SIEMENS

SINAMICS G120: The modular inverter

Space-saving, safe and rugged

siemens.com/sinamics-g120

SINAMICS G120

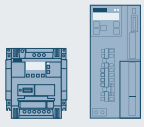
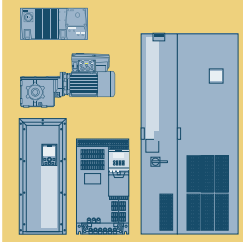
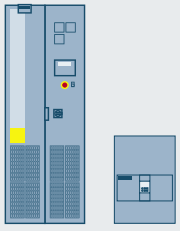
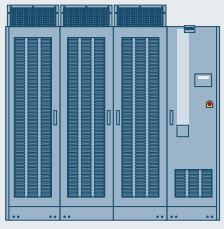
Space-saving, reliable and rugged

Irrespective of whether pumping, ventilating, compressing, moving or processing: SINAMICS G120 is the universal drive to address the widest range of requirements. It leverages its strengths in general machinery construction as well as in the automotive, textile and packaging industries.

Its modular design and wide range of power ratings extending from 0.55 kW up to 250 kW always ensures that you can configure the optimum inverter for your particular application. What is also clear:
With SINAMICS G120, you benefit from the wide range of possibilities that its modular design offers – including remaining flexible and saving costs, thanks to the reduced spare part stocking, for example. And all of this is complemented by the high degree of user-friendliness – from installation through to maintenance. SINAMICS G120 is part of the comprehensive family of SINAMICS drives.

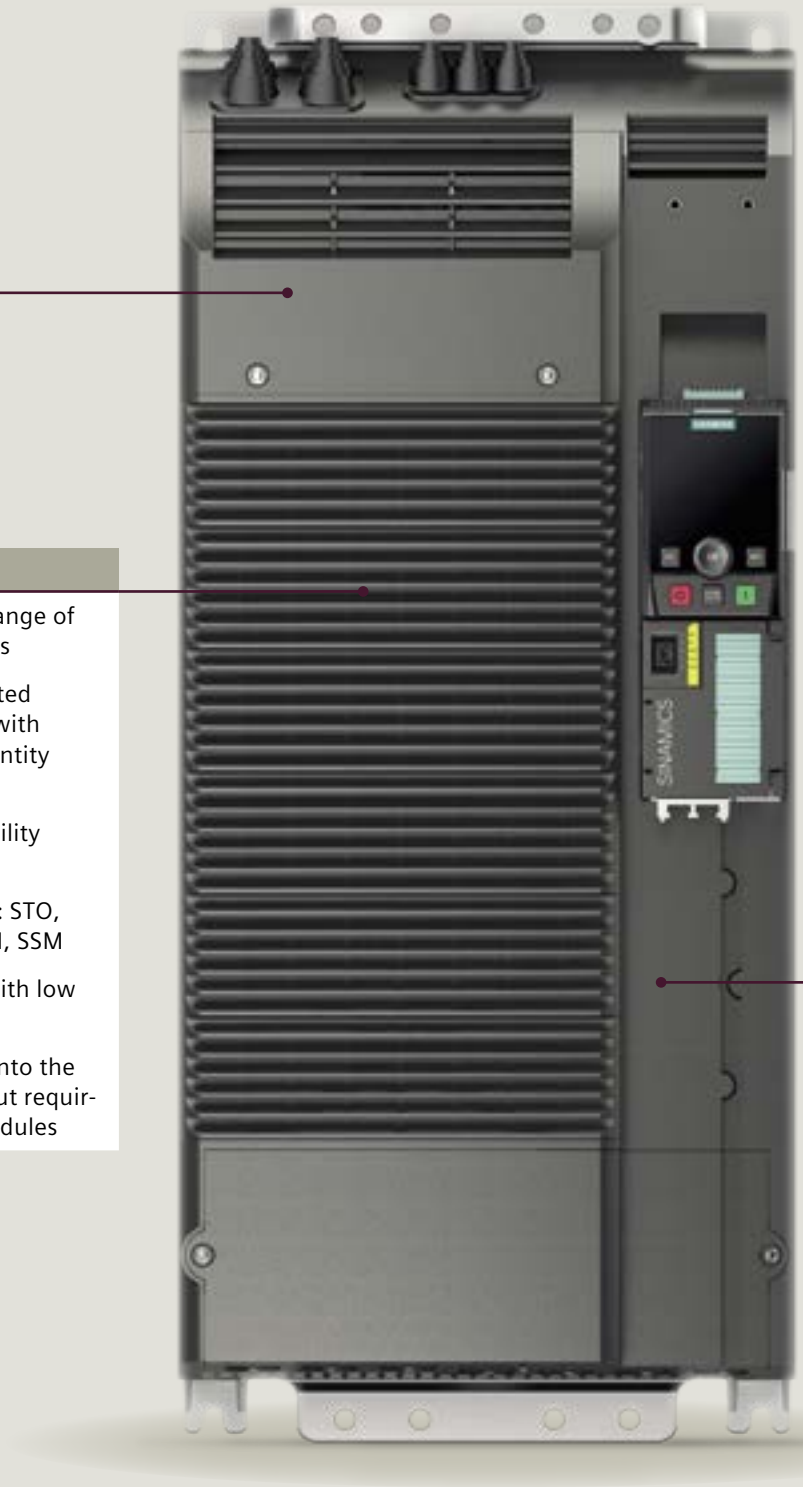
The advantages of the SINAMICS family – an overview:

- Wide range of power ratings from 0.12 kW to 85 MW
- Available in low-voltage, medium-voltage as well as DC versions
- High degree of flexibility and combinability
- Simple coupling to SIMATIC control systems and seamless integration in the automation landscape as well as part of Totally Integrated Automation
- Higher-level, standard Safety Integrated concept
- Standard and unified functionality as a result of the common hardware and software platform
- Common engineering for all drives
  - SIZER for engineering
  - STARTER / SINAMICS Startdrive for parameterizing and commissioning

Low voltage AC			DC voltage DC	Medium voltage AC
Basic Performance	General Performance	High Performance	DC applications	For applications with high power ratings
				
V-series	G-series	S-series	DCM	Medium voltage series
0.12 – 30 kW	0.37 – 6,600 kW	0.15 – 5,700 kW	6 kW – 30 MW	0.15 – 85 MW
When it comes to the hardware as well as the functionality, SINAMICS V converters concentrate on the essentials. This results in a high degree of ruggedness with low associated investment costs.	The functionality of SINAMICS G converters makes them the perfect choice when addressing basic and medium requirements relating to the control dynamic performance.	SINAMICS S converters are predestined for demanding single-axis and multi-axis applications in plant and machinery construction – as well as for the widest range of motion control tasks.	In addition to the highest power ratings, SINAMICS DC converters also offer the maximum degree of availability.	Our seamless and integrated range – which is unique worldwide – encompasses all dynamic response and performance levels in voltage classes 2.3 to 11 kV.

