  |             |                  |            | Current       | Article No.    |                      | Rated voltage 600 V AC | Current |
| A                                      | Article No. | Class            | A          |               |                |                      |                        |         |
| <b>Line voltage 380 ... 480 V 3 AC</b> |             |                  |            |               |                |                      |                        |         |
| 0.55                                   | 0.75        | 1KE11-8..2       | FSAA       | 10            | <b>3NA3803</b> | <b>3RV2011-1JA10</b> | J, T, CC, G, CF        | 10      |
| 0.75                                   | 1           | 1KE12-3..2       | FSAA       | 10            | <b>3NA3803</b> | <b>3RV2011-1JA10</b> | J, T, CC, G, CF        | 10      |
| 1.1                                    | 1.5         | 1KE13-2..2       | FSAA       | 10            | <b>3NA3803</b> | <b>3RV2011-1JA10</b> | J, T, CC, G, CF        | 10      |
| 1.5                                    | 2           | 1KE14-3..2       | FSAA       | 10            | <b>3NA3803</b> | <b>3RV2011-1JA10</b> | J, T, CC, G, CF        | 10      |
| 2.2                                    | 3           | 1KE15-8..2       | FSAA       | 10            | <b>3NA3803</b> | <b>3RV2011-1JA10</b> | J, T, CC, G, CF        | 10      |
| 3                                      | 4           | 1KE17-5..1       | FSA        | 16            | <b>3NA3805</b> | <b>3RV2011-4AA10</b> | J, T, CC, G, CF        | 15      |
| 4                                      | 5           | 1KE18-8..1       | FSA        | 16            | <b>3NA3805</b> | <b>3RV2011-4AA10</b> | J, T, CC, G, CF        | 15      |
| 5.5                                    | 7.5         | 1KE21-3..1       | FSB        | 32            | <b>3NA3812</b> | <b>3RV2021-4EA10</b> | J, T, CC, G, CF        | 35      |
| 7.5                                    | 10          | 1KE21-7..1       | FSB        | 32            | <b>3NA3812</b> | <b>3RV2021-4EA10</b> | J, T, CC, G, CF        | 35      |
| 11                                     | 15          | 1KE22-6..1       | FSC        | 63            | <b>3NA3822</b> | <b>3RV1041-4JA10</b> | J, T, CC, G, CF        | 60      |
| 15                                     | 20          | 1KE23-2..1       | FSC        | 63            | <b>3NA3822</b> | <b>3RV1041-4JA10</b> | J, T, CC, G, CF        | 60      |
| 18.5                                   | 25          | 1KE23-8..1       | FSC        | 63            | <b>3NA3822</b> | <b>3RV1041-4JA10</b> | J, T, CC, G, CF        | 60      |

## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

DC link components > Braking resistors

### Overview



Braking resistor for SINAMICS G120C, frame size FSB

The excess energy of the DC link is dissipated using the braking resistor. The braking resistors are designed for use with the SINAMICS G120C. SINAMICS G120C has an integrated brake chopper and cannot feed back regenerative energy to the line supply. For regenerative operation, e.g. the braking of a rotating mass with high moment of inertia, a braking resistor must be connected to convert the resulting energy into heat.

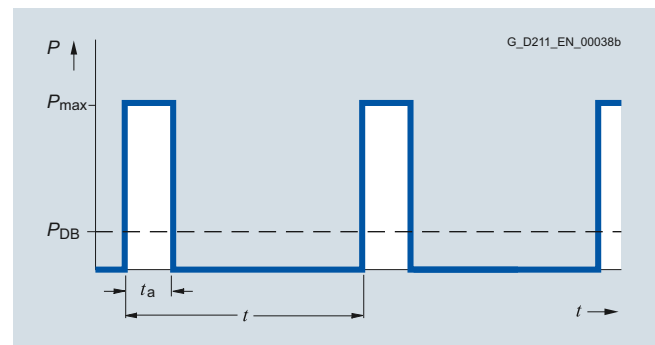
The braking resistors are designed for mounting horizontally or vertically onto a heat-resistant sheet steel panel. The resistors should be mounted such as to ensure that the air can flow in and out and heat cannot build up. The heat dissipated by the braking resistor must not diminish the inverter cooling.

Every braking resistor is equipped with a temperature switch. The temperature switch can be evaluated to prevent consequential damage if the braking resistor overheats.

