SIEMENS

Motion Control Drives

SINAMICS Converters for Single-Axis Drives

SINAMICS G120X infrastructure converters for HVAC/Water/Wastewater

Order overview D 31.5

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siemens.com/sinamics-g120x

Overview

SINAMICS G120X, frame sizes FSA to FSJ, degree of protection IP20, with IOP-2 Intelligent Operator Panel

Easy handling, utmost reliability, superior efficiency and advanced digitalization - Siemens offers an answer to these trends with the SINAMICS G120X converter series. SINAMICS G120X is an innovative and user-friendly converter series that has been specifically developed for applications performed in infrastructure environments such as water/wastewater, but also for tasks in building automation. In this context, the converter supports, for example, pump, fan and compressor applications through numerous integrated functionalities and combines these in one device for the target sectors.

The SINAMICS G120X converter is an integrated and efficient drive solution for a wide range of tasks. The system allows convenient handling through optimized user interfaces: IOP-2 Intelligent Operator Panel with graphic color display and the optional web server module SINAMICS G120 Smart Access - a WLAN-based web server solution. Thus, the SINAMICS G120X fulfils the request for an easy and fast setup of the devices during the commissioning phase. Further, experienced users can use the full flexibility of a SINAMICS converter and adjust the relevant application to their requirements.

Totally integrated operation - this approach is also supported from ordering through to delivery.

For example, all the major features of the converter are configured and displayed in the article number. The delivery includes the complete device - as configured - that means, the converter and the selected operator panel.

In addition, SINAMICS G120X has an extremely rugged and reliable construction. The integrated DC link reactor with a maximum output of 250 kW and optional resistance to harmful gases up to environmental class 3C3 ensure a reliable, stable and largely robust operation.

The converter system is fit for digitalization. Thanks to its full integration in the SINAMICS CONNECT 300 system, data from up to eight converters can be acquired and transferred to the MindSphere cloud solution. The MindSphere application "Analyze MyDrives" facilitates the evaluation of data - tailored to individual customer needs. This simplifies the acquisition and evaluation of converter conditions.

Further, the SINAMICS G120X converter series provides innovative hardware and software functions, e.g. for controlling synchronous reluctance drive systems with SIMOTICS reluctance motors. In this way, the SINAMICS G120X converter series makes a substantial contribution towards saving energy and makes more careful use of our natural resources.

User-friendliness

A high degree of user-friendliness is one of the main characteristics of the SINAMICS G120X:

- Operator panel with color display and extensive diagnostics functions (IOP-2 Intelligent Operator Panel)
- Two different setup options are available: Standard and quick start with graphical user guidance
- Optimized setups for pumps and fans in the web server module SINAMICS G120 Smart Access
- SINAMICS SD card for storing parameter settings, cloning and local commissioning

Integrated functionalities for the start/operational/stop phases of the application

SINAMICS G120X is always preset, depending on the selected converter performance. Further, the following functions can be easily selected and parameterized:

Start phase

During the start phase, the following functions are supported by default:

- Deragging mode for pumps for cleaning the pump system, improving efficiency and reducing wear
- Pipe filling mode for preventing pressure shocks in pipeline systems
- Two acceleration ramps for shorter start/stop times
- Flying restart of the running motor for fast hot restart
- Automatic restart function after power failure during short downtimes

Operating phase

During the operating phase, the following functions are supported by default:

- Continued run mode with autonomous reduction of output and pulse frequency
- PID controller for autonomous closed-loop control mode, operated according to analog input values
- Up to 16 variable-speed setpoints as fixed frequencies
- Speed monitoring via sensor (pulse input)
- Multi-pump control of up to four pumps
- Protection against blocking, leakage, dry running and cavitation
- Fire response mode for extended operation in case of emergency
- Skip frequencies for skipping critical frequencies and avoiding vibration
- Real time clock for switching over setpoints or controlling releases

Stop phase

During the stop phase, the following functions are supported by default:

- STO (Safe Torque Off) according to IEC 61508 SIL 3 and EN ISO 13489-1 PL e and Category 3.
  External components (e.g. safety relays) are necessary for using the STO safety function.
- ON/OFF2 for a optimized braking ramp
- Condensation protection for the motor
- Frost protection function for the pump

A detailed description of the functions and connection diagrams are included in the device documentation.

Commissioning of complex applications

Sample applications, which include the description and device setting, are provided for SINAMICS G120X.

The following application descriptions are available:

- Fan for exhaust air with closed-loop control of pressure and air quality
- Fan for cooling tower with closed-loop control of the cooling water temperature
- Fan for tunnel/parking garage with closed-loop control of air quality and essential service mode
- Fan for supply air with closed-loop control of pressure, temperature, air quality and flowrate
- Pumps with closed-loop control of the pressure
- Pumps with closed-loop control of the filling level
- Pumps for cooling circuits with closed-loop control of the temperature
- Compressor with closed-loop control of the pressure
- Vacuum pump with closed-loop control of the pressure

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

Benefits

Energy efficiency

SINAMICS G120X increases the efficiency and minimizes energy consumption in the complete process chain. The converter has integrated hardware as well as software functions as standard. The main features are:

- Power units with DC link reactor for extremely high active power component thanks to efficient converter topology - for the same drive power, the converter requires a lower line current than comparable converters
- Flux reduction through automatic adaptation of the motor current to the prevailing load conditions with closed-loop control modes V/f (ECO) and vector without sensor (SLVC) and savings of up to 5 % under partial load conditions
- Hibernation mode dependent on setpoints in the process
- High efficiency $\eta \geq$ 98 %

Application-specific commissioning and operation using operator panel

- Local commissioning without specialized knowledge of converters thanks to default settings and graphical user interface
- Unique: SINAMICS SD memory card for pre-parameterization and cloning of converter data sets
- Data backup for easy replacement
- Commissioning/diagnostics and controlling of converters

Flexible deployment of integrated functions

- Four integrated PID controllers
  Distributed closed-loop control for motor-independent process control without higher-level controller (PLC)
- Three freely programmable digital timer switches
  Control for freely selectable daily and weekly programs

Flexible deployment across a wide range of applications

- Isolated digital inputs with separate potential group
- Isolated analog inputs
  - Potential transfer avoided
  - EMC-compliant design without the need for additional components in line with process industry requirements
- Direct connection of Pt1000/Ni1000 temperature sensors with optional SINAMICS G120X I/O Extension Module (available soon)
- 230 V AC relay
  - Direct control for auxiliary equipment, e.g. reactor or valve actuators
- Safety functions
  - Terminals for controlling the STO (Safe Torque Off) Safety function according to IEC 61508 SIL 3 and EN ISO 13489-1 PL e and Category 3.
    External components (e.g. safety relays) are necessary for using the STO safety function.
    For further information see the operating instructions
    www.siemens.com/sinamics-g120x/documentation
- X9 terminal strip for devices in frame sizes FSH and FSJ (315 kW to 630 kW)
  - Input for external 24 V DC supply
  - Input for external alarm/fault
  - Input for EMERGENCY OFF/EMERGENCY STOP
  - Output for 24 V DC
  - Control of the main contactor
  - Feedback message "DC link charged"
- Use at ambient temperatures of -20 °C to +55 °C possible with PROFINET version (up to +60 °C with other versions available soon)
- Removable operator panel
  - Protection against unauthorized access
  - Color-coded signaling of operating states
- Replacement of individual components without the need for reinstallation
  - Plug-in version of control terminals (for replacement without removing wiring)
- Version for harsh environmental conditions
  - Coated modules for increased resistance to humidity and dust (Class 3C2)
  - PCB coating for environmental class/harmful chemical substances Class 3C3 acc. to EN 60721-3-3 (available soon)

Extended warranty

Siemens offers for SINAMICS G120X an extended warranty up to 7½ years:

- 24 months of standard warranty
- Optional extension via **Drive Service Extended Exchange**
  - 6 months free of charge after product registration at:
    www.siemens.com/drive-registration
  - chargeable for additional 3 or 5 years

More information at:
https://support.industry.siemens.com/cs/ww/en/sc/4842

Clicking to the Industry Mall
6SL3255-0AA00-5AA0

Selection and ordering data

SINAMICS G120X converters · Degree of protection IP20/UL Open Type · 380 ... 480 V 3 AC ➡ Configuration with line-side components (see right page)

Rated power [1]		Base-load current I_L [2]		Rated input current [3]	Frame size	SINAMICS G120X Degree of protection IP20/UL Open Type without integrated line filter — Converters up to 132 kW delivery ex stock	SINAMICS G120X Degree of protection IP20/UL Open Type with integrated line filter — Converters up to 132 kW delivery ex stock
400 V	480 V	400 V	480 V	400 V		10 ... 48	10 ... 48
kW	hp	A	A	A		Article No.	Article No.
380 ... 480 V 3 AC · Rated pulse frequency 4 kHz ≤90 kW and 2 kHz ≥ 110 kW · Input frequency 47 ... 63 Hz							
0.75	1	2.2	2.1	2.1	FSA	**6SL32 ■ 0- ■ YE10- ■ U ■ 0**	**6SL32 ■ 0- ■ YE10- ■ A ■ 0**
1.1	1.5	3.1	3	2.8	FSA	**6SL32 ■ 0- ■ YE12- ■ U ■ 0**	**6SL32 ■ 0- ■ YE12- ■ A ■ 0**
1.5	2	4.1	3.4	3.6	FSA	**6SL32 ■ 0- ■ YE14- ■ U ■ 0**	**6SL32 ■ 0- ■ YE14- ■ A ■ 0**
2.2	3	5.9	4.8	5.5	FSA	**6SL32 ■ 0- ■ YE16- ■ U ■ 0**	**6SL32 ■ 0- ■ YE16- ■ A ■ 0**
3	4	7.7	6.2	6.9	FSA	**6SL32 ■ 0- ■ YE18- ■ U ■ 0**	**6SL32 ■ 0- ■ YE18- ■ A ■ 0**
4	5	10.2	7.6	9.8	FSB	**6SL32 ■ 0- ■ YE20- ■ U ■ 0**	**6SL32 ■ 0- ■ YE20- ■ A ■ 0**
5.5	7.5	13.2	11	12	FSB	**6SL32 ■ 0- ■ YE22- ■ U ■ 0**	**6SL32 ■ 0- ■ YE22- ■ A ■ 0**
7.5	10	18	14	17	FSB	**6SL32 ■ 0- ■ YE24- ■ U ■ 0**	**6SL32 ■ 0- ■ YE24- ■ A ■ 0**
11	15	26	21	24.5	FSC	**6SL32 ■ 0- ■ YE26- ■ U ■ 0**	**6SL32 ■ 0- ■ YE26- ■ A ■ 0**
15	20	32	27	29.5	FSC	**6SL32 ■ 0- ■ YE28- ■ U ■ 0**	**6SL32 ■ 0- ■ YE28- ■ A ■ 0**
18.5	25	38	34	37	FSD	**6SL32 ■ 0- ■ YE30- ■ U ■ 0**	**6SL32 ■ 0- ■ YE30- ■ A ■ 0**
22	30	45	40	44	FSD	**6SL32 ■ 0- ■ YE32- ■ U ■ 0**	**6SL32 ■ 0- ■ YE32- ■ A ■ 0**
30	40	60	52	59	FSD	**6SL32 ■ 0- ■ YE34- ■ U ■ 0**	**6SL32 ■ 0- ■ YE34- ■ A ■ 0**
37	50	75	65	72	FSD	**6SL32 ■ 0- ■ YE36- ■ U ■ 0**	**6SL32 ■ 0- ■ YE36- ■ A ■ 0**
45	60	90	77	89	FSE	**6SL32 ■ 0- ■ YE38- ■ U ■ 0**	**6SL32 ■ 0- ■ YE38- ■ A ■ 0**
55	75	110	96	107	FSE	**6SL32 ■ 0- ■ YE40- ■ U ■ 0**	**6SL32 ■ 0- ■ YE40- ■ A ■ 0**
75	100	145	124	144	FSF	**6SL32 ■ 0- ■ YE42- ■ U ■ 0**	**6SL32 ■ 0- ■ YE42- ■ A ■ 0**
90	125	178	156	177	FSF	**6SL32 ■ 0- ■ YE44- ■ U ■ 0**	**6SL32 ■ 0- ■ YE44- ■ A ■ 0**
110	150	205	180	203	FSF	**6SL32 ■ 0- ■ YE46- ■ U ■ 0**	**6SL32 ■ 0- ■ YE46- ■ A ■ 0**
132	200	250	240	247	FSF	**6SL32 ■ 0- ■ YE48- ■ U ■ 0**	**6SL32 ■ 0- ■ YE48- ■ A ■ 0**
160	250	302	302	308	FSG	–	**6SL32 ■ 0- ■ YE50- ■ ■ ■ 0**
200	300	370	361	374	FSG	–	**6SL32 ■ 0- ■ YE52- ■ ■ ■ 0**
250	400	477	477	482	FSG	–	**6SL32 ■ 0- ■ YE54- ■ ■ ■ 0**
315	400	570	477	597	FSH	–	**6SL32 2 0- ■ YE56- 0 C F 0**
355	450	640	515	668	FSH	–	**6SL32 2 0- ■ YE58- 0 C F 0**
400	500	720	590	750	FSH	–	**6SL32 2 0- ■ YE60- 0 C F 0**
450	500	820	663	870	FSJ	–	**6SL32 2 0- ■ YE62- 0 C F 0**
500	600	890	724	945	FSJ	–	**6SL32 2 0- ■ YE64- 0 C F 0**
560	700	1000	830	1061	FSJ	–	**6SL32 2 0- ■ YE66- 0 C F 0**

Article No. supplements

Supplement	Without integrated line filter	With integrated line filter
Environmental class/harmful chemical substances acc. to EN 60721-3-3		
Class 3C2 – **delivery ex stock**	**2**	**2**
Class 3C3 ***** (available soon)	**3**	**3**
Operator Panel		
Without Operator Panel *****	**1**	**1**
With BOP-2 Basic Operator Panel (numeric 2-line display) *****	**2**	**2**
With IOP-2 Intelligent Operator Panel (graphic color display) – **delivery ex stock**	**3**	**3**
Extension with SINAMICS G120X I/O Extension Module (available soon)		
Without extension – **delivery ex stock**	**0**	**0**
Line filter		
Without integrated line filter – **delivery ex stock**	**U**	
With integrated line filter Category C2 – **delivery ex stock**		**A**
With integrated line filter Category C3 *****		**C**
Communication (variants for PROFIBUS DP or USS, Modbus RTU, BACnet MS/TP available soon)		
PROFINET, EtherNet/IP – **delivery ex stock**	**F**	**F**

***** If you select one of these supplements, the delivery time for converters up to 132 kW will change from "**delivery ex stock**" to "**standard delivery time**".

