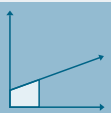
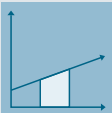
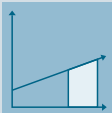
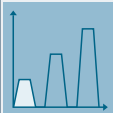
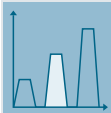
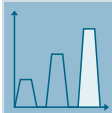

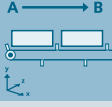
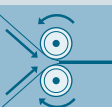



## SINAMICS G110 standard inverters

0.12 kW to 3 kW (0.16 hp to 4 hp)

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

The SINAMICS G110 inverter is especially suited for applications with pumps and fans, as a drive in various sectors, e.g. food and beverages, textiles, packaging, as well as conveyor technology, with factory gate and garage door drives and as a universal drive for moving advertising media.

Specific application examples and descriptions can be found 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, higher functionality ⇒ SINAMICS G120, SINAMICS G120C
- Higher degree of protection ⇒ SINAMICS G110M, SINAMICS G110D, SINAMICS G120D
- Special functions for pumps, fans, and compressors ⇒ SINAMICS G120P (Catalog D 35)

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

## SINAMICS G110 standard inverters

0.12 kW to 3 kW (0.16 hp to 4 hp)

### Controlled Power Modules

3

#### Overview



SINAMICS G110, frame size FSA (right with flat heat sink)



SINAMICS G110, frame sizes FSB and FSC

SINAMICS G110 is an inverter with basic functions for a wide range of industrial drive applications with variable speeds.

The extremely compact SINAMICS G110 inverter operates with voltage-frequency control from 200 V to 240 V on single-phase line supply systems.

It is the ideal "price-conscious" inverter solution in the lower power range of the SINAMICS product family.

The following **line-side power components** are available for SINAMICS G110 inverters:

- EMC filters
- Line reactors
- Fuses
- Circuit breakers

The **accessories** listed below are also available:

- Operator panel
- Mounting accessories
- Commissioning tool

The latest technical documentation (catalogs, dimension drawings, certificates, manuals and operating instructions), are available on the Internet at the following address:

[www.siemens.com/sinamics-g110/documentation](http://www.siemens.com/sinamics-g110/documentation)

and offline on the DVD-ROM CA 01 in the DT Configurator. In addition, the DT Configurator can be used in the Internet without requiring any installation. The Drive Technology Configurator (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)

#### Benefits

- Simple installation, configuration, and commissioning
- Robust EMC design
- Extensive parameter range enables configurations for a wide range of applications
- Simple cable connection
- Scalable functionality with analog and USS versions
- Quiet motor operation as a result of the high pulse frequency
- Status information and alarms via the optional BOP (Basic Operator Panel)
- Rapid copying of parameters via the optional BOP
- External options for PC communication and BOP
- Fast response time of the digital inputs with a high degree of reproducibility for applications demanding fast responses
- Precise setpoint input using a high-resolution 10-bit analog input (analog versions only)
- LED for status information
- Variants with integrated EMC filter class A or B
- DIP switches for easy adaptation to 50 Hz or 60 Hz applications
- DIP switches for simple bus termination for the USS version (RS485)
- Bus-capable serial RS485 interface (USS versions only) enables integration into a networked drive system
- 2/3-wire method (pulsed/maintained signals) for universal control via digital inputs
- Adjustable lower voltage limit for the DC link to ensure controlled motor braking if the power fails

#### Accessories (overview)

- BOP operator panel
- Adapter for mounting on DIN rails (frame sizes FSA and FSB)
- PC inverter connection kit
- STARTER commissioning tool

#### Line-side power components (overview)

- EMC filter, class B with low leakage currents (additionally available for inverters with integrated filter)
- EMC filter, class B (additionally available for inverters with integrated filter)
- Line reactors

#### International standards

- Fulfills the requirements of the EU low-voltage guideline
- CE marking
- Certified to UL and cUL
- C-Tick

## SINAMICS G110 standard inverters

0.12 kW to 3 kW (0.16 hp to 4 hp)

### Controlled Power Modules

#### Design

The SINAMICS G110 standard inverters are equipped with a control module and a power module, providing the inverter in the CPM 110 version (Controlled Power Module) with a compact and efficient design. They operate with the latest IGBT technology and digital microprocessor control.