Mechanical system

- Modular design
- Innovative cooling concept for a higher degree of ruggedness



Functionality

- Comprehensive range of encoder interfaces
- Application-oriented control modules with expanded I/O quantity scope
- Positioning capability (EPos)
- Safety Integrated: STO, SS1, SBC, SLS, SDI, SSM
- Power Modules with low line harmonics
- Energy recovery into the line supply without requiring additional modules

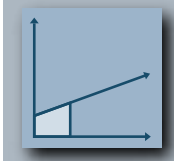
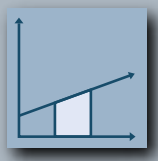
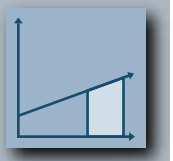
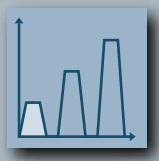
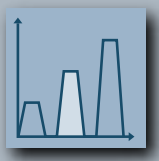
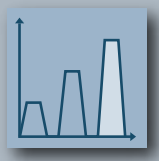
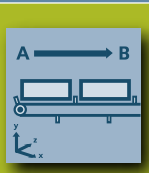
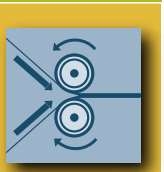
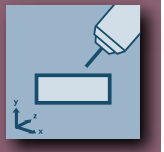
Communication

- Integral part of Totally Integrated Automation Automation – with interfaces for PROFINET and PROFIBUS
- Profiles that are supported: PROFIdrive, PROFIsafe, PROFIenergy
- Coupling to third-party systems via USS / Modbus RTU, CANopen, BacNet MS/TP, EtherNet/IP

SINAMICS inverters –

for every application, power and performance

The modular SINAMICS G120 is especially suitable for the applications that have been highlighted.

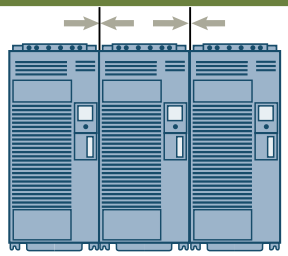
Performance*) / Purpose	Continuous motion			Discontinuous motion		
	 Basic	 Medium	 High	 Basic	 Medium	 High
 **Pumping/ ventilating/ compressing**	Centrifugal pumps Radial/axial fans Compressors	**Centrifugal pumps Radial/axial fans Compressors**	Excentric screw pumps	**Hydraulic pumps Dosing pumps**		Descaling pumps Hydraulic pumps
 **Moving**	Conveyor belts Roll conveyors Chain conveyors	**Conveyor belts Roller conveyors Chain conveyors Vertical material handling Elevators, escalators Gantry cranes Marine drives Cable railways**	Elevators Container cranes Mine hoists Open-cast mine excavators Test stands	**Accelerating conveyors Rack feeders**	Accelerating conveyors Rack feeders Crosscutters Roll changers	Storage and retrieval machines Robotics Pick & place Rotary indexing machines Crosscutters Roll feeds Engaging/disengaging function
 **Processing**	Mills Mixers Kneaders Crushers Agitators Centrifuges	**Mills Mixers Kneaders Crushers Agitators Centrifuges Extruders Rotary furnaces**	Extruders Winders/ unwinders Leading/ following drives Calenders Main press drives Printing machines	**Tubular bagging machines Single-axis motion control such as Positioning profiles Path profiles**		Servo presses Rolling mill drives Multi-axis motion control such as • Multi-axis positioning • Cam discs • Interpolations
 **Machining**	Main drives for Turning Milling Drilling	Main drives for Drilling Sawing	Main drives for Turning Milling Drilling Gear cutting Grinding	Axis drives for Turning Milling Drilling	Axis drives for Drilling Sawing	Axis drives for Turning Milling Drilling Laser machining Gear cutting Grinding Nibbling and punching

*) Requirements placed on the torque accuracy / speed accuracy / positioning accuracy / axis coordination / functionality

Space-saving

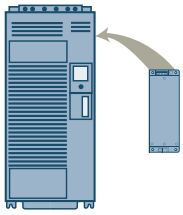
The well-conceived design and innovative technology make SINAMICS G120 especially compact.

Side-by-side mounting



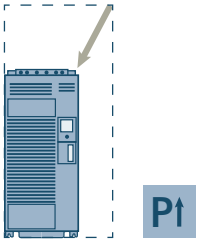
Cost reduction by saving space in the control cabinet

Same housing geometry for all voltages with and without filter A



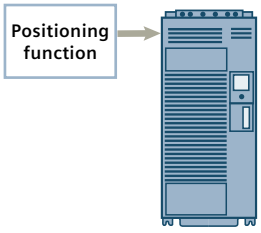
Space-saving as a result of the same frame size with integrated filter

Higher power density



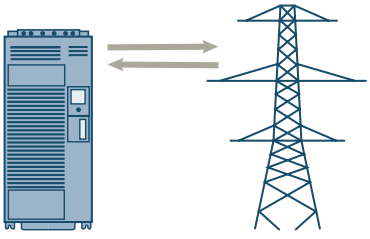
Space-saving as a result of a higher power rating in a smaller space

Integrated basic positioning functionality



Modules can be eliminated, such as additional positioning modules, encoder interfaces, etc.

Integrated energy recovery (Efficient Infeed Technology)



With the PM250, excess energy can be directly fed back into the line supply

Mounting dimensions PM240/ PM240-2*) with/without integrated Class A line filter

Frame size	W mm	H mm	D mm
FSA	73	196	165
FSB	100	292	
FSC	140	355	
FSD	200	472	237
FSE	275	551	
FSF	305	709	357
FSGX	326/–	1,533/–	547/–

*) Same frame size with and without filter A

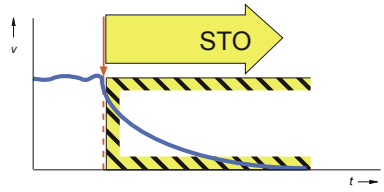
Mounting dimensions PM250 with/without integrated Class A line filter

Frame size	W mm	H mm	D mm
FSC	–/189	–/334	–/185
FSD	275	419/512	204
FSE		499/635	
FSF	350	634/934	316

Safe

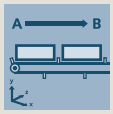
Safety functions in SINAMICS G120

Safe Torque Off (STO)



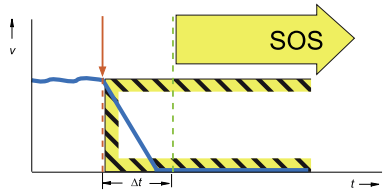
- Protects against inadvertent drive starting
- The drive is safely switched into a no-torque condition

e.g. baggage handling / packet transport, feeding, removing



Conveyor belt

Safe Stop 1 (SS1)

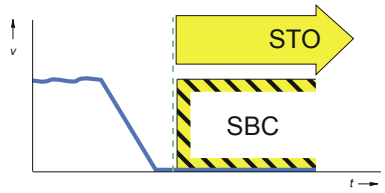


- The drive is quickly stopped and safely monitored, especially for high moments of inertia
- An encoder is not required

e.g. saws, unwinders, extruders, centrifuges, storage and retrieval machines

Saws

Safe Brake Control (SBC) with CU250S-2

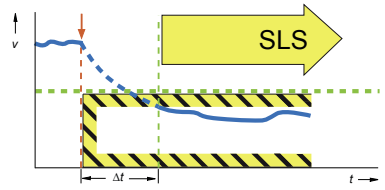


- Safe control of holding brakes that are active in the no-current state
- Prevents sagging of suspended / pulling loads

e.g. cranes, winders

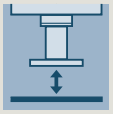
Crane

Safely Limited Speed (SLS)



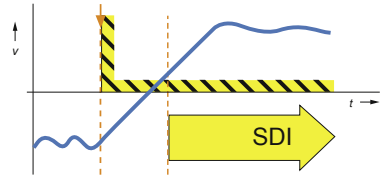
- Reduction and continuous monitoring of the drive speed to directly work at the machine while operational
- An encoder is not required

e.g. presses, punches, winders, conveyor belts, grinding machines



Press

Safe Direction (SDI)

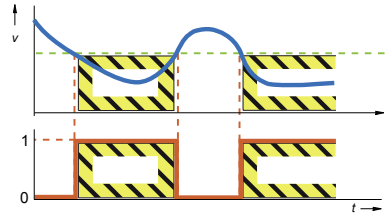


- The function ensures that the drive can only rotate in the selected direction

e.g. storage and retrieval machines, presses, unwinders

Loading gantry

Safe Speed Monitoring (SSM)



- The function provides a safe output signal, if the drive has fallen below the specified velocity limit

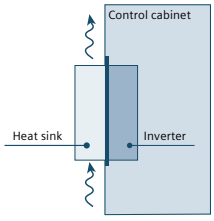
e.g. grinding machines, conveyor lines, drills, milling machines, packaging machines

Milling tool

Rugged

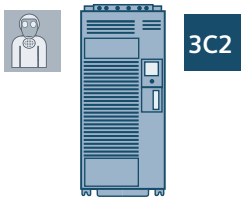
SINAMICS G120 is the reliable system for a multitude of applications.