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

2) The base-load current I_L is based on the duty cycle for low overload (LO). These current values are valid for 400 V or 480 V and are specified on the rating plate of the converter.

3) The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_L) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the converter.

Line-side components (Configuration with load-side power components see next double page)

Line filters		**Line harmonics filters** [1]	**Line reactors**	**Recommended line-side overcurrent protection devices** [4]			
Category C2	Category C1 For frame sizes FSD to FSF mandatory using a converter with integrated line filter		For frame sizes FSH and FSJ mandatory when using an external line filter Category C2	Fuses IEC-compliant		Fuses UL/cUL-compliant Rated voltage 600 V AC [5]	
				Current		Fuse type	Current
Article No.	Article No.		Article No.	A	Article No.	Class/Article No.	A
SINAMICS G120X available with integrated line filter Category C2	Available soon	–	A DC line reactor is integrated for frame sizes FSA to FSG – therefore no line reactor is required.	10	**3NA3803**	J	10
		–		16	**3NA3805**	J	15
		–		16	**3NA3805**	J	15
		–		16	**3NA3805**	J	15
		–		16	**3NA3805**	J	15
		–		32	**3NA3812**	J	35
		UAC:FN34406112E2XXJRX		32	**3NA3812**	J	35
		UAC:FN34408112E2XXJRX		32	**3NA3812**	J	35
		UAC:FN344011113E2FAJRX		50	**3NA3820**	J	50
		UAC:FN344015113E2FAJRX		50	**3NA3820**	J	50
	6SL3203-0BE23-8BA0	**UAC:FN344019113E2FAJRX**		63	**3NA3822**	J	60
		UAC:FN344022115E2FAJRX		80	**3NA3824**	J	70
	6SL3203-0BE27-5BA0	**UAC:FN344030115E2FAJRX**		100	**3NA3830**	J	90
		UAC:FN344037115E2FAJRX		100	**3NA3830**	J	100
	6SL3203-0BE31-1BA0	**UAC:FN344045115E2FAJRX**		125	**3NA3832**	J	125
		UAC:FN344055115E2FAJRX		160	**3NA3836**	J	150
	6SL3203-0BE31-8BA0	**UAC:FN344075116E2FAJRX**		200	**3NA3140**	J	200
		UAC:FN344090116E2FAJRX		224	**3NA3142**	J	250
		UAC:FN3440110118E2FAJRX		300	**3NA3250**	J	300
	–	**UAC:FN3440132118E2FAJXX** [2]		315	**3NA3252**	J	350
	–	**UAC:FN3440160118E2FAJXX** [2]		355	**3NA3254**	J	400
	–	**UAC:FN3440200118E2FAJXX** [2]		400	**3NA3260**	J	500
	–	**UAC:FN3440132118E2FAJXX** (2×) [2] [3]		630	**3NA3372**	J	600
6SL3760-0MR00-0AA0	–	–	**6SL3000-0CE36-3AA0**	710	**3NE1437-2**		710
	–	–	**6SL3000-0CE37-7AA0**	800	**3NE1438-2**		800
	–	–		850	**3NE1448-2**		850
	–	–	**6SL3000-0CE38-7AA0**	1000	**3NB3350-1KK26**		1000
	–	–	**6SL3000-0CE41-0AA0**	1100	**3NB3351-1KK26**		1100
	–	–		1250	**3NB3352-1KK26**		1250

1) Voltage 380 V to 415 V, frequency 50 Hz.

2) For 160 kW, 200 kW and 250 kW, only operation in Vector Control is permitted. V/f must not be used.

3) 250 kW with parallel connection of 2x 132 kW.

4) Further information at https://support.industry.siemens.com/cs/document/109762895

5) The Short Circuit Current Rating (SCCR) according to UL for industrial control panel installations to NEC Article 409 or UL 508A/508C or UL 61800-5-1 is 100 kA for SINAMICS G120X.

Clicking to the Industry Mall
6SL3255-0AA00-5AA0

Selection and ordering data (continued)

SINAMICS G120X converters · Degree of protection IP20/UL Open Type · 380 ... 480 V 3 AC ➡ Configuration with load-side power components (see right page)

Rated power 1) 400 V kW	Rated power 1) 480 V hp	Base-load current I_L 2) 400 V A	Base-load current I_L 2) 480 V A	Rated input current 3) 400 V A	Frame size	SINAMICS G120X Degree of protection IP20/UL Open Type without integrated line filter – Converters up to 132 kW delivery ex stock (10 ... 48) – Article No.	SINAMICS G120X Degree of protection IP20/UL Open Type with integrated line filter – Converters up to 132 kW delivery ex stock (10 ... 48) – Article No.
380 ... 480 V 3 AC · Rated pulse frequency 4 kHz ≤90 kW and 2 kHz ≥ 110 kW · Input frequency 47 ... 63 Hz							
0.75	1	2.2	2.1	2.1	FSA	6SL32 ■ 0- ■ YE10- ■ U ■ 0	6SL32 ■ 0- ■ YE10- ■ A ■ 0
1.1	1.5	3.1	3	2.8	FSA	6SL32 ■ 0- ■ YE12- ■ U ■ 0	6SL32 ■ 0- ■ YE12- ■ A ■ 0
1.5	2	4.1	3.4	3.6	FSA	6SL32 ■ 0- ■ YE14- ■ U ■ 0	6SL32 ■ 0- ■ YE14- ■ A ■ 0
2.2	3	5.9	4.8	5.5	FSA	6SL32 ■ 0- ■ YE16- ■ U ■ 0	6SL32 ■ 0- ■ YE16- ■ A ■ 0
3	4	7.7	6.2	6.9	FSA	6SL32 ■ 0- ■ YE18- ■ U ■ 0	6SL32 ■ 0- ■ YE18- ■ A ■ 0
4	5	10.2	7.6	9.8	FSB	6SL32 ■ 0- ■ YE20- ■ U ■ 0	6SL32 ■ 0- ■ YE20- ■ A ■ 0
5.5	7.5	13.2	11	12	FSB	6SL32 ■ 0- ■ YE22- ■ U ■ 0	6SL32 ■ 0- ■ YE22- ■ A ■ 0
7.5	10	18	14	17	FSB	6SL32 ■ 0- ■ YE24- ■ U ■ 0	6SL32 ■ 0- ■ YE24- ■ A ■ 0
11	15	26	21	24.5	FSC	6SL32 ■ 0- ■ YE26- ■ U ■ 0	6SL32 ■ 0- ■ YE26- ■ A ■ 0
15	20	32	27	29.5	FSC	6SL32 ■ 0- ■ YE28- ■ U ■ 0	6SL32 ■ 0- ■ YE28- ■ A ■ 0
18.5	25	38	34	37	FSD	6SL32 ■ 0- ■ YE30- ■ U ■ 0	6SL32 ■ 0- ■ YE30- ■ A ■ 0
22	30	45	40	44	FSD	6SL32 ■ 0- ■ YE32- ■ U ■ 0	6SL32 ■ 0- ■ YE32- ■ A ■ 0
30	40	60	52	59	FSD	6SL32 ■ 0- ■ YE34- ■ U ■ 0	6SL32 ■ 0- ■ YE34- ■ A ■ 0
37	50	75	65	72	FSD	6SL32 ■ 0- ■ YE36- ■ U ■ 0	6SL32 ■ 0- ■ YE36- ■ A ■ 0
45	60	90	77	89	FSE	6SL32 ■ 0- ■ YE38- ■ U ■ 0	6SL32 ■ 0- ■ YE38- ■ A ■ 0
55	75	110	96	107	FSE	6SL32 ■ 0- ■ YE40- ■ U ■ 0	6SL32 ■ 0- ■ YE40- ■ A ■ 0
75	100	145	124	144	FSF	6SL32 ■ 0- ■ YE42- ■ U ■ 0	6SL32 ■ 0- ■ YE42- ■ A ■ 0
90	125	178	156	177	FSF	6SL32 ■ 0- ■ YE44- ■ U ■ 0	6SL32 ■ 0- ■ YE44- ■ A ■ 0
110	150	205	180	203	FSF	6SL32 ■ 0- ■ YE46- ■ U ■ 0	6SL32 ■ 0- ■ YE46- ■ A ■ 0
132	200	250	240	247	FSF	6SL32 ■ 0- ■ YE48- ■ U ■ 0	6SL32 ■ 0- ■ YE48- ■ A ■ 0
160	250	302	302	308	FSG	–	6SL32 ■ 0- ■ YE50- ■ ■ ■ 0
200	300	370	361	374	FSG	–	6SL32 ■ 0- ■ YE52- ■ ■ ■ 0
250	400	477	477	482	FSG	–	6SL32 ■ 0- ■ YE54- ■ ■ ■ 0
315	400	570	477	597	FSH	–	6SL32 2 0- ■ YE56- 0 C F 0
355	450	640	515	668	FSH	–	6SL32 2 0- ■ YE58- 0 C F 0
400	500	720	590	750	FSH	–	6SL32 2 0- ■ YE60- 0 C F 0
450	500	820	663	870	FSJ	–	6SL32 2 0- ■ YE62- 0 C F 0
500	600	890	724	945	FSJ	–	6SL32 2 0- ■ YE64- 0 C F 0
560	700	1000	830	1061	FSJ	–	6SL32 2 0- ■ YE66- 0 C F 0

Article No. supplements

Supplement	Without integrated line filter	With integrated line filter
Environmental class/harmful chemical substances acc. to EN 60721-3-3		
Class 3C2 – **delivery ex stock**	2	2
Class 3C3 * (available soon)	3	3
Operator Panel		
Without Operator Panel *	1	1
With BOP-2 Basic Operator Panel (numeric 2-line display) *	2	2
With IOP-2 Intelligent Operator Panel (graphic color display) – **delivery ex stock**	3	3
Extension with SINAMICS G120X I/O Extension Module (available soon)		
Without extension – **delivery ex stock**	0	0
Line filter		
Without integrated line filter – **delivery ex stock**	U	
With integrated line filter Category C2 – **delivery ex stock**		A
With integrated line filter Category C3 *		C
Communication (variants for PROFIBUS DP or USS, Modbus RTU, BACnet MS/TP available soon)		
PROFINET, EtherNet/IP – **delivery ex stock**	F	F

* If you select one of these supplements, the delivery time for converters up to 132 kW will change from "**delivery ex stock**" to "**standard delivery time**".

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

2) The base-load current I_L is based on the duty cycle for low overload (LO). These current values are valid for 400 V or 480 V and are specified on the rating plate of the converter.

3) The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_L) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the converter.

Load-side power components (Configuration with line-side components see double page before)

Output reactors	Sine-wave filters	dv/dt filters plus VPL
Article No.	Article No.	Article No.
A DC link reactor is integrated for frame sizes FSA to FSC – therefore long cable lengths are possible without output reactors.	Available soon	–
		–
		–
		–
		–
		–
		–
		–
		–
6SL3202-0AE23-8CA0	**6SL3202-0AE24-6SA0**	**JTA:TEF1203-0HB**
6SE6400-3TC07-5ED0		**JTA:TEF1203-0JB**
	6SL3202-0AE26-2SA0	
	6SL3202-0AE28-8SA0	**JTA:TEF1203-0KB**
6SE6400-3TC14-5FD0		
	6SL3202-0AE31-5SA0	**JTA:TEF1203-0LB**
	6SL3202-0AE31-8SA0	**JTA:TEF1203-0MB**
6SL3000-2BE32-1AA0	**6SL3000-2CE32-3AA0**	
6SL3000-2BE32-6AA0		
6SL3000-2BE33-2AA0	**6SL3000-2CE32-8AA0** [1]	**6SL3000-2DE35-0AA0**
6SL3000-2BE33-8AA0	**6SL3000-2CE33-3AA0** [1]	
6SL3000-2BE35-0AA0	**6SL3000-2CE34-1AA0** [1]	
6SL3000-2AE36-1AA0	–	**6SL3000-2DE38-4AA0**
6SL3000-2AE38-4AA0	–	
	–	
6SL3000-2AE41-0AA0	–	**6SL3000-2DE41-4AA0**
	–	
6SL3000-2AE41-4AA0	–	

Ordering examples

Basic selection	Example 1	Example 2
SINAMICS G120X converters · degree of protection IP20/UL Open Type · 380 ... 480 V 3 AC, 15 kW · with integrated line filter – converters up to 132 kW delivery ex stock	**6SL32 ■ 0- ■ YE28- ■ A ■ 0**	**6SL32 ■ 0- ■ YE28- ■ A ■ 0**
Article No. supplements		
Environmental class/harmful chemical substances acc. to EN 60721-3-3		
Class 3C2 – **delivery ex stock**	2	
Class 3C3 * (available soon)		3
Operator Panel		
With BOP-2 Basic Operator Panel (numeric 2-line display) *		2
With IOP-2 Intelligent Operator Panel (graphic color display) – **delivery ex stock**	3	
Extension with SINAMICS G120X I/O Extension Module (available soon)		
Without extension – **delivery ex stock**	0	0
Line filter		
With integrated line filter Category C2 – **delivery ex stock**	A	A
Communication		
PROFINET, EtherNet/IP – **delivery ex stock**	F	F
Complete Article No.	**6SL32 2 0- 3 YE28- 0 A F 0**	**6SL32 3 0- 2 YE28- 0 A F 0**
	Delivery ex stock	**Standard delivery time**

* If you select one of these supplements, the delivery time for converters up to 132 kW will change from "**delivery ex stock**" to "**standard delivery time**".

[1] For 160 kW, 200 kW and 250 kW, only operation in Vector Control is permitted. V/f must not be used.

