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SINAMICS G120

Space-saving, safe and rugged

Whether pumping, ventilating, compressing, moving or processing, the SINAMICS G120 is the universal drive to address the widest range of application 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 (.75–400 hp) always ensures that you can configure the perfect drive for your application.

With SINAMICS G120, you will benefit from the wide range of possibilities that its modular design offers — including flexiblity and cost-savings, thanks to the need for reduced spare parts. All of this is complemented by its user-friendliness — from installation through maintenance.

The advantages of the SINAMICS drives family — an overview:

- Wide range of power ratings from 0.05kW (1/6 hp) 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 automation integration through the Siemens Totally Integrated Automation Portal
- Higher-level, standard Safety Integrated concept
- Standard and unified functionality resulting from common hardware and software
- Common engineering for all drives SIZER for engineering and STARTER/SINAMICS Startdrive for parameterization and commissioning

Mechanical system

- Modular design
- >>> Innovative cooling concept for a higher degree of flexibility

Functionality

- Application-oriented control modules with expanded I/O quantity scope and wide range of functionality
- Positioning capability (EPos)
- Comprehensive range of encoder interfaces
- Safety Integrated: STO, SS1, SBC, SLS, SDI, SSM
- >> Power Modules with low line harmonics
- Energy recovery into the line supply without requiring additional modules
- Integrated SIL3 on PM240-2 frame sizes D, E and F



High-power density

- >> Extremely compact design
- Significantly smaller than previous generation

Communication

- Integral part of Totally Integrated Automation Automation — with interfaces for PROFINET and PROFIBUS
- Supported profiles include PROFIdrive, PROFIsafe, PROFIenergy
- Coupling to third-party systems via USS/Modbus RTU, BacNet MS/TP, EtherNet/IP

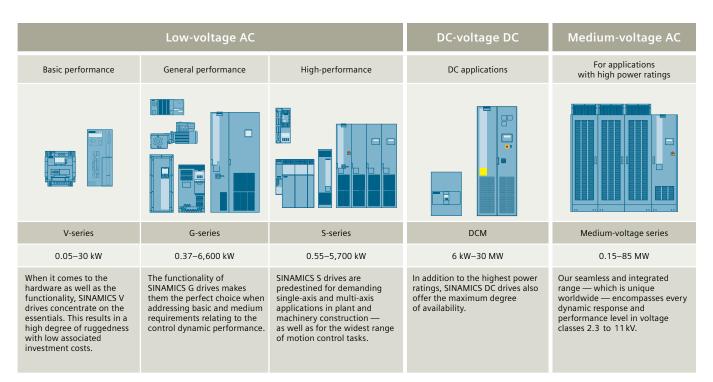
SINAMICS drives

Power and performance for every application

The modular SINAMICS G120 is suitable for the applications highlighted below.

Performance*		Continuous motion			Discontinuous motior	1
Purpose	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
A → B L: 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-and-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

 $^{^{\}star)} \, Requirements \, placed \, on \, the \, torque \, accuracy/speed \, accuracy/positioning \, accuracy/axis \, coordination/functionality$



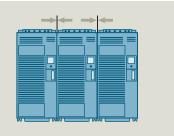


Space-saving

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

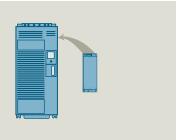
Side-by-side mounting

Cost reduction by saving space in the control cabinet



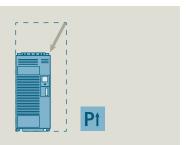
Same housing geometry for all voltages with and without filter A

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



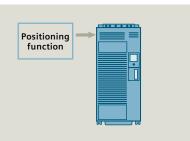
Higher power density

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



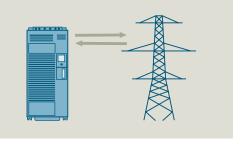
Integrated basic positioning functionality

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 regenerated into the line supply





SINAMICS G120 family — frame sizes A, B, C, D, E and F

Mounting dimensions PM240/PM240-2°) without/with integrated Class A line filter					
Frame size	W (mm)	H (mm)	D (mm)		
FSA	73	196			
FSB	100	292	165		
FSC	140	355			
FSD	200	472	237		
FSE	275	551	237		
FSF	305	708	357		
FSGX	326/-	1,533/-	547/-		

^{*)} Same frame size with and without filter A

Mounting dimensions PM250 without/with integrated Class A line filter				
Frame size	W (mm)	H (mm)	D (mm)	
FSC	-/189	-/334	<i>−1</i> 185	
FSD	275	419/512	204	
FSE	2/3	499/635	204	
FSF	350	634/934	316	

Safe

Safety functions in SINAMICS G1201)

Safe Torque Off (STO)

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



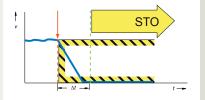


Conveyor belt

e.g. baggage handling *l* packet transport, feeding, removing

Safe Stop 1 (SS1)

 The drive is quickly stopped and safely monitored, especially for high moments of inertia



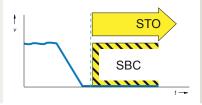


Saws

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

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



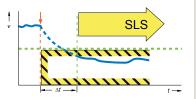


Crane

e.g. cranes, winders

Safely Limited Speed (SLS)

 Reduction and continuous monitoring of the drive speed to directly work at the machine while operational



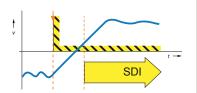


Press

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

Safe Direction (SDI)

