



sinamics



SINAMICS G110
Inverter Chassis Units
0.12 kW to 3 kW

SIEMENS

Related catalogs

SINAMICS G130 D11
Drive Converter Chassis Units
SINAMICS G150
Drive Converter Cabinet Units
Order No.:
German: E86060-K5511-A101-A3
English: E86060-K5511-A101-A3-7600



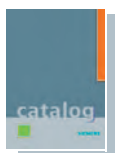
MICROMASTER DA 51.2
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Catalog CA 01 CA01
The Offline Mall of Automation and Drives
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CD-ROM: E86060-D4001-A110-C4-7600 (Engl.)
DVD: E86060-D4001-A500-C4 (German)



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Internet:
<http://www.siemens.com/automation/maill>



Catalog CA 01 – SD configurator selection aid

The **SD configurator** selection aid is available in combination with the CA 01 electronic catalog.



On CD 2 of the selection and configuration aids you will find the SD configurator for low-voltage motors, inverters MICROMASTER 4, SINAMICS G110 inverter chassis units and frequency converters for distributed I/Os SIMATIC ET 200S FC including:

- Dimension drawing generator for motors
- Data sheet generator
- Starting calculation
- 3D models in .stp format
- Extensive documentation

Hardware and software requirements

- PC with Pentium II or comparable processor
- Operating systems
 - Windows 98/ME
 - Windows 2000
 - Windows XP
 - Windows NT (Service Pack 5 upwards)
- Minimum of 128 MB RAM
- 1024 x 768 graphics with more than 256 colors / small fonts
- CD-ROM drive
- Windows-compatible sound card
- Windows-compatible mouse

Installation

You can install this catalog directly from the CD-ROM as a complete or partial version on your hard disk or in the network.

Hotline:

For technical advice and hotline support concerning our CA 01 catalog:

Tel.: +49 (0) 180 50 50 22 2

E-Mail: adsupport@siemens.com

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SINAMICS G110 Inverter Chassis Units 0.12 kW to 3 kW

Catalog D 11.1 · 2005



Supersedes:
Catalog D 11.1 · December 2003

The products contained in this catalog
can also be found in the e-Catalog CA 01
Order No.:
E86060-D4001-A110-C4-7600 (CD-ROM)

Please contact your local
Siemens branch

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Welcome to Automation and Drives

We would like to welcome you to Automation and Drives and our comprehensive range of products, systems, solutions and services for production and process automation and building technology worldwide.

With Totally Integrated Automation and Totally Integrated Power, we deliver solution platforms based on standards that offer you a considerable savings potential.

Discover the world of our technology now. If you need more detailed information, please contact one of your regional Siemens partners. They will be glad to assist you.



SINAMICS G



Pumps/Fans



Extrusion



Forming/Shaping



Textiles



Conveyor Systems



Rolling Mills

SINAMICS S



Packaging



Printing Machines



Machine Tools

G_D212_EN_00053

Applications of the SINAMICS drive family

Application

SINAMICS is the new family of Siemens drives designed for machine and plant engineering applications. SINAMICS offers solutions for all drive tasks:

- Simple pump and fan applications in the process industry.
- Complex individual drives in centrifuges, presses, extruders, elevators, as well as conveyor and transport systems.
- Drive line-ups in textile, plastic film and paper machines, as well as in rolling mill plants.
- Highly dynamic servo drives for machine tools, as well as packaging and printing machines.

Versions

Depending on the application, the SINAMICS range offers the ideal version for any drive task.

- SINAMICS G is designed for standard applications with asynchronous (induction) motors. These applications have less stringent requirements regarding the dynamics and accuracy of the motor speed.
- SINAMICS S handles complex drive tasks with synchronous/asynchronous (induction) motors and fulfills stringent requirements regarding:
 - dynamics and accuracy
 - integration of extensive technological functions in the drive control system

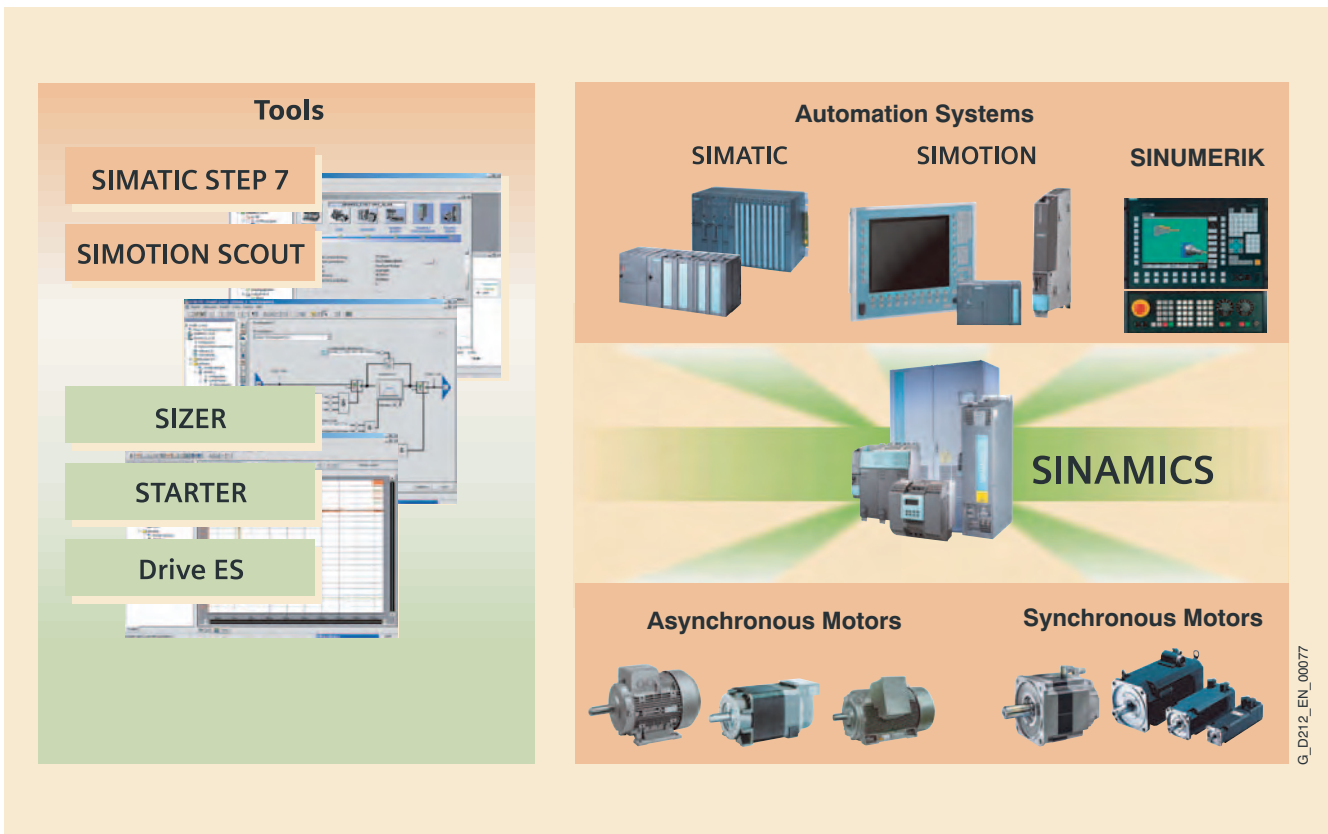
Platform Concept and Totally Integrated Automation

All SINAMICS versions are based on a platform concept. Joint hardware and software components, as well as standardized tools for design, configuration and commissioning tasks, ensure high-level integration across all components. SINAMICS handles a wide variety of drive tasks with no system gaps. The different SINAMICS versions can be easily combined with each other.