Clicking to the Industry Mall
6SL3255-0AA00-5AA0

Selection and ordering data (continued)

SINAMICS G120X converters · Degree of protection IP20/UL Open Type · 500 ... 690 V 3 AC ➡ Configuration with line-side components (see right page)

Rated power [1]		Base-load current I_L [2]		Rated input current [3]	Frame size	SINAMICS G120X Degree of protection IP20/UL Open Type without integrated line filter	SINAMICS G120X Degree of protection IP20/UL Open Type with integrated line filter
690 V	600 V	690 V	600 V	690 V			
kW	hp	A	A	A		Article No.	Article No.
500 ... 690 V 3 AC · Rated pulse frequency 2 kHz · Input frequency 47 ... 63 Hz							
3	4	5	5	6	FSD	**6SL32 ■ 0- ■ YH18- ■ U ■ 0**	**6SL32 ■ 0- ■ YH18- ■ A ■ 0**
4	5	6.3	6.3	7	FSD	**6SL32 ■ 0- ■ YH20- ■ U ■ 0**	**6SL32 ■ 0- ■ YH20- ■ A ■ 0**
5.5	7.5	9	9	10	FSD	**6SL32 ■ 0- ■ YH22- ■ U ■ 0**	**6SL32 ■ 0- ■ YH22- ■ A ■ 0**
7.5	10	11	11	12	FSD	**6SL32 ■ 0- ■ YH24- ■ U ■ 0**	**6SL32 ■ 0- ■ YH24- ■ A ■ 0**
11	10	14	14	15	FSD	**6SL32 ■ 0- ■ YH26- ■ U ■ 0**	**6SL32 ■ 0- ■ YH26- ■ A ■ 0**
15	15	19	19	19	FSD	**6SL32 ■ 0- ■ YH28- ■ U ■ 0**	**6SL32 ■ 0- ■ YH28- ■ A ■ 0**
18.5	20	23	23	23	FSD	**6SL32 ■ 0- ■ YH30- ■ U ■ 0**	**6SL32 ■ 0- ■ YH30- ■ A ■ 0**
22	25	27	27	26	FSD	**6SL32 ■ 0- ■ YH32- ■ U ■ 0**	**6SL32 ■ 0- ■ YH32- ■ A ■ 0**
30	30	35	35	34	FSD	**6SL32 ■ 0- ■ YH34- ■ U ■ 0**	**6SL32 ■ 0- ■ YH34- ■ A ■ 0**
37	40	42	42	41	FSD	**6SL32 ■ 0- ■ YH36- ■ U ■ 0**	**6SL32 ■ 0- ■ YH36- ■ A ■ 0**
45	50	52	52	52	FSE	**6SL32 ■ 0- ■ YH38- ■ U ■ 0**	**6SL32 ■ 0- ■ YH38- ■ A ■ 0**
55	60	62	62	60	FSE	**6SL32 ■ 0- ■ YH40- ■ U ■ 0**	**6SL32 ■ 0- ■ YH40- ■ A ■ 0**
75	75	80	80	80	FSF	**6SL32 ■ 0- ■ YH42- ■ U ■ 0**	**6SL32 ■ 0- ■ YH42- ■ C ■ 0**
90	100	100	100	99	FSF	**6SL32 ■ 0- ■ YH44- ■ U ■ 0**	**6SL32 ■ 0- ■ YH44- ■ C ■ 0**
110	125	125	125	124	FSF	**6SL32 ■ 0- ■ YH46- ■ U ■ 0**	**6SL32 ■ 0- ■ YH46- ■ C ■ 0**
132	150	144	144	141	FSF	**6SL32 ■ 0- ■ YH48- ■ U ■ 0**	**6SL32 ■ 0- ■ YH48- ■ C ■ 0**
160	150	171	171	175	FSG [4]	–	**6SL32 ■ 0- ■ YH50- ■ C ■ 0**
200	200	208	208	210	FSG [4]	–	**6SL32 ■ 0- ■ YH52- ■ C ■ 0**
250	250	250	250	255	FSG [4]	–	**6SL32 ■ 0- ■ YH54- ■ C ■ 0**
315	350	330	345	383	FSH	–	**6SL32 2 0- ■ YH56- 0 C F 0**
355	400	385	388	416	FSH	–	**6SL32 2 0- ■ YH58- 0 C F 0**
400	450	420	432	471	FSH	–	**6SL32 2 0- ■ YH60- 0 C F 0**
450	500	470	487	537	FSH	–	**6SL32 2 0- ■ YH62- 0 C F 0**
500	500	520	546	596	FSJ	–	**6SL32 2 0- ■ YH64- 0 C F 0**
560	600	580	610	679	FSJ	–	**6SL32 2 0- ■ YH66- 0 C F 0**
630	700	650	679	753	FSJ	–	**6SL32 2 0- ■ YH68- 0 C F 0**

Article No. supplements

	Without integrated line filter	With integrated line filter
Environmental class/harmful chemical substances acc. to EN 60721-3-3		
Class 3C2	**2**	**2**
Class 3C3 (available soon)	**3**	**3**
Operator Panel		
Without Operator Panel	**1**	**1**
With BOP-2 Basic Operator Panel (numeric 2-line display)	**2**	**2**
With IOP-2 Intelligent Operator Panel (graphic color display)	**3**	**3**
Extension with SINAMICS G120X I/O Extension Module (available soon)		
Without extension	**0**	**0**
Line filter		
Without integrated line filter	**U**	
With integrated line filter Category C2		**A**
With integrated line filter Category C3		**C**
Communication (variants for PROFIBUS DP or USS, Modbus RTU, BACnet MS/TP available soon)		
PROFINET, EtherNet/IP	**F**	**F**

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

[2] The base-load current I_L is based on the duty cycle for low overload (LO). These current values are valid for 690 V or 600 V and are specified on the rating plate of the converter.

[3] The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_L) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the converter.

[4] The 690 V versions of frame size FSG are only available with an integrated line filter Category C3. To operate the converters also within TN systems with grounded outer conductor, you must remove the grounding screw.

Line-side components (Configuration with load-side power components see next double page)

Line filters		**Line reactors**	**Recommended line-side overcurrent protection devices** [1]			
Category C2	Category C1	For frame sizes FSH and FSJ mandatory when using an external line filter Category C2	Fuses IEC-compliant		Fuses UL/cUL-compliant Rated voltage 600 V AC [2]	
	Article No.	Article No.	Current A	Article No.	Fuse type Class/Article No.	Current A
SINAMICS G120X available with integrated line filter Category C2	–	A DC link reactor is integrated for frame sizes FSA to FSG – therefore no line reactor is required.	20	**3NA3807-6**	J	20
	–		20	**3NA3807-6**	J	20
	–		20	**3NA3807-6**	J	20
	–		20	**3NA3807-6**	J	20
	–		20	**3NA3807-6**	J	20
	–		25	**3NA3810-6**	J	25
	–		32	**3NA3812-6**	J	30
	–		40	**3NA3817-6KJ**	J	35
	–		50	**3NA3820-6KJ**	J	50
	–		63	**3NA3822-6**	J	60
	–		80	**3NA3824-6**	J	80
	–		80	**3NA3824-6**	J	80
–	–		100	**3NA3830-6**	J	110
–	–		125	**3NA3132-6**	J	150
–	–		160	**3NA3136-6**	J	150
–	–		200	**3NA3140-6**	J	200
–	–		250	**3NE1227-0**		250
–	–		315	**3NE1230-0**		315
–	–		355	**3NE1331-0**		355
6SL3760-0MS00-0AA0	–	**6SL3000-0CH34-8AA0**	450	**3NE1333-2**		450
	–		500	**3NE1334-2**		500
	–		560	**3NE1435-2**		560
	–	**6SL3000-0CH36-0AA0**	630	**3NE1436-2**		630
	–		710	**3NE1437-2**		710
	–	**6SL3000-0CH38-4AA0**	800	**3NE1438-2**		800
	–		850	**3NE1448-2**		850

[1] Further information at https://support.industry.siemens.com/cs/document/109762895

[2] The Short Circuit Current Rating (SCCR) according to UL for industrial control panel installations to NEC Article 409 or UL 508A/508C or UL 61800-5-1 is 100 kA for SINAMICS G120X.

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6SL3255-0AA00-5AA0

Selection and ordering data (continued)

SINAMICS G120X converters · Degree of protection IP20/UL Open Type · 500 ... 690 V 3 AC ➡ Configuration with load-side power components (see right page)

Rated power [1]		Base-load current I_L [2]		Rated input current [3]	Frame size	SINAMICS G120X Degree of protection IP20/UL Open Type without integrated line filter	SINAMICS G120X Degree of protection IP20/UL Open Type with integrated line filter
690 V	600 V	690 V	600 V	690 V			
kW	hp	A	A	A		Article No.	Article No.
500 ... 690 V 3 AC · Rated pulse frequency 2 kHz · Input frequency 47 ... 63 Hz							
3	4	5	5	6	FSD	6SL32 ■ 0- ■ YH18- ■ U ■ 0	6SL32 ■ 0- ■ YH18- ■ A ■ 0
4	5	6.3	6.3	7	FSD	6SL32 ■ 0- ■ YH20- ■ U ■ 0	6SL32 ■ 0- ■ YH20- ■ A ■ 0
5.5	7.5	9	9	10	FSD	6SL32 ■ 0- ■ YH22- ■ U ■ 0	6SL32 ■ 0- ■ YH22- ■ A ■ 0
7.5	10	11	11	12	FSD	6SL32 ■ 0- ■ YH24- ■ U ■ 0	6SL32 ■ 0- ■ YH24- ■ A ■ 0
11	10	14	14	15	FSD	6SL32 ■ 0- ■ YH26- ■ U ■ 0	6SL32 ■ 0- ■ YH26- ■ A ■ 0
15	15	19	19	19	FSD	6SL32 ■ 0- ■ YH28- ■ U ■ 0	6SL32 ■ 0- ■ YH28- ■ A ■ 0
18.5	20	23	23	23	FSD	6SL32 ■ 0- ■ YH30- ■ U ■ 0	6SL32 ■ 0- ■ YH30- ■ A ■ 0
22	25	27	27	26	FSD	6SL32 ■ 0- ■ YH32- ■ U ■ 0	6SL32 ■ 0- ■ YH32- ■ A ■ 0
30	30	35	35	34	FSD	6SL32 ■ 0- ■ YH34- ■ U ■ 0	6SL32 ■ 0- ■ YH34- ■ A ■ 0
37	40	42	42	41	FSD	6SL32 ■ 0- ■ YH36- ■ U ■ 0	6SL32 ■ 0- ■ YH36- ■ A ■ 0
45	50	52	52	52	FSE	6SL32 ■ 0- ■ YH38- ■ U ■ 0	6SL32 ■ 0- ■ YH38- ■ A ■ 0
55	60	62	62	60	FSE	6SL32 ■ 0- ■ YH40- ■ U ■ 0	6SL32 ■ 0- ■ YH40- ■ A ■ 0
75	75	80	80	80	FSF	6SL32 ■ 0- ■ YH42- ■ U ■ 0	6SL32 ■ 0- ■ YH42- ■ C ■ 0
90	100	100	100	99	FSF	6SL32 ■ 0- ■ YH44- ■ U ■ 0	6SL32 ■ 0- ■ YH44- ■ C ■ 0
110	125	125	125	124	FSF	6SL32 ■ 0- ■ YH46- ■ U ■ 0	6SL32 ■ 0- ■ YH46- ■ C ■ 0
132	150	144	144	141	FSF	6SL32 ■ 0- ■ YH48- ■ U ■ 0	6SL32 ■ 0- ■ YH48- ■ C ■ 0
160	150	171	171	175	FSG [4]	–	6SL32 ■ 0- ■ YH50- ■ C ■ 0
200	200	208	208	210	FSG [4]	–	6SL32 ■ 0- ■ YH52- ■ C ■ 0
250	250	250	250	255	FSG [4]	–	6SL32 ■ 0- ■ YH54- ■ C ■ 0
315	350	330	345	383	FSH	–	6SL32 2 0- ■ YH56- 0 C F 0
355	400	385	388	416	FSH	–	6SL32 2 0- ■ YH58- 0 C F 0
400	450	420	432	471	FSH	–	6SL32 2 0- ■ YH60- 0 C F 0
450	500	470	487	537	FSH	–	6SL32 2 0- ■ YH62- 0 C F 0
500	500	520	546	596	FSJ	–	6SL32 2 0- ■ YH64- 0 C F 0
560	600	580	610	679	FSJ	–	6SL32 2 0- ■ YH66- 0 C F 0
630	700	650	679	753	FSJ	–	6SL32 2 0- ■ YH68- 0 C F 0

Article No. supplements

	Without integrated line filter	With integrated line filter
Environmental class/harmful chemical substances acc. to EN 60721-3-3		
Class 3C2	2	2
Class 3C3 (available soon)	3	3
Operator Panel		
Without Operator Panel	1	1
With BOP-2 Basic Operator Panel (numeric 2-line display)	2	2
With IOP-2 Intelligent Operator Panel (graphic color display)	3	3
Extension with SINAMICS G120X I/O Extension Module (available soon)		
Without extension	0	0
Line filter		
Without integrated line filter	U	
With integrated line filter Category C2		A
With integrated line filter Category C3		C
Communication (variants for PROFIBUS DP or USS, Modbus RTU, BACnet MS/TP available soon)		
PROFINET, EtherNet/IP	F	F

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

2) The base-load current I_L is based on the duty cycle for low overload (LO). These current values are valid for 690 V or 600 V and are specified on the rating plate of the converter.

3) The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_L) for a line impedance corresponding to u_K = 1 %. The current values are specified on the rating plate of the converter.

4) The 690 V versions of frame size FSG are only available with an integrated line filter Category C3. To operate the converters also within TN systems with grounded outer conductor, you must remove the grounding screw.