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



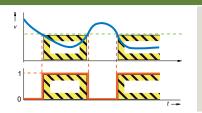


Loading gantry

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

Safe Speed Monitoring (SSM)

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





Milling tool

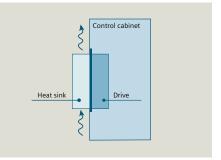
e.g. grinding machines, conveyor lines, drills, milling machines, packaging machines

Flexible

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

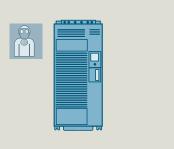
Push-through versions

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



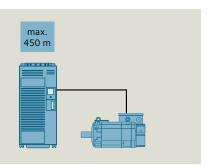
Components resistant to aggressive gases and coated modules

- Compliance with environmental class 3C2 (3C3 with SIPLUS) for frames A, B, C
- 3C3 is standard for frames D, E, F



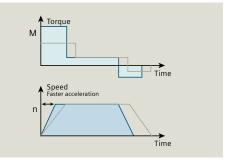
Optimized power module design

- Longer motor cables are possible: shielded: 300m (984 ft.) unshielded: 450 m (1485 ft.)
- Eliminates the need for input line and output reactor for frames D, E, F as a result of the integrated DC link choke
- Insensitive to line fluctuations



Closed-loop control

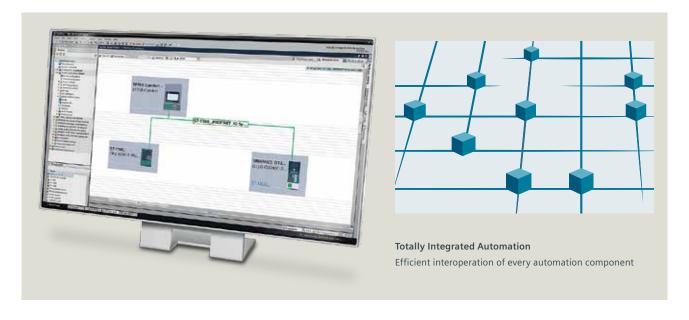
 Rugged open-loop and closed-loop control response for drives with low dynamic requirements — as well as for demanding drives with speed and torque control



Integrated, intelligent and innovative

With SINAMICS G120, we implement a holistic approach for automation and drive technology that paves the way for improved production. We can offer you everything to help you efficiently work with our innovative products and solutions — and create the pre-conditions so that these devices can be seamlessly integrated into the automation environment.

Networked with the automation — Totally Integrated Automation

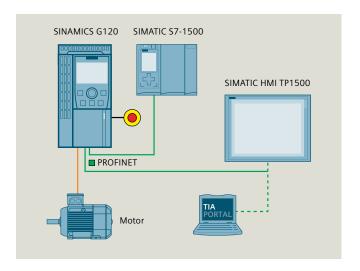


Using the Totally Integrated Automation Portal (TIA Portal), our innovative engineering framework for all automation tasks, SINAMICS drives can be simply and efficiently integrated into any automation environment — using the SINAMICS Startdrive commissioning software, an integral component of the TIA Portal. This simplifies engineering, commissioning and diagnostics.

TIA Portal is the core of Totally Integrated Automation. The open system architecture covers the complete production process — and means that every automation component efficiently interacts with each another. This is achieved through consistent data management, global standards and unified hardware and software interfaces.

PROFINET — the leading Ethernet standard for industry

- 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 pre-condition for sustainably increasing productivity and more competitiveness.

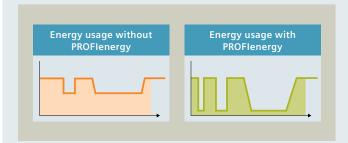


A systematic approach to higher energy efficiency

UP TO 65% ENERGY SAVING POTENTIAL

Our drives 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 drives are capable of energy recovery.



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 drive is automatically switched on and switched off depending upon the process requirements
- Display of the electrical energy used
- Cascade drives are switched on and switched off in stages depending upon the process requirement

Ready for SIMATIC Energy Suite SIMATIC Energy Suite as integrated option for the TIA Portal efficiently links energy management with the automation, therefore making energy usage transparent in your production environment.

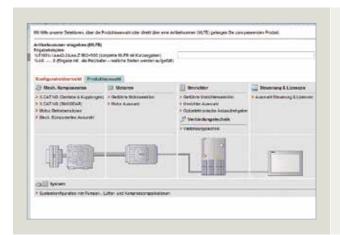
Engineering costs have been significantly reduced as it is now simpler to engineer components that measure energy, e.g. the SINAMICS G-series.

Thanks to the standardized connection to higher-level energy management systems or Cloud-based services, you can seamlessly extend the energy data acquired to create an energy management system across locations and facilities.

You can find additional information about the SIMATIC Energy Suite at www.siemens.com/energysuite

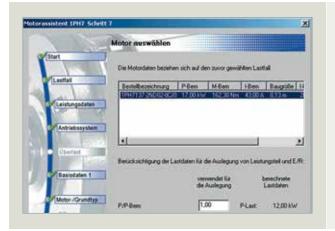
Powerful software tools — support when selecting, commissioning and operating

The SINAMICS G120 is not only easy to configure, it already offers a high degree of operator-friendliness during commissioning. Standard software tools make this possible.