Push-through versions



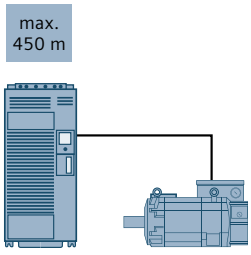
- Lower temperature rise in the control cabinet
- Flexible control cabinet concepts

Components resistant to aggressive gases and coated modules



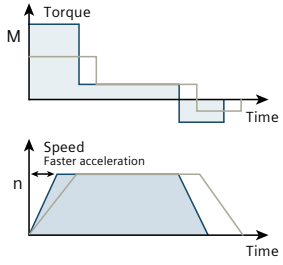
- Compliance with environmental class 3C2 (3C3 with SIPLUS)

Optimized Power Module design



- Longer motor cables possible
  – shielded: 200 m
  – unshielded: 450 m
- Elimination of an output reactor
- Insensitive to line fluctuations
- Up to IP20

Closed-loop control



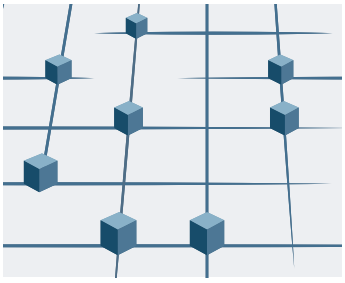
- Rugged open-loop and closed-loop control response for drives with low dynamic requirements – as well as for demanding drives with speed and torque control

Integrated, intelligent and innovative

A holistic approach for automation and drive technology paves the way for improved production. With SINAMICS G120, we consequentially implement this concept. Down to the finest details. We can offer you everything that helps you to efficiently work with our innovative inverters. And create the preconditions so that these devices can be seamlessly integrated into the automation environment.

Networked with the automation: Totally Integrated Automation

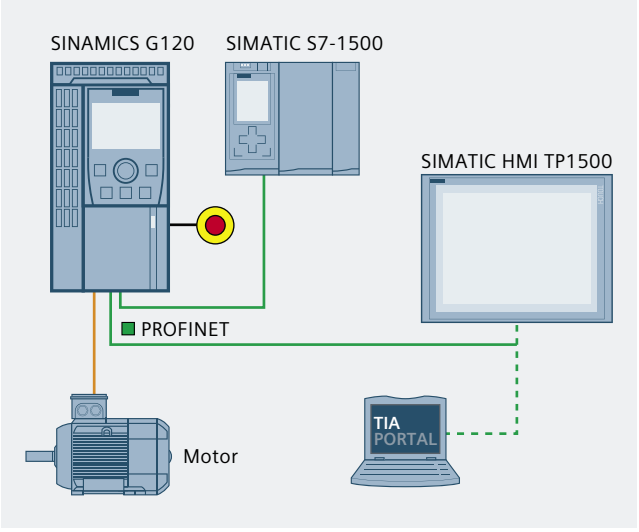
Using the Totally Integrated Automation Portal (TIA Portal), our innovative engineering framework for all automation tasks, SINAMICS drives can be simply and efficiently integrated into any automation environment – using the SINAMICS Startdrive commissioning software, an integral component of the TIA Portal.
This simplifies engineering, commissioning and diagnostics. The TIA Portal is the core of Totally Integrated Automation. The open system architecture covers the complete production process – and means that all of the automation components efficiently interact with one another. This is achieved through consistent data management, global standards and unified hardware and software interfaces.



Totally Integrated Automation
Efficient interoperation of all of the automation components

The leading Ethernet standard for industry: PROFINET

PROFINET plays a central role within the scope of Totally Integrated Automation. The open Ethernet standard stands for fast and secure data exchange between all of the company hierarchic levels. Its flexibility, efficiency and performance create the optimum preconditions for sustainably increasing productivity – and therefore the competitiveness.



A systematic approach to higher energy efficiency

UP TO
65%
ENERGY SAVING POTENTIAL

Our inverters save energy through focused application-specific speed control as well as recovering braking energy up to 65 % energy. Integrated energy-saving functions minimize your power costs even more.

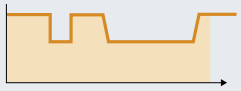
With Efficient Infeed Technology, we offer an innovative feature, which also means that compact inverters are capable of energy recovery. As a consequence, they can also be used in applications where up until now this possibility was not used.

SINAMICS G120 with PROFINET interface supports PROFIenergy. With the PROFINET-based profile, loads can be shut down independent of the manufacturer and device in non-operational periods – in a coordinated fashion and centrally controlled.

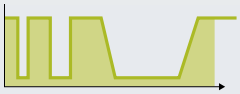
Additional energy-saving functions

- ECO mode / flux reduction reduces motor currents in the partial load range
- Hibernation mode: The inverter is automatically switched on and switched off depending on the process requirements
- Display of the electrical energy used
- Cascade: Drives are switched on and switched off in stages depending on the requirement

Energy usage without PROFIenergy



Energy usage with PROFIenergy



Support when selecting, commissioning and operating: powerful software tools

SINAMICS G120 is not only easy to configure, but already offers a high degree of operator-friendliness when commissioning and in subsequent operation. This is made possible using standard tools.

DT-Configurator

Fast product selection and ordering

SIZER

Efficient engineering of a complete drive system

STARTER / SINAMICS Startdrive

Configuration and commissioning in the Totally Integrated Automation Portal

Intuitive operation and monitoring: Intelligent Operator Panel and Basic Operator Panel

For easy and efficient local operation and monitoring of the SINAMICS G120, two different operator panels are available: the Basic Operator Panel (BOP-2) and the Intelligent Operator Panel (IOP).

The IOP makes it simple to commission standard drives – thanks to the large plain text display, menu prompting and application wizards. By displaying parameters in plain text, explanatory help texts and parameter filters, commissioning can be essentially carried out without having to use a printed parameter list.

Inverter troubleshooting is done in a user-friendly fashion using plain text display of the faults and alarms. Explanatory help texts are provided using the INFO key.

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

SINAMICS BOP

SINAMICS IOP

14 interface languages are available

	IOP (Intelligent Operator Panel)	BOP-2 (Basic Operator Panel)
Fast commissioning without expert knowledge	• Series commissioning using the clone function • User-defined parameter list where users can select the number of parameters	
	• Commissioning of standard applications using application-specific wizards, knowledge about parameters not necessary • Simple commissioning on site using a handheld terminal	• Good overview as parameters and parameter values are simultaneously displayed
High degree of operator-friendliness and intuitive operation	• The drive can be manually operated – it is possible to simply toggle between automatic and manual modes	
	• Graphic display of status values, e.g. pressure and flow in bar-type diagrams • Status display with freely selectable units to specify physical values	• 2-line display for up to 2 process values with text • Status display of predefined units
Minimized wait times	• Diagnostics using a plain text display, without any documentation and locally on site • Simple update of languages, application wizards and firmware via USB	• Diagnostics with menu prompting with 7-segment display
Can be flexibly used	• Can be mounted directly on the Control Unit, installed in the door or as handheld terminal (depends on the inverter type) • 14 interface languages are available, including simplified Chinese	• Can be mounted directly on the Control Unit or installed in the door (depends on the inverter type)

Power Modules PM240 / PM240-2

What power is required? (LO = Low Overload; HO = High Overload) Definition HO/LO see p.18	Is a filtered device of Class A required?	Are additional external line filters required (for example to maintain specific EMC values)?
PM240/PM240-2 Power Modules have an integrated braking chopper and are suitable for many applications in general machinery construction.	The integrated EMC filter (Class A filter) is required to maintain the cable-conducted interference voltages and the radiated disturbances for installations in compliance with EN 61800-3 Category C2.	The external EMC filter (Class B filter) is also used to maintain cable-conducted interference voltages for installations according to EN 61800-3 Category C1. An unfiltered PM240-2 must be selected when using a Class B filter.