Load-side power components (Configuration with line-side components see double page before)

Output reactors	Sine-wave filters	dv/dt filters plus VPL
Article No.	Article No.	Article No.
JTA:TEU2532-0FP00-4EA0	–	**JTA:TEF1203-0GB**
	–	
	–	
	–	
	–	
	–	
	–	
JTA:TEU9932-0FP00-4EA0	–	**JTA:TEF1203-0HB**
	–	
	–	
JTA:TEU9932-0FS00-0EA0	–	**JTA:TEF1203-0JB**
	–	
JTA:TEU9932-1FC00-1BA0	–	**JTA:TEF1203-0KB**
	–	
JTA:TEU9932-0FV00-1BA0	–	**JTA:TEF1203-0LB**
	–	
JTA:TEU4732-0FA00-0BA0	–	**JTA:TEF1203-0MB**
	–	
	–	
6SL3000-2AH34-7AA0	–	**6SL3000-2DH35-8AA0**
	–	
6SL3000-2AH35-8AA0	–	
6SL3000-2AH38-1AA0	–	**6SL3000-2DH38-1AA0**
	–	
	–	
	–	

Selection and ordering data (continued)

Supplementary system components for SINAMICS G120X

Description	Article No.
IOP-2 Intelligent Operator Panel Operating languages: English, German, French, Italian, Spanish, Portuguese, Dutch, Swedish, Finnish, Russian, Czech, Polish, Turkish, Chinese Simplified	**6SL3255-0AA00-4JA2**
IOP-2 Handheld	**6SL3255-0AA00-4HA1**
BOP-2 Basic Operator Panel	**6SL3255-0AA00-4CA1**
Door mounting kit for IOP-2/BOP-2	**6SL3256-0AP00-0JA0**
SINAMICS SD card 512 MB, empty	**6SL3054-4AG00-2AA0**
SINAMICS G120 Smart Access for wireless commissioning, operation and diagnostics of the following converters using a smartphone, tablet or laptop	**6SL3255-0AA00-5AA0**
SINAMICS G120X I/O Extension Module (available soon)	**6SL3255-0BE00-0AA0**
Shield connection kits for Power Module for SINAMICS G120X	
• Frame sizes FSA to FSG	Included in the scope of delivery of the converters, can be ordered as spare part
• Frame sizes FSH to FSJ	Please observe the notes included in the operating instructions
Push-through mounting frames (available soon) for SINAMICS G120X degree of protection IP20/UL Open Type	
• Frame size FSA	**6SL3261-6GA00-0BA0**
• Frame size FSB	**6SL3261-6GB00-0BA0**
• Frame size FSC	**6SL3261-6GC00-0BA0**
• Frame size FSD	**6SL3261-6GD00-0BA0**
• Frame size FSE	**6SL3261-6GE00-0BA0**
• Frame size FSF	**6SL3261-6GF00-0BA0**
• Frame size FSG	**6SL3261-6GG00-0BA0**
Installation handles (available soon) for SINAMICS G120X	
• Frame sizes FSD to FSF	**6SL3200-0SM22-0AA0**
IP21 top covers (available soon) for SINAMICS G120X degree of protection IP20/UL Open Type	
• Frame size FSA	**6SL3266-1PA00-0BA0**
• Frame size FSB	**6SL3266-1PB00-0BA0**
• Frame sizes FSC and FSD	**6SL3266-1PD00-0BA0**
• Frame size FSE	**6SL3266-1PE00-0BA0**
• Frame sizes FSF and FSG	**6SL3266-1PF00-0BA0**
Installation kit for line-side cable connection, left (available soon) for SINAMICS G120X	
• Frame size FSH	**6SL3366-1LH00-0PA0**
SINAMICS G120X Starter Kits Converter (380 ... 480 V 3 AC, PROFINET) with IOP-2 and SINAMICS G120 Smart Access	
• 0.75 kW, FSA, without integrated line filter	**6SL3200-0AE70-0AA0**
• 0.75 kW, FSA, with integrated line filter Category C2	**6SL3200-0AE72-0AA0**
• 3 kW, FSA, with integrated line filter Category C2	**6SL3200-0AE73-0AA0**
• 7.5 kW, FSB, with integrated line filter Category C2	**6SL3200-0AE74-0AA0**
SINAMICS G120X training case	**6AG1067-2AA00-0AC1**

Spare parts for SINAMICS G120X

Description	Article No.
FPI board **(freely-programmable interface board)** (available soon) for SINAMICS G120X	
• Frame sizes FSH and FSJ	Available soon
PSB board (power supply board) (available soon) for SINAMICS G120X	
• Frame sizes FSH and FSJ	Available soon
Current transformers (available soon) for SINAMICS G120X	
• 2000 A for frame sizes FSH and FSJ	**6SL3200-0SE01-0AA0**
• 1000 A for frame size FSJ	**6SL3200-0SE02-0AA0**
Spare parts kit for Control Unit (available soon) for SINAMICS G120X	
• Frame sizes FSA to FSJ	**6SL3200-0SK10-0AA0**
Shield connection kit for Control Unit (available soon) for SINAMICS G120X	
• Frame sizes FSD to FSG	**6SL3264-1EA00-0YA0**
Shield connection kits for Power Module for SINAMICS G120X degree of protection IP20/UL Open Type	
• Frame size FSA (available soon)	**6SL3262-1AA01-0DA0**
• Frame size FSB (available soon)	**6SL3262-1AB01-0DA0**
• Frame size FSC (available soon)	**6SL3262-1AC01-0DA0**
• Frame size FSD	**6SL3262-1AD01-0DA0**
• Frame size FSE	**6SL3262-1AE01-0DA0**
• Frame size FSF	**6SL3262-1AF01-0DA0**
• Frame size FSG	**6SL3262-1AG01-0DA0**
Mounting set for SINAMICS G120X	
• Frame sizes FSD to FSG	**6SL3200-0SK08-0AA0**
Terminal cover kits for SINAMICS G120X	
• Frame size FSD	**6SL3200-0SM13-0AA0**
• Frame size FSE	**6SL3200-0SM14-0AA0**
• Frame size FSF	**6SL3200-0SM15-0AA0**
• Frame size FSG	**6SL3200-0SM16-0AA0**
External fan units for SINAMICS G120X degree of protection IP20/UL Open Type	
• Frame size FSA (available soon)	**6SL3200-0SF52-0AA0**
• Frame size FSB (available soon)	**6SL3200-0SF53-0AA0**
• Frame size FSC (available soon)	**6SL3200-0SF54-0AA0**
• Frame size FSD	**6SL3200-0SF15-0AA0**
• Frame size FSE	**6SL3200-0SF16-0AA0**
• Frame size FSF	**6SL3200-0SF17-0AA0**
• Frame size FSG	**6SL3200-0SF18-0AA0**
• Frame sizes FSH and FSJ	**6SL3300-0SF01-0AA0**
Internal fan unit (available soon) for SINAMICS G120X degree of protection IP20/UL Open Type	
• Frame sizes FSH and FSJ	**6SL3200-0SF50-0AA0**

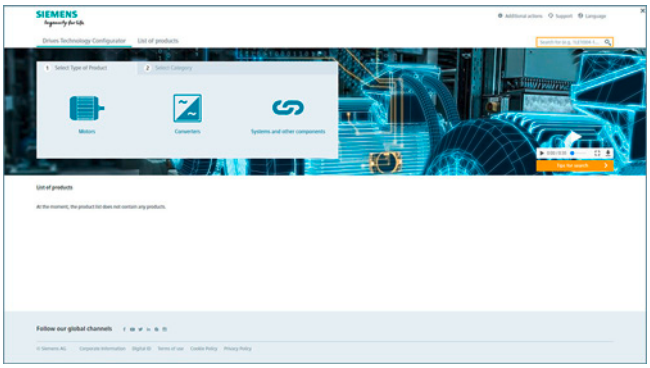
Compact Installation Instructions are supplied in hard copy form in German and English with every SINAMICS G120X.

Further technical specifications and documentation are available on the Internet at: www.siemens.com/sinamics-g120x/documentation and via the Drive Technology Configurator (DT Configurator) in the Siemens Industry Mall: www.siemens.com/dt-configurator

Overview

The Drive Technology Configurator (DT Configurator) helps you to configure the optimum drive technology products for your application – starting with gear units, motors, converters as well as the associated options and components and ending with controllers, software licenses and connection systems. Whether with little or detailed knowledge of products: preselected product groups, deliberate navigation through selection menus and direct product selection through entry of the article number support quick, efficient and convenient configuration.

In addition, comprehensive documentation comprising technical data sheets, 2D dimensional drawings/3D CAD models, operating instructions, certificates, etc. can be selected in the DT Configurator. Immediate ordering is possible by simply transferring a parts list to the shopping cart of the Industry Mall.



Drive Technology Configurator for efficient drive configuration with the following functions

- Quick and easy configuration of drive products and associated components – gear units, motors, converters, controllers, connection systems
- Configuration of drive systems for pumps, fans and compressor applications from 1 kW to 2.6 MW
- Retrievable documentation for configured products and components, such as
  - Data sheets in up to 9 languages in PDF or RTF format
  - 2D dimensional drawings/3D CAD models in various formats
  - Terminal box drawing and terminal connection diagram
  - Operating instructions
  - Certificates
  - Start-up calculation for SIMOTICS motors
  - EPLAN macros
- Support with retrofitting in conjunction with Spares On Web (www.siemens.com/sow)
- Ability to order products directly through the Siemens Industry Mall

Access to the Drive Technology Configurator

The Drive Technology Configurator can be called up without registration and without a login:
www.siemens.com/dt-configurator

Selection and ordering data

Description	Article No.
Interactive Catalog CA 01 including Drive Technology Configurator	
• German (DVD-ROM – Edition Germany)	**E86060-D4001-A500-D9**
• German, English, French, Spanish (Download – without prices)	**E86060-D4001-A510-D8-7500**

More information

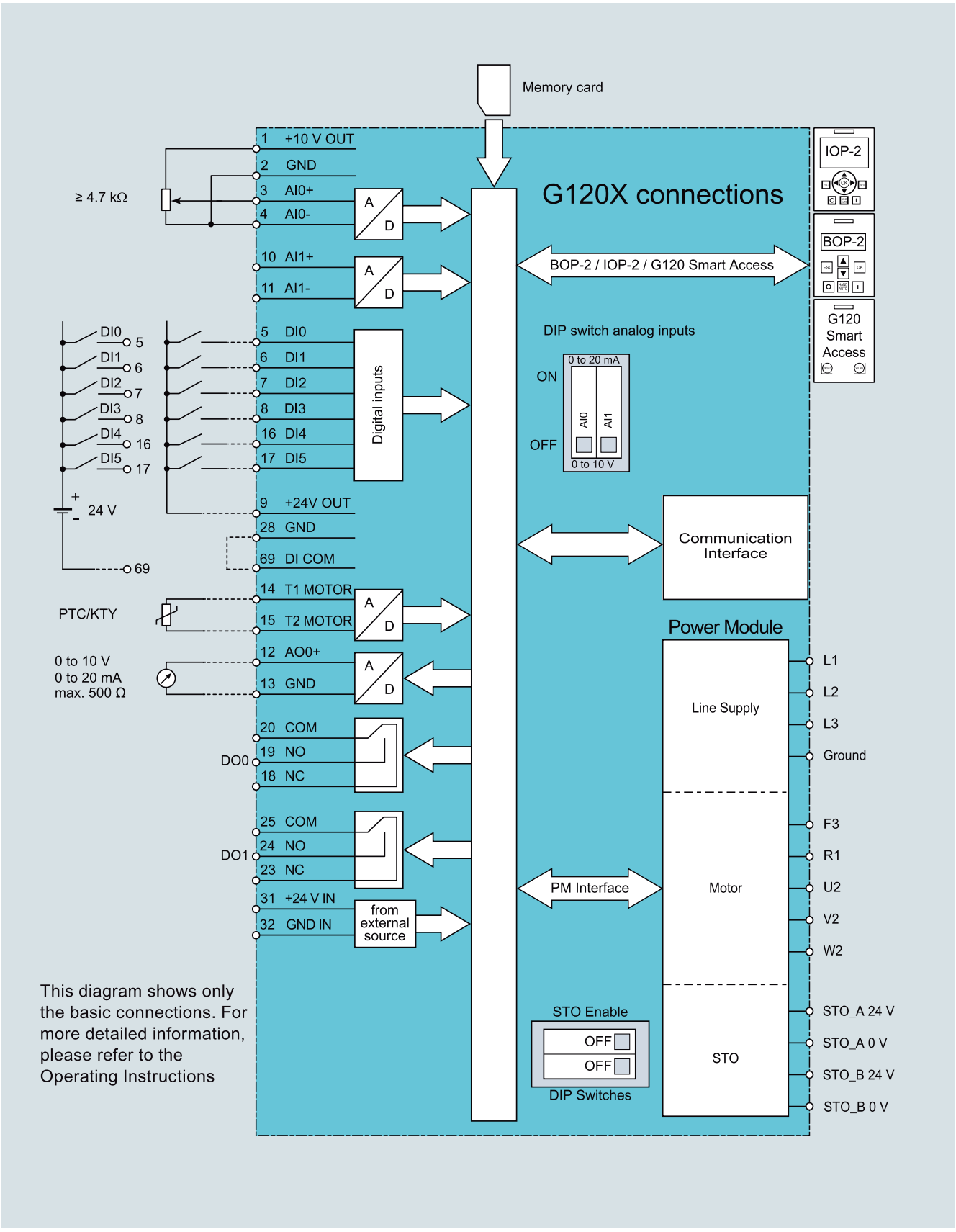
Online access to the Drive Technology Configurator

More information about the Drive Technology Configurator is available on the Internet at
www.siemens.com/dtconfigurator

Offline access to the Drive Technology Configurator in the Interactive Catalog CA 01

In addition, the Drive Technology Configurator is also included in the Interactive Catalog CA 01 – the offline version of the Siemens Industry Mall.
The Interactive Catalog CA 01 can be ordered from the relevant Siemens sales office or via the Internet:
www.siemens.com/automation/CA01

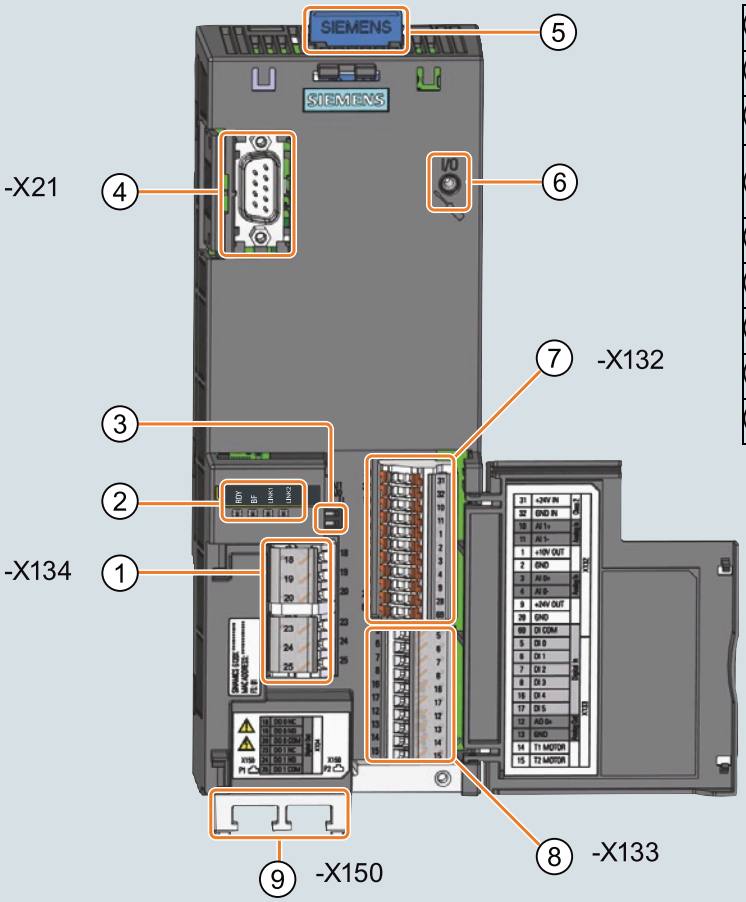
Integration



Block diagram SINAMICS G120X

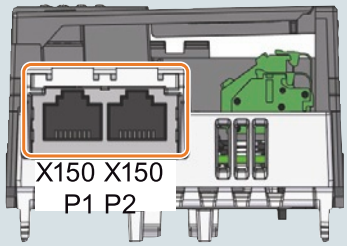
Integration (continued)