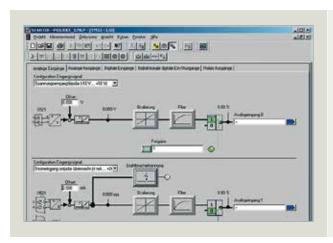
DT Configurator

■ Fast product selection and ordering



SIZER

■ Efficient engineering of a complete drive system



STARTER/SINAMICS Startdrive

 Configuration and commissioning in the Totally Integrated Automation (TIA) Portal

Intelligent Operator Panel and Basic Operator Panel — intuitive operation and monitoring

Two different operator panels are available for simple and efficient operation including monitoring of the SINAMICS G120 drive. SINAMICS IOP-2 SINAMICS BOP 14 interface languages available **IOP-2 (Intelligent Operator Panel) BOP-2 (Basic Operator Panel)** SINAMICS G drives and the associated Simple commissioning Good overview as parameters standard applications can be simply and parameter values are commissioned using wizards simultaneously displayed Cloning function for fast series commissioning of the drives **Operator control** New design—membrane keypad with 2-line display for up to two process and visualization central sensor control panel values with text Graphic display of status values, e.g. Status display of pre-defined units pressure and flow in bar-type diagrams Simple, individualized local drive operation (start/stop, setpoint input, direction of rotation change) Application-specific scenarios can be easily implemented, e.g. operating concepts with additional external operating devices **Diagnostics** Fast diagnostics using local plain Diagnostics with menu prompting text display with 7-segment display Integrated plain text help function for local display and to remove fault messages Can be flexibly used Can be mounted directly on the Control Can be mounted directly on the and open for expansions Unit, installed in the door or as handheld Control Unit or installed in the door terminal (depends on the drive-type) (depends on the drive-type) ■ 14 interface languages are available ■ IOP-2 device design, open for future expanded functionality (e.g. device functions, wizards, languages) Can be simply upgraded to a new function release via the USB port

SINAMICS G120 user-friendliness through modularity

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

Modularity offers you 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

SINAMICS G120 simply select —









SINAMICS selector app



Using this app, you can compile the order numbers for your SINAMICS G120 drive. It will guide you quickly and easily through the correct order numbers (MLFBs).

This is how it works

- Select SINAMICS frequency drives
- Select the rated power and device options
- Select accessories

You will be able to save and send your selection via e-mail. The pre-selection serves as the basis for an order specification with your distributor/Siemens.



Scan this QR-code to download the app free-of-charge 1



The choice is yours

You can select between two power modules* depending upon your particular requirements.

Standard braking response with braking chopper

Innovative braking response with energy recovery

PM240/PM240-2 power modules

PM250 power modules

The PM240/PM240-2 power modules are ideal for standard applications in general machinery construction.

The PM250 power module is ideal for applications requiring energy recovery.

2

Select your control unit



CU230P-2 control unit

CU240E-2 control unit

CU250S-2 control unit

The CU230P-2 control unit is specifically designed for pump, fan and compressor applications

The CU240E-2 is ideal for a multitude of applications in general machine building (e.g. mixers, agitators)

The CU250S-2 is ideal for high-quality applications (e.g. extruders, centrifuges)

3

Select the optional components



Additional components are available depending upon your particular requirements, for example, an operator panel (IOP-2 or BOP-2) or a blanking cover.





+









Your SINAMICS G120 drive has now been configured

*Detailed information about the PM230 power module is provided in SINAMICS G120P documentation. Detailed information on products and options is provided in the current Catalog D31 in Chapter "SINAMICS G120 standard inverters" or in the Siemens Industry Mall (iMall).

PM240/PM240-2 power modules

What power is required? (LO = Low Overload; HO = High Overload) *Definition HO/LO see p.22*

PM240/PM240-2 Power Modules have an integrated braking chopper and are suitable for many applications in general machine building.

Is a filtered device of Class A 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.

Are additional external line filters required (for example to maintain

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.

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

Rated power LO (kW)	Rated power (hp)	Output current LO (A) I _N	Output current HO (A) Існ	Frame size		Unfiltered power modules (part number)	Integrated Class A filter power modules (part number)		Class A filter	Class B line filter
1AC / 3 A	C 200V	240V								
0.55	0.75	3.2	2.3	FSA		6SL3210-1PB13-0UL0	6SL3210-1PB13-0AL0	> 5	integrated	-
0.75	1	4.2	3.2	FSA		6SL321□-1PB13-8UL0	6SL321□-1PB13-8AL0	230V en ected.	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	The PM240 has now completely s	integrated	-
3	4	13.6	10.4	FSC		6SL3210-1PB21-4UL0	6SL3210-1PB21-4AL0	he F ha	integrated	-
4	5	17.5	13.6	FSC	7	6SL321□-1PB21-8UL0	6SL321□-1PB21-8AL0		integrated	-
3AC 200V	3AC 200V 240V									
5.5	7.5	22	17.5	FSC		6SL3210-1PC22-2UL0	6SL3210-1PC22-2AL0		integrated	-
7.5	10	28	22	FSC		6SL3210-1PC22-8UL0	6SL3210-1PC22-8AL0		integrated	_
11	15	42	35	FSD		6SL3210-1PC24-2UL0	-	200V en ected.	-	-
15	20	54	42	FSD		6SL3210-1PC25-4UL0	-	e PM240-2 200V has now been npletely selected	-	-
18.5	25	68	54	FSD	\	6SL3210-1PC26-8UL0	-		-	-
22	30	80	68	FSE		6SL3210-1PC28-0UL0	-	124 nov	_	-
30	40	104	80	FSE		6SL3210-1PC31-1UL0	-	The PM24(has now	-	-
37	50	130	104	FSF		6SL3210-1PC31-3UL0	_	The	-	_
45	60	154	130	FSF		6SL3210-1PC31-6UL0	-		-	-
55	60	178	154	FSF		6SL3210-1PC31-8UL0	-		-	-