The SINAMICS G110 inverter product range consists of the following variants and versions:

- The **analog variant** is available in the following versions:
  - Without EMC filter, with heat sink
  - With integrated EMC filter, class A/B, with heat sink
  - Without EMC filter, with flat heat sink (FSA frame size only)
  - With integrated EMC filter, class B, with flat heat sink (FSA frame size only)
- The **USS variant** (RS485) is available in the following versions:
  - Without EMC filter, with heat sink
  - With integrated EMC filter, class A/B, with heat sink
  - Without EMC filter, with flat heat sink (FSA frame size only)
  - With integrated EMC filter, class B, with flat heat sink (FSA frame size only)

For frame size FSA, cooling is achieved through a heat sink and natural convection. Frame size FSA with flat heat sink offers space-saving and favorable heat dissipation since an additional heat sink can be installed outside the control cabinet. For frame sizes FSB and FSC, an integrated fan is used to cool the heat sink, making the compact design possible.

The connections for all inverter variants are easily accessible and in the same location. To ensure optimum electromagnetic compatibility and easy connection, the line and motor connections are located on opposite sides (as with contactors). The control terminal block does not require screws to install it.

The optional BOP (Basic Operator Panel) can be installed without the use of tools.

#### Function

- The stress on the machine mechanical system is reduced by using a skippable frequency range to avoid resonance effects, selecting ramp-up/ramp-down times up to 650 s, using ramp smoothing as well as being able to switch the inverter to a spinning motor (flying restart circuit)
- Increased plant availability as a result of automatic restarting following a power failure or stoppage
- Fast current limiting (FCL) for fault-free operation in the event of sudden load surges
- Parameterizable V/f characteristic (e.g. for synchronous motors)
- DC braking as well as compound braking for fast braking without an external braking resistor
- DC link voltage limiting using  $V_{DCmax}$  controller
- Slip compensation, electronic motorized potentiometer function and three fixed speed setpoints
- Parameterizable voltage boost for a higher dynamic performance when starting and accelerating
- Motor holding brake function to control an external mechanical brake

# SINAMICS G110 standard inverters

0.12 kW to 3 kW (0.16 hp to 4 hp)

## Controlled Power Modules

### Selection and ordering data

Referring to the rated output current, most 2-pole to 6-pole low-voltage motors are being supported, e.g. the motor series 1LE1. The rated power represents a benchmark only. For a

description of the overload performance, please refer to the general technical specifications of the Controlled Power Modules.