Power Modules 1/3AC PM240-2 / 200 V – 240 V +/–10 %

Rated power LO (kW)	Rated power (hp)	Output current LO (A)	Output current HO (A)	Frame size	Unfiltered Power Modules (Article number)	Power Modules with integrated Class A filter (Article No.)		Class A filter	Class B line filter
1 AC/3 AC 200 V ... 240 V									
0.55	0.75	3.2	2.3	FSA	6SL3210-1PB13-0UL0	6SL3210-1PB13-0AL0	The **PM240-2** 200 V has now been completely selected.	integrated	–
0.75	1	4.2	3.2	FSA	6SL321□-1PB13-8UL0	6SL321□-1PB13-8AL0		integrated	–
1.1	1.5	6	4.2	FSB	6SL3210-1PB15-5UL0	6SL3210-1PB15-5AL0		integrated	–
1.5	2	7.4	6	FSB	6SL3210-1PB17-4UL0	6SL3210-1PB17-4AL0		integrated	–
2.2	3	10.4	7.4	FSB	6SL321□-1PB21-0UL0	6SL321□-1PB21-0AL0		integrated	–
3	4	13.6	10.4	FSC	6SL3210-1PB21-4UL0	6SL3210-1PB21-4AL0		integrated	–
4	5	17.5	13.6	FSC	6SL321□-1PB21-8UL0	6SL321□-1PB21-8AL0		integrated	–
3 AC 200 V ... 240 V									
5.5	7.5	22	17.5	FSC	6SL3210-1PC22-2UL0	6SL3210-1PC22-2AL0	The **PM240-2** 200 V has now been completely selected.	integrated	–
7.5	10	28	22	FSC	6SL3210-1PC22-8UL0	6SL3210-1PC22-8AL0		integrated	–
11	15	42	35	FSD	6SL3210-1PC24-2UL0	–		–	–
15	20	54	42	FSD	6SL3210-1PC25-4UL0	–		–	–
18.5	25	68	54	FSD	6SL3210-1PC26-8UL0	–		–	–
22	30	80	68	FSE	6SL3210-1PC28-0UL0	–		–	–
30	40	104	80	FSE	6SL3210-1PC31-1UL0	–		–	–

Power Modules 3AC PM240 / PM240-2 / 380 V – 480 V +/–10 %

Rated power LO (kW)	Rated power (hp)	Output current LO (A)	Output current HO (A)	Frame size	Unfiltered Power Modules (Article number)	Power Modules with integrated Class A filter (Article number)		Class A filter is already integrated in the filter device up to 90 kW (Article number)	Class B line filter (subassembly)[3] (Article number)
0.55	0.75	1.7	1.3	FSA	6SL3210-1PE11-8UL1	6SL3210-1PE11-8AL1	The **PM240 / PM240-2** 400 V has now been completely selected.	integrated	6SL3203-0BE17-7BA0
0.75	1	2.2	1.7	FSA	6SL3210-1PE12-3UL1	6SL3210-1PE12-3AL1		integrated	6SL3203-0BE17-7BA0
1.1	1.5	3.1	2.2	FSA	6SL3210-1PE13-2UL1	6SL3210-1PE13-2AL1		integrated	6SL3203-0BE17-7BA0
1.5	2	4.1	3.1	FSA	6SL3210-1PE14-3UL1	6SL3210-1PE14-3AL1		integrated	6SL3203-0BE17-7BA0
2.2	3	5.9	4.1	FSA	6SL3210-1PE16-1UL1	6SL3210-1PE16-1AL1		integrated	6SL3203-0BE17-7BA0
3	4	7.7	5.9	FSA	6SL321□-1PE18-0UL1	6SL321□-1PE18-0AL1		integrated	6SL3203-0BE17-7BA0
4	5	10.2	7.7	FSB	6SL3210-1PE21-1UL0	6SL3210-1PE21-1AL0		integrated	6SL3203-0BE21-8BA0
5.5	7.5	13.2	10.2	FSB	6SL3210-1PE21-4UL0	6SL3210-1PE21-4AL0		integrated	6SL3203-0BE21-8BA0
7.5	10	18	13.7	FSB	6SL321□-1PE21-8UL0	6SL321□-1PE21-8AL0		integrated	6SL3203-0BE21-8BA0
11	15	26	18	FSC	6SL3210-1PE22-7UL0	6SL3210-1PE22-7AL0		integrated	6SL3203-0BE23-8BA0
15	20	32	26	FSC	6SL321□-1PE23-3UL0	6SL321□-1PE23-3AL0		integrated	6SL3203-0BE23-8BA0
18.5	25	38	32	FSD	6SL3210-1PE23-8UL0	6SL3210-1PE23-8AL0		integrated	–
22	30	45	38	FSD	6SL3210-1PE24-5UL0	6SL3210-1PE24-5AL0		integrated	–
30	40	60	45	FSD	6SL3210-1PE26-0UL0	6SL3210-1PE26-0AL0		integrated	–
37	50	75	60	FSD	6SL3210-1PE27-5UL0	6SL3210-1PE27-5AL0		integrated	–
45	60	90	75	FSE	6SL3210-1PE28-8UL0	6SL3210-1PE28-8AL0		integrated	–
55	75	110	90	FSE	6SL3210-1PE31-1UL0	6SL3210-1PE31-1AL0		integrated	–
75	100	145	110	FSF	6SL3224-0BE35-5UA0	6SL3224-0BE35-5AA0		integrated	–
90	125	178	145	FSF	6SL3224-0BE37-5UA0	6SL3224-0BE37-5AA0		integrated	–
110	150	205	178	FSF	6SL3224-0BE38-8UA0	–		6SL3203-0BE32-5AA0	–
132	200	250	205	FSF	6SL3224-0BE41-1UA0	–		6SL3203-0BE32-5AA0	–
160	250	302	250	FSGX[2]	6SL3224-0XE41-3UA0	–		6SL3000-0BE36-0AA0	–
200	300	370	302	FSGX[2]	6SL3224-0XE41-6UA0	–		6SL3000-0BE36-0AA0	–
250	400	477	370	FSGX[2]	6SL3224-0XE42-0UA0	–		6SL3000-0BE36-0AA0	–

Heat sink version: Standard 0, Push-through 1

[1] 1AC line reactor as third-party option will be available soon.

[2] A Braking Module is additionally required for frame size FSGX: 6SL3300-1AE32-5AA0

	Is a braking resistor required as a result of the application?	Should an output filter be used, for instance to be able to use long motor cables?		Is a shield plate required for the Power Module?
Line reactors: to smooth voltage peaks, buffer commutation dips and reduce the effects of harmonics on the inverter and line supply.	Excess energy in the DC link is dissipated using a braking resistor. Frame sizes FSA to FSF already include an integrated braking chopper (electronic switch).	Output reactors reduce the voltage stress on the motor winding. The cable lengths between the inverter and motor can be extended.	Sine-wave filters limit the voltage rate of rise and the capacitive recharging currents. An output reactor is not required.	The shield connection kit simplifies connecting the shields of supply and control cables, offers mechanical strain relief and guarantees an optimum EMC behavior.