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

Rated power LO (kW)	Rated power (hp)	Output current LO (A)	Output current HO (A)	Frame size	Unfiltered power modules (part number)	Power modules with integrated Class A filter (part number)		Class A filter is already integrated in the filter device up to 132 kW (part number)	
0.55	0.75	1.7	1.3	FSA	6SL3210-1PE11-8UL1	6SL3210-1PE11-8AL1		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	ctec	integrated	6SL3203-0BE17-7BA0
2.2	3	5.9	4.1	FSA	6SL3210-1PE16-1UL1	6SL3210-1PE16-1AL1	e le	integrated	6SL3203-0BE17-7BA0
3	4	7.7	5.9	FSA	6SL3210-1PE18-0UL1	6SL321□-1PE18-0AL1	completely selected.	integrated	6SL3203-0BE17-7BA0
4	5	10.2	7.7	FSB	6SL321□-1PE21-1UL0	6SL3210-1PE21-1AL0	lete	integrated	6SL3203-0BE21-8BA0
5.5	7.5	13.2	10.2	FSB	6SL3210-1PE21-4UL0	6SL3210-1PE21-4AL0	ш	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	now been	integrated	6SL3203-0BE23-8BA0
15	20	32	26	FSC	6SL321□-1PE23-3UL0	6SL321□-1PE23-3AL0	y A	integrated	6SL3203-0BE23-8BA0
18.5	25	38	32	FSD	6SL3210-1PE23-8UL0	6SL3210-1PE23-8AL0	no	integrated	_
22	30	45	38	FSD	6SL3210-1PE24-5UL0	6SL3210-1PE24-5AL0	has	integrated	-
30	40	60	45	FSD	6SL3210-1PE26-0UL0	6SL3210-1PE26-0AL0		integrated	_
37	50	75	60	FSD	6SL3210-1PE27-5UL0	6SL3210-1PE27-5AL0	/ PM240-2 480V	integrated	-
45	60	90	75	FSE	6SL3210-1PE28-8UL0	6SL3210-1PE28-8AL0	0-2	integrated	_
55	75	110	90	FSE	6SL3210-1PE31-1UL0	6SL3210-1PE31-1AL0	J 24	integrated	-
75	100	145	110	FSF	6SL3210-1PE31-5UL0	6SL3210-1PE31-5AL0	<u>a</u> /	integrated	-
90	125	178	145	FSF	6SL3210-1PE31-8UL0	6SL3210-1PE31-8AL0	40	integrated	-
110	150	205	178	FSF	6SL3210-1PE32-1UL0	6SL3210-1PE32-1AL0	The PM240	integrated	-
132	200	250	205	FSF	6SL3210-1PE32-5UL0	6SL3210-1PE32-5AL0	В	integrated	-
160	250	302	250	FSGX ²⁾	6SL3224-0XE41-3UA0	-	È	6SL3000-0BE34-4AA0	_
200	300	370	302	FSGX ²⁾	6SL3224-0XE41-6UA0	-		6SL3000-0BE34-4AA0	-
250	400	477	370	FSGX ²⁾	6SL3224-0XE42-0UA0	_		6SL3000-0BE36-0AA0	_

Heat sink version Standard
Push-through

¹⁾ Frame size FSD–FSF—supplementary condition: only rated frequency—or less than the permissible max. output frequency 150 Hz

 $^{^{\}rm 2)}$ A braking module is additionally required for frame size FSGX: 6SL3300-1AE32-5AA0

specific EMC values)?	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? ⁵⁾	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 drive 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 drive and motor can be extended.	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 ⁴⁾ (part number)	Braking resistors side-mounted (part number)	Output reactor side-mounted ¹⁾ (part number)	Shield plate for the 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	JJY:023422620002	6SE6400-3TC07-5ED0	included	
integrated	JJY:023422620002	6SE6400-3TC07-5ED0	included	
integrated	JJY:023422620002	6SE6400-3TC07-5ED0	included	
integrated	JJY:023423320001	6SE6400-3TC14-5FD0	included	
integrated	JJY:023423320001	6SE6400-3TC14-5FD0	included	
integrated	JJY:023434020003	6SE6400-3TC14-5FD0	included	
integrated	JJY:023434020003	6SE6400-3TC14-5FD0	included	
integrated	JJY:023434020003	6SE6400-3TC14-5FD0	included	
3AC line reactor side-mounted up to FSC ⁴); integrated for FSD-FSF (part number)	Braking resistors side-mounted (part number)	Output reactor side-mounted ¹⁾ (part number)	Shield plate for the power modules (part 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	
	6SL3201-0BE21-8AA0		included	
6SL3203-0CE21-8AA0		6SL3202-0AE21-8CA0		
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	JJY:023422620001	6SE6400-3TC07-5ED0	included	
integrated	JJY:023422620001	6SE6400-3TC07-5ED0	included	
integrated	JJY:023424020001	6SE6400-3TC07-5ED0	included	
integrated	JJY:023424020001	6SE6400-3TC07-5ED0	included	
integrated	JJY:023434020001	6SE6400-3TC14-5FD0	included	
integrated	JJY:023434020001	6SE6400-3TC14-5FD0	included	
integrated	JJY:023454020001	6SE6400-3TC14-5FD0	included	
integrated	JJY:023454020001	6SE6400-3TC14-5FD0	included	
integrated	JJY:023464020001	6SL3000-2BE32-1AA0	included	
integrated	JJY:023464020001	6SL3000-2BE32-6AA0	included	
6SL3000-0CE33-3AA0	6SL3000-1BE31-3AA0 ²⁾	6SL3000-2BE33-2AA0		
6SL3000-0CE35-3AA0	6SL3000-1BE31-5AA0-2)	6SL3000-2BE33-2AA0	_	
6SL3000-0CE35-1AA0	6SL3000-1BE32-5AA0 ²⁾	6SL3000-2BE35-0AA0	_	