### Selection and ordering data

| Rated power                            |      | SINAMICS G120C      |               | Braking resistor          |
|--|------|---------------------|---------------|---------------------------|
| kW                                     | hp   | Type<br>6SL3210-... | Frame<br>size | Article No.               |
| <b>Line voltage 380 ... 480 V 3 AC</b> |      |                     |               |                           |
| 0.55                                   | 0.75 | 1KE11-8..2          | FSA           | <b>6SL3201-0BE14-3AA0</b> |
| 0.75                                   | 1    | 1KE12-3..2          |               |                           |
| 1.1                                    | 1.5  | 1KE13-2..2          |               |                           |
| 1.5                                    | 2    | 1KE14-3..2          |               |                           |
| 2.2                                    | 3    | 1KE15-8..2          | FSA           | <b>6SL3201-0BE21-0AA0</b> |
| 3                                      | 4    | 1KE17-5..1          | FSA           |                           |
| 4                                      | 5    | 1KE18-8..1          |               |                           |
| 5.5                                    | 7.5  | 1KE21-3..1          | FSB           | <b>6SL3201-0BE21-8AA0</b> |
| 7.5                                    | 10   | 1KE21-7..1          |               |                           |
| 11                                     | 15   | 1KE22-6..1          | FSC           | <b>6SL3201-0BE23-8AA0</b> |
| 15                                     | 20   | 1KE23-2..1          |               |                           |
| 18.5                                   | 25   | 1KE23-8..1          |               |                           |

### Characteristic curves



Load diagram for the braking resistors

$$t_a = 12 \text{ s}$$

$$t = 240 \text{ s}$$

## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

DC link components &gt; Braking resistors

### Technical specifications

| Line voltage 380 ... 480 V 3 AC  |                 | Braking resistor   |   |  |  |
|--|-----------------|--|---|--|--|
|  |                 | 6SL3201-0BE14-3AA0   | 6SL3201-0BE21-0AA0  | 6SL3201-0BE21-8AA0                       | 6SL3201-0BE23-8AA0   |
| <b>Resistance</b>  | $\Omega$        | 370  | 140   | 75                                       | 30   |
| <b>Rated power <math>P_{DB}</math></b><br>(Continuous braking power)                           | kW (hp)         | 0.075 (0.1)  | 0.2 (0.3)   | 0.375 (0.5)                              | 0.925 (1.25)   |
| <b>Peak power <math>P_{max}</math></b><br>(load duration $t_a = 12$ s with period $t = 240$ s) | kW (hp)         | 1.5 (2)  | 4 (5)   | 7.5 (10)                                 | 18.5 (25)  |
| <b>Power connection</b>  |                 | Terminal block   | Terminal block  | Terminal block                           | Terminal block   |
| • Conductor cross-section  | mm <sup>2</sup> | 2.5  | 2.5   | 2.5                                      | 6  |
| <b>Thermostatic switch</b>   |                 | NC contact   | NC contact  | NC contact                               | NC contact   |
| • Contact load, max.   |                 | 250 V AC/2.5 A   | 250 V AC/2.5 A  | 250 V AC/2.5 A                           | 250 V AC/2.5 A   |
| • Conductor cross-section  | mm <sup>2</sup> | 2.5  | 2.5   | 2.5                                      | 2.5  |
| <b>PE connection</b>   |                 |  |   |  |  |
| • Via terminal block   |                 | Yes  | Yes   | Yes                                      | Yes  |
| • PE connection on housing   |                 | M4 screw   | M4 screw  | M4 screw                                 | M4 screw   |
| <b>Degree of protection</b>  |                 | IP20   | IP20  | IP20                                     | IP20   |
| <b>Dimensions</b>  |                 |  |   |  |  |
| • Width  | mm (in)         | 105 (4.13)   | 105 (4.13)  | 175 (6.89)                               | 250 (9.84)   |
| • Height   | mm (in)         | 295 (11.61)  | 345 (13.58)   | 345 (13.58)                              | 490 (19.29)  |
| • Depth  | mm (in)         | 100 (3.94)   | 100 (3.94)  | 100 (3.94)                               | 140 (5.51)   |
| <b>Weight, approx.</b>   | kg (lb)         | 1.48 (3.26)  | 1.8 (3.97)  | 2.73 (6.02)                              | 6.2 (13.7)   |
| <b>Suitable for SINAMICS G120C</b>   | Type            | 6SL3210-1KE11-8..2<br>6SL3210-1KE12-3..2<br>6SL3210-1KE13-2..2<br>6SL3210-1KE14-3..2 | FSAA<br>6SL3210-1KE15-8..2<br>FSA<br>6SL3210-1KE17-5..1<br>6SL3210-1KE18-8..1 | 6SL3210-1KE21-3..1<br>6SL3210-1KE21-7..1 | 6SL3210-1KE22-6..1<br>6SL3210-1KE23-2..1<br>6SL3210-1KE23-8..1 |
| • Frame size   |                 | FSAA   | FSAA/FSA  | FSB                                      | FSC  |

## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

Load-side power components > Output reactors

### Overview



Output reactor for SINAMICS G120C, frame size FSA

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.

Owing to the high rates of voltage rise of the fast-switching IGBTs, the capacitance of long motor cables reverses polarity very quickly with every switching operation in the inverter. As a result, the inverter is loaded with additional current peaks of substantial magnitude.

Output reactors reduce the magnitude of these additional peaks because the cable capacitance reverses polarity more slowly across the reactor inductance, thereby attenuating the amplitudes of the current peaks.

When using output reactors, the following should be observed:

- Max. permissible output frequency 200 Hz
- Max. permissible pulse frequency 4 kHz
- The output reactor must be installed as close as possible to the frequency inverter

### Selection and ordering data

| Rated power               |      | SINAMICS G120C      |               | Output reactor            |
|---------------------------|------|---------------------|---------------|---------------------------|
| kW                        | hp   | Type<br>6SL3210-... | Frame<br>size | Article No.               |
| <b>380 ... 480 V 3 AC</b> |      |                     |               |                           |
| 0.55                      | 0.75 | 1KE11-8..2          | FSA           | <b>6SL3202-0AE16-1CA0</b> |
| 0.75                      | 1    | 1KE12-3..2          |               |                           |
| 1.1                       | 1.5  | 1KE13-2..2          |               |                           |
| 1.5                       | 2    | 1KE14-3..2          |               |                           |
| 2.2                       | 3    | 1KE15-8..2          |               |                           |
| 3                         | 4    | 1KE17-5..1          | FSA           | <b>6SL3202-0AE18-8CA0</b> |
| 4                         | 5    | 1KE18-8..1          |               |                           |
| 5.5                       | 7.5  | 1KE21-3..1          | FSB           | <b>6SL3202-0AE21-8CA0</b> |
| 7.5                       | 10   | 1KE21-7..1          |               |                           |
| 11                        | 15   | 1KE22-6..1          | FSC           | <b>6SL3202-0AE23-8CA0</b> |
| 15                        | 20   | 1KE23-2..1          |               |                           |
| 18.5                      | 25   | 1KE23-8..1          |               |                           |



## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

Load-side power components > Output reactors

### Technical specifications

| Line voltage 380 ... 480 V 3 AC                               |                 | Output reactor   |  |  |  |
|---|-----------------|--|--|--|--|
|   |                 | 6SL3202-0AE16-1CA0   | 6SL3202-0AE18-8CA0                       | 6SL3202-0AE21-8CA0                       | 6SL3202-0AE23-8CA0   |
| <b>Rated current</b>  | A               | 6.1  | 9  | 18.5                                     | 39   |
| <b>Power loss</b>   | kW              | 0.09   | 0.08                                     | 0.08                                     | 0.11   |
| <b>Connection to the Power Module/motor connection</b>        |                 | Screw terminals  | Screw terminals                          | Screw terminals                          | Screw terminals  |
| • Conductor cross-section                                     | mm <sup>2</sup> | 4  | 4  | 10                                       | 16   |
| <b>PE connection</b>  |                 | M4 screw stud  | M4 screw stud                            | M5 screw stud                            | M5 screw stud  |
| <b>Cable length, max.</b><br>between output reactor and motor |                 |  |  |  |  |
| • 380 V -10 % ... 415 V<br>+10 % 3 AC                         |                 |  |  |  |  |
| - Shielded  | m (ft)          | 150 (492)  | 150 (492)                                | 150 (492)                                | 150 (492)  |
| - Unshielded  | m (ft)          | 225 (738)  | 225 (738)                                | 225 (738)                                | 225 (738)  |
| • 440 ... 480 V 3 AC +10 %                                    |                 |  |  |  |  |
| - Shielded  | m (ft)          | 100 (328)  | 100 (328)                                | 100 (328)                                | 100 (328)  |
| - Unshielded  | m (ft)          | 150 (492)  | 150 (492)                                | 150 (492)                                | 150 (492)  |
| <b>Dimensions</b>   |                 |  |  |  |  |
| • Width   | mm (in)         | 207 (8.15)   | 207 (8.15)                               | 247 (9.72)                               | 257 (10.12)  |
| • Height  | mm (in)         | 175 (6.89)   | 180 (7.08)                               | 215 (8.46)                               | 235 (9.25)   |
| • Depth   | mm (in)         | 72.5 (2.85)  | 72.5 (2.85)                              | 100 (3.94)                               | 114.7 (4.51)   |
| <b>Possible as base component</b>                             |                 | No   | No                                       | No                                       | No   |
| <b>Degree of protection</b>                                   |                 | IP20   | IP20                                     | IP20                                     | IP20   |
| <b>Weight, approx.</b>  | kg (lb)         | 3.4 (7.49)   | 3.9 (8.60)                               | 10.1 (22.26)                             | 11.2 (24.70)   |
| <b>Suitable for SINAMICS G120C</b>                            | Type            | 6SL3210-1KE11-8..2<br>6SL3210-1KE12-3..2<br>6SL3210-1KE13-2..2<br>6SL3210-1KE14-3..2<br>6SL3210-1KE15-8..2 | 6SL3210-1KE17-5..1<br>6SL3210-1KE18-8..1 | 6SL3210-1KE21-3..1<br>6SL3210-1KE21-7..1 | 6SL3210-1KE22-6..1<br>6SL3210-1KE23-2..1<br>6SL3210-1KE23-8..1 |
| • Frame size  |                 | FSAA   | FSA                                      | FSB                                      | FSC  |

## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

### Supplementary system components > Operator panels

#### Overview

| Operator panel   | Intelligent Operator Panel IOP and IOP Handheld  | Basic Operator Panel BOP-2  |
|--|--|---|
| Description  |  <p>Thanks to the large plain text display, menu-based operation and the application wizards, commissioning of the standard drives is easy. Optionally available application wizards <sup>1)</sup> guide the user interactively through the commissioning process for important applications such as pumps, fans, compressors and conveyor systems.</p>   |  <p>Commissioning of standard drives is easy with the menu-prompted dialog on a 2-line display. Simultaneous display of the parameter and parameter value, as well as parameter filtering, means that basic commissioning of a drive can be performed easily and, in most cases, without a printed parameter list.</p> |
| Possible applications  | <ul style="list-style-type: none"> <li>• Can be directly mounted on SINAMICS G120C</li> <li>• Can be mounted in the control cabinet door using a door mounting kit (achievable degree of protection is IP54/UL Type 12)</li> <li>• Available as handheld version</li> <li>• The IOP is available in 2 versions with the following languages <sup>1)</sup>: <ul style="list-style-type: none"> <li>- German, English, French, Italian, Spanish, Portuguese, Dutch, Swedish, Russian, Czech, Polish, Turkish, Finnish.</li> <li>- Chinese (simplified), English, German</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Can be directly mounted on SINAMICS G120C</li> <li>• Can be mounted in the control cabinet door using a door mounting kit (achievable degree of protection is IP55/UL Type 12)</li> </ul>  |
| Quick commissioning without expert knowledge                 | <ul style="list-style-type: none"> <li>• Standard commissioning using the clone function</li> <li>• User-defined parameter list with a reduced number of self-selected parameters</li> <li>• Simple commissioning of standard applications using application-specific wizards; it is not necessary to know the parameter structure</li> <li>• Simple local commissioning using the handheld version</li> <li>• Commissioning largely without documentation</li> </ul>  | <ul style="list-style-type: none"> <li>• Standard commissioning using the clone function</li> </ul>   |
| High degree of operator friendliness and intuitive operation | <ul style="list-style-type: none"> <li>• Direct manual operation of the drive – you can simply toggle between the automatic and manual modes</li> <li>• Intuitive navigation using a rotary knob – just like in everyday applications</li> <li>• Graphic display to show status values such as pressure or flow in bar-type diagrams</li> <li>• Status display with freely selectable units to specify physical values</li> </ul>  | <ul style="list-style-type: none"> <li>• Direct manual operation of the drive – you can simply toggle between the automatic and manual modes</li> <li>–</li> <li>• 2-line display for showing up to 2 process values with text</li> <li>• Status display of predefined units</li> </ul>   |
| Minimization of maintenance times                            | <ul style="list-style-type: none"> <li>• Diagnostics using plain text display, can be used locally on-site without documentation</li> <li>• Simple update of languages, wizards and firmware updates via USB</li> </ul>  | <ul style="list-style-type: none"> <li>• Diagnostics with menu prompting with 7-segment display</li> </ul>  |