	3AC line reactor side-mounted[1) 5)] (Article number)	Braking resistors side-mounted (Article number)	Output reactor side-mounted (Article number)	Sine-wave filter	Shield plate for Power Modules
	6SL3203-0CE13-2AA0	JJY:023146720008	6SL3202-0AE16-1CA0	–	included
	6SL3203-0CE13-2AA0	JJY:023146720008	6SL3202-0AE16-1CA0	–	included
	6SL3203-0CE21-0AA0	JJY:023151720007	6SL3202-0AE16-1CA0	–	included
	6SL3203-0CE21-0AA0	JJY:023151720007	6SL3202-0AE18-8CA0	–	included
	6SL3203-0CE21-0AA0	JJY:023151720007	6SL3202-0AE21-8CA0	–	included
	6SL3203-0CE21-8AA0	JJY:023163720018	6SL3202-0AE21-8CA0	–	included
	6SL3203-0CE21-8AA0	JJY:023163720018	6SL3202-0AE21-8CA0	–	included
	6SL3203-0CE23-8AA0	JJY:023433720001	6SL3202-0AE23-8CA0	–	included
	6SL3203-0CE23-8AA0	JJY:023433720001	6SL3202-0AE23-8CA0	–	included
	integrated	6SE6400-4BC18-0DA0	not necessary	–	included
	integrated	6SE6400-4BC18-0DA0	not necessary	–	included
	integrated	6SE6400-4BC21-2EA0	not necessary	–	included
	integrated	6SE6400-4BC21-2EA0	not necessary	–	included
	integrated	6SE6400-4BC22-5FA0	not necessary	–	included

	3AC line reactor side-mounted up to FSC[5)]; integrated from FSD (Article number)	Braking resistors side-mounted (Article number)	Output reactor side-mounted (Article number)	Sine-wave filter side-mounted (Article number)	Shield plate for the Power Modules (Article number)
	6SL3203-0CE13-2AA0	6SL3201-0BE14-3AA0	6SL3202-0AE16-1CA0	–	included
	6SL3203-0CE13-2AA0	6SL3201-0BE14-3AA0	6SL3202-0AE16-1CA0	–	included
	6SL3203-0CE13-2AA0	6SL3201-0BE14-3AA0	6SL3202-0AE16-1CA0	–	included
	6SL3203-0CE21-0AA0	6SL3201-0BE14-3AA0	6SL3202-0AE16-1CA0	–	included
	6SL3203-0CE21-0AA0	6SL3201-0BE21-0AA0	6SL3202-0AE16-1CA0	–	included
	6SL3203-0CE21-0AA0	6SL3201-0BE21-0AA0	6SL3202-0AE18-8CA0	–	included
	6SL3203-0CE21-8AA0	6SL3201-0BE21-8AA0	6SL3202-0AE21-8CA0	–	included
	6SL3203-0CE21-8AA0	6SL3201-0BE21-8AA0	6SL3202-0AE21-8CA0	–	included
	6SL3203-0CE21-8AA0	6SL3201-0BE21-8AA0	6SL3202-0AE21-8CA0	–	included
	6SL3203-0CE23-8AA0	6SL3201-0BE23-8AA0	6SL3202-0AE23-8CA0	–	included
	6SL3203-0CE23-8AA0	6SL3201-0BE23-8AA0	6SL3202-0AE23-8CA0	–	included
	integrated	6SE6400-4BD21-2DA0	not necessary	–	included
	integrated	6SE6400-4BD21-2DA0	not necessary	–	included
	integrated	6SE6400-4BD22-2EA1	not necessary	–	included
	integrated	6SE6400-4BD22-2EA1	not necessary	–	included
	integrated	6SE6400-4BD24-0FA0	not necessary	–	included
	integrated	6SE6400-4BD24-0FA0	not necessary	–	included
	6SE6400-3CC11-2FD0	6SE6400-4BD24-0FA0	6SE6400-3TC15-4FD0	6SL3202-0AE31-5SA0	6SL3262-1AF00-0DA0
	6SE6400-3CC11-7FD0	6SE6400-4BD24-0FA0	6SE6400-3TC14-5FD0	6SL3202-0AE31-8SA0	6SL3262-1AF00-0DA0
	6SL3000-0CE32-3AA0	6SE6400-4BD26-0FA0	6SL3000-2BE32-1AA0	6SL3000-2CE32-3AA0	6SL3262-1AF00-0DA0
	6SL3000-0CE32-8AA0	6SE6400-4BD26-0FA0	6SL3000-2BE32-6AA0	6SL3000-2CE32-3AA0	6SL3262-1AF00-0DA0
	6SL3000-0CE33-3AA0	6SL3000-1BE31-3AA0	6SL3000-2BE33-2AA0	6SL3000-2CE32-8AA0	–
	6SL3000-0CE35-1AA0	6SL3000-1BE32-5AA0	6SL3000-2BE33-8AA0	6SL3000-2CE33-3AA0	–
	6SL3000-0CE35-1AA0	6SL3000-1BE32-5AA0	6SL3000-2BE35-0AA0	6SL3000-2CE34-1AA0	–

[3)] An unfiltered Power Module is required to use the external Class B filter

[4)] Side-mounted up to FSC; integrated from FSD

see Prodis: http://support.automation.siemens.com/WW/view/de/84925578

5) The line reactor can be omitted for frame sizes A-C if the power module is selected with a power rating one stage higher. Refer to the catalog for more details.

Power Modules 3AC PM240-2 / 500 V – 690 V +/–10 %

What power is required? (LO = Low Overload; HO = High Overload)					Is a filtered device of Class A required?			Are additional external line filters required (for example to n	
PM240/PM240-2 Power Modules have an integrated braking chopper and are suitable for many applications in general machinery construction.					The integrated EMC filter (Class A filter) is required to maintain the cable-conducted interference voltages and the radiated disturbances for installations in compliance with EN 61800-3 Category C2.				
Rated power LO (kW)	**Rated power (hp)**	**Output current LO (A)**	**Output current HO (A)**	**Frame size**	**Unfiltered Power Modules (Article number)**	**Power Modules with integrated Class A filter (Article number)**		**Class A filter is already integrated**	**Class B line filter**
11	10	14	11	**FSD**	6SL3210-1PH21-4UL0	6SL3210-1PH21-4AL0	The PM240-2 690 V has now been completely selected	integrated	–
15	15	19	14	**FSD**	6SL3210-1PH22-0UL0	6SL3210-1PH22-0AL0		integrated	–
18.5	20	23	19	**FSD**	6SL3210-1PH22-3UL0	6SL3210-1PH22-3AL0		integrated	–
22	25	27	23	**FSD**	6SL3210-1PH22-7UL0	6SL3210-1PH22-7AL0		integrated	–
30	30	35	27	**FSD**	6SL3210-1PH23-5UL0	6SL3210-1PH23-5AL0		integrated	–
37	40	42	35	**FSD**	6SL3210-1PH24-2UL0	6SL3210-1PH24-2AL0		integrated	–
45	50	52	42	**FSE**	6SL3210-1PH25-2UL0	6SL3210-1PH25-2AL0		integrated	–
55	60	62	52	**FSE**	6SL3210-1PH26-2UL0	6SL3210-1PH26-2AL0		integrated	–