SINAMICS is a part of the Siemens "Totally Integrated Automation" concept. Integrated SINAMICS systems covering configuration, data storage and communication at automation level, ensure low-maintenance solutions with SIMATIC, SIMOTION and SINUMERIK.

Introduction

The SINAMICS drive family



SINAMICS as part of the Siemens modular automation system

Quality to DIN EN ISO 9001

SINAMICS conforms with the most exacting quality requirements. Comprehensive quality assurance measures in all development and production processes ensure a consistently high level of quality.

Of course, our quality assurance system is certified by an independent authority to DIN EN ISO 9001.

Suitable for use anywhere in the world

SINAMICS meets the requirements of relevant international standards and regulations – from the EN standards through IEC standards to UL and cULus regulations.

Overview



SINAMICS G110, frame size A (on the right with flat plate heatsink)



SINAMICS G110, frame sizes B and C

SINAMICS G110 is a frequency inverter with basic functions for a variety of industrial variable-speed drive applications.

The particularly compact SINAMICS G110 inverter operates with voltage frequency control on single-phase supplies (200 V to 240 V).

It is the ideal low-cost frequency inverter solution for the lower power range of the SINAMICS family.

The latest technical documentation (catalogs, dimensional drawings, certificates, user manuals and operating instructions) is available on the Internet at:

<http://www.siemens.com/sinamics-g110>

and also on CD-ROM CA 01 Vol. 2 "Planning" in the SD configurator, which can be ordered from the following address:

<http://www.siemens.com/automation/CA01>

Benefits

- Easy to install, parameterize and commission
- Rugged EMC design
- Comprehensive range of parameters enabling configuration for a wide range of applications
- Simple cable connection
- Scalable functionality due to analog and USS variants
- High pulse frequencies for low-noise motor operation
- Status information and alarm messages with the optional Basic Operator Panel (BOP)
- Time saving parameter cloning with the optional Basic Operator Panel (BOP)
- External options for PC communications and Basic Operator Panel (BOP)
- Fast, repeatable digital input response time for fast reaction applications
- Precise setpoint entry by means of a high resolution 10-bit analog input (analog variants only)
- LED for status information
- Versions with internal EMC filters Class A or B
- DIP switch for easy setting of 50 Hz or 60 Hz applications
- DIP switch for easy bus termination on the RS485 USS variant
- RS485 serial interface (USS variants only) facilitates connection to a networked drive system
- 2-/3-wire method (static/pulsed signals) for universal control via digital inputs
- Adjustable lower voltage limit in the DC link circuit for initiating a controlled braking of the motor in the case of a power failure.

Accessories (overview)

- Basic Operator Panel (BOP)
- DIN rail mounting kit (frame sizes A and B)
- PC to inverter connection kit
- STARTER commissioning tool.

Line-side power components (overview)

- Low leakage EMC Class B filter
- Supplementary EMC Class B filter
- Line reactors.

International standards

- Complies with the requirements of the EC low voltage directive
- CE marking
- UL and cUL listed
- c-tick.

SINAMICS G110

Inverter Chassis Units

Controlled Power Modules

Application

SINAMICS G110 is especially suited for use with pumps and fans, or as a drive in various industrial sectors, such as the food, textile and packaging industries, as well as for conveyor systems, factory gate and garage door operating mechanisms, and as a universal drive for moving billboards.

Design

The chassis units of the SINAMICS G110 family comprise a control and a power module giving the inverter of the version CPM 110 Controlled Power Module a compact and efficient design. The inverters use latest IGBT technology and digital microprocessor control.

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

- **Analog variant** available in the following versions:
 - without EMC filter, with heat sink
 - integrated EMC Class A/B filter, with heat sink
 - without EMC filter, with flat plate heat sink (FS A only)
 - integrated EMC Class B filter, with flat plate heat sink (FS A only).
- **USS variant** (RS485) available in the following versions:
 - without EMC filter, with heat sink
 - integrated EMC Class A/B filter, with heat sink
 - without EMC filter, with flat plate heat sink (FS A only)
 - integrated EMC Class B filter, with flat plate heat sink (FS A only).

Cooling is achieved on FS A by a heat sink and natural convection. The FS A flat plate heat sink version offers space saving and favorable heat dissipation because an additional heat sink can be installed outside the control cabinet. On FS B and FS C an integrated fan is used to cool the heat sink, which ensures the design is as compact as possible.

The connections on all versions of the inverter are easily accessible and conform to the standard layout. The mains and motor connections are separated for optimum electromagnetic compatibility and clear connection (as with contactors). The control terminal strip has a screwless design.

The optional Basic Operator Panel BOP can be fitted without the need for tools.

Function

- Careful handling of the machine mechanical system due to a skip frequency band in case of resonance, parameterizable ramp up/ramp down times up to 650 s, ramp smoothing, as well as bringing the inverter into circuit on turning motor (flying start)
- Increased installation availability by automatic restart facility following power failure or fault
- Fast current limit (FCL) for trip-free operation in case of sudden load changes
- Programmable V/f characteristic (e.g. for synchronous motors)
- Fast DC and compound braking without external braking resistor
- Limitation of DC link voltage by means of the V_{DCmax} controller
- Slip compensation, electronic motor potentiometer function and three fixed speed setpoints
- Configurable voltage boost for higher dynamic response when starting and accelerating
- Motor holding brake function to control an external mechanical brake.

Technical specification

Power range	0.12 kW to 3.0 kW			
Line voltage	200 V to 240 V AC ±10%			
Line frequency	47 Hz to 63 Hz			
Output frequency	0 Hz to 650 Hz			
cos phi	≥ 0.95			
Inverter efficiency	Inverters < 0.75 kW: 90% to 94% Inverters ≥ 0.75 kW: ≥ 95%			
Overload capability	Overload current 1.5 x rated output current (i.e. 150% overload capability) for 60 s, then 0.85 x rated output current for 240 s, cycle time 300 s			
Inrush current	less than rated input current			
Control method	linear V/f characteristic (with programmable voltage boost); quadratic V/f characteristic; multipoint characteristic (programmable V/f characteristic)			
Pulse frequency	8 kHz (standard) 2 kHz to 16 kHz (in 2 kHz steps)			
Fixed frequencies	3, programmable			
Skip frequency band	1, programmable			
Setpoint resolution	0.01 Hz digital 0.01 Hz serial 10 bit analog (motor potentiometer 0.1 Hz)			
Digital inputs	3 programmable digital inputs, non-isolated; PNP type, SIMATIC compatible			
Analog input (analog variant)	1, for setpoint (0 V to 10 V, scalable or for use as 4th digital input)			
Digital output	1 isolated optocoupler output (24 V DC, 50 mA, resistive, NPN type)			
Serial interface (USS variant)	RS485, for operation with USS protocol			
Motor cable length	max. 25 m (shielded) max. 50 m (unshielded)			
Electromagnetic compatibility	All devices with internal EMC filter for power drive systems in Category C2 installations (limit complies with EN 55011, Class A, Group 1) and Category C3 installations (limit complies with EN 55011, Class A, Group 2). Furthermore, all devices with internal EMC filter and shielded cables with a max. length of 5 m comply with the limits of EN 55011, Class B.			
Braking	DC braking, compound braking			
Protection level	IP20			
Temperature range	-10 °C to +40 °C up to +50 °C with derating			
Storage temperature	-40 °C to +70 °C			
Relative humidity	95% (non-condensing)			
Operational altitude	up to 1000 m above sea level without derating Rated output current at 4000 m above sea level: 90% Line voltage up to 2000 m above sea level: 100% at 4000 m above sea level: 75%			
Protection features for	undervoltage, overvoltage, earth fault, short circuits, stall prevention, β_t thermal motor protection, inverter over-temperature, motor over-temperature			
Conformity with standards	UL, cUL, CE, c-tick			
CE marking	conformity with EC low voltage directive 73/23/EEC			
Dimensions and weights (without options)	Frame size	Dimensions H x W x D	Weight, approx. (kg)	
	(FS)	mm	unfiltered	filtered
	A ≤ 0.37 kW	150 x 90 x 116	0.7	0.8
	A 0.55 kW and 0.75 kW	150 x 90 x 131	0.8	0.9
	A ≤ 0.37 kW with flat plate heat sink	150 x 90 x 101	0.6	0.7
	A 0.55 kW and 0.75 kW with flat plate heat sink	150 x 90 x 101	0.7	0.8
	B	160 x 140 x 142	1.4	1.5
	C 2.2 kW	181 x 184 x 152	1.9	2.1
	C 3.0 kW	181 x 184 x 152	2.0	2.2