<sup>1)</sup> Further information is available at <https://support.industry.siemens.com/cs/document/67273266>

**Overview**
**Intelligent Operator Panel IOP**


Intelligent Operator Panel IOP

The Intelligent Operator Panel IOP is a very user-friendly and powerful operator panel for the SINAMICS G120, SINAMICS G120C, SINAMICS G120P, SINAMICS G110D, SINAMICS G120D, SINAMICS G110M and SINAMICS S110 standard drives.

The IOP supports both entry-level personnel and drive experts. Thanks to the large plain text display, the menu-based operation and the application wizards, it is easy to commission standard drives. A drive can be essentially commissioned without having to use a printed parameter list – as the parameters are displayed in plain text, and explanatory help texts and the parameter filtering function are provided.

Application wizards interactively guide you when commissioning important applications such as conveyor technology, pumps, fans and compressors. There is a basic commissioning wizard for general commissioning.

Up to 2 process values can be displayed graphically or numerically on the status screen/status display. Process values can also be displayed in technological units.

The IOP supports standard commissioning of identical drives. For this purpose, a parameter list can be copied from an inverter into the IOP and downloaded into other drive units of the same type as required.

The IOP is available in 2 versions with the following languages <sup>1)</sup>:

- German, English, French, Italian, Spanish, Portuguese, Dutch, Swedish, Russian, Czech, Polish, Turkish, Finnish
- Chinese (simplified), English, German

The IOP can be installed in control cabinet doors using the optionally available door mounting kit.

The operating temperature of the IOP is 0 °C ... 50 °C (32 °F ... 122 °F).

**IOP Handheld**


IOP Handheld

A handheld version <sup>2)</sup> of the IOP can be ordered for mobile use. In addition to the IOP, this includes a housing with rechargeable batteries, charging unit and RS232 connecting cable. The charging unit is supplied with connector adapters for Europe, the US and UK. When the batteries are fully charged, the operating time is up to 8 hours.

To connect the IOP handheld to SINAMICS G110D, SINAMICS G120D or SINAMICS G110M, the RS232 connecting cable with optical interface is required in addition.

**Updating the IOP**

The IOP can be updated and expanded using the integrated USB interface.

Data to support future drive systems can be transferred from the PC to the IOP. Further, the USB interface allows user languages and wizards that will become available in the future to be subsequently downloaded and the firmware to be updated for the IOP <sup>1)</sup>.

The IOP is supplied with power via the USB interface during an update.

<sup>1)</sup> Further information is available at <https://support.industry.siemens.com/cs/document/67273266>

<sup>2)</sup> The IOP with Article No. 6SL3255 0AA00 4JA1 is included in the scope of supply of the IOP Handheld.

## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

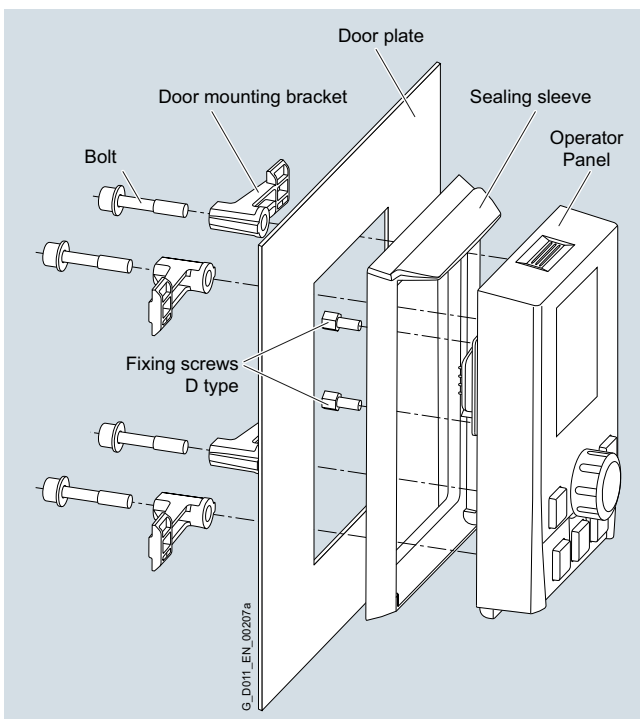
### Supplementary system components > IOP Intelligent Operator Panel