Power Modules 3AC PM250 / 380 V – 480V +/–10 %

What power is required? (LO = Low Overload; HO = High Overload)					Is a filtered device of Class A required?			Are additional external line filters required (for example to n	
PM250 Power Modules have integrated energy recovery. This means that any braking energy is directly fed back into the line supply. Four-quadrant applications – a braking chopper is not required.					The integrated EMC filter (Class A filter) is required to maintain the cable-conducted interference voltages and the radiated disturbances for installations in compliance with EN 61800-3 Category C2.			The additional EMC filter (Class B filter) is also used to maintain cable-conducted interference voltages for installations according to EN 61800-3 Category C1.	
Rated power LO (kW)	**Rated power (hp)**	**Output current LO (A)**	**Output current HO (A)**	**Frame size**	**Unfiltered Power Modules (Article number)**	**Power Modules with integrated Class A filter (Article number)**		**Class A filter is already integrated in the filter device up to 90 kW**	**Class B line filter (subassembly)[3] (Article number)**
7.5	10	18	13.2	**FSC**	–	6SL3225-0BE25-5AA1	The PM250 has now been completely selected	integrated	6SL3203-0BD23-8SA0
11	15	25	19	**FSC**	–	6SL3225-0BE27-5AA1		integrated	6SL3203-0BD23-8SA0
15	20	32	26	**FSC**	–	6SL3225-0BE31-1AA1		integrated	6SL3203-0BD23-8SA0
18.5	25	38	32	**FSD**	6SL3225-0BE31-5UA0	6SL3225-0BE31-5AA0		integrated	–
22	30	45	38	**FSD**	6SL3225-0BE31-8UA0	6SL3225-0BE31-8AA0		integrated	–
30	40	60	45	**FSD**	6SL3225-0BE32-2UA0	6SL3225-0BE32-2AA0		integrated	–
37	50	75	60	**FSE**	6SL3225-0BE33-0UA0	6SL3225-0BE33-0AA0		integrated	–
45	60	90	75	**FSE**	6SL3225-0BE33-7UA0	6SL3225-0BE33-7AA0		integrated	–
55	75	110	90	**FSF**	6SL3225-0BE34-5UA0	6SL3225-0BE34-5AA0		integrated	–
75	100	145	110	**FSF**	6SL3225-0BE35-5UA0	6SL3225-0BE35-5AA0		integrated	–
90	125	178	145	**FSF**	6SL3225-0BE37-5UA0	6SL3225-0BE37-5AA0		integrated	–

Missing options such as sine-wave filter, subchassis braking resistors, etc., can be supplied from audited drive option suppliers
More detailed information is provided at
www.siemens.com/sinamics-G120

[3] An unfiltered Power Module is required to use the external Class B filter

maintain specific EMC values)?		Is a braking resistor required as a result of the application?	Should an output filter be used, for example, in order to be able to use longer motor cables?		Is a shield plate required for the Power Module?
	Line reactors: to smooth voltage peaks, buffer commutation dips and reduce the effects of harmonics on the inverter and line supply.	Excess energy in the DC link is dissipated using a braking resistor. Frame sizes FSA to FSF already include an integrated braking chopper (electronic switch).	Output reactors reduce the voltage stress on the motor winding. The cable lengths between the inverter and motor can be extended.	Sine-wave filters limit the voltage rate of rise and the capacitive recharging currents. An output reactor is not required.	The shield connection kit simplifies connecting the shields of supply and control cables, offers mechanical strain relief and guarantees an optimum EMC behavior.
	Line reactor	**Braking resistors**	**Output reactor**	**Sine-wave filter (Article number)**	**Shield plate for Power Modules**
	integrated	–	not necessary	–	included
	integrated	–	not necessary	–	included
	integrated	–	not necessary	–	included
	integrated	–	not necessary	–	included
	integrated	–	not necessary	–	included
	integrated	–	not necessary	–	included
	integrated	–	not necessary	–	included
	integrated	–	not necessary	–	included

maintain specific EMC values)?		Is a braking resistor required as a result of the application?	Should an output filter be used, for example, in order to be able to use longer motor cables?		Is a shield plate required for the Power Module?
	In conjunction with the PM250, a line reactor is not required, and it is also not permissible that one is used.	The PM250 is capable of energy recovery. A braking resistor is not used, and it is also not permissible that one is used.	Output reactors reduce the voltage stress on the motor winding. The cable lengths between the inverter and motor can be extended.	Sine-wave filters limit the voltage rate of rise and the capacitive recharging currents. An output reactor is not required.	The shield connection kit simplifies connecting the shields of supply and control cables, offers mechanical strain relief and guarantees an optimum EMC behavior.
	Line reactor, side mounting up to FSC; subchassis from FSD	**PM250 with energy recovery. As a consequence, it is not permissible that a braking resistor is used.**	**Subchassis output reactor (Article number)**	**Sine-wave filter FSC subchassis, from FSD, side-mounted (Article number)**	**Shield plate for Power Modules (Article number)**
	–	is not required	6SL3202-0AJ23-2CA0	6SL3202-0AE22-0SA0	6SL3262-1AC00-0DA0
	–	is not required	6SL3202-0AJ23-2CA0	6SL3202-0AE23-3SA0	6SL3262-1AC00-0DA0
	–	is not required	6SL3202-0AJ23-2CA0	6SL3202-0AE23-3SA0	6SL3262-1AC00-0DA0
	–	is not required	6SE6400-3TC05-4DD0	6SL3202-0AE24-6SA0	6SL3262-1AD00-0DA0
	–	is not required	6SE6400-3TC03-8DD0	6SL3202-0AE24-6SA0	6SL3262-1AD00-0DA0
	–	is not required	6SE6400-3TC05-4DD0	6SL3202-0AE26-2SA0	6SL3262-1AD00-0DA0
	–	is not required	6SE6400-3TC08-0ED0	6SL3202-0AE28-8SA0	6SL3262-1AD00-0DA0
	–	is not required	6SE6400-3TC07-5ED0	6SL3202-0AE28-8SA0	6SL3262-1AD00-0DA0
	–	is not required	6SE6400-3TC14-5FD0	6SL3202-0AE31-5SA0	6SL3262-1AF00-0DA0
	–	is not required	6SE6400-3TC15-4FD0	6SL3202-0AE31-5SA0	6SL3262-1AF00-0DA0
	–	is not required	6SE6400-3TC14-5FD0	6SL3202-0AE31-8SA0	6SL3262-1AF00-0DA0

SINAMICS G120 – user-friendliness through modularity

Flexible combinability, high degree of operator-friendliness and standard software make SINAMICS G120 a user-friendly solution from the very start.

The modularity offers many advantages:
- Parts can be simply selected
- Lower costs and parts can be quickly replaced when service is required
- Fewer parts have to be stocked
- Can be simply expanded
- High reliability through integrated communication

1

The choice is yours

You can select between two Power Modules depending on your particular requirements:

Standard braking response with braking chopper	Innovative braking response with energy recovery
PM240/PM240-2 Power Modules	PM250 Power Modules
The ideal Power Module for standard applications in general machinery construction	The ideal Power Module for applications requiring energy recovery

2

Select your Control Unit

CU230P-2 Control Unit	CU240B-2 / CU240E-2 Control Unit	CU250S-2 Control Unit
specifically designed for pump, fan and compressor applications	suitable for a multitude of applications in general machinery construction (e.g. mixers, agitators)	suitable for high-quality applications (e.g. extruders and centrifuges)

3

Select the optional components

Additional components are available depending on your particular requirements – e.g. an operator panel (IOP or BOP-2) or a blanking cover

The optimum inverter SINAMICS G120 has now been configured!

Detailed information on products and options is provided in the current Catalog D 31 in Chapter "SINAMICS G120 standard inverters" or in the Siemens Industry Mall.

CU250S-2 Control Unit

Is an encoder used for signal feedback? Is integrated positioning capability required?

no	yes (EPos positioning functionality through Extended Function license)

CU230P-2	CU240B-2	CU240E-2	CU240E-2 Failsafe	CU250S-2

Is integrated safety technology required?

no	yes		
	STO (Safe Torque Off)	STO (Safe Torque Off) SS1 (Safe Stop 1) SLS (Safely Limited Speed) SSM (Safe Speed Monitor) SDI (Safe Direction)	STO (Safe Torque Off) SS1 (Safe Stop 1) SBC (Safe Brake Control)[1] SLS (Safely Limited Speed)[2] SSM (Safe Speed Monitor)[2] SDI (Safe Direction)[2] [1] A Safe Brake Relay is required for the SBC function [2] With Safety license

CU230P-2	CU240B-2	CU240E-2	CU240E-2 F	CU250S-2

How many inputs and outputs are required?