SINAMICS G110

Inverter Chassis Units

Controlled Power Modules

Technical specifications (continued)

Technical specifications for versions with flat plate heat sink

The flat plate heat sink version offers space saving and favorable heat dissipation because an additional heat sink can be installed outside the control cabinet.

Output	120 W	250 W	370 W	550 W	750 W
Operating temperature	-10 °C to +50 °C	-10 °C to +50 °C	-10 °C to +50 °C	-10 °C to +50 °C	-10 °C to +40 °C
Total losses at full load and maximum operating temperature as specified	22 W	28 W	36 W	43 W	54 W
Line-side and control losses	9 W	10 W	12 W	13 W	15 W
Recommended thermal resistance of heatsink	3.0 K/W	2.2 K/W	1.6 K/W	1.2 K/W	1.2 K/W
Recommended output current	0.9 A	1.7 A	2.3 A	3.2 A	3.9 A

Derating data

Pulse frequency

Output kW	Rated output current in A for a pulse frequency of							
	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
0.12	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
0.25	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
0.37	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
0.55	3.2	3.2	3.2	3.2	3.0	2.7	2.5	2.2
0.75 (at 40 °C)	3.9	3.9	3.9	3.9	3.6	3.3	3.0	2.7
0.75	3.2	3.2	3.2	3.2	3.0	2.7	2.5	2.2
1.1	6.0	6.0	6.0	6.0	5.9	5.7	5.6	5.4
1.5 (at 40 °C)	7.8	7.8	7.8	7.8	7.6	7.4	7.2	7.0
1.5	6.0	6.0	6.0	6.0	5.9	5.7	5.6	5.4
2.2	11.0	11.0	11.0	11.0	10.8	10.5	10.2	9.9
3.0 (at 40 °C)	13.6	13.6	13.6	13.6	13.3	12.9	12.6	12.3
3.0	11.0	11.0	11.0	11.0	10.8	10.5	10.2	9.9

The current data applies for an ambient temperature of 50 °C unless otherwise specified.

Standard conversion factors: metric to US units

Unit	US to metric standard units	Metric to US standard units
Length	1 in. = 25.40 mm 1 ft. = 30.48 cm 1 yd = 0.91 m 1 mi. = 1.61 km	1 mm = 0.03937 in. 1 cm = 0.39370 in. 1 m = 3.28084 ft. 1 km = 0.62137 mi.
Temperature	°C = 5/9 (°F - 32)	°F = (9 x °C)/5 + 32
Weight	1 lbs = 0.454 kg	1 kg = 2.205 lbs
Torque	1 lb.ft. = 1.356 Nm	1 Nm = 0.738 lb.ft.
Power	1 hp = 0.746 kW	1 kW = 1.341 hp

Note:

For kW and hp specifications in the Selection and Ordering tables, we do not use calculated hp values but the corresponding standardized hp motor ratings.

Technical specifications (continued)

Conformity with standards

CE marking



SINAMICS G110 inverters fulfill the requirements of the Low-Voltage Directive 73/23/EEC.

Low-Voltage directive

The devices fulfill the following standards listed in the Official Journal of the EC:

- EN 60204
Safety of machinery, electrical equipment of machines.
- EN 50178
Electronic equipment for use in power installations.

UL listing



UL and cUL listed power conversion equipment of UL category NMMS, in accordance with UL508C. UL file number E121068. For use in pollution degree 2 environments. Also refer to the Internet at <http://www.ul.com>

Machine directive

The inverters are suitable for installation in machines. Compliance with the machine directive 89/392/EEC requires a separate certificate of conformity. This must be issued by the firm which constructs the plant or puts the machine on the market.

EMC directive

- EN 61800-3
Adjustable speed electrical power drive systems
Part 3: EMC product standard including specific test methods.

The new EMC product standard for electrical drive systems (EN 61800-3) is effective as of July 1, 2005. The transition period for the previous standard (EN 61800-3/A11) of February 2001 ends on October 1, 2007. The following explanations apply to the frequency inverters for the Siemens SINAMICS G110 range:

- EMC product standard EN 61800-3 does not relate directly to a frequency inverter but to a PDS (Power Drive System) which, along with the inverter, encompasses the entire circuitry, including the motor and cables.
- Frequency inverters are normally only delivered to competent experts for installation in machines or systems. For this reason, a frequency inverter must only be considered as a component and, therefore, is not subject to the requirements of EMC product standard EN 61800-3. The operating instructions for the inverter, however, do specify the conditions under which the product standard can be fulfilled if the frequency inverter is installed in a PDS. For a PDS, the EU EMC directive is fulfilled when product standard EN 61800-3 for variable-speed electrical drive systems is observed. According to the EMC directive, the frequency inverters themselves do not generally require marking according to the EMC directive.

- In standard EN 61800-3, which is effective as of July 2005, a distinction is no longer made between "general availability" and "restricted availability". Instead, different categories (C1 to C4) have been defined in accordance with the environment in which the PDS is used:
 - **Category C1:** Drive systems for rated voltages < 1000 V for use in first environment.
 - **Category C2:** Stationary drive systems not connected by means of a plug connector for rated voltages < 1000 V. When used in first environment, the system must be installed and commissioned by personnel familiar with EMC requirements. A warning label is required.
 - **Category C3:** Drive systems for rated voltages < 1000 V used exclusively in second environment. A warning label is required.
 - **Category C4:** Drive systems for rated voltages ≥ 1000 V or for rated currents ≥ 400 A or for use in complex systems in second environment. An EMC plan must be created.
- In EMC product standard EN 61800-3, limit values for conducted and emitted interference are also specified for "second environment" (industrial networks that do not supply households). These limit values are below the limit values of filter class A to EN 55011. Unfiltered inverters can be used in industrial environments as long as they are installed in a system that contains line filters on the higher-level infeed side.
- With SINAMICS G110, Power Drive Systems (PDS) can be set up that fulfill EMC product standard EN 61800-3 (see the setup instructions). The table "Overview of SINAMICS G110 components and PDS categories" and the SINAMICS G110 ordering documentation show which of the components can be installed directly in a PDS.
- A distinction must generally be made between the product standards for electrical drive systems (PDS) of the EN 61800 series of standards (in which part 3 covers EMC) and the product standards for the devices/systems/machines. This should not make any difference in practice. Since frequency inverters are always part of a PDS which, in turn, is part of a machine, the machine manufacturer must observe different standards depending on the type and environment (e.g. EN 61000-3-2 for line harmonics and EN 55011 for radio interference). In this case, therefore, the product standard for PDS itself is either insufficient or irrelevant.
- Regarding the observance of limit values for line harmonics, EMC product standard EN 61800-3 for PDS refers to standards EN 61000-3-2 and EN 61000-3-12.
- Regardless of the configuration with SINAMICS G110 and its components, the machine manufacturer can also implement other measures to ensure that the machine complies with the EU EMC directive. The EU EMC directive is generally fulfilled when the relevant EMC product standards are observed. If they are not available, the generic standards (e.g. DIN EN 61000-x-x) can be used instead. It is important that the conducted and emitted interference at the line connection point and outside the machine remain below the relevant limit values. Any suitable technical means can be used to ensure this.