#### Benefits

- Simple commissioning of standard applications using wizards, it is not necessary to know the parameter structure
- Diagnostics using plain text display; can be used locally on-site without documentation
- Direct manual operation of the drive – you can toggle between automatic and manual modes
- Status display with freely selectable units; display of real physical values
- Intuitive, navigation using a wheel – just like in everyday applications
- Graphic display e.g. for status values such as pressure or flowrate in bar charts
- Quickly and simply mounted in the door – mechanically and electrically
- Simple local commissioning on-site using the handheld version
- Commissioning without documentation using the integrated help function
- Standard commissioning using the clone function (parameter set data is saved for fast replacement)
- Upload and download of parameter sets (IOP system memory or SINAMICS SD card)
- Storing of up to 16 fixed or 200 freely namable parameter sets in IOP (IOP with firmware V1.5 SP1 and higher)
- User-defined parameter list with a reduced number of self-selected parameters (to generate your own commissioning screens)
- The IOP is available in 2 versions with the following languages <sup>1)</sup>:
  - German, English, French, Italian, Spanish, Portuguese, Dutch, Swedish, Russian, Czech, Polish, Turkish, Finnish.
  - Chinese (simplified), English, German
- Simple update of languages, wizards and firmware updates via USB <sup>1)</sup>

#### Integration

Using the optionally available door mounting kit, an operator panel can be simply mounted in a control cabinet door with just a few manual operations. For door mounting with an IOP, degree of protection IP54/UL Type 12 is achieved, and with BOP-2, degree of protection IP55.



Door mounting kit with plugged-on IOP

#### Selection and ordering data

| Description   | Article No.  |
|---|--|
| <b>Intelligent Operator Panel IOP</b> <ul style="list-style-type: none"> <li>• German, English, French, Italian, Spanish, Portuguese, Dutch, Swedish, Russian, Czech, Polish, Turkish, Finnish</li> <li>• Chinese (simplified), English, German</li> </ul>  | <b>6SL3255-0AA00-4JA1</b><br><br><b>6SL3255-0AA00-4JC1</b> |
| <b>IOP Handheld</b><br>For use with SINAMICS G120, SINAMICS G120C, SINAMICS G120P, SINAMICS G110D, SINAMICS G120D, SINAMICS G110M and SINAMICS S110<br><br>Included in the scope of delivery: <ul style="list-style-type: none"> <li>• IOP (6SL3255-0AA00-4JA1)</li> <li>• Handheld housing</li> <li>• Rechargeable batteries (4 x AA)</li> <li>• Charging unit (international)</li> <li>• RS232 connecting cable (3 m/9.84 ft long), used in combination with SINAMICS G120, SINAMICS G120C, SINAMICS G120P and SINAMICS S110 <sup>2)</sup></li> <li>• USB cable (1 m/3.28 ft long)</li> </ul> | <b>6SL3255-0AA00-4HA0</b>                                  |
| <b>Accessories</b>  |  |
| <b>Door mounting kit</b><br>For mounting an operator panel in control cabinet doors with sheet steel thicknesses of 1 ... 3 mm (0.04 ... 0.12 in)<br>IP54 degree of protection for IOP<br>IP55 degree of protection for BOP-2<br><br>Included in the scope of delivery: <ul style="list-style-type: none"> <li>• Seal</li> <li>• Mounting material</li> <li>• Connecting cable (5 m/16.4 ft long, also supplies voltage to the IOP directly via the SINAMICS G120C compact inverter)</li> </ul>   | <b>6SL3256-0AP00-0JA0</b>                                  |

<sup>1)</sup> Further information is available at <https://support.industry.siemens.com/cs/document/67273266>

<sup>2)</sup> For use in combination with SINAMICS G110D, SINAMICS G120D and SINAMICS G110M, the RS232 connecting cable with optical interface is required (Article No.: 3RK1922-2BP00). The cable must be ordered separately.