Power		Rated input current (at 230 V)	Rated output current	Frame size	Version	SINAMICS G110 without filter	SINAMICS G110 with integrated filter
kW	hp	A	A			Article No.	Article No.
0.12	0.16	2.3	0.9	FSA	Analog	<b>6SL3211-0AB11-2UA1</b>	<b>6SL3211-0AB11-2BA1</b>
					USS	<b>6SL3211-0AB11-2UB1</b>	<b>6SL3211-0AB11-2BB1</b>
					Analog (with flat heat sink)	<b>6SL3211-0KB11-2UA1</b>	<b>6SL3211-0KB11-2BA1</b>
					USS (with flat heat sink)	<b>6SL3211-0KB11-2UB1</b>	<b>6SL3211-0KB11-2BB1</b>
0.25	0.33	4.5	1.7	FSA	Analog	<b>6SL3211-0AB12-5UA1</b>	<b>6SL3211-0AB12-5BA1</b>
					USS	<b>6SL3211-0AB12-5UB1</b>	<b>6SL3211-0AB12-5BB1</b>
					Analog (with flat heat sink)	<b>6SL3211-0KB12-5UA1</b>	<b>6SL3211-0KB12-5BA1</b>
					USS (with flat heat sink)	<b>6SL3211-0KB12-5UB1</b>	<b>6SL3211-0KB12-5BB1</b>
0.37	0.5	6.2	2.3	FSA	Analog	<b>6SL3211-0AB13-7UA1</b>	<b>6SL3211-0AB13-7BA1</b>
					USS	<b>6SL3211-0AB13-7UB1</b>	<b>6SL3211-0AB13-7BB1</b>
					Analog (with flat heat sink)	<b>6SL3211-0KB13-7UA1</b>	<b>6SL3211-0KB13-7BA1</b>
					USS (with flat heat sink)	<b>6SL3211-0KB13-7UB1</b>	<b>6SL3211-0KB13-7BB1</b>
0.55	0.75	7.7	3.2	FSA	Analog	<b>6SL3211-0AB15-5UA1</b>	<b>6SL3211-0AB15-5BA1</b>
					USS	<b>6SL3211-0AB15-5UB1</b>	<b>6SL3211-0AB15-5BB1</b>
					Analog (with flat heat sink)	<b>6SL3211-0KB15-5UA1</b>	<b>6SL3211-0KB15-5BA1</b>
					USS (with flat heat sink)	<b>6SL3211-0KB15-5UB1</b>	<b>6SL3211-0KB15-5BB1</b>
0.75	1	10	3.9 (at 40 °C (104 °F))	FSA	Analog	<b>6SL3211-0AB17-5UA1</b>	<b>6SL3211-0AB17-5BA1</b>
					USS	<b>6SL3211-0AB17-5UB1</b>	<b>6SL3211-0AB17-5BB1</b>
					Analog (with flat heat sink)	<b>6SL3211-0KB17-5UA1</b>	<b>6SL3211-0KB17-5BA1</b>
					USS (with flat heat sink)	<b>6SL3211-0KB17-5UB1</b>	<b>6SL3211-0KB17-5BB1</b>
1.1	1.5	14.7	6	FSB	Analog	<b>6SL3211-0AB21-1UA1</b>	B <b>A<sup>2)</sup></b> <b>A<sup>2)</sup></b>
					USS	<b>6SL3211-0AB21-1UB1</b>	B <b>A<sup>2)</sup></b> <b>A<sup>2)</sup></b>
1.5	2	19.7	7.8 (at 40 °C (104 °F))	FSB	Analog	<b>6SL3211-0AB21-5UA1</b>	B <b>A<sup>2)</sup></b> <b>A<sup>2)</sup></b>
					USS	<b>6SL3211-0AB21-5UB1</b>	B <b>A<sup>2)</sup></b> <b>A<sup>2)</sup></b>
2.2	3	27.2	11	FSC	Analog	<b>6SL3211-0AB22-2UA1</b>	B <b>A<sup>2)</sup></b> <b>A<sup>2)</sup></b>
					USS	<b>6SL3211-0AB22-2UB1</b>	B <b>A<sup>2)</sup></b> <b>A<sup>2)</sup></b>
3	4	35.6	13.6 (at 40 °C (104 °F))	FSC	Analog	<b>6SL3211-0AB23-0UA1</b>	B <b>A<sup>2)</sup></b> <b>A<sup>2)</sup></b>
					USS	<b>6SL3211-0AB23-0UB1</b>	B <b>A<sup>2)</sup></b> <b>A<sup>2)</sup></b>

The current data apply to an ambient temperature of 50 °C (122 °F) unless specified otherwise.

The last digit of the complete article number for the SINAMICS G110 inverters represents the release version. When ordering, a different digit from the one specified may be provided due to technical updates.

All SINAMICS G110 inverters are supplied without an operator panel (BOP). A BOP or other accessories must be ordered separately.

<sup>1)</sup> The filter class **in bold** is stamped on the inverter rating plate.

<sup>2)</sup> With additional filter (also class B).