SINAMICS G110

Inverter Chassis Units

Controlled Power Modules

Technical specifications (continued)

Overview of SINAMICS G110 components and PDS categories

First Environment (Residential, commercial)	Category C1 Unfiltered devices and external filter class B with low leakage currents (shielded motor cable up to 5 m)	Second Environment (Industrial)
	Category C2 All devices with an integrated filter (shielded motor cable up to 5 m) or All devices with an integrated filter (frame size FS A: up to 10 m; FS B and C: shielded motor cable up to 25 m) plus warning label or All devices with an integrated filter and an external class B filter (shielded motor cable up to 25 m)	Category C2 All devices with an integrated filter (shielded motor cable up to 5 m) or All devices with an integrated filter (frame size FS A: up to 10 m; FS B and C: shielded motor cable up to 25 m) or All devices with an integrated filter and an external class B filter (shielded motor cable up to 25 m) Note: When devices with an integrated filter and a max. motor cable length of 5 m or external class B filters are used, this exceeds the requirements of EN 61800-3 by a considerable margin!
	Category C3 All devices with an integrated filter (frame size FS A: up to 10 m; FS B and C: shielded motor cable up to 25 m) or All devices with an integrated filter and an external class B filter (shielded motor cable up to 25 m) A warning label is required. Note: When devices with an integrated filter or external class B filters are used, this exceeds the requirements of EN 61800-3 by a considerable margin!	
	Category C4 Not applicable to SINAMICS G110	

Electromagnetic compatibility

No inadmissible electromagnetic emissions occur if the product-specific installation guidelines are correctly observed.

The table below lists the measured results for emissions and immunity to interference for SINAMICS G110 inverters.

The inverters were installed according to the guidelines with shielded motor cables and shielded control cables.

EMC phenomenon Standard/test	Relevant criteria	Limit value
Emissions EN 61800-3 (First Environment)	Conducted via mains cable	150 kHz to 30 MHz Unfiltered devices: not tested All devices with internal/external filter: Depending on type of filter and designated PDS installation: Category C1: Limit complies with EN 55011, Class B. Category C2: Limit complies with EN 55011, Class A, Group 1. Furthermore, all devices with internal/external filter fulfil the limit of Category C3 installations. Limit complies with EN 55011, Class A, Group 2.
	Emitted by the drive	30 MHz to 1 GHz All devices Limit complies with EN 55011, Class A, Group 1.
ESD immunity test EN 61000-4-2	ESD through air discharge	Test level 3 8 kV
	ESD through contact discharge	Test level 3 6 kV
Electromagnetic fields immunity test EN 61000-4-3	Electrical field applied to unit	Test level 3 80 MHz to 1 GHz 10 V/m
Burst immunity test EN 61000-4-4	Applied to all cable terminations	Test level 4 4 kV
Surge immunity test EN 61000-4-5	Applied to mains cables	Test level 3 2 kV
Immunity to conducted disturbances, induced by radio frequency fields EN 61000-4-6	Applied to mains, motor and control cables	Test level 3 0.15 MHz to 80 MHz 80% AM (1 kHz) 10 V

Selection and ordering data

Output		Rated input current (at 230 V)		Rated output current	Frame size	Version	SINAMICS G110 without filter	SINAMICS G110 with internal filter	Filter class ¹⁾ when using shielded cables with a cable length of max.		
kW	hp	A	A	A			Order No.	Order No.	5 m	10 m	25 m
0.12	0.16	2.3	0.9	FS A		Analog	6SL3211-0AB11-2UA1	6SL3211-0AB11-2BA1	B	A ²⁾	²⁾
						USS	6SL3211-0AB11-2UB1	6SL3211-0AB11-2BB1	B	A ²⁾	²⁾
						Analog (with flat plate heat sink)	6SL3211-0KB11-2UA1	6SL3211-0KB11-2BA1	B	A ²⁾	²⁾
						USS (with flat plate heat sink)	6SL3211-0KB11-2UB1	6SL3211-0KB11-2BB1	B	A ²⁾	²⁾
0.25	0.33	4.5	1.7	FS A		Analog	6SL3211-0AB12-5UA1	6SL3211-0AB12-5BA1	B	A ²⁾	²⁾
						USS	6SL3211-0AB12-5UB1	6SL3211-0AB12-5BB1	B	A ²⁾	²⁾
						Analog (with flat plate heat sink)	6SL3211-0KB12-5UA1	6SL3211-0KB12-5BA1	B	A ²⁾	²⁾
						USS (with flat plate heat sink)	6SL3211-0KB12-5UB1	6SL3211-0KB12-5BB1	B	A ²⁾	²⁾
0.37	0.5	6.2	2.3	FS A		Analog	6SL3211-0AB13-7UA1	6SL3211-0AB13-7BA1	B	A ²⁾	²⁾
						USS	6SL3211-0AB13-7UB1	6SL3211-0AB13-7BB1	B	A ²⁾	²⁾
						Analog (with flat plate heat sink)	6SL3211-0KB13-7UA1	6SL3211-0KB13-7BA1	B	A ²⁾	²⁾
						USS (with flat plate heat sink)	6SL3211-0KB13-7UB1	6SL3211-0KB13-7BB1	B	A ²⁾	²⁾
0.55	0.75	7.7	3.2	FS A		Analog	6SL3211-0AB15-5UA1	6SL3211-0AB15-5BA1	B	A ²⁾	²⁾
						USS	6SL3211-0AB15-5UB1	6SL3211-0AB15-5BB1	B	A ²⁾	²⁾
						Analog (with flat plate heat sink)	6SL3211-0KB15-5UA1	6SL3211-0KB15-5BA1	B	A ²⁾	²⁾
						USS (with flat plate heat sink)	6SL3211-0KB15-5UB1	6SL3211-0KB15-5BB1	B	A ²⁾	²⁾
0.75	1.0	10.0	3.9 (at 40 °C)	FS A		Analog	6SL3211-0AB17-5UA1	6SL3211-0AB17-5BA1	B	A ²⁾	²⁾
						USS	6SL3211-0AB17-5UB1	6SL3211-0AB17-5BB1	B	A ²⁾	²⁾
						Analog (with flat plate heat sink)	6SL3211-0KB17-5UA1	6SL3211-0KB17-5BA1	B	A ²⁾	²⁾
						USS (with flat plate heat sink)	6SL3211-0KB17-5UB1	6SL3211-0KB17-5BB1	B	A ²⁾	²⁾
1.1	1.5	14.7	6.0	FS B		Analog	6SL3211-0AB21-1UA1	6SL3211-0AB21-1AA1	B	A ²⁾	A ²⁾
						USS	6SL3211-0AB21-1UB1	6SL3211-0AB21-1AB1	B	A ²⁾	A ²⁾
1.5	2.0	19.7	7.8 (at 40 °C)	FS B		Analog	6SL3211-0AB21-5UA1	6SL3211-0AB21-5AA1	B	A ²⁾	A ²⁾
						USS	6SL3211-0AB21-5UB1	6SL3211-0AB21-5AB1	B	A ²⁾	A ²⁾
2.2	3.0	27.2	11.0	FS C		Analog	6SL3211-0AB22-2UA1	6SL3211-0AB22-2AA1	B	A ²⁾	A ²⁾
						USS	6SL3211-0AB22-2UB1	6SL3211-0AB22-2AB1	B	A ²⁾	A ²⁾
3.0	4.0	35.6	13.6 (at 40 °C)	FS C		Analog	6SL3211-0AB23-0UA1	6SL3211-0AB23-0AA1	B	A ²⁾	A ²⁾
						USS	6SL3211-0AB23-0UB1	6SL3211-0AB23-0AB1	B	A ²⁾	A ²⁾

The current data applies for an ambient temperature of 50 °C unless otherwise specified.