 $^{^{\}rm 3)}\,{\rm An}$ unfiltered power module is required to use the external Class B filter

For frame sizes FSA—FSC, the line reactor to extend the service life can be omitted if a power module one power stage higher is selected. More detailed information is provided in the catalog.

⁵⁾ Supplementary products, for instance filters and braking resistors, are available through our selected "Product partners":

8AC PM240-2/500V-690V ±/-10 %

What power is required? (LO = Low Overload; HO = High Overload)

PM240-2 power modules have an integrated braking chopper and are suitable for many applications in general machinery construction.

Frame size	Output current HO (A)	Output current LO (A)	Rated power (hp)	Rated power LO (kW)
FSD	11	14	10	11
FSD	14	19	15	15
FSD	19	23	20	18.5
FSD	23	27	25	22
FSD	27	35	30	30
FSD	35	42	40	37
FSE	42	52	50	45
FSE	52	62	60	55
FSF	62	80	75	75
FSF	80	100	100	90
FSF	100	115	100	110
FSF	115	142	125	132

Is a filtered device of Class A 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.

	Power modules with integrated Class A filter (part number)	Unfiltered power modules (part number)
	6SL3210-1PH21-4AL0	6SL3210-1PH21-4UL0
	6SL3210-1PH22-0AL0	6SL3210-1PH22-0UL0
	6SL3210-1PH22-3AL0	6SL3210-1PH22-3UL0
///09	6SL3210-1PH22-7AL0	6SL3210-1PH22-7UL0
	6SL3210-1PH23-5AL0	6SL3210-1PH23-5UL0
	6SL3210-1PH24-2AL0	6SL3210-1PH24-2UL0
DNA 240-2	6SL3210-1PH25-2AL0	6SL3210-1PH25-2UL0
	6SL3210-1PH26-2AL0	6SL3210-1PH26-2UL0
	6SL3210-1PH28-0AL0	6SL3210-1PH28-0UL0
	6SL3210-1PH31-0AL0	6SL3210-1PH31-0UL0
	6SL3210-1PH31-2AL0	6SL3210-1PH31-2UL0

6SL3210-1PH31-4AL0

Power Modules with

has now been completely selected

The PM250 has now been completely selected

Are additional external line filters required (for example to maintain spec

Class A filter is already integrated	Class B line filter
integrated	-
integrated	_
integrated	-
	I .

3AC PM250/380V-480V +/-10 %

What power is required? (LO = Low Overload; HO = High Overload)

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.

Rated power LO (kW)	Rated power (hp)	Output current LO (A)	Output current HO (A)	Frame size		
7.5	10	18	13.2	FSC		
11	15	25	19	FSC		
15	20	32	26	FSC		
18.5	25	38	32	FSD		
22	30	45	38	FSD		
30	40	60	45	FSD		
37	50	75	60	FSE		
45	60	90	75	FSE		
55	75	110	90	FSF		
75	100	145	110	FSF		
90	125	178	145	FSF		
Missing antions such as sing ways filter sub-chassis braking resists						

Is a filtered device of Class A required?

6SL3210-1PH31-4UL0

Unfiltored

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.

power modules (part number)	integrated Class A filter (part number)
-	6SL3225-0BE25-5AA1
-	6SL3225-0BE27-5AA1
-	6SL3225-0BE31-1AA1
6SL3225-0BE31-5UA0	6SL3225-0BE31-5AA0
6SL3225-0BE31-8UA0	6SL3225-0BE31-8AA0
6SL3225-0BE32-2UA0	6SL3225-0BE32-2AA0
6SL3225-0BE33-0UA0	6SL3225-0BE33-0AA0
6SL3225-0BE33-7UA0	6SL3225-0BE33-7AA0
6SL3225-0BE34-5UA0	6SL3225-0BE34-5AA0
6SL3225-0BE35-5UA0	6SL3225-0BE35-5AA0
6SL3225-0BE37-5UA0	6SL3225-0BE37-5AA0
can be supplied from audited drive	ontion suppliers

Are additional external line filters required (for example to maintain spec

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.

integrated

Class A filter is integrated in the filter device up to 90 kW	Class B line filter (sub-assembly) ³ (part number)
integrated	6SL3203-0BD23-8SA0
integrated	6SL3203-0BD23-8SA0
integrated	6SL3203-0BD23-8SA0
integrated	_
integrated	-
integrated	-
integrated	_
integrated	_