## SINAMICS G110 standard inverters

0.12 kW to 3 kW (0.16 hp to 4 hp)

### Controlled Power Modules

#### Technical specifications

	Controlled Power Modules
<b>Power range</b>	0.12 ... 3 kW (0.16 ... 4 hp)
<b>Line voltage</b>	200 ... 240 V $\pm 10\%$ 1 AC
<b>Line frequency</b>	47 ... 63 Hz
<b>Output frequency</b>	0 ... 650 Hz (a 550 Hz limit is in preparation in order to satisfy legal requirements)
<b>Output voltage</b>	200 ... 240 V 3 AC
<b>Offset factor <math>\cos \varphi</math></b>	$\geq 0.95$
<b>Inverter efficiency</b>	
• For devices < 0.75 kW	90 ... 94 %
• For devices $\geq 0.75$ kW	$\geq 95\%$
<b>Overload capability</b>	Overload current $1.5 \times$ rated output current (i.e. 150 % overload) for 60 s, then $0.85 \times$ rated output current for 240 s, cycle time 300 s
<b>Inrush current</b>	Not higher than the rated input current
<b>Control methods</b>	Linear V/f characteristic (with parameterizable voltage boost); square V/f characteristic; multipoint characteristic (parameterizable V/f characteristic)
<b>Pulse frequency</b>	8 kHz (standard) 2 ... 16 kHz (in 2 kHz increments)
<b>Fixed frequencies</b>	3, programmable
<b>Skippable frequency range</b>	1, programmable
<b>Setpoint resolution</b>	0.01 Hz digital 0.01 Hz serial 10 bit analog (motorized potentiometer 0.1 Hz)
<b>Digital inputs</b>	3 programmable digital inputs, non-floating; PNP type, SIMATIC-compatible
<b>Analog input (analog variant)</b>	1, for setpoint (0 ... 10 V, scaleable or for use as 4th digital input)
<b>Digital output</b>	1 isolated optocoupler output (24 V DC, 50 mA, ohmic, NPN type)
<b>Universal serial interface (USS variant)</b>	RS485, for operation with USS protocol
<b>Motor cable length, max.</b>	
• Shielded	25 m (82 ft)
• Unshielded	50 m (164 ft)
<b>Electromagnetic compatibility</b>	All devices with integrated EMC filter for drive systems in category C2 installations (limit value in accordance with EN 55011, class A, group 1) and category C3 installations (limit value in accordance with EN 55011, class A, group 2). All devices with an integrated EMC filter and shielded cables with a maximum length of 5 m (16 ft) also fulfill the limit values of EN 55011, class B for conducted interference.
<b>Braking</b>	DC injection braking, compound braking
<b>Degree of protection</b>	IP20
<b>Operating temperature</b>	-10 ... +40 °C (14 °F ... 104 °F) up to +50 °C (122 °F) with derating
<b>Storage temperature</b>	-40 ... +70 °C (-40 °F ... +158 °F)
<b>Relative humidity</b>	95 % (non-condensing)
<b>Installation altitude</b>	Up to 1000 m (3281 ft) above sea level without derating • Rated output current at 4000 m (13124 ft) above sea level: 90 % • Line voltage up to 2000 m (6562 ft) above sea level: 100 % at 4000 m (13124 ft) above sea level: 75 %
<b>SCCR (Short Circuit Current Rating) according to UL <sup>1)</sup></b>	10 kA (up to maximum 100 kA)
<b>Protection features for</b>	<ul style="list-style-type: none"> <li>• Undervoltage</li> <li>• Overvoltage</li> <li>• Ground fault</li> <li>• Short-circuit</li> <li>• Stall protection</li> <li>• Thermal motor protection <math>I^2t</math></li> <li>• Inverter overtemperature</li> <li>• Motor overtemperature</li> </ul>
<b>Compliance with standards</b>	UL, cUL, CE, C-Tick
<b>CE marking, according to</b>	Low-Voltage Directive 2006/95/EC

<sup>1)</sup> Applies to industrial control panel installations to NEC article 409 or UL 508A.