	CU230P-2	CU240B-2	CU240E-2	CU240E-2 F	CU250S-2
Digital inputs (DI)	6	4	6	6	11
Failsafe DI	–	–	1 (opt. for 2 DI)	3 (opt. for 2 DI)	3 (opt. for 2 DI)
Digital outputs (DO)	3	1	3	3	3 (opt. 1 F-DO)
Fast DI/DO	–	–	–	–	4
Analog inputs	4	1	2	2	2
Analog outputs	2	1	2	2	2

CU230P-2	CU240B-2	CU240E-2	CU240E-2 F	CU250S-2

What type of communication/bus system is required?

	CU230P-2 HVAC	CU240B-2	CU240E-2	CU240E-2 F	CU250S-2
USS, Modbus RTU	6SL3243-0BB30-1HA3	6SL3244-0BB00-1BA1	6SL3244-0BB12-1BA1	6SL3244-0BB13-1BA1	6SL3246-0BA22-1BA0
BACnet MS/TP	CU230P-2 HVAC	–	–	–	–
	6SL3243-0BB30-1HA3				
PROFIBUS DP	CU230P-2 DP	CU240B-2 DP	CU240E-2 DP	CU240E-2 DP-F	CU250S-2 DP
	6SL3243-0BB30-1PA3	6SL3244-0BB00-1PA1	6SL3244-0BB12-1PA1	6SL3244-0BB13-1PA1	6SL3246-0BA22-1PA0
PROFINET/EtherNet IP	CU230P-2 PN	–	CU240E-2 PN	CU240E-2 PN-F	CU250S-2 PN
	6SL3243-0BB30-1FA0		6SL3244-0BB12-1FA0	6SL3244-0BB13-1FA0	6SL3246-0BA22-1FA0
CANopen	CU230P-2 CAN	–	–	–	CU250S-2 CAN
	6SL3243-0BB30-1CA3				6SL3246-0BA22-1CA0

Permissible combinations with Power Modules

PM230 (IP20)	yes	yes	yes	yes	no
PM240	yes	yes	yes	yes	yes
PM240-2	yes	yes	yes	yes	yes
PM250	yes	yes	yes	yes	yes

Which optional shield connection kit is required for the particular Control Unit?

Shield connection kit 1 6SL3264-1EA00-0FA0	HVAC PROFIBUS CANopen	–	–	–	–
Shield connection kit 2 6SL3264-1EA00-0HA0	–	USS, Modbus RTU, PROFIBUS	USS, Modbus RTU, PROFIBUS	USS, Modbus RTU, PROFIBUS	–
Shield connection kit 3 6SL3264-1EA00-0HB0	PROFINET	PROFINET	PROFINET	PROFINET	–
Shield connection kit 4 6SL3264-1EA00-0LA0	–	–	–	–	All versions

Optional additional components

Description	Article number
Intelligent Operator Panel (IOP) with 13 interface languages: German, English, French, Italian, Spanish, Portuguese, Dutch, Swedish, Russian, Czech, Polish, Turkish, Finnish	6SL3255-0AA00-4JA1
Intelligent Operator Panel (IOP) with the user interfaces simplified Chinese and English	6SL3255-0AA00-4JC1
IOP Handheld (degree of protection IP54)	6SL3255-0AA00-4HA0
Basic Operator Panel (BOP-2)	6SL3255-0AA00-4CA1
Door mounting kit for BOP-2/IOP	6SL3256-0AP00-0JA0
SINAMICS Memory Card (SD-Card)	6SL3054-4AG00-2AA0
Additional licenses for CU250S-2 – SD card + license Extended Functions Safety (SLS, SSM, SDI) – SD card + license Extended Functions basic positioning (EPos) – SD card + license Extended Safety + basic positioning – License Extended Functions Safety for CU250S-2 – License Extended Functions basic positioning (EPos)	 6SL3054-4AG00-2AA0-Z F01 6SL3054-4AG00-2AA0-Z E01 6SL3054-4AG00-2AA0-Z F01+E01 6SL3074-0AA10-0AA0 6SL3074-7AA04-0AA0
Additional licenses for CU250S-2 plus firmware V4.7 – SD card + license Extended Functions Safety (SLS, SSM, SDI) + FW V4.7 – SD card + license Extended Functions basic positioning (EPos) + FW V4.7 – SD card + license Extended Functions Safety + basic positioning + FW V4.7	 6SL3054-7EH00-2BA0-Z F01 6SL3054-7EH00-2BA0-Z E01 6SL3054-7EH00-2BA0-Z F01+E01
PC connection kit 2 (for CU230P-2, CU240B-2, CU240E-2, CU250S-2)	6SL3255-0AA00-2CA0
Brake Relay (for direct activation of a motor brake by the CU)	6SL3252-0BB00-0AA0
Safe Brake Relay (Safety version)	6SL3252-0BB01-0AA0
SINAMICS G120/G120C connector plug	6SL3200-0ST05-0AA0
SINAMICS G120/G120C fan unit	6SL3200-0SF12-0AA0
Push-through mounting frame For PM230 Power Modules, degree of protection IP20, as well as PM240-2 – frame size FSA – frame size FSB – frame size FSC	 6SL3260-6AA00-0DA0 6SL3260-6AB00-0DA0 6SL3260-6AC00-0DA0

Software for engineering and commissioning

Description	Article number
STARTER commissioning tool on DVD-ROM	6SL3072-0AA00-0AG0
SINAMICS Startdrive commissioning tool on DVD-ROM	6SL3072-4DA02-0XG0
SIZER for Siemens Drives engineering tool	6SL3070-0AA00-0AG0
CAD Creator	6SL3075-0AA00-0AG0

Detailed information about the products and options can be found in the current Catalog D 31, chapter “SINAMICS G120 standard inverters” or in the Siemens Industry Mall.