CU Interfaces

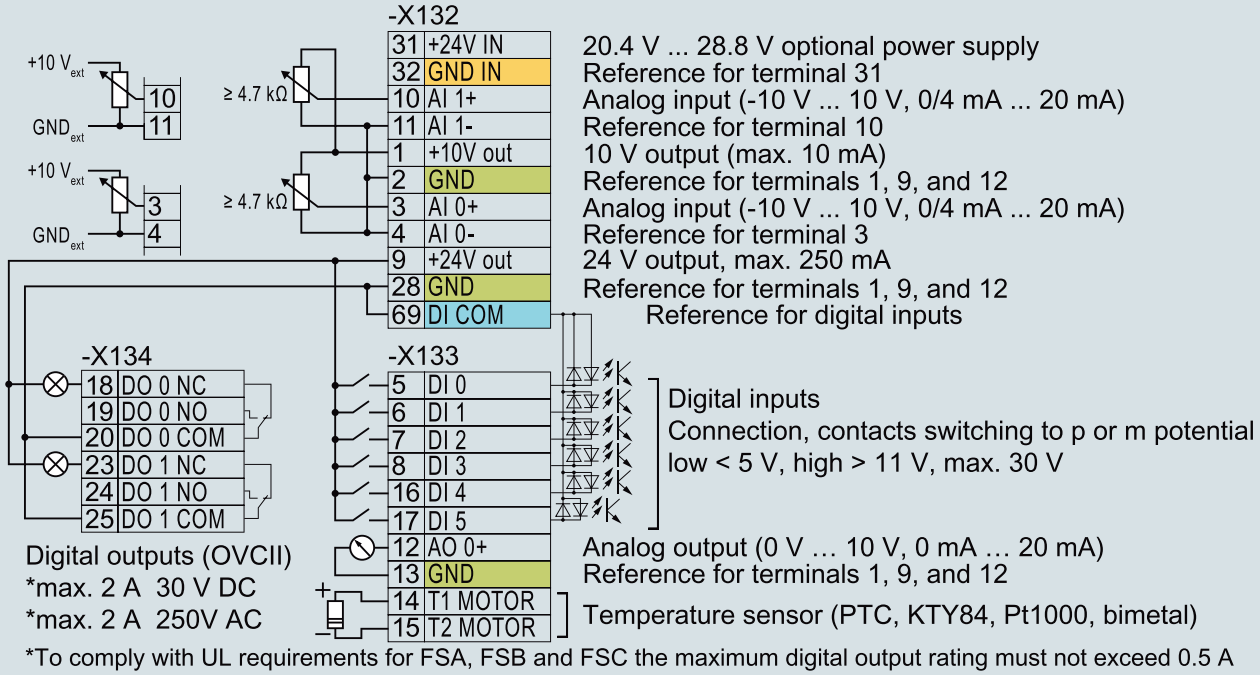


1	Terminal strip X134
2	Status LEDs
3	Analog Input selection DIP switch
4	Interface X21 for Operator Panel or SINAMICS G120 Smart Access
5	Memory card slot
6	Reserved for future use
7	Terminal strip X132
8	Terminal strip X133
9	PROFINET interface

PROFINET connections



Terminal strips with wiring example



*To comply with UL requirements for FSA, FSB and FSC the maximum digital output rating must not exceed 0.5 A

Connection example for SINAMICS G120X

Technical specifications

Unless explicitly specified otherwise, the following technical specifications are valid for all SINAMICS G120X.

General technical specifications	
Mechanical specifications	
Shock and vibration load	
• Frame sizes FSA to FSG	
-Transport in transport packaging acc. to EN 61800-5-1 and EN 60068-2-6	Class 2M3
-Vibration during operation acc. to EN 60721-3-3: 1995	Class 3M1
• Frame sizes FSH and FSJ	
-Vibration in transport packaging: Test Fc acc. to EN 60068-2-64	±1.5 mm for 5 ... 9 Hz 0.5 × *g* at 9 ... 200 Hz
-Shock in product packaging: Test Fc acc. to EN 60068-2-6	±1.5 mm for 5 ... 9 Hz 0.5 × *g* at 9 ... 200 Hz
-Vibration during operation: Test Fc acc. to EN 60068-2-6	0.075 mm at 10 ... 58 Hz 9.81 m/s^2 (1 × *g*) at > 58 ... 200 Hz
-Shock during operation: Test acc. to EN 60068-2-27	Shock type EA 49 m/s^2 (5 × *g*)/30 ms 147 m/s^2 (15 × *g*)/11 ms
Degree of protection	
• Frame sizes FSA ... FSJ	IP20/ UL Open Type
• Frame sizes FSA ... FSG	Optional IP21/ UL Open Type with IP21 top covers (available soon)
Permissible mounting position	Vertical wall mounting
Ambient conditions	
Protection class According to EN 61800-5-1	Class III (PELV1) for Power Module Class II (PELV1) for Control Unit
Touch protection According to EN 61800-5-1	Class I (with protective conductor system)
Humidity, max.	<95 % at 40 °C (104 °F), condensation and icing not permissible
Ambient temperature	
• Storage acc. to EN 60068-2-1	
-Frame sizes FSA to FSG	-40 ... +70 °C (-40 ... +158 °F)
-Frame sizes FSH and FSJ	-25 ... +55 °C (-13 ... +131 °F)
• Transport acc. to EN 60068-2-1	-40 ... +70 °C (-40 ... +158 °F)
• Operation acc. to EN 60068-2-2	
-Frame sizes FSA to FSG	-20 °C ... +55 °C (-4 ... +131 °F) with a side clearance of 5 cm or -20 °C ... +50 °C (-4 ... +122 °F) for side-by-side mounting, >45 °C (95 °F) with derating
-Frame sizes FSH and FSJ	0 ... 55 °C (32 ... 131 °F) with derating Current derating as a function of the ambient temperature
-All frame sizes with operator panel	0 ... 50 °C (32 ... 122 °F) see also derating characteristics
Environmental class in operation	
• Harmful chemical substances	
-Frame sizes FSA to FSG	Class 3C2 acc. to EN 60721-3-3 Optional: Class 3C3 acc. to EN 60721-3-3 (available soon) without operator panel
-Frame sizes FSH and FSJ	Class 3C2 acc. to EN 60721-3-3
• Organic/biological pollutants	Class 3B1 acc. to EN 60721-3-3
• Degree of pollution	2 acc. to EN 61800

Technical specifications (continued)

General technical specifications (continued)

Standards	
Compliance with standards [1]	
• Frame sizes FSA to FSG	CE, UL, cUL, RCM, SEMI F47, RoHS II, EAC, KCC, REACH
• Frame sizes FSH and FSJ	CE, UL, cUL, RCM, SEMI F47, RoHS II, EAC, REACH
Fail-safe certification	Function: Safe Torque Off (STO) External components (e.g. safety relays) are necessary for using the STO safety function.
• According to IEC 61508	SIL 3
• According to EN ISO 13849-1	PL d and Category 3
CE marking, according to	EMC Directive 2014/30/EU Low Voltage Directive 2014/35/EU
EMC Directive [1] acc. to EN 61800-3	
• Interference immunity	The SINAMICS G120X converters are tested according to the interference immunity requirements for environments according to Category C3.
• Interference emissions	
-Frame sizes FSA to FSF without integrated line filter	[2]
-Frame sizes FSA to FSG with integrated line filter Category C2	Observance of the limit values according to Category C2
-Frame sizes FSG to FSJ with integrated line filter Category C3	Observance of the limit values according to Category C3
-Frame sizes FSH and FSJ with integrated line filter Category C3 with optional line filter Category C2 and optional line reactor	Observance of the limit values according to Category C2
-Frame sizes FSA to FSC without integrated line filter with optional line filter Category C1	Observance of the limit values according to Category C1
-Frame sizes FSD to FSF with integrated line filter Category C2 with optional line filter Category C1	Observance of the limit values according to Category C1
	Note: The EMC product standard EN 61800-3 does not apply directly to a frequency converter but to a PDS (Power Drive System), which comprises the complete circuitry, motor and cables in addition to the converter. The frequency converters on their own do not generally require identification according to the EMC Directive.

[1] Additional information is available in the operating instructions on the Internet at: www.siemens.com/sinamics-g120x/documentation

[2] 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.

Technical specifications (continued)

SINAMICS G120X converters	
Integrated bus interface	
Fieldbus protocols	• PROFINET • EtherNet/IP
Hardware	2 × RJ45, max. 100 Mbit/s (full duplex), device name can be stored on the device
I/O interfaces	
Signal cable cross-section	0.15 ... 1.5 mm^2 (28 ... 16 AWG)
Digital inputs – standard	6 isolated inputs Optically isolated; Free reference potential (own potential group) NPN/PNP logic can be selected using the wiring
• Switching level: 0 →1	11 V
• Switching level: 1 →0	5 V
Digital inputs – fail-safe	1 isolated input Max. input voltage 60 V Safety function: Safe Torque Off (STO) External components (e.g. safety relays) are necessary for using the STO safety function.
Digital outputs	2 relay changeover contacts 250 V AC, 2 A (inductive load), 30 V DC, 5 A (ohmic load)
Analog inputs	2 analog inputs Differential input Switchable between voltage (-10 ... +10 V) and current (0/4 ... 20 mA) using a DIP switch 12-bit resolution Can be used as additional digital input
• Switching threshold: 0 →1	4 V
• Switching threshold: 1 →0	1.6 V
Analog outputs	1 non-isolated output Switchable between voltage (0 ... 10 V) and current (0/4 ... 20 mA) using a parameter Voltage mode: 10 V, min. burden 10 kΩ Current mode: 20 mA, max. burden 500 Ω The analog outputs have short-circuit protection
PTC/KTY interface	1 motor temperature sensor input Connectable sensors PTC, Pt1000, KTY and bimetal, accuracy ±5 °C
Voltage supply for the integrated Control Unit	24 V DC via the Power Module or by connecting to an external 20.4 ... 28.8 V DC power supply Typical input current: 500 mA at 24 V DC
Tool interfaces	
Memory card	Optional SINAMICS SD card
Operator panels	Optional BOP-2 Basic Operator Panel or IOP-2 Intelligent Operator Panel or SINAMICS G120 Smart Access

Technical specifications (continued)

SINAMICS G120X converters	
Open-loop/closed-loop control techniques	
V/f linear/quadratic/parameterizable	✓
V/f with flux current control (FCC)	✓
V/f ECO linear/quadratic	✓
Vector control, sensorless	✓
Software functions	
Setpoint input, can be parameterized	✓
Fixed frequencies	16, parameterizable
JOG	✓
Digital motorized potentiometer (MOP)	✓
Ramp smoothing	✓
Extended ramp-function generator (with ramp smoothing OFF3)	✓
Slip compensation	✓
Switchable drive data sets (DDS)	✓ (4)
Switchable command data sets (CDS)	✓ (2)
Flying restart	✓
Automatic restart after line supply failure or operating fault (AR)	✓
Technology controller (internal PID)	✓
Energy saving display	✓
3 additional, free PID controllers	✓
2-zone controller	✓
Hibernation mode with internal/external PID controller	✓
Belt monitoring with and without sensor (load torque monitoring)	✓
Dry-running/overload protection monitoring (load torque monitoring)	✓
Deragging	✓
Thermal motor protection	✓ (I^2t, sensor: PTC, Pt1000, KTY and bimetal)
Thermal converter protection	✓
Motor identification	✓
Auto-ramping (V_{dc_max} controller)	✓
Kinetic buffering (V_{dc_min} controller)	✓
Braking functions	
• DC braking	✓
• Compound braking	✓

Technical specifications (continued)

General technical specifications of the power electronics	
System operating voltage	
• Frame sizes FSA to FSG	For systems complying with IEC: 380 ... 480 V 3 AC +10 % -20 % 500 ... 690 V 3 AC +10 % -20 % For systems complying with UL: 380 ... 480 V 3 AC 500 ... 600 V 3 AC
• Frame sizes FSH and FSJ	380 ... 480 V 3 AC +10 % -15 % 500 ... 690 V 3 AC +10 % -15 %
Line supply requirements **Line impedance u_K**	
• Frame sizes FSA to FSG	4 %
• Frame sizes FSH and FSJ	A line reactor (u_K = 2 %) must be connected in series, if the short-circuit power ratio R_{SC} > 33 (315 ... 500 kW) or R_{SC} > 20 (560 kW)
Input frequency	47 ... 63 Hz
Output frequency	
• Frame sizes FSA to FSG	Control mode V/f: 0 ... 550 Hz Control mode Vector: 0 ... 240 Hz
• Frame sizes FSH and FSJ	Control mode V/f: 0 ... 150 Hz Control mode Vector: 0 ... 150 Hz
Pulse frequency	
• Frame sizes FSA to FSG	400 V: 4 kHz for converters with a rated power ≤90 kW 2 kHz for converters with a rated power ≥ 110 kW Higher pulse frequencies up to 16 kHz see derating data 690 V: 2 kHz Higher pulse frequencies up to 4 kHz see derating data
• Frame sizes FSH and FSJ	2 kHz Self-adjusting up to 4 kHz see derating data
Power factor λ	
• Frame sizes FSA to FSG	0.75 ... 0.93
• Frame sizes FSH and FSJ	0.75 ... 0.93 (with line reactor u_K = 2 %)
Offset factor cos φ	
• Frame sizes FSA to FSC	0.96
• Frame sizes FSD to FSG	0.99
• Frame sizes FSH and FSJ	0.96
Output voltage, max. as % of line voltage	97 %
Overload capability	
• Low overload (LO)	1.1 × base-load current I_L (i. e. 110 % overload) for 60 s within a cycle time of 300 s
• High overload (HO)	1.5 × base-load current I_H (i. e. 150 % overload) for 60 s within a cycle time of 600 s
Cooling	Air cooling using an integrated fan
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, >1000 m (3281 ft) see derating characteristics
Short Circuit Current Rating (SCCR) max.	100 kA see Recommended line-side overcurrent protection devices – the value depends on the fuses and circuit breakers used For more information, see: https://support.industry.siemens.com/cs/document/109762895
Protection functions	• Undervoltage • Overvoltage • Overcurrent/overload • Ground fault • Short-circuit • Stall protection • Motor blocking protection • Motor overtemperature • Converter overtemperature • Parameter locking

Technical specifications (continued)

Maximum permissible motor cable lengths SINAMICS G120X

The values specified in the table below apply with low-capacitance CY cables and with pulse frequencies set in the factory.