For SINAMICS G110 inverters the last digit of the full Order No. indicates the version type. As a result of product development, this digit may differ from the one specified when ordering.

All SINAMICS G110 inverters are supplied without a Basic Operator Panel (BOP). Any Basic Operator Panel or other accessories have to be ordered separately.

- 1) The **highlighted** filter class is quoted on the rating plate of the inverter.
- 2) Class B also with additional filter.

SINAMICS G110

Inverter Chassis Units

Accessories

Overview

Basic Operator Panel (BOP)



The BOP can be used to make individual parameter settings. Values and units are shown on a 5-digit display.

One BOP can be used for several inverters. It is directly plugged into the inverter.

The BOP offers a parameter cloning function, which enables a parameter set from one inverter to be saved and then downloaded to another inverter.

PC to inverter connection kit

For controlling and commissioning an inverter directly from a PC if the appropriate software (STARTER) has been installed.

Isolated RS232 adapter board for reliable point to point connection to a PC.

It offers a 9-pole Sub-D connector and an RS232 standard cable (3 m).

Commissioning tool

STARTER is a graphic commissioning tool for commissioning SINAMICS G110 frequency inverters under Windows NT/2000/XP Professional. Parameter lists can be read out, altered, stored, read in and printed.

Selection and ordering data

The accessories listed here are suitable for all SINAMICS G110 inverters.

Accessories	Order No.
Basic Operator Panel (BOP)	6SL3255-0AA00-4BA0
PC to inverter connection kit	6SL3255-0AA00-2AA0
Adapter for mounting on DIN rail, Size 1 (FS A)	6SL3261-1BA00-0AA0
Adapter for mounting on DIN rail, Size 2 (FS B)	6SL3261-1BB00-0AA0
Documentation CD, with Operating Instructions, Parameter List, Getting Started Guide and STARTER commissioning tool ¹⁾	6SL3271-0CA00-0AG0
STARTER commissioning tool on CD-ROM ²⁾	6SL3072-0AA00-0AG0

Starter kit

Overview

Starter kit



The SINAMICS G110 starter kit provides a low-cost introduction to the world of variable speed drives.

It comprises a stackable carrying case containing the following:

- Inverter with analog input and internal EMC filter
- Basic Operator Panel (BOP)
- PC to inverter connection kit
- Product brief, operating instructions and parameter list (paper version in German or English)
- STARTER commissioning tool on CD-ROM, including: operating instructions, parameter list and Getting Started Guide
- Screwdriver.

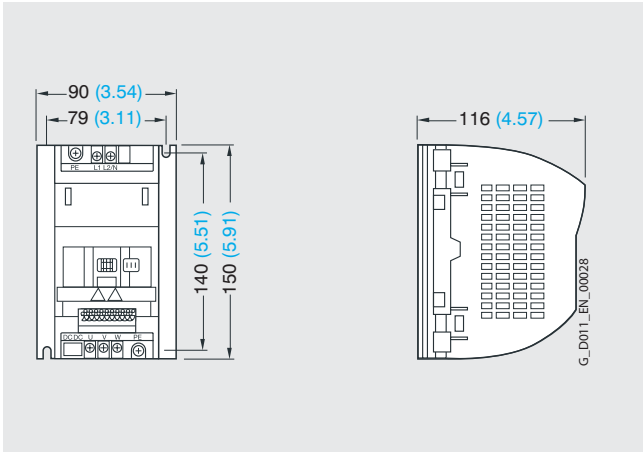
Selection and ordering data

	Output	Language	Order No.
Starter kit	0.75 kW	German	6SL3200-0AB10-0AA0
	1.5 kW	German	6SL3200-0AB20-0AA0
	0.75 kW	English	6SL3200-0AB30-0AA0
	1.5 kW	English	6SL3200-0AB40-0AA0

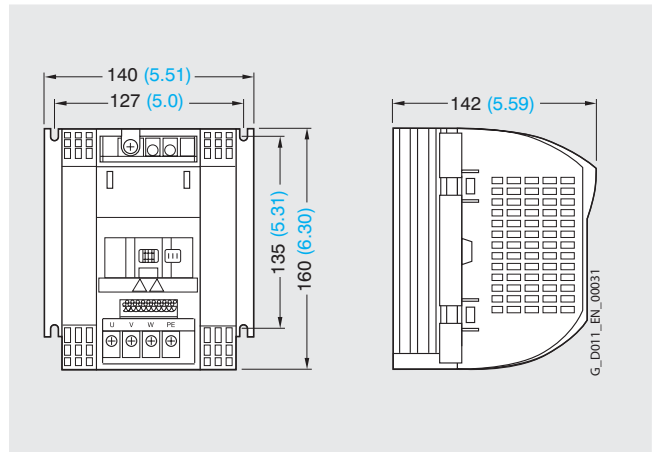
¹⁾ Documentation is also available on the Internet at <http://www.siemens.com/sinamics-g110>

²⁾ STARTER commissioning tool is also available on the Internet at <http://www4.ad.siemens.de/WW/view/en/10804985/133100>