Missing options such as sine-wave filter, sub-chassis 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

ific 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 drive 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 drive and motor can be extended.	The du/dt filter plus Voltage Peak Limiter limits the voltage rate of rise and typical voltage peaks		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 (part number)		Output reactor	du/dt filter plus VPL (part number)		Shield plate for the power modules
integrated	JJY:023424020002		not necessary	6SL3000-2DH31-0AA0	1	included
integrated	JJY:023424020002	١	not necessary	6SL3000-2DH31-0AA0		included
integrated	JJY:023424020002	١	not necessary	6SL3000-2DH31-0AA0		included
integrated	JJY:023424020002		not necessary	6SL3000-2DH31-0AA0		included
integrated	JJY:023424020002		not necessary	6SL3000-2DH31-0AA0		included
integrated	JJY:023424020002		not necessary	6SL3000-2DH31-0AA0		included
integrated	JJY:023434020002		not necessary	6SL3000-2DH31-0AA0		included
integrated	JJY:023434020002		not necessary	6SL3000-2DH31-0AA0		included
integrated	JJY:023464020002		6SL3000-2AH31-0AA0	6SL3000-2DH31-0AA0		included
integrated	JJY:023464020002		6SL3000-2AH31-0AA0	6SL3000-2DH31-0AA0		included
integrated	JJY:023464020002		6SL3000-2AH31-5AA0	6SL3000-2DH31-5AA0		included
integrated	JJY:023464020002		6SL3000-2AH31-5AA0	6SL3000-2DH31-5AA0		included

ific 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 drive 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.
	PM250 with energy recovery. As a result, it is not permissible that a braking resistor is used.	Sub-chassis output reactor (part number)	Sine-wave filter FSC subchassis, from FSD, side-mounted (part number)		Shield plate for the power modules (part number)
-	is not required	6SL3202-0AJ23-2CA0	6SL3202-0AE22-0SA0		6SL3262-1AC00-0DA0
-	is not required	6SL3202-0AJ23-2CA0	6SL3202-0AE23-3SA0	П	6SL3262-1AC00-0DA0
-	is not required	6SL3202-0AJ23-2CA0	6SL3202-0AE23-3SA0	М	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	И	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

⁶⁾ Selected supplementary products, for example filters or braking resistors are available through our selected "Product partners". Here, select "Solution Partner Finder" as technology "Drive Object": siemens.com/partnerfinder



CU250S-2 control unit

Is an encoder used for signals integrated positioning ca			
	no		yes (EPos positioning functionality through Extended Function license)
CU230P-2	CU240E-2	CU240E-2 Failsafe	CU250S-2

Is integrated safety technology required?					
		yes			
	STO (Safe Torque Off)	STO (Safe Torque Off)	STO (Safe Torque Off)		
		SS1 (Safe Stop 1)	SS1 (Safe Stop 1)		
		SLS (Safely Limited Speed)	SBC (Safe Brake Control)1)		
		SSM (Safe Speed Monitor)	SLS (Safely Limited Speed) ²⁾		
no		SDI (Safe Direction)	SSM (Safe Speed Monitor) ²⁾		
			SDI (Safe Direction) ²⁾		
			A Safe Brake Relay is required for the SBC function		
			²⁾ With Safety license		
CU230P-2	CU240E-2	CU240E-2 Failsafe	CU250S-2		

How many inputs and outputs are required?						
Digital inputs (DI)	6	6	6	11		
Failsafe DI	_	1 (opt. for 2 DI)	3 (opt. for 2 DI)	3 (opt. for 2 DI)		
Digital outputs (DO)	3	3	3	3 (opt. 1 F-DO)		
Fast DI/DO	_	_	-	4		
Analog inputs	4	2	2	2		
Analog outputs	2	2	2	2		
	CU230P-2	CU240E-2	CU240E-2 Failsafe	CU250S-2		

What type of communication/bus system is required?						
LICC Madhus DTII	CU230P-2 HVAC	CU240E-2	CU240E-2 F	CU250S-2		
USS, Modbus RTU	6SL3243-0BB30-1HA3	6SL3244-0BB12-1BA1	6SL3244-0BB13-1BA1	6SL3246-0BA22-1BA0		
DACmot MC/TD	CU230P-2 HVAC					
BACnet MS/TP	6SL3243-0BB30-1HA3	_	_	_		
DROEINIC DD	CU230P-2 DP	CU240E-2 DP	CU240E-2 DP-F	CU250S-2 DP		
PROFIBUS DP	6SL3243-0BB30-1PA3	6SL3244-0BB12-1PA1	6SL3244-0BB13-1PA1	6SL3246-0BA22-1PA0		
DDOCINET/EstN+/ID	CU230P-2 PN	CU240E-2 PN	CU240E-2 PN-F	CU250S-2 PN		
PROFINET/EtherNet/IP	6SL3243-0BB30-1FA0	6SL3244-0BB12-1FA0	6SL3244-0BB13-1FA0	6SL3246-0BA22-1FA0		

Permissible combinations with power modules					
PM240*	yes	yes	yes	yes	
PM240-2	yes	yes	yes	yes	
PM250	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	-	-	-		
Shield connection kit 2 6SL3264-1EA00-0HA0	-	USS, Modbus RTU, PROFIBUS	USS, Modbus RTU, PROFIBUS	-		
Shield connection kit 3 6SL3264-1EA00-0HB0	PROFINET	PROFINET	PROFINET	-		
Shield connection kit 4 6SL3264-1EA00-0LA0	-	-	-	All versions		

^{*}The PM240 power modules, frame size FSGX (i.e. from 160 kW and higher) have only been released for the basic safety funtions (STO, SS1 and SBC)