## Overview



Basic Operator Panel BOP-2

The Basic Operator Panel BOP-2 can be used to commission drives, monitor drives in operation and input individual parameter settings.

Commissioning of standard drives is easy with the menu-prompted dialog on a 2-line display. Simultaneous display of the parameter and parameter value, as well as parameter filtering, means that basic commissioning of a drive can be performed easily and, in most cases, without a printed parameter list.

The drives are easily controlled manually using directly assigned navigation buttons. The BOP-2 has a dedicated switchover button to switch from automatic to manual mode.

Diagnostics can easily be performed on the connected inverter by following the menus.

Up to two process values can be numerically visualized simultaneously.

BOP-2 supports standard commissioning of identical drives. For this purpose, a parameter list can be copied from an inverter into the BOP-2 and when required, downloaded into other drive units of the same type.

The operating temperature of the BOP-2 is 0 °C ... 50 °C (32 °F ... 122 °F).

## Benefits

- Shorten commissioning times – Easy commissioning of standard drives using basic commissioning wizards (setup)
- Minimize standstill times – Fast detection and rectification of faults (Diagnostics)
- Greater transparency in the process – The status display of the BOP-2 makes process variable monitoring easy (Monitoring)
- Direct mounting on the inverter (also see IOP)
- User-friendly user interface:
  - Easy navigation using clear menu structure and clearly assigned control keys
  - Two-line display

## Selection and ordering data

| Description                       | Article No.               |
|-----------------------------------|---------------------------|
| <b>Basic Operator Panel BOP-2</b> | <b>6SL3255-0AA00-4CA1</b> |

### Accessories

|  |                           |
|--|---------------------------|
| <p><b>Door mounting kit</b><br/>For mounting an operator panel in control cabinet doors with sheet steel thicknesses of 1 ... 3 mm (0.04 ... 0.12 in)<br/>IP54 degree of protection for IOP<br/>IP55 degree of protection for BOP-2<br/>Included in the scope of delivery:</p> <ul style="list-style-type: none"> <li>• Seal</li> <li>• Mounting material</li> <li>• Connecting cable (5 m/16.4 ft long, also supplies voltage to the BOP-2 directly via the SINAMICS G120C compact inverter)</li> </ul> | <b>6SL3256-0AP00-0JA0</b> |
|--|---------------------------|

## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

Supplementary system components > Memory cards

### Overview



SINAMICS memory card (SD 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.

- Parameter settings can be written from the memory card to the inverter or saved from the inverter to the memory card.
- Up to 100 parameter sets can be stored.
- The memory card supports standard commissioning without the use of an operator panel such as the IOP, BOP-2 or the STARTER and SINAMICS Startdrive commissioning tools.
- If firmware is stored on the memory card and a frequency inverter is installed, the firmware can be upgraded/downgraded during inverter startup <sup>1)</sup>.

#### Note:

The memory card is not required for operation and does not have to remain inserted.

### Selection and ordering data

| Description  | Article No.                   |
|--|-------------------------------|
| <b>SINAMICS SD card<br/>512 MB</b>   | <b>6SL3054-4AG00-2AA0</b>     |
| <i>Optional firmware memory cards</i>  |                               |
| <b>SINAMICS SD card<br/>512 MB + firmware V4.6</b><br>(Multicard V4.6)                 | <b>6SL3054-7EG00-2BA0</b>     |
| <b>SINAMICS SD card<br/>512 MB + firmware V4.7</b><br>(Multicard V4.7)                 | <b>6SL3054-7EH00-2BA0</b>     |
| <b>SINAMICS SD card<br/>512 MB + firmware V4.7 SP6 HF1</b><br>(Multicard V4.7 SP6 HF1) | <b>NEW 6SL3054-7TD00-2BA0</b> |

For more information on firmware V4.6:

<https://support.industry.siemens.com/cs/document/67385235>

For more information on firmware V4.7:

<https://support.industry.siemens.com/cs/document/92554110>

For more information on firmware V4.7 SP6 HF1:

<https://support.industry.siemens.com/cs/document/109482094>

#### Note:

SINAMICS G120C compact inverters, frame size FSAA, can be operated from firmware V4.7 SP3.