	Maximum permissible motor cable lengths (shielded/unshielded) in m (ft)			
	FSA to FSC	**FSD and FSE**	**FSF and FSG**	**FSH and FSJ**
Without compliance to the EMC category				
Converters without optional power components				
• 400 V versions	150/300 (492/984)	200/300 (656/984)	300/450 (984/1476)	150/200 (492/656)
• 690 V versions	–	200/300 (656/984)	300/450 (984/1476)	150/200 (492/656)
Converters with optional output reactor				
• 400 V versions	–	200/300 (656/984) [1]	300/450 (984/1476) [1]	300/450 (984/1476)
• 690 V versions	–	200/300 (656/984) [1]	300/450 (984/1476) [1]	300/450 (984/1476)
Converters with optional sine-wave filter				
• 400 V versions	Available soon	200/300 (656/984)	FSF up to 90 kW: 200/300 (656/984) FSF 110 kW and higher and FSG: 300/450 (984/1476)	–
• 690 V versions	–	–	–	–
Converters with optional dv/dt filter plus VPL				
• 400 V versions	–	FSD up to 30 kW: 350/525 (1148/1723) FSD 37 kW and FSE: 450/650 (1476/2133) [2]	450/650 (1476/2133) [2]	300/450 (984/1476)
• 690 V versions	–	350/525 (1148/1723)	450/650 (1476/2133) [2]	300/450 (984/1476)
With compliance to the EMC category [3]				
Converters with integrated line filter According to EN 61800-3 EMC Category C3				
• 400 V versions	150/– (492/–)	150/– (492/–)	150/– (492/–)	150/– (492/–) [4]
• 690 V versions	–	100/– (328/–)	150/– (492/–)	150/– (492/–) [4]
Converters with integrated line filter According to EN 61800-3 EMC Category C2				
• 400 V versions	150/– (492/–)	150/– (492/–)	150/– (492/–)	150/– (492/–)
• 690 V versions	–	100/– (328/–)	–	150/– (492/–) [5]
Converters with integrated line filter with external line filter Category C1 According to EN 55011 to comply with cable-conducted radio interference emissions according to EN 61800-3 EMC Category C1				
• 400 V versions	–	FSD: 10/– (32.8/–) FSE: 20/– (65.6/–)	FSF up to 110 kW: 10/– (32.8/–)	–
• 690 V versions	–	–	–	–
Converters without integrated line filter with external line filter Category C1 To comply with cable-conducted radio interference emissions according to EN 61800-3 EMC Category C1				
• 400 V versions	Available soon	–	–	–
• 690 V versions	–	–	–	–

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

2) Maximum overvoltage at the motor terminals <1350 V with cable lengths up to 450 m (1476 ft) shielded or 650 m (2133 ft) unshielded – maximum overvoltage at the motor terminals <1500 V with cable lengths up to 525 m (1723 ft) shielded or 800 m (2625 ft) unshielded.

3) Further information is available on the Internet at: www.siemens.com/sinamics-g120x/documentation

4) For motor cable lengths of 100 m (328 ft) up to 150 m (492 ft) with an additional basic interference suppression module (available on request).

5) Use in the first environment, Category C2 only with external line filter Category C2 and line reactor.

Characteristic curves

Derating data

Pulse frequency

Frame size	Rated power [1] at 50 Hz 400 V 3 AC		**Rated output current [2] in A** (at an ambient temperature of 45 °C (113 °F)) for a pulse frequency of							
	kW	hp	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
FSA	0.75	1	2.2	**2.2**	1.87	1.54	1.32	1.1	0.99	0.88
	1.1	1.5	3.1	**3.1**	2.635	2.17	1.86	1.55	1.395	1.24
	1.5	2	4.1	**4.1**	3.485	2.87	2.46	2.05	1.895	1.64
	2.2	3	5.9	**5.9**	5.015	4.13	3.54	2.95	2.655	2.36
	3	4	7.7	**7.7**	6.545	5.39	4.62	3.85	3.465	3.08
FSB	4	5	10.2	**10.2**	8.67	7.14	6.12	5.1	4.59	4.08
	5.5	7.5	13.2	**13.2**	11.22	9.24	7.92	6.6	5.94	5.28
	7.5	10	18	**18**	15.3	12.6	10.8	9	8.1	7.2
FSC	11	15	26	**26**	22.1	18.2	15.6	13	11.7	10.4
	15	20	32	**32**	27.2	22.4	19	18	14.4	12.8
FSD	18.5	25	38	**38**	32.3	26.6	22.8	19	17.1	15.2
	22	30	45	**45**	38.2	31.5	27	22.5	20.2	18
	30	40	60	**60**	51	42	36	30	27	24
	37	50	75	**75**	63.7	52.5	45	37.5	33.7	30
FSE	45	60	90	**90**	76.5	63	54	45	40.5	36
	55	75	110	**110**	93.5	77	66	55	49.5	44
FSF	75	100	145	**145**	123.2	101.5	87	72.5	65.2	58
	90	125	178	**178**	151	124.6	107	89	80.1	71.2
	110	150	**205**	143.5	103	82	–	–	–	–
	132	200	**250**	175	125	100	–	–	–	–
FSG	160	250	**302**	211.4	151	121	–	–	–	–
	200	300	**370**	259	185	148	–	–	–	–
	250	400	**477**	334	239	191	–	–	–	–
FSH [3]	315	400	**585**	468	–	–	–	–	–	–
	355	450	**655**	524	–	–	–	–	–	–
	400	500	**735**	588	–	–	–	–	–	–
FSJ [3]	450	500	**840**	672	–	–	–	–	–	–
	500	600	**910**	728	–	–	–	–	–	–
	560	700	**1021**	817	–	–	–	–	–	–

The rated output currents in **bold** apply for the standard pulse frequency.

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

[2] Frame sizes FSA to FSG: Output current based on the base-load current I_L. The base-load current I_L is based on the duty cycle for low overload (LO). Frame sizes FSH and FSJ: Output current based on the rated output current I_{rated}. The rated output current I_{rated} can be used up to 100 %; however, without overload.

[3] In the factory setting, these converters start at a pulse frequency of 4 kHz and reduce it automatically under load to the associated required frequencies. As the load decreases, the pulse frequency increases automatically up to 4 kHz.

Characteristic curves (continued)

Frame size	Rated power [1] at 50 Hz 690 V 3 AC		**Rated output current in A** (at an ambient temperature of 45 °C (113 °F)) for a pulse frequency of							
	kW	hp	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
FSD	3	4	**6**	3.6	–	–	–	–	–	–
	4	5	**7**	4.2	–	–	–	–	–	–
	5.5	7.5	**10**	6	–	–	–	–	–	–
	7.5	10	**13**	7.8	–	–	–	–	–	–
	11	10	**16**	9.6	–	–	–	–	–	–
	15	15	**21**	12.6	–	–	–	–	–	–
	18.5	20	**25**	15	–	–	–	–	–	–
	22	25	**29**	17.4	–	–	–	–	–	–
	30	30	**38**	22.8	–	–	–	–	–	–
	37	40	**46**	27.6	–	–	–	–	–	–
FSE	45	50	**58**	34.8	–	–	–	–	–	–
	55	60	**68**	40.8	–	–	–	–	–	–
FSF	75	75	**90**	54	–	–	–	–	–	–
	90	100	**112**	67.2	–	–	–	–	–	–
	110	125	**128**	76.8	–	–	–	–	–	–
	132	150	**158**	94.8	–	–	–	–	–	–
FSG	160	150	**196**	118	–	–	–	–	–	–
	200	200	**236**	142	–	–	–	–	–	–
	250	250	**288**	173	–	–	–	–	–	–
FSH [2]	315	350	**330**	215	–	–	–	–	–	–
	355	400	**385**	250	–	–	–	–	–	–
	400	450	**420**	273	–	–	–	–	–	–
	450	500	**470**	306	–	–	–	–	–	–
FSJ [2]	500	500	**520**	338	–	–	–	–	–	–
	560	600	**580**	377	–	–	–	–	–	–
	630	700	**650**	423	–	–	–	–	–	–

The rated output currents in **bold** apply for the standard pulse frequency.

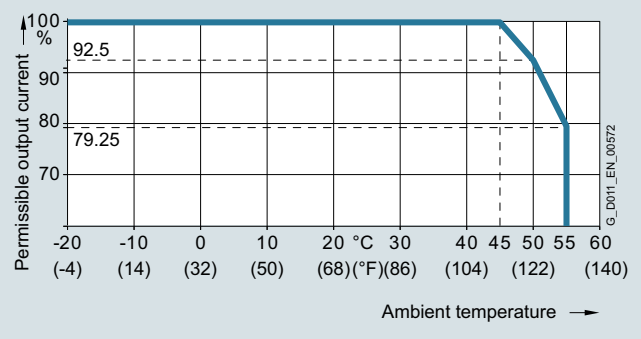
[1] Rated power based on the base-load current I_L. The base-load current I_L is based on the duty cycle for low overload (LO).

[2] In the factory setting, these converters start at a pulse frequency of 4 kHz and reduce it automatically under load to the associated required frequencies. As the load decreases, the pulse frequency increases automatically up to 4 kHz. The values of the rated currents apply to a pulse frequency of 2 kHz and are reached at any time by automatic adaptation of the output pulse frequency.

Characteristic curves (continued)

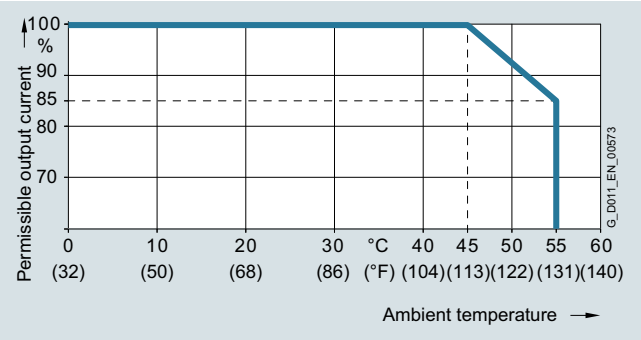
Ambient temperature

Frame sizes FSA to FSG:



Permissible output current as a function of ambient temperature for SINAMICS G120X, frame sizes FSA to FSG, for low overload (LO)

Frame sizes FSH and FSJ:

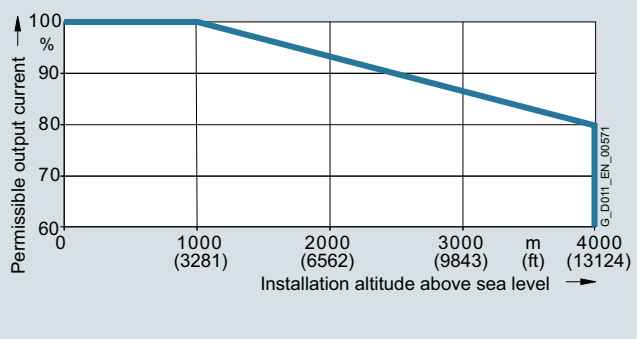


Permissible output current as a function of ambient temperature for SINAMICS G120X, frame sizes FSH and FSJ, for low overload (LO)

The operating temperature ranges of the operator panels should be taken into account. The temperature ranges are specified in the Technical specifications section under Operator panels.

Installation altitude

Frame sizes FSA to FSJ:



Permissible output current as a function of installation altitude for SINAMICS G120X for low overload (LO)

The connected motors, power elements and components must be considered separately.
Permissible line supplies as a function of the installation altitude

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

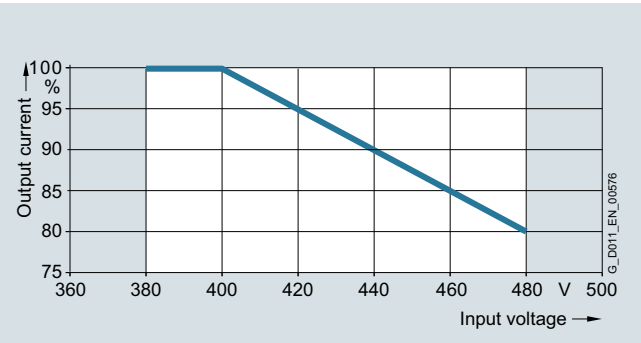
When using converters on TN systems with voltages ≥ 600 V and at installation altitudes of 2000 m to 4000 m, the TN line supply must have a grounded neutral point established using an isolation transformer.

System operating voltage

400 V converters frame sizes FSA to FSG:

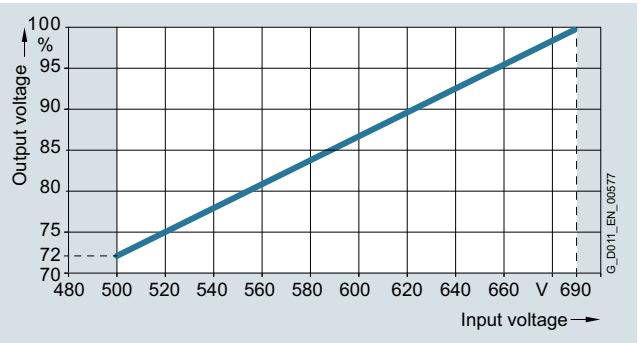
(Available soon)

400 V converters frame sizes FSH and FSJ:



Permissible output current as a function of input voltage for 400 V SINAMICS G120X converters, frame sizes FSH and FSJ, for low overload (LO)

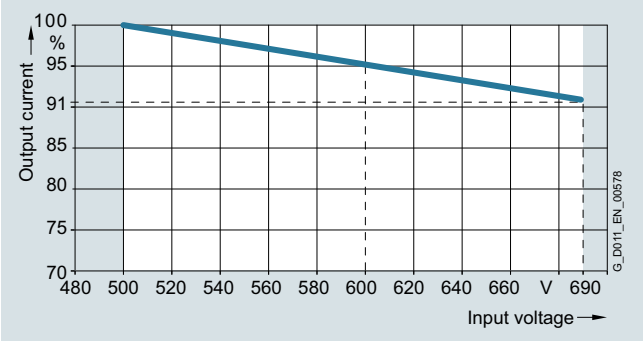
600 V converters frame sizes FSA to FSG:



Permissible output voltage as a function of input voltage for 600 V SINAMICS G120X converters, frame sizes FSA to FSG, for low overload (LO)