Description	Part number
IOP-2 Intelligent Operator Panel with 14 interface languages: German, English, French, Italian, Spanish, Portuguese, Dutch, Swedish, Russian, Czech, Polish, Turkish, Finnish, Chinese)	6SL3255-0AA00-4JA2
IOP-2 mobile hand-held device connection through a cable includes: IOP-2 (6SL3255-0AA00-4JA2), hand-held housing, rechargeable batteries (4 x AA), charging unit (international), RS232 connecting cable (3 m), USB cable (1 m)	6SL3255-0AA00-4HA1
Basic Operator Panel (BOP-2)	6SL3255-0AA00-4CA1
Door mounting kit for BOP-2/IOP for installation in cabinet doors with sheet steel thicknesses of 1–3 mm. Includes seal, installation materials and connecting cable (5 m)	6SL3256-0AP00-0JA0
SINAMICS memory card (SD card)	6SL3054-4AG00-2AA0
SINAMICS G120 multi-card (SD card) plus license V4.7 SP6	6SL3054-7TD00-2BA0
Additional licenses for CU250S-2	
SD card + license extended functions safety (SLS, SSM, SDI)	6SL3054-4AG00-2AA0-Z F01
SD card + license extended functions basic positioning (EPos)	6SL3054-4AG00-2AA0-Z E01
SD card + license extended safety + basic positioning	6SL3054-4AG00-2AA0-Z F01+E0
License extended functions safety for CU250S-2	6SL3074-0AA10-0AA0
License extended functions basic positioning (EPos)	6SL3074-7AA04-0AA0
Additional licenses for CU250S-2 plus firmware V4.7 SP6	
SD card + license extended functions safety (SLS, SSM, SDI) + FW V4.7 SP6	6SL3054-7EH00-2BA0-Z F01
SD card + license extended functions basic positioning (EPos) + FW V4.7 SP6	6SL3054-7EH00-2BA0-Z E01
SD card + license extended functions safety + basic positioning + FW V4.7 SP6	6SL3054-7EH00-2BA0-Z F01+E0
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 PM240-2 push-through power modules	
frame size FSA	6SL3260-6AA00-0DA0
frame size FSB	6SL3260-6AB00-0DA0
frame size FSC	6SL3260-6AC00-0DA0

Software for engineering and commissioning				
Description	Part number			
STARTER commissioning tool on DVD	6SL3072-0AA00-0AG0			
SINAMICS Startdrive commissioning tool on DVD	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\ D31,\ chapter\ "SINAMICS\ G120\ standard\ inverters"\ or\ in\ the\ Industry\ Mall:\ www.siemens.com/industrymall\ and\ options\ can\ be\ found\ in\ the\ current\ Catalog\ D31,\ chapter\ "SINAMICS\ G120\ standard\ inverters"\ or\ in\ the\ Industry\ Mall:\ www.siemens.com/industrymall\ and\ options\ can\ be\ found\ in\ the\ current\ Catalog\ D31,\ chapter\ "SINAMICS\ G120\ standard\ inverters"\ or\ in\ the\ Industry\ Mall:\ www.siemens.com/industrymall\ and\ options\ can\ be\ found\ in\ the\ current\ Catalog\ D31,\ chapter\ "SINAMICS\ G120\ standard\ inverters"\ or\ in\ the\ Industry\ Mall:\ www.siemens.com/industrymall\ and\ options\ can\ option\ option\$

Power modules	PM240 / PM240-2 IP20		PM250 IP20			
	General machine building; Braking with a braking resistor		General machine building; Braking with energy recovery			
Line voltage	1AC / 3AC 200 240V +/-10 % 3AC 380V 480V +/-10 % 3AC 500V 690V +/-10 %		3AC 380V 480V +/-10 %			
Power	но	LO	но	LO		
HO = High Overload LO = Low Overload	200 240V 1AC 0.37 3 kW (.5–4 hp) 3AC 0.37 45 kW (.5–5 hp) 380 480V 3AC 0.37 200 kW (.5–250 hp) 500 690V 3AC 7.5 110 kW (10–150 hp)	200 240V 1AC 0.55 4 kW (.75–5 hp) 3AC 0.55 55 kW (.75–75 hp) 380 480V 3AC 0.55–250 kW (.75–400 hp) 500 690V 3AC 11 132 kW (15–200 hp)	Unfiltered 15 75 kW (20–100 hp) Filtered 5.5 75 kW (7.5–125 hp)	Unfiltered 18.5 90 kW (25–125 hp) Filtered 7.5 90 kW (10–125 hp)		
Rated input current	но	LO	НО	LO		
(dependent upon the motor load and line impedance)	200 240V 1AC 6.6 37.5 A 3AC 3.8 164 A 380 480V 3AC 2.0 354 ¹⁾ /442 A 500 690V 3AC 11 122 A	200 240V 1AC 7.5 43 A 3AC 4.3 172 A 380 480V 3AC 2.3 354 ¹⁾ /442 A 500 690V 3AC 14 137A	13.2 135 A	18 166 A		
Rated output current	но	LO	но	LO		
(derating for ambient temperatures) > 40 °C (LO) or > 50 °C (HO)	200 240V 1AC 2.3 13.6 A 3AC 2.3 154A 380 480V 3AC 1.3 370 A 500 690V 3AC 11 115 A	200 240V 1AC 3.2 17.5 A 3AC 3.2 178 380 480V 3AC 1.7 477 A 500 690V 3AC 14 142 A	1.3 145 A	1.7 178 A		
Conformance with standards	UL, cUL, CE, C-Tick, SEMI F47		UL, cUL, CE, C-Tick	'		
CE marking	According to the Low-Voltage Dire	ctive 2006/95/EC				
Electrical information						
Line frequency	47 63 Hz					
Low Overload		manding a low level of dynamic per eed precision. For example: centrifu		equare-law torque characteristic with cating blowers, radial compressors,		
Overload capability (for Low Overload)	150% for 3 seconds: 110% for 57 s	seconds				
High Overload		manding a higher dynamic performa nple: conveyor belts, geared pumps,				
Overload capability (for High Overload)	200% for 3 seconds: 150% for 57 s	seconds				
Overload capability (LO/HO)	When using the overload capability	y, the continuous output current is r	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)				
	·					
Functions	·					
	4 kHz (standard) or 4 16 kHz (de			. 8 kHz (derating)		
Functions	4 kHz (standard) or 4 16 kHz (de	erating) or holding brake, compound brake	FSF: 4 kHz (standard) or 4 kHz	. 8 kHz (derating)		