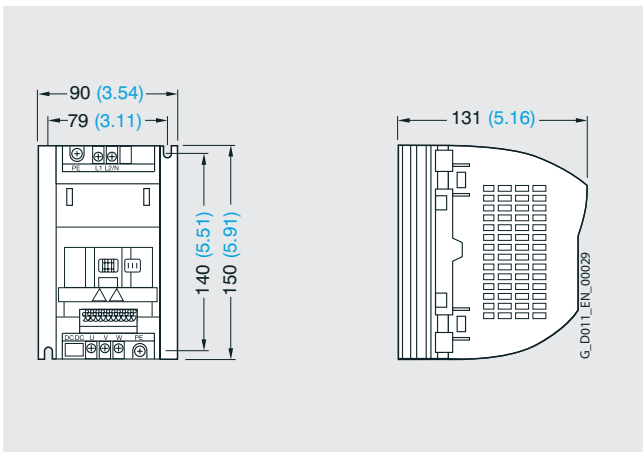
Dimensional drawings



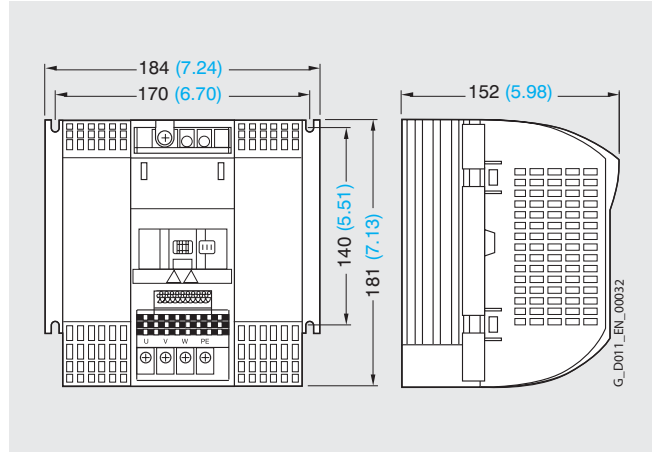
FS A inverter; 0.12 kW to 0.37 kW



FS B inverter; 1.1 kW to 1.5 kW



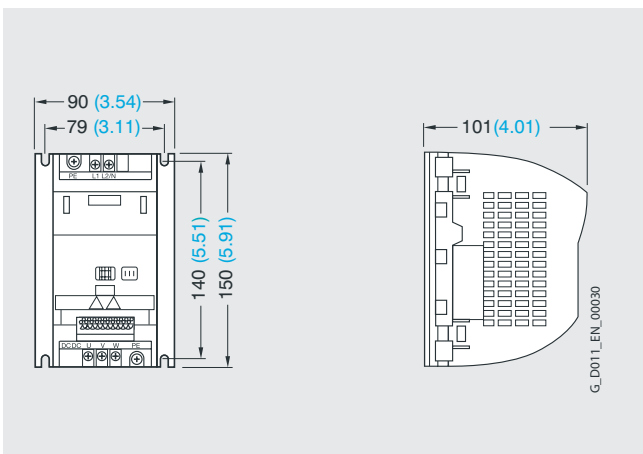
FS A inverter; 0.55 kW to 0.75 kW



FS C inverter; 2.2 kW to 3.0 kW

With plugged Basic Operator Panel (BOP), the mounting depth increases by 8 mm (0.31 inches).

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



FS A inverter with flat plate heat sink; 0.12 kW to 0.75 kW

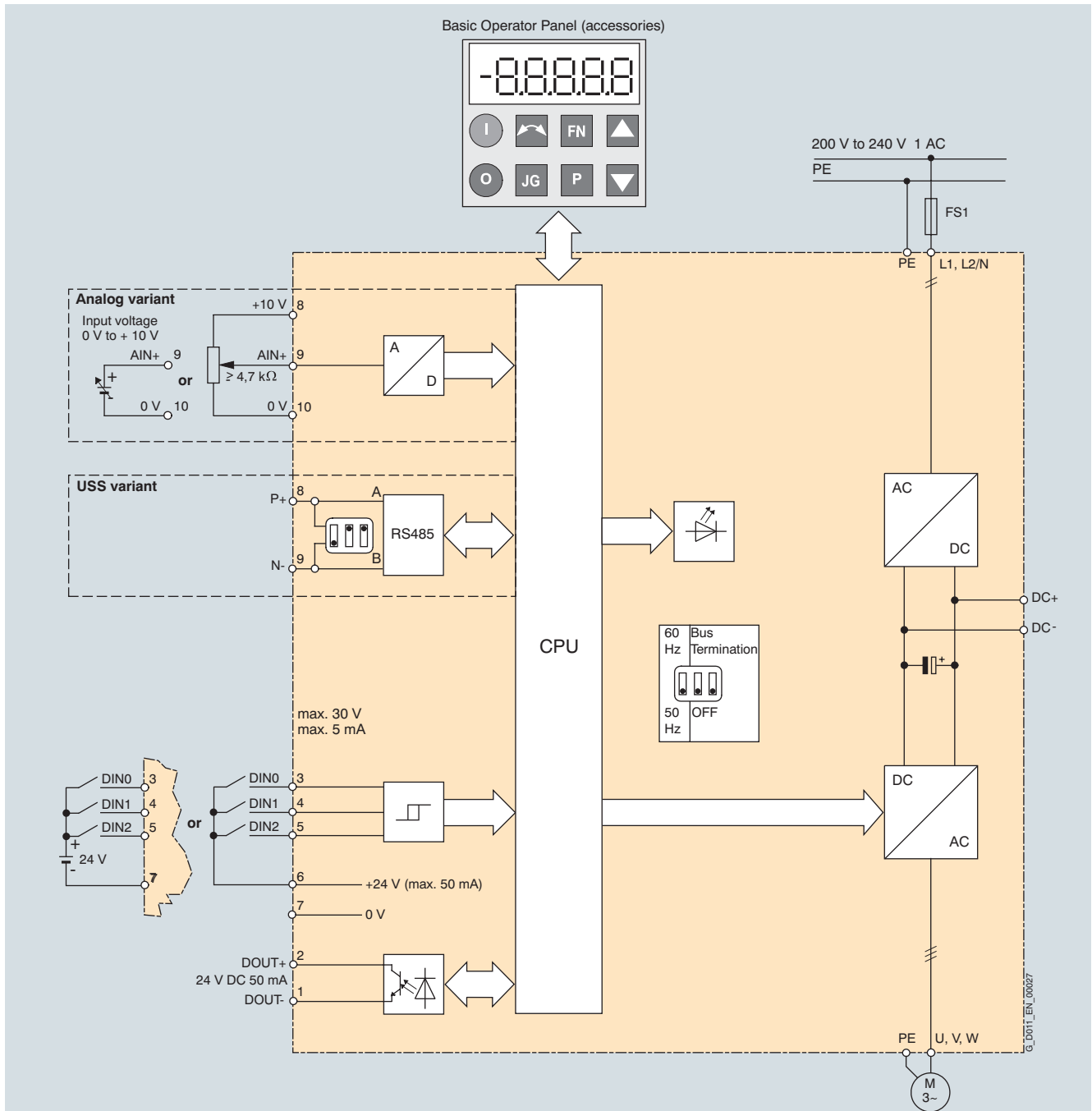
SINAMICS G110

Inverter Chassis Units

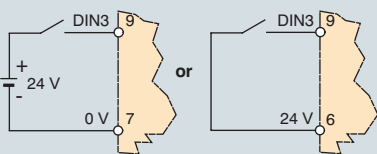
Controlled Power Modules

Schematic

General circuit diagram



For an additional digital input (DIN 3) external connections should be made:



Overview

Internal EMC filter

Variants with internal EMC filter for both Class A and Class B environments are available.

• Class A

For Class A the requirements are fulfilled using shielded cables with a maximum length of 10 m (for FS A) or 25 m (for FS B and FS C). The limits comply with EN 55011, Class A.

• Class B

For Class B the requirements are fulfilled using shielded cables with a maximum length of 5 m. The limits comply with EN 55011, Class B.

An inverter with an internal filter can be used with a 30 mA residual-current circuit-breaker, and is only suitable for fixed installations.

A non-filtered inverter together with the optional "Class B with low leakage currents filter" has a leakage current of < 3.5 mA (shielded motor cable up to 5 m).

Supplementary Class B EMC filter

Available for inverters with an internal EMC filter.

With this filter, the inverter complies with the emission standard EN 55011, Class B.

The requirements are fulfilled using shielded cables with a max. length of 25 m.

Class B filter with low leakage currents

With this filter, the unfiltered inverter complies with the emission standard EN 55011, Class B. The leakage currents are reduced to < 3.5 mA.

Unfiltered inverters can be used for power drive systems in category C1 installations.

The requirements are fulfilled with

- shielded cables with a max. length of 5 m
- installation of the inverter in a metal enclosure (e.g. control cabinet)
- 16 kHz pulse frequency (frame size B and C only)

For category C1 installations, a 16 kHz pulse frequency is generally recommended for ultrasonic operation and low motor noise.

Line reactor

Line reactors are used to smooth voltage peaks or to bridge commutating dips.

In addition, line reactors reduce the effects of harmonics on the inverter and the power supply.

If the ratio of inverter rated power to mains short-circuit power is less than 1%, a line reactor must be used in order to reduce the current peaks.

According to EN 61000-3-2 "Limits for harmonic currents with device input current ≤ 16 A per phase", there are special considerations for drives with 120 W to 550 W and 230 V single-phase supplies which are used in non-industrial applications (environment 1).

For devices with 120 W to 370 W, users must either fit the recommended line reactors or apply to the power utility company for authorization to connect the devices to the public power supply.