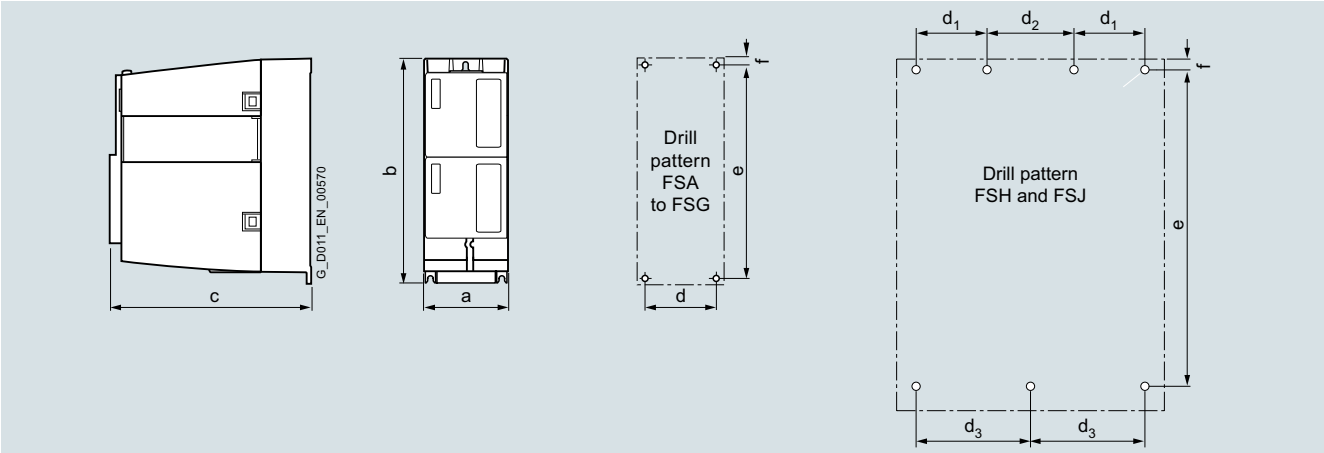
Characteristic curves (continued)

600 V converters frame sizes FSH and FSJ:



Permissible output current as a function of input voltage for 600 V SINAMICS G120X converters, frame sizes FSH and FSJ, for low overload (LO)

Dimensional drawings



Principle dimension drawing and drill pattern for SINAMICS G120X

Frame size	Dimensions in mm (inches)			Drilling dimensions in mm (inches)						Cooling clearance [2] in mm (inches)			Mounting
	a (width)	b (height)	c (depth) [1]	d	d_1	d_2	d_3	e	f	top	bottom	front	With screws (plus washers and nuts)
FSA	73 (2.87)	232 (9.13)	209 (8.23)	55 (2.17)	–	–	–	221.5 (8.72)	5.5 (0.22)	80 (3.15)	100 (3.94)	0 (0)	4 × M4
FSB	100 (3.94)	275 (10.83)	209 (8.23)	80 (3.15)	–	–	–	265 (10.43)	7 (0.28)	80 (3.15)	100 (3.94)	0 (0)	4 × M4
FSC	140 (5.51)	295 (11.61)	209 (8.23)	118 (4.65)	–	–	–	283 (11.14)	7 (0.28)	80 (3.15)	100 (3.94)	0 (0)	4 × M5
FSD	200 (7.87)	472 (18.58)	239 (9.41)	170 (6.69)	–	–	–	430 (16.93)	15 (0.59)	300 (11.81)	350 (13.78)	0 (0)	4 × M5
FSE	275 (10.83)	551 (21.69)	239 (9.41)	230 (9.06)	–	–	–	509 (20.04)	11 (043)	300 (11.81)	350 (13.78)	0 (0)	4 × M6
FSF	305 (12.01)	709 (27.91)	360 (14.17)	270 (10.63)	–	–	–	680 (26.77)	16.6 (0.65)	300 (11.81)	350 (13.78)	0 (0)	4 × M8
FSG	305 (12.01)	999 (39.33)	360 (14.17)	265 (10.43)	–	–	–	970.5 (38.21)	18.5 (0.73)	300 (11.81)	350 (13.78)	0 (0)	4 × M10
FSH	548 (21.57)	1696 (66.77)	393 (15.47)	–	160 (6.3)	150 (5.91)	225 (8.86)	1419 (55.87)	21 (0.83)	200 (7.87)	250 (9.84)	100 (3.94)	7 × M8
FSJ	801 (31.54)	1621 (63.82)	393 (15.47)	–	200 (7.87)	290 (11.42)	345 (13.58)	1399 (55.08)	21 (0.83)	200 (7.87)	250 (9.84)	100 (3.94)	7 × M8

[1] Increased depth for frame sizes FSA to FSG:
- When the operator panel is plugged on, the depth increases by 9 mm (0.35 in)
- When SINAMICS G120 Smart Access is plugged on, the depth increases by 7 mm (0.28 in)

[2] The converters in frame sizes FSA to FSG can be mounted side by side. A side clearance of 1 mm (0.04 in) is recommended for tolerance-related reasons. A side clearance of 30 mm (1.18 in) is required between the converters for frame sizes FSH and FSJ.

Overview

Operator panel	IOP-2 and IOP-2 Handheld Intelligent Operator Panel	BOP-2 Basic Operator Panel
Description	 	
	Thanks to the high-contrast color display, menu-based operation and the wizards, commissioning of the standard drives is easy. Application wizards guide the user through the commissioning of important applications such as pumps, fans, compressors, or conveyor systems.	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.
Possible applications	• Can be mounted directly on the converter • Can be mounted in a control cabinet door using a door mounting kit (achievable degree of protection is IP55/ UL Type 12 enclosure) • Available as handheld version • The following languages are integrated in the IOP-2: English, German, French, Italian, Spanish, Portuguese, Dutch, Swedish, Finnish, Russian, Czech, Polish, Turkish, Chinese Simplified	• Can be mounted directly on the converter • Can be mounted in the control cabinet door using a door mounting kit (achievable degree of protection is IP55/UL Type 12)
Quick commissioning without expert knowledge	• Standard commissioning using the clone function • For quicker access, the parameter block names can be directly entered respectively changed on the IOP-2 using the virtual keyboard. • User-defined parameter list with a reduced number of self-selected parameters • Simple commissioning of standard applications using application-specific wizards; it is not necessary to know the parameter structure • Simple local commissioning using the handheld version • Commissioning is possible largely without documentation	• Standard commissioning using the clone function
High degree of operator friendliness and intuitive operation	• Intuitive navigation by operating with a sensor control field • Graphic color display to show status values such as pressure or flow rate in the form of scalar values, bar-type diagrams, or trend displays • Status display with freely selectable units to specify physical values • Direct manual operation of the drive – you can simply toggle between the automatic and manual modes • Simple cloning of specific settings of the IOP-2 user interface.	• 2-line display for showing up to 2 process values with text • Status display of predefined units • Direct manual operation of the drive – you can simply toggle between the automatic and manual modes
Minimization of maintenance times	• Diagnostics using plain text display, can be used locally on-site without documentation • The support function is used to determine the drive data for the Power Module, Control Unit and IOP-2 and makes this available as a two-dimensional code (data matrix/QR code) • Easily upgradable to new functional status via USB interface	• Diagnostics with menu prompting with 7-segment display

Overview

IOP-2 Intelligent Operator Panel

IOP-2 Intelligent Operator Panel

The Intelligent Operator Panel IOP-2 is a very user-friendly and powerful operator panel for the SINAMICS G120, SINAMICS G120C, SINAMICS G120X, SINAMICS G110D, SINAMICS G120D, SINAMICS G110M and SIMATIC ET 200pro FC-2.

The IOP-2 supports both newcomers and drive experts. Thanks to the membrane keyboard with a central sensor control field, high-contrast color displays, menu-based operation and application wizards, it is easy to commission 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 two process values can be graphically visualized and up to four process values can be numerically visualized on the status screen/display. Process values can also be displayed in technological units.

The IOP-2 supports standard commissioning of identical drives. For this purpose, a parameter list can be copied from a converter into the IOP-2 and downloaded into other drive units of the same type as required.

The IOP-2 can be installed in control cabinet doors using the optionally available door mounting kit.

Updating the IOP-2

The IOP-2 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-2. 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-2 [1].

The IOP-2 is supplied with power via the USB interface during an update.

IOP-2 Handheld

IOP-2 Handheld

A handheld version of the IOP-2 can be ordered for mobile use. In addition to the IOP-2, it includes a housing with rechargeable batteries, a charging unit, an RS232 connecting cable, and a USB 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 10 hours.

To connect the IOP-2 Handheld to SINAMICS G110D, SINAMICS G120D, SINAMICS G110M and SIMATIC ET 200pro FC-2, the RS232 connecting cable with optical interface is required in addition.

[1] Information on updates for the IOP-2 is available at https://support.industry.siemens.com/cs/document/67273266

Selection and ordering data

Description	Article No.
IOP-2 Intelligent Operator Panel For use with SINAMICS G120 SINAMICS G120C SINAMICS G120X SINAMICS G110D SINAMICS G120D SINAMICS G110M SIMATIC ET 200pro FC-2 Operating languages: English, German, French, Italian, Spanish, Portuguese, Dutch, Swedish, Finnish, Russian, Czech, Polish, Turkish, Chinese Simplified	**6SL3255-0AA00-4JA2**
IOP-2 Handheld For use with SINAMICS G120 SINAMICS G120C SINAMICS G120X SINAMICS G110D SINAMICS G120D SINAMICS G110M SIMATIC ET 200pro FC-2 Included in the scope of delivery: • IOP-2 • Handheld housing • Rechargeable batteries (4 × AA) • Charging unit (international) • RS232 connecting cable [1] 3 m (9.84 ft) long, can be used in combination with SINAMICS G120 SINAMICS G120C SINAMICS G120X • USB cable 1 m (3.28 ft) long	**6SL3255-0AA00-4HA1**
Accessories	
Door mounting kit For mounting an operator panel in control cabinet doors with sheet steel thicknesses of 1 ... 3 mm (0.04 in ... 0.12 in) Degree of protection IP55 Included in the scope of delivery: • Seal • Mounting material • Connecting cable 5 m (16.4 ft) long, also supplies voltage to the IOP-2 directly via the converter	**6SL3256-0AP00-0JA0**
RS232 connecting cable 2.5 m (8.20 ft) long, with optical interface for connecting the IOP-2 Handheld to SINAMICS G110D SINAMICS G120D SINAMICS G110M SIMATIC ET 200pro FC-2	**3RK1922-2BP00**

Benefits

- New device design
  - Intuitive user interface – membrane keyboard with central sensor control field
  - High-contrast color display with a range of display options
  - IOP-2 device design open for future functional expansions (e.g. device functions, wizards, languages)
  - Easily upgradable to new functional status via USB interface
- Commissioning
  - Simple commissioning via wizards
  - The "Fieldbus Interface Settings" wizard is used for easy configuration of the Ethernet interface
  - Fast standard commissioning of converters thanks to cloning function
  - For quicker access, the parameter block names can be directly entered respectively changed on the IOP-2 using the virtual keyboard.
  - Simple local commissioning on-site using the handheld version
- Operator control and monitoring
  - Simple, individual local drive control (start/stop, setpoint value specification, change in direction of rotation)
  - Application-specific scenarios such as operator concepts with additional external operating elements can be implemented easily
  - Simple cloning of specific settings of the IOP-2 user interface, such as status screen, language settings, lighting duration, date/time settings, parameter backup mode and “My Parameters” – settings made once can such be easily transferred to many further IOP-2 Intelligent Operator Panels
- Diagnostics
  - Rapid diagnostics thanks to on-site plain text display
  - Integrated plain text help function for local display and resolution of fault messages
- Support function
  - Used to determine the drive data for the Power Module, Control Unit and IOP-2 (article number, serial number, firmware version, error statuses) and makes this available as a two-dimensional code (data matrix/QR code)
  - Allows easy contact with Customer Support via a data matrix/QR code generated on the IOP-2
  - Quick access via mobile devices (e.g. smartphones, tablets) to product information, documentation, FAQs, contact persons via a two-dimensional code generated on the IOP-2 (data matrix/QR code)
  - Scanning and evaluating of the two-dimensional data matrix code using the Industry Online Support app (https://support.industry.siemens.com/cs/ww/en/sc/2067), see also: https://support.industry.siemens.com/cs/document/109748340

[1] For use in conjunction with SINAMICS G110D, SINAMICS G120D, SINAMICS G110M and SIMATIC ET 200pro FC-2, the RS232 connecting cable with optical interface is required (Article No.: **3RK1922-2BP00**). The cable must be ordered separately.

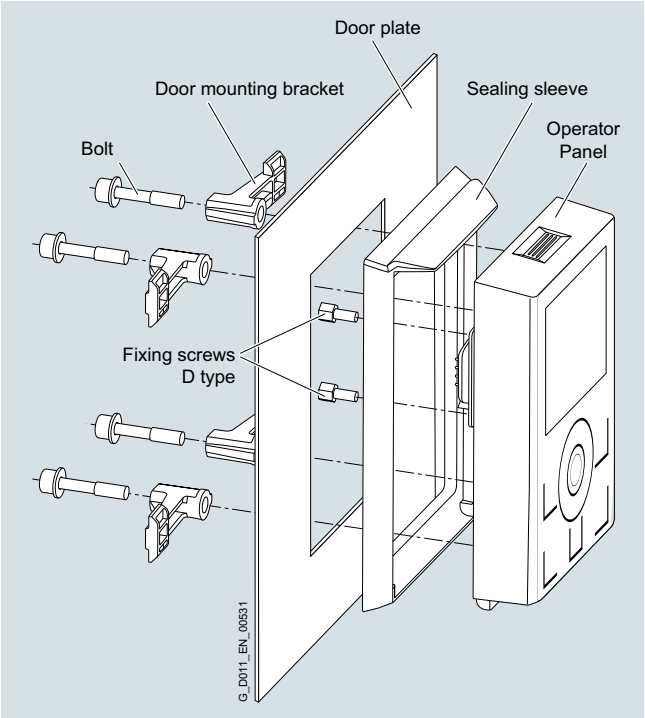
Integration

Using the IOP-2 with the converters

	• SINAMICS G120 with CU230P-2, CU240E-2 or CU250S-2 • SINAMICS G120C • SINAMICS G120X	• SINAMICS G110D • SINAMICS G120D • SINAMICS G110M • SIMATIC ET 200pro FC-2
Plugging the IOP-2 onto the converter (Voltage supply via converter)	✓	–
Door mounting of the IOP-2 with the door mounting kit (Voltage supply via converter. For this purpose, the IOP-2 must be connected up by means of the connecting cable supplied with the door mounting kit.)	✓	–
Mobile use of the IOP-2 Handheld (supplied from rechargeable batteries)	✓	✓(RS232 connecting cable with optical interface required, article number 3RK1922-2BP00)

Door mounting

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. In the case of door mounting, the IOP-2 Operator Panel achieves degree of protection IP55/UL Type 12 enclosure.