<sup>1)</sup> You can find more information about firmware upgrades/downgrades on the Internet at <https://support.industry.siemens.com/cs/document/67364620>

## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

Supplementary system components > PC inverter connection kit 2

### Overview



PC inverter connection kit 2

For controlling and commissioning an inverter directly from a PC if the STARTER<sup>1)</sup> commissioning tool or SINAMICS Startdrive has been installed on the PC. With this, the inverter can be

- parameterized (commissioned, optimized),
- monitored (diagnostics)
- controlled (master control via the STARTER or SINAMICS Startdrive commissioning tool for test purposes)

A USB cable (3 m/9.84 ft) is included in the scope of delivery.

### Selection and ordering data

| Description                         | Article No.               |
|-------------------------------------|---------------------------|
| <b>PC inverter connection kit 2</b> | <b>6SL3255-0AA00-2CA0</b> |
| USB cable (3 m/9.84 ft long) for    |                           |
| • SINAMICS G120C                    |                           |
| • SINAMICS G120 Control Units       |                           |
| • SINAMICS G110M Control Units      |                           |
| • SINAMICS G120D Control Units      |                           |
| - CU230P-2                          |                           |
| - CU240B-2                          |                           |
| - CU240E-2                          |                           |
| - CU250S-2                          |                           |
| • SINAMICS G110M Control Units      |                           |
| - CU240M                            |                           |
| • SINAMICS G120D Control Units      |                           |
| - CU240D-2                          |                           |
| - CU250D-2                          |                           |

<sup>1)</sup> The STARTER commissioning tool is available on the Internet at <https://support.industry.siemens.com/cs/ww/en/ps/13437/dl>



## SINAMICS G120C compact inverters

0.55 kW to 18.5 kW (0.75 hp to 25 hp)

### Spare parts

#### Overview

The following spare parts are available for SINAMICS G120C for service and maintenance work.

#### **SINAMICS G120C shield plates**

A set of shield plates is included in the scope of delivery for the motor and signal cables corresponding to the frame size of the SINAMICS G120C compact inverter, and can also be ordered as spare parts.

#### **SINAMICS G120C Spare Parts Kit**

This kit comprises 4 sets of I/O terminals, 1 RS485 terminal, 2 sets of Control Unit doors (1 × PN and 1 × other communication versions) and 1 blanking cover.

#### **SINAMICS G120C 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 compact inverter.

#### **SINAMICS G120C 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 compact inverter.



SINAMICS G120C frame size FSB, with integrated roof-mounted fan

#### **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 compact inverter.



SINAMICS G120C frame size FSB, with fan unit (rear view of rotated inverter)

#### Selection and ordering data

| Description   | Article No.               |
|---|---------------------------|
| <b>SINAMICS G120C shield plate</b>                              |                           |
| • Frame size FSAA <span style="float: right;"><b>NEW</b></span> | <b>6SL3266-1ER00-0KA0</b> |
| • Frame size FSA  | <b>6SL3266-1EA00-0KA0</b> |
| • Frame size FSB  | <b>6SL3266-1EB00-0KA0</b> |
| • Frame size FSC  | <b>6SL3266-1EC00-0KA0</b> |
| <b>SINAMICS G120C Spare Parts Kit</b>                           | <b>6SL3200-0SK41-0AA0</b> |
| <b>SINAMICS G120C connectors</b>                                |                           |
| • Frame size FSA  | <b>6SL3200-0ST05-0AA0</b> |
| • Frame size FSB  | <b>6SL3200-0ST06-0AA0</b> |
| • Frame size FSC  | <b>6SL3200-0ST07-0AA0</b> |
| <b>SINAMICS G120C roof-mounted fan</b>                          |                           |
| • Frame size FSAA <span style="float: right;"><b>NEW</b></span> | <b>6SL3200-0SF38-0AA0</b> |
| • Frame size FSA  | <b>6SL3200-0SF40-0AA0</b> |
| • Frame size FSB  | <b>6SL3200-0SF41-0AA0</b> |
| • Frame size FSC  | <b>6SL3200-0SF42-0AA0</b> |
| <b>SINAMICS G120C fan unit</b>                                  |                           |
| • Frame size FSA  | <b>6SL3200-0SF12-0AA0</b> |
| • Frame size FSB  | <b>6SL3200-0SF13-0AA0</b> |
| • Frame size FSC  | <b>6SL3200-0SF14-0AA0</b> |