No limits are currently defined in the EN 61000-3-2 standard for professionally used devices with a connected load > 1 kW. This means that inverters with an output power ≥ 0.75 kW comply with the EN 61000-3-2 standard.

SINAMICS G110

Inverter Chassis Units

Line-side power components

Selection and ordering data

The line-side power components listed here are inverter-specific. EMC filters and line reactors have to be mounted separately.

The inverter and the associated line-side power components have the same voltage ratings.

All line-side power components are certified to UL, except fuses. 3NA3 fuses are recommended for European use.

Use in America requires UL listed fuses, for example the Class NON range from Bussmann.

Output		Order No. of the options				
kW	hp	Class B filter with low leakage currents	Line reactor	Supplementary Class B EMC filter	Fuse	Circuit-breaker
Options for inverters without filter						
0.12	0.16	6SE6400-2FL01-0AB0	6SE6400-3CC00-4AB3	-	3NA3803	3RV1021-1DA10
0.25	0.33	6SE6400-2FL01-0AB0	6SE6400-3CC00-4AB3	-	3NA3803	3RV1021-1FA10
0.37	0.50	6SE6400-2FL01-0AB0	6SE6400-3CC01-0AB3	-	3NA3803	3RV1021-1HA10
0.55	0.75	6SE6400-2FL01-0AB0	6SE6400-3CC01-0AB3	-	3NA3803	3RV1021-1JA10
0.75	1.0	6SE6400-2FL01-0AB0	6SE6400-3CC01-0AB3	-	3NA3805	3RV1021-1KA10
1.1	1.5	6SE6400-2FL02-6BB0	6SE6400-3CC02-6BB3	-	3NA3807	3RV1021-4BA10
1.5	2.0	6SE6400-2FL02-6BB0	6SE6400-3CC02-6BB3	-	3NA3810	3RV1021-4CA10
2.2	3.0	6SE6400-2FL02-6BB0	6SE6400-3CC02-6BB3	-	3NA3814	3RV1031-4EA10
3.0	4.0	-	6SE6400-3CC03-5CB3	-	3NA3820	3RV1031-4FA10
Options for inverters with internal filter Class A/B						
0.12	0.16	-	6SE6400-3CC00-4AB3	6SE6400-2FS01-0AB0	3NA3803	3RV1021-1DA10
0.25	0.33	-	6SE6400-3CC00-4AB3	6SE6400-2FS01-0AB0	3NA3803	3RV1021-1FA10
0.37	0.50	-	6SE6400-3CC01-0AB3	6SE6400-2FS01-0AB0	3NA3803	3RV1021-1HA10
0.55	0.75	-	6SE6400-3CC01-0AB3	6SE6400-2FS01-0AB0	3NA3803	3RV1021-1JA10
0.75	1.0	-	6SE6400-3CC01-0AB3	6SE6400-2FS01-0AB0	3NA3805	3RV1021-1KA10
1.1	1.5	-	6SE6400-3CC02-6BB3	6SE6400-2FS02-6BB0	3NA3807	3RV1021-4BA10
1.5	2.0	-	6SE6400-3CC02-6BB3	6SE6400-2FS02-6BB0	3NA3810	3RV1021-4CA10
2.2	3.0	-	6SE6400-3CC02-6BB3	6SE6400-2FS02-6BB0	3NA3814	3RV1031-4EA10
3.0	4.0	-	6SE6400-3CC03-5CB3	6SE6400-2FS03-5CB0	3NA3820	3RV1031-4FA10

Overview



The people who operate, program and service these devices have special skills and knowledge regarding the efficient use of drive technology.

The training centers of the Automation and Drives Group train your employees so that they can master this innovative technology. Well-trained employees are motivated and are dedicated to optimizing automation solutions.

Our SINAMICS training is carried out on specially developed training devices in the training centers. In addition, training cases are available for mobile use by sales and servicing personnel, and can be ordered separately.

The courses are designed on a modular basis and are aimed at various target groups, but can also be tailored to individual customer requirements.

We offer courses for:

- managers, decision makers and sales personnel
- designers and project managers
- servicing specialists and operating and servicing personnel.

In addition to the standard courses in our training centers, we also offer individual courses, which are tailored to specific customer requirements and can also be carried out locally on request.

SINAMICS DR-SN-UEB overview course

This course was designed specifically for sales personnel and decision makers, who want to obtain a general overview of the SINAMICS and MICROMASTER 4 drive concept and its position in the world of Siemens drives.

The system overview starts with an introduction to the basics of motor and inverter technology.

The SIZER planning tool and the STARTER commissioning tool are introduced and illustrated with short exercises.

MICROMASTER 4 SD-MM4 commissioning and servicing course

MICROMASTER 4 and SINAMICS G110 have a unique configuration and start-up. This course is therefore recommended both for MICROMASTER 4 users and SINAMICS G110 customers.

MICROMASTER 4 and SINAMICS G110 inverters are available for practical exercises.

Further information

All SITRAIN training courses can be booked by calling

01805-235611

or using the following order data.

	Order No.
ITC catalog , German	E86060-K6850-A101-B6
List of dates and prices including course information on CD-ROM, German	E86060-P6850-A101-D2
SITRAIN course information system on a separate CD-ROM, German/English	E86060-D6850-A100-C4-7400

Contact

If you have further questions regarding the courses on offer, please contact the training office on

01805-235611

or visit our website at:

<http://www.siemens.com/sitrain>

Here you will find our full range of courses with the latest additional dates, details of course reservations and further information.

Siemens AG
Trainingscenter A&D
Gleiwitzer Str. 555
90475 Nürnberg-Moorenbrunn
Germany

Tel.: 01805-235611
Fax: 01805-235612
E-mail: A&D.kursbuero@nbgm.siemens.de

SINAMICS G110

Inverter Chassis Units

Training case

Documentation

Overview



Within the modular SIDEMO case system for microsystems, there is also a training case for SINAMICS G110, which is designed for mobile use by sales and servicing personnel.

The training case is equipped with an analog variant of the SINAMICS G110 inverter.

The training case can be operated on its own or in combination with other demonstration systems, e.g. LOGO!, SIMATIC S7-200, SITOP DC UPS.

The training case therefore includes an instruction sheet on how to replace the inverter with an USS variant (not included in the scope of supply).

The demonstration systems are delivered in dark blue carrying cases with dimensions 400 x 300 x 210 mm (gross weight 12 kg). The carrying cases can be stacked.

Further information is available on the Internet at <http://www.siemens.com/sidemo>

Selection and ordering data

	Order No.
Training case SINAMICS G110 (including Basic Operator Panel (BOP))	6AG1064-1AA03-0AA0
Line adapter 115 V/230 V	6AG1064-1AA02-0AA0

Selection and ordering data

Type of documentation	Language	Order No.
Operating instructions ¹⁾ (paper version)	German	6SL3298-0AA11-0AP0
	English	6SL3298-0AA11-0BP0
	French	6SL3298-0AA11-0DP0
	Italian	6SL3298-0AA11-0CP0
	Spanish	6SL3298-0AA11-0EP0
Parameter list ¹⁾ (paper version)	German	6SL3298-0BA11-0AP0
	English	6SL3298-0BA11-0BP0
	French	6SL3298-0BA11-0DP0
	Italian	6SL3298-0BA11-0CP0
	Spanish	6SL3298-0BA11-0EP0
Getting Started Guide ¹⁾	Multilanguage	A paper version is supplied with each inverter.