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Power Modules				
Power units	**PM240 / PM240-2 IP20 General machinery construction; Braking with a braking resistor**		**PM250 IP20 General machinery construction; Braking with energy recovery**	
Line voltage	1 AC / 3 AC 200 ... 240 V +/–10 % 3 AC 380 V ... 480 V +/–10 % 3 AC 500 V ... 690 V +/–10 %		3 AC 380 V ... 480 V +/–10 %	
Power **HO = High Overload** **LO = Low Overload**	**HO** **200 ... 240 V** 1 AC 0.37 ... 3 kW 3 AC 0.37 ... 22 kW **380 ... 480 V** 3 AC 0.37 ... 200 kW **500 ... 690 V** 3 AC 7.5 ... 45 kW	**LO** **200 ... 240 V** 1 AC 0.55 ... 4 kW 3 AC 0.55 ... 30 kW **380 ... 480 V** 3 AC 0.55 ... 250 kW **500 ... 690 V** 3 AC 11 ... 55 kW	**HO** **Unfiltered** 15 ... 75 kW **Filtered** 5.5 ... 75 kW	**LO** **Unfiltered** 18.5 ... 90 kW **Filtered** 7.5 ... 90 kW
Rated input current **(dependent on the motor load and line impedance)**	**HO** **200 ... 240 V** 1 AC 6.6 ... 37.5 A 3 AC 3.8 ... 83 A **380 ... 480 V** 3 AC 2.0 ... 354[1]/ 442 A **500 ... 690 V** 3 AC 11 ... 54 A	**LO** **200 ... 240 V** 1 AC 7.5 ... 43 A 3 AC 4.3 ... 98 A **380 ... 480 V** 3 AC 2.3 ... 354[1]/ 442 A **500 ... 690 V** 3 AC 14 ... 59 A	**HO** 13.2 ... 135 A	**LO** 18 ... 166 A
Rated output current **(derating for ambient temperatures) > 40 °C (LO) or > 50 °C (HO)**	**HO** **200 ... 240 V** 1 AC 2.3 ... 13.6 A 3 AC 2.3 ... 80 A **380 ... 480 V** 3 AC 1.3 ... 370 A **500 ... 690 V** 3 AC 11 ... 52 A	**LO** **200 ... 240 V** 1 AC 3.2 ... 17.5 A 3 AC 3.2 ... 104 A **380 ... 480 V** 3 AC 1.7 ... 477 A **500 ... 690 V** 3 AC 14 ... 62 A	**HO** 1.3 ... 145 A	**LO** 1.7 ... 178 A
Conformance with standards	UL, cUL, CE, C-Tick, SEMI F47		UL[2], cUL[2], CE, C-Tick	
CE Marking	According to the Low-Voltage Directive 2006/95/EC			
Electrical data				
Line frequency	47 ... 63 Hz			
Low Overload	Generally used for applications demanding a low level of dynamic performance (continuous operation), square-law torque characteristic with low breakaway torque and low speed precision. For example: centrifugal pumps, radial/ axial fans, reciprocating blowers, radial compressors, vacuum pumps, agitators, ...			
Overload capability (for Low Overload)	150 % for 3 seconds plus 110 % for 57 seconds within 300 seconds			
High Overload	Generally used for applications demanding a higher dynamic performance (cyclic duty) as well as constant torque characteristics with a high breakaway torque. For example: conveyor belts, geared pumps, excentric worm pumps, mills, mixers, crushers, vertical conveying equipment, centrifuges, ...			
Overload capability (for High Overload)	200 % for 3 seconds plus 150 % for 57 seconds within 300 seconds			
Overload capability (LO/HO)	When using the overload capability, the continuous output current is not reduced			
Output frequency	0 ... 550 Hz (control modes V/f and FCC), 200 Hz SLVC			
Pulse frequency	4 kHz (standard) or 4 ... 16 kHz (derating)		4 kHz (standard) or 4 kHz ... 16 kHz (derating) FSF: 4 kHz (standard) or 4 kHz ... 8 kHz (derating)	
Electromagnetic compatibility	Class A line filter available / partially integrated		Class A or B line filter[3] available	
Functions				
Brake functions	Dynamic braking, DC braking, motor holding brake, compound brake		Energy recovery in regenerative operation	
Motors that can be connected	Three-phase induction motors and three-phase synchronous motors, reluctance motors			
Protection functions	Undervoltage, overvoltage, overmodulation/overload. Ground fault, short circuit, stall protection, motor blocked protection, motor overtemperature, inverter overtemperature, parameter interlocking			

[1] With line reactor
[2] UL certification is being drawn up for frame sizes FSD to FSF
[3] Only for frame size FSC

Control Units

Control Units	CU230P-2 optimized for pumps, fans, compressors	CU240B-2 / CU240E-2 optimized for general applications in machinery construction, such as conveyor belts and mixers		CU250S-2 for demanding applications in the standard drives domain, for example extruders, centrifuges
Architecture	Application-optimized number of I/O	Basic number of I/O	Standard number of I/O with integrated safety technology	Higher number of I/O, integrated safety technology and basic positioning function
Communication functions				
PROFINET	CU230P-2 PN	–	CU240E-2 PN, CU240E-2 PN-F	CU250S-2 PN
PROFIBUS DP	CU230P-2 DP	CU240B-2 DP	CU240E-2 DP, CU240E-2 DP-F	CU250S-2 DP
EtherNet/IP	CU230P-2 PN	–	CU240E-2 PN, CU240E-2 PN-F	CU250S-2 PN
Modbus RTU and USS	CU230P-2 HVAC	CU240B-2	CU240E-2, CU240E-2 F	CU250S-2
BACnet MS/TP	CU230P-2 HVAC	–	–	–
CANopen	CU230P-2 CAN	–	–	CU250S-2 CAN
USB interface	1	1	1	1
Safety functions acc. to Category 3 of EN 954-1 or acc. to SIL2 of IEC 61508				
Integrated safety function: STO	–	–	CU240E-2, DP, PN	–
STO, SS1, SLS, SDI, SSM	–	–	CU240E-2 F, DP-F, PN-F	–
STO, SBC, SS1	–	–	–	CU250S-2, DP, PN, CAN
STO, SBC, SS1, SLS, SSM, SDI	–	–	–	CU250S-2, DP, PN, CAN (SLS, SSM, SDI with Safety license)
Electrical data				
Supply voltage	24 V DC (via Power Modules or externally)			
Digital inputs	6	4	6	11
Digital inputs failsafe	–	–	CU240E-2, CU240E-2 DP: 1 CU240E-2 DP-F: 3	3
Analog inputs, parameterizable	2 x (–10 to +10 V, 0/4 to 20 mA) 1 x (0/4 to 20 mA, Pt1000 / LG-Ni1000) 1 x (Pt1000 / LG-Ni1000)	1 x (–10 to +10 V, 0/4 to 20 mA)	2 x (–10 to +10 V, 0/4 to 20 mA)	2 x (–10 to +10 V, 0/4 to 20 mA)
Digital outputs	2 x (relay NO/NC, 250 V AC, 2 A, 30 V DC, 5 A)[1)] 1 x (relay NO, 30 V DC, 0.5 A)	1 x (transistor, 30 V DC, 0.5 A) 1 x (relay NO/NC, 30 V DC, 0.5 A)	1 x (transistor, 30 V DC, 0.5 A) 2 x (relay NO/NC, 30 V DC, 0.5 A)	4 x (transistor, 30 V DC, 0.5 A) can be optionally used as digital inputs 1 x relay: NO: 30 V DC, 0.5 A 2 x relay: NO/NC: 30 V DC, 0.5 A
Analog outputs	2 x (0 to 10 V, 0/4 to 20 mA)	1 x (0 to 10 V, 0/4 to 20 mA)	1 x (0 to 10 V, 0/4 to 20 mA) 1 x (0 to 10 V, 0 to 20 mA)	2 x (0 to 10 V, 0/4 to 20 mA)
Functions				
Open-loop/closed-loop control techniques	V/f (linear, square law, free, FFC, ECO), field-oriented control of speed and torque without encoder			
				Field-oriented control of speed and torque with encoder
Setpoints	Setpoint selection: analog value, fixed setpoints (max. 16), motorized potentiometer, communication interface, PID controller for process quantities Setpoint channel: minimum speed, maximum speed, ramp-function generator with rounding, 4 skip frequencies			
Protection functions	Inverters: overvoltage and undervoltage as well as phase failure, overcurrent protection, overload I2t, overtemperature of the control module and power unit, wire breakage of analog signals, evaluation of 3 external faults/alarms Motor: temperature monitoring with and without temperature sensor, overspeed, locked rotor and stall protection Drive: torque monitoring for dry running protection, belt monitoring Communication: telegram failure, bus interruption Fault message memory: Buffer for 8 fault cases, each with 8 faults and fault value and time, buffer for 56 alarms with alarm value and instant in time			
Mechanical data				
Degree of protection	IP20			
Software				
STARTER, SIZER, DT Configurator, SINAMICS Startdrive	x	x	x	x
Accessories				
	IOP, BOP-2, shield connection kit, PC inverter connection kit 2, memory card (SINAMICS SD card)			

1) For plants and systems corresponding to UL, the following applies: via terminals 18/20 (DO 0 NC) and 23/25 (DO 2 NC) max. 3 A, 30 V DC or 2 A, 250 V AC

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