Door mounting kit with plugged-on IOP-2

Technical specifications

	IOP-2 6SL3255-0AA00-4JA2	IOP-2 Handheld 6SL3255-0AA00-4HA1
Display	High-contrast color display, a variety of display options	
• Resolution	320 × 240 pixels	
Operator panel	Membrane keyboard with central sensor control field	
Operating languages	English, German, French, Italian, Spanish, Portuguese, Dutch, Swedish, Finnish, Russian, Czech, Polish, Turkish, Chinese Simplified	
Ambient temperature		
• During transport and storage	-40 ... +70 °C (-40 ... +158 °F)	-20 ... +55 °C (-4 ... +131 °F)
• During operation	For direct mounting on the converter: 0 ... 50 °C (32 ... 122 °F) For installation with door mounting kit: 0 ... 55 °C (32 ... 131 °F)	0 ... 40 °C (32 ... 104 °F)
Humidity	Relative humidity < 95 %, non-condensing	
Degree of protection	For direct mounting on the converter: IP20 For installation with door mounting kit: IP55, UL Type 12 enclosure	IP20
Dimensions (H × W × D)	106.86 × 70 × 19.65 mm (4.21 × 2.76 × 0.77 in)	195.04 × 70 × 37.58 mm (7.68 × 2.76 × 1.48 in)
Weight, approx.	0.134 kg (0.3 lb)	0.724 kg (1.6 lb)
Compliance with standards	CE, RCM, cULus, EAC, KC-REM-S49-SINAMICS	

Overview

BOP-2 Basic Operator Panel

The BOP-2 Basic Operator Panel 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 converter 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 a converter 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).

Selection and ordering data

Description	Article No.
BOP-2 Basic Operator Panel	**6SL3255-0AA00-4CA1**
Accessories	
Door mounting kit For mounting an operator panel in control cabinet doors with sheet steel thicknesses of 1 ... 3 mm (0.04 ... 0.12 in) Degree of protection IP55 Included in the scope of delivery: • Seal • Mounting material • Connecting cable 5 m/16.4 ft long, also supplies voltage to the operator panel directly via the converter	**6SL3256-0AP00-0JA0**

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 converter
- User-friendly user interface:
  - Easy navigation using clear menu structure and clearly assigned control keys
  - Two-line display

Overview

SINAMICS SD memory card

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

- Parameter settings can be written from the memory card to the converter or saved from the converter 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-2 or BOP-2.
- If firmware is stored on the memory card, the firmware can be upgraded/downgraded during power-up.

Note:

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

Selection and ordering data

Description	Article No.
SINAMICS SD card 512 MB, empty	**6SL3054-4AG00-2AA0**

Overview

SINAMICS G120 Smart Access

It is also easy and convenient to commission and operate the SINAMICS G120, SINAMICS G120C and SINAMICS G120X converters of firmware V4.7 SP6 and higher using the web server module SINAMICS G120 Smart Access and a connected smartphone, tablet or laptop.

Benefits

- Wireless commissioning, operation and diagnostics via mobile device or laptop thanks to the optional SINAMICS G120 Smart Access
- Easy access to the converter in difficult-to-access areas
- Intuitive user interface and commissioning wizard
- Free choice of terminal devices as the web server works with all common web browsers, such as iOS, Android, Windows, Linux and Mac OS

Function

- Commissioning using commissioning wizard
- Setting and saving parameters
- Testing motor in JOG mode
- Monitoring of converter data
- Quick diagnostics
- Saving the settings and restoring to factory settings

Selection and ordering data

Description	Article No.
SINAMICS G120 Smart Access For wireless commissioning, operation and diagnostics of the following converters using a smartphone, tablet or laptop • SINAMICS G120C • SINAMICS G120 together with the CU230P-2 and CU240E-2 Control Units (without fail-safe versions) • SINAMICS G120X	**6SL3255-0AA00-5AA0**

Technical specifications

	SINAMICS G120 Smart Access 6SL3255-0AA00-5AA0
Operating system	iOS, Android, Windows, Linux, Mac OS
Languages	Support of six languages: English, French, German, Italian, Spanish, Chinese
Ambient temperature	
• During storage and transport	-40 ... +70 °C (-40 ... +158 °F)
• During operation	0 ... 50 °C (32 ... 122 °F) if the Smart Access is plugged directly into the converter
Humidity	< 95 %, non-condensing
Degree of protection	Depending on the degree of protection of the converter, max. IP55/UL Type 12 enclosure
Dimensions	
• Width	70 mm (2.76 in)
• Height	108.9 mm (4.29 in)
• Depth	17.3 mm (0.68 in)
Weight, approx.	0.08 kg (0.18 lb)
Compliance with standards	CE, FCC, SRRC, WPC, ANATEL, BTK

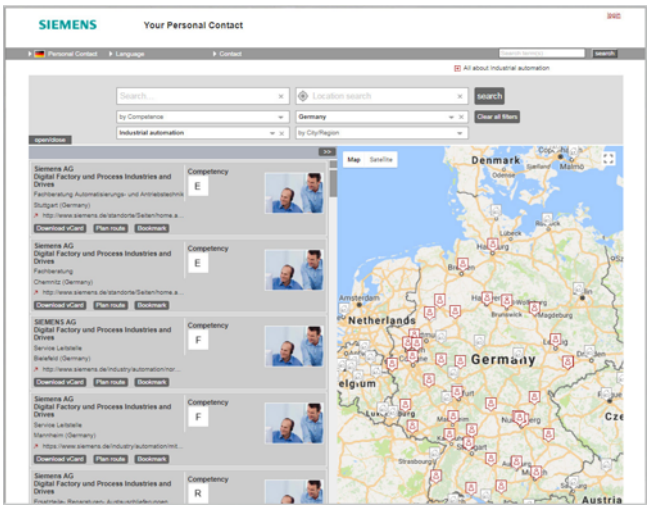
Integration

SINAMICS G120X frame size FSD with plugged-on SINAMICS G120 Smart Access

The optional SINAMICS G120 Smart Access is simply plugged onto the converter and is available for the following converters of firmware V4.7 SP6 and higher.

- SINAMICS G120C
- SINAMICS G120 together with the CU230P-2 and CU240E-2 Control Units (without fail-safe versions)
- SINAMICS G120X

Partner at Siemens



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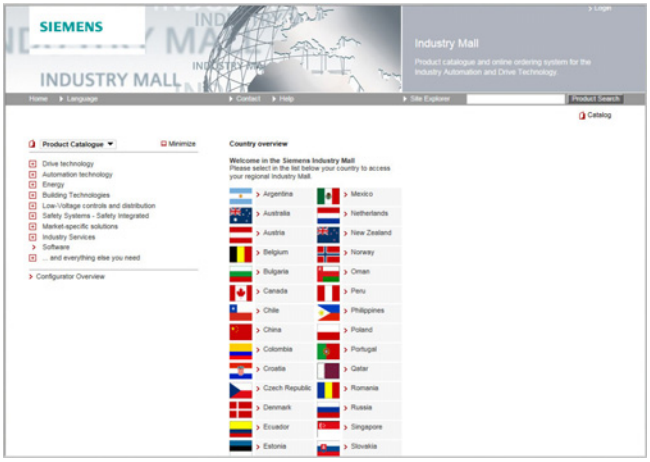

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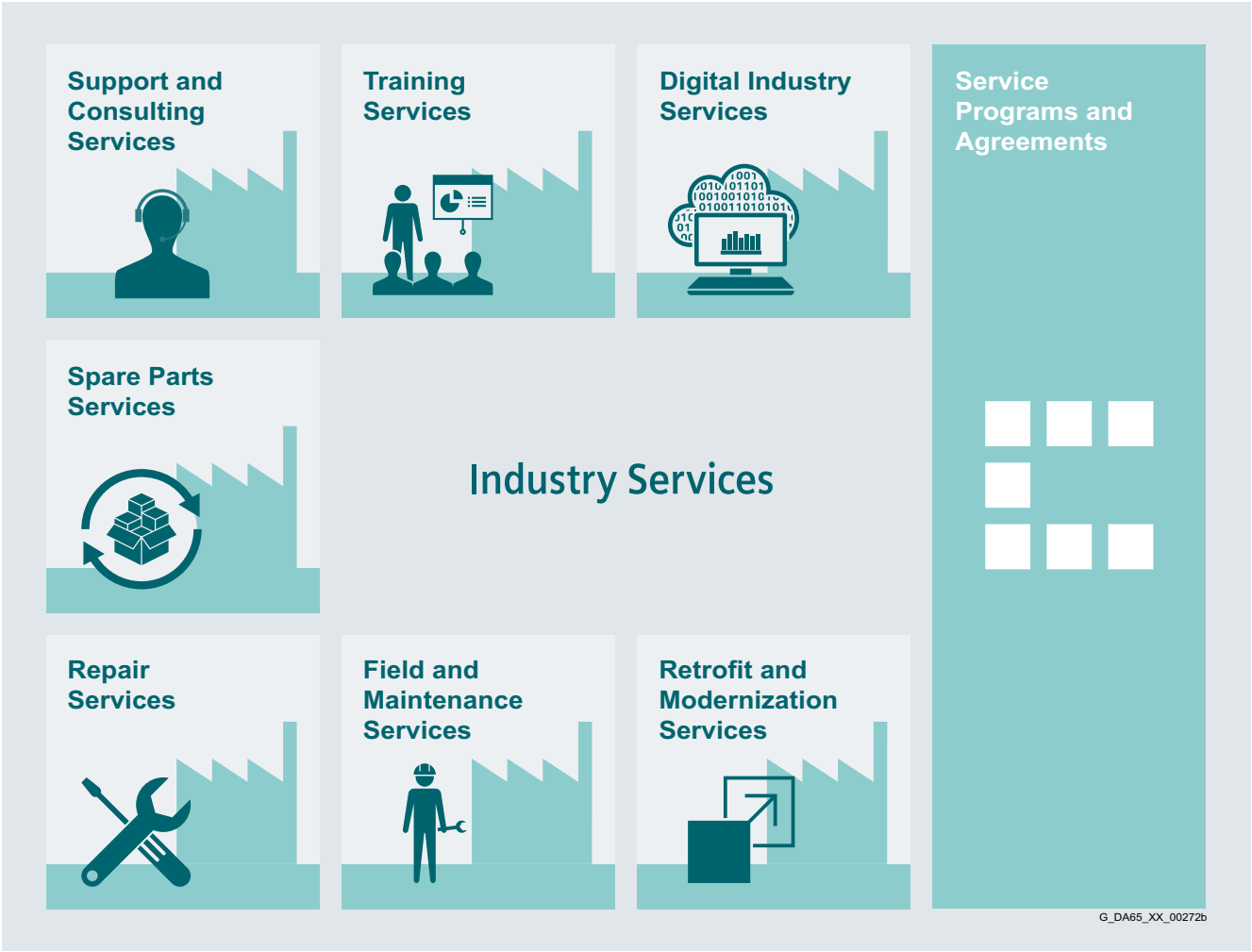
Overview



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Since not all spare parts can be kept in stock at all times, Siemens offers a preventive measure for spare parts provisioning on the customer's premises with optimized **Spare Parts Packages** for individual products, custom-assembled drive components and entire integrated drive trains – including risk consulting.

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https://support.industry.siemens.com/cs/ww/en/sc/2110

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Overview

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- for stand-alone software products and software products forming a part of a product or project, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany"[1)] and/or
- for other supplies and/or services the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"[1)].
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1.2 For customers with a seat or registered office outside Germany

For customers with a seat or registered office outside Germany, the following applies subordinate to the T&C:

- for Plant Analytics Services the "Standard Terms and Conditions for Plant Analytics Services"[1)] and/or
- for services the "International Terms & Conditions for Services"[1)] supplemented by "Software Licensing Conditions"[1)] and/or
- for other supplies of hard- and/or software the "International Terms & Conditions for Products"[1)] supplemented by "Software Licensing Conditions" [1)].

1.3 For customers with master or framework agreement

To the extent our supplies and/or services offered are covered by an existing master or framework agreement, the terms and conditions of that agreement shall apply instead of T&C.

2. Prices

The prices are in € (Euro) ex point of delivery, exclusive of packaging.

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

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

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation.

You will find a detailed explanation of the metal factor on the page headed "Metal surcharges" – see catalog D 31.5.

To calculate the surcharge (except in the cases of dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog –especially with regard to data, dimensions and weights given –these are subject to change without prior notice.

[1)] The text of the Terms and Conditions of Siemens AG can be downloaded at
www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

4. Export regulations

We shall not be obligated to fulfill any agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes and/or other sanctions.

Export may be subject to license. We shall indicate in the delivery details whether licenses are required under German, European and US export lists.

Our products are controlled by the U.S. Government (when labeled with "ECCN" unequal "N") and authorized for export only to the country of ultimate destination for use by the ultimate consignee or end-user(s) herein identified. They may not be resold, transferred, or otherwise disposed of, to any other country or to any person other than the authorized ultimate consignee or end-user(s), either in their original form or after being incorporated into other items, without first obtaining approval from the U.S. Government or as otherwise authorized by U.S. law and regulations.

The export indications can be viewed in advance in the description of the respective goods on the Industry Mall, our online catalog system. Only the export labels "AL" and "ECCN" indicated on order confirmations, delivery notes and invoices are authoritative.

Products labeled with "AL" unequal "N" are subject to European / national export authorization. Products without label, with label "AL:N" / "ECCN:N", or label "AL:9X9999" / "ECCN: 9X9999" may require authorization from responsible authorities depending on the final end-use, or the destination.

If you transfer goods (hardware and/or software and/or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you must comply with all applicable national and international (re-)export control regulations.

If required for the purpose of conducting export control checks, you (upon request by us) shall promptly provide us with all information pertaining to the particular end customer, final disposition and intended use of goods delivered by us respectively works and services provided by us, as well as to any export control restrictions existing in this relation.

The products listed in this catalog may be subject to European/German and/or US export regulations. Any export requiring approval is therefore subject to authorization by the relevant authorities.

Get more information

SINAMICS G120X infrastructure converters for HVAC/Water/Wastewater:
www.siemens.com/sinamics-g120x

Catalog D 31.5:
www.siemens.com/d31-5

SIMOTICS electric motors:
www.siemens.com/simotics

Motion Control Systems and Solutions for production machine and machine tool equipment:
www.siemens.com/motioncontrol

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Siemens AG
Digital Factory Division
Motion Control
Postfach 31 80
91050 ERLANGEN
GERMANY

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Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit
https://www.siemens.com/industrialsecurity

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

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Discover the advantages of Integrated Drive Systems at a glance