¹⁾ Documentation is also available on the Internet at <http://www.siemens.com/sinamics-g110>

A&D in the WWW



A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

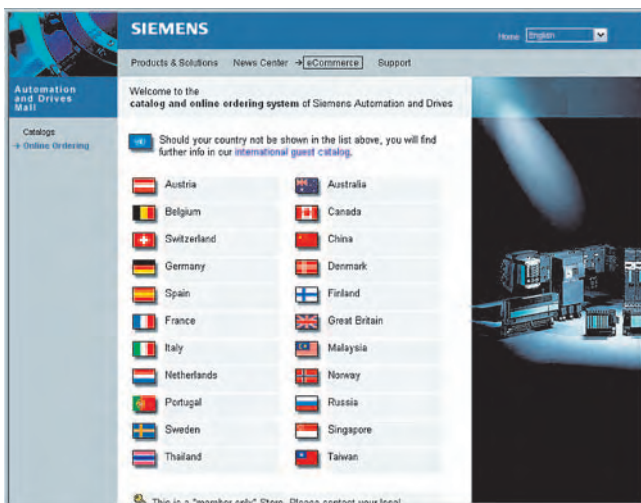
The Siemens Automation and Drives Group (A&D) has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

<http://www.siemens.com/automation>

you will find everything you need to know about products, systems and services.

Easy Shopping with the A&D Mall



The A&D Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the A&D Mall on the Internet under:

<http://www.siemens.com/automation/mall>

Online Support



The comprehensive information system available round the clock via Internet ranging from Product Support and Service & Support services to Support Tools in the Shop.

<http://www.siemens.com/automation/service&support>

Service On Site



With Service On Site we offer services for startup and maintenance, essential for ensuring system availability.

In Germany
0180 50 50 444 ¹⁾

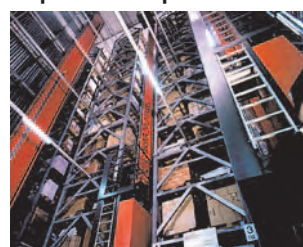
Technical Support



Competent consulting in technical questions covering a wide range of customer-oriented services for all our products and systems.

Tel.: +49 (0)180 50 50 222
Fax: +49 (0)180 50 50 223
E-Mail:
adsupport@siemens.com

Repairs and Spare Parts



In the operating phase of a machine or automation system we provide a comprehensive repair and spare parts service ensuring the highest degree of operating safety and reliability.

In Germany
0180 50 50 448 ¹⁾

¹⁾ For country-specific telephone numbers go to our Internet site at:
<http://www.siemens.com/automation/service&support>

SINAMICS G110

Inverter Chassis Units

Appendix

Terms and conditions of sale and delivery

By using this catalog you can acquire hardware and software products described therein from the Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity.

For customers with a seat or registered office in Germany

The „General Terms of Payment“ as well as the „General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry“ shall apply.

For software products, the „General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany“ shall apply.

For customers with a seat or registered office outside of Germany

The „General Terms of Payment“ as well as the „General Conditions for Supplies of Siemens. Automation and Drives for Customers with a Seat or registered Office outside of Germany“ shall apply.

For software products, the „General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office outside of Germany“ shall apply.

General

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

In addition to the prices of products which include silver, plump, aluminum and/or copper, surcharges may be calculated if the respective limits of the notes are exceeded. The respective note (e.g. source: German newspaper „Handesblatt“ in category „deutsche Edelmetalle“ and „Metallverarbeiter“) for silver („verarbeitetes Silber“), plump („Blei in Kabeln“), aluminum („Aluminium in Kabeln“) and copper („Elektrolytkupfer“, „DEL-Notiz“) respectively, of the day the order or rather the on call order is received, is decisive for the calculation of the surcharges.

Surcharges of copper shall be calculated for Drives at a note („DEL-Notiz“) above EUR 225,00 / 100 Kg and for chokes / transformers above EUR 150,00 / 100 kg.

Surcharges shall be charged based on the quantities of the materials which are contained in the relevant products.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

The dimensions are in mm. Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

Comprehensive Terms and Conditions of Sale and Delivery are available free of charge from your local Siemens business office under the following Order Nos.:

- 6ZB5310-0KR30-0BA0
(for customers based in the Federal Republic of Germany)
- 6ZB5310-0KS53-0BA0
(for customers based outside of the Federal Republic of Germany)

or download them from the Internet:

<http://www.siemens.com/automation/mall>

(Germany: A&D Mall Online-Help System)

Export regulations

The products listed in this catalog / price list may be subject to European / German and/or US export regulations.

Therefore, any export requiring a license is subject to approval by the competent authorities.

According to current provisions, the following export regulations must be observed with respect to the products featured in this catalog / price list:

AL	Number of the <u>German Export List</u> . Products marked other than “N” require an export license. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an “ <u>AL not equal to N</u> ” are subject to a European or German export authorization when being exported out of the EU.
ECCN	<u>Export Control Classification Number</u> . Products marked other than “N” are subject to a reexport license to specific countries. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an “ <u>ECCN not equal to N</u> ” are subject to a US re-export authorization.

Even without a label or with an “AL: N” or “ECCN: N”, authorization may be required due to the final destination and purpose for which the goods are to be used.

The deciding factors are the AL or ECCN export authorization indicated on order confirmations, delivery notes and invoices. Errors excepted and subject to change without prior notice.


A&D/VuL/En 17.03.05

Catalogs of the Automation and Drives Group (A&D)

Further information can be obtained from our branch offices listed in the appendix or at www.siemens.com/automation/partner

Automation and Drives	<i>Catalog</i>		
Interactive catalog on CD-ROM			
• The Offline Mall of Automation and Drives	CA 01		
Automation Systems for Machine Tools			
SINUMERIK & SIMODRIVE	NC 60		
Drive Systems			
<u>Variable-Speed Drives</u>			
SINAMICS G130 Drive Converter Chassis Units, SINAMICS G150 Drive Converter Cabinet Units	D 11		
SINAMICS G110 Inverter Chassis Units	D 11.1		
SINAMICS S120 Servo Control Drive System	D 21.2		
SINAMICS S150 Drive Converter Cabinet Units	D 21.3		
DC Motors	DA 12		
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1		
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2		
SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units	DA 22		
SIMOVERT PM Modular Converter Systems	DA 45		
SIEMOSYN Motors	DA 48		
MICROMASTER 410/420/430/440 Inverters	DA 51.2		
MICROMASTER 411/COMBIMASTER 411	DA 51.3		
SIMOVERT MV Medium-Voltage Drives	DA 63		
SIMOVERT MASTERDRIVES Vector Control	DA 65.10		
SIMOVERT MASTERDRIVES Motion Control	DA 65.11		
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3		
SIMODRIVE 611 universal and POSMO	DA 65.4		
<u>Low-Voltage Three-Phase-Motors</u>			
Squirrel-Cage Motors, Totally Enclosed, Fan-Cooled	M 11		
<u>Automation Systems for Machine Tools SIMODRIVE</u>	NC 60		
• Main Spindle Motors			
• Feed Motors			
• Converter Systems SIMODRIVE 611/POSMO			
<u>Drive and Control Components for Hoisting Equipment</u>	HE 1		
Electrical Installation Technology			
ALPHA Small Distribution Boards and Distribution Boards	ET A1		
<i>PDF: ALPHA 8HP Molded-Plastic Distribution System</i>	ET A3		
ALPHA FIX Terminal Blocks	ET A5		
BETA Modular Installation Devices	ET B1		
DELTA Switches and Outlets	ET D1		
GAMMA Building Management Systems	ET G1		
Factory Automation Sensors	FS 10		
Human Machine Interface Systems SIMATIC HMI	ST 80		
Industrial Communication for Automation and Drives	IK PI		
Low-Voltage Controls and Distribution	<i>Catalog</i>		
Low-Voltage Switchgear – Controlgear for Industry	LV 10		
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