¹⁾ with line reactor

²⁾ depending upon the respective Control Unit

Control units	CU230P-2	CU240E-2	CU250S-2			
	Optimized for pumps, fans, compressors	Optimized for general applications in machine building, such as conveyor belts and mixers	For demanding applications in the standard drives domain, for example extruders, centrifuge			
Architecture	Application-optimized number of I/O	Standard number of I/O, integrated safety technology	Higher number of I/O, integrated safety technology and basic positioning function			
Mounting dimensions [WxHxD]	73 x 199 x 65.5 mm (2.9 x 7.8 x 2.6 in.)	73 x 199 x 46 mm (2.9 x 7.8 x 1.8 in.)	73 x 199 x 46 mm (2.9 x 7.8 x 1.8 in.)			
Communication functions						
PROFINET	CU230P-2 PN	CU240E-2 PN, CU240E-2 PN-F	CU250S-2 PN			
PROFIBUS DP	CU230P-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	CU240E-2, CU240E-2 F	CU250S-2			
BACnet MS/TP	CU230P-2 HVAC	-	-			
USB interface	1	1	1			
Safety functions according to Ca	tegory 3 of EN 954-1 or acc. to SIL2 of IEC 61508	3				
ntegrated 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			
STO, SBC, SS1, SLS, SSM, SDI	-	-	CU250S-2, DP, PN (SLS, SSM, SDI with safety license)			
Electrical information						
Supply voltage	24V DC (via power modules or externally)					
Digital inputs	6	6	11			
Digital inputs failsafe	_	CU240E-2, CU240E-2 DP: 1 CU240E-2 DP-F: 3	3			
Analog inputs, parameterizable	2x (-10 to +10V, 0/4 to 20 mA) 1x (0/4 to 20 mA, Pt1000/LG-Ni1000) 1x (Pt1000/LG-Ni1000)	2 x (–10 to +10V, 0/4 to 20 mA)	2 x (-10 to +10V, 0/4 to 20 mA)			
Digital outputs	2 x (relay NO/NC, 250V AC, 2 A, 30V DC, 5 A) ¹⁾ 1 x (relay NO, 30V DC, 0.5 A)	1 x (transistor, 30V DC, 0.5 A) 2 x (relay NO/NC, 30V DC, 0.5 A)	4 x (transistor, 30V DC, 0.5 A) can be optionally used as digital inputs 1 x relay: NO: 30V DC, 0.5 A 2 x relay: NO/NC: 30V DC, 0.5 A			
Analog outputs	2 x (0 to 10V, 0/4 to 20 mA)	1 x (0 to 10V, 0/4 to 20 mA) 1 x (0 to 10V, 0 to 20 mA)	2 x (0 to 10V, 0/4 to 20 mA)			
Functions		7.7.(0.10.101) 0.10.2011119				
Open-loop/closed-loop	V/f (linear, square law,	free, FFC, ECO), field-oriented control of speed and	torque without encoder			
control techniques			Field-oriented control of speed and torque with encoder			
Setpoints	Setpoint selection: analog value, fixed setpoints	(max. 16), motorized potentiometer, communicati	on interface, PID controller for process quantities			
	Setpoint channel: minimum speed, maximum sp	peed, ramp-function generator with rounding, 4 ski	p frequencies			
Protection	Drives: over-voltage and under-voltage, as well a and power unit, wire breakage of analog signals,	s phase failure, over-current protection, overload l2 evaluation of 3 external faults/alarms	tt, over-temperature of the control module			
	Motor: temperature monitoring with and withou	t temperature sensor, over-speed, locked rotor and	stall protection			
	Drive: torque monitoring for dry running protecti	on, belt monitoring				
	Communication: telegram failure, bus interruption	on				
	Fault message memory: buffer for 8 fault cases, 6	each with 8 faults and fault value and time, buffer fo	or 56 alarms with alarm value and instant in time			
Mechanical information						
Degree of protection		IP20				
Software						
STARTER, SIZER, DT Configurator, SINAMICS Startdrive	x	x	x			
Accessories						
	IOP-2 ROP-2 shield con	nnection kit, PC inverter connection kit 2, SINAMIC	S memory card (SD card)			
		and 22/25 (DO 2 NC) may 24 20V DC or 24 250V AC				

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. 3A, 30V DC or 2A, 250V AC

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