SIEMENS

Ingenuity for life

SINAMICS G120

The modular inverter: space-saving, safe and rugged

siemens.com/sinamics-g120

SINAMICS G120

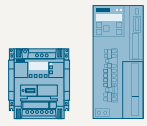
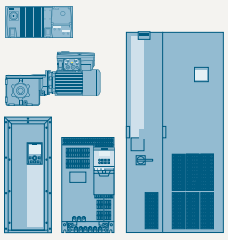
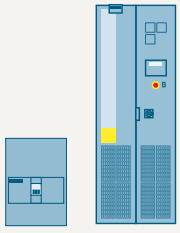
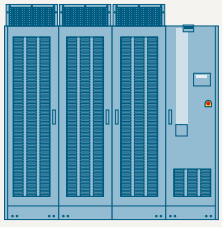
Space-saving, safe and rugged

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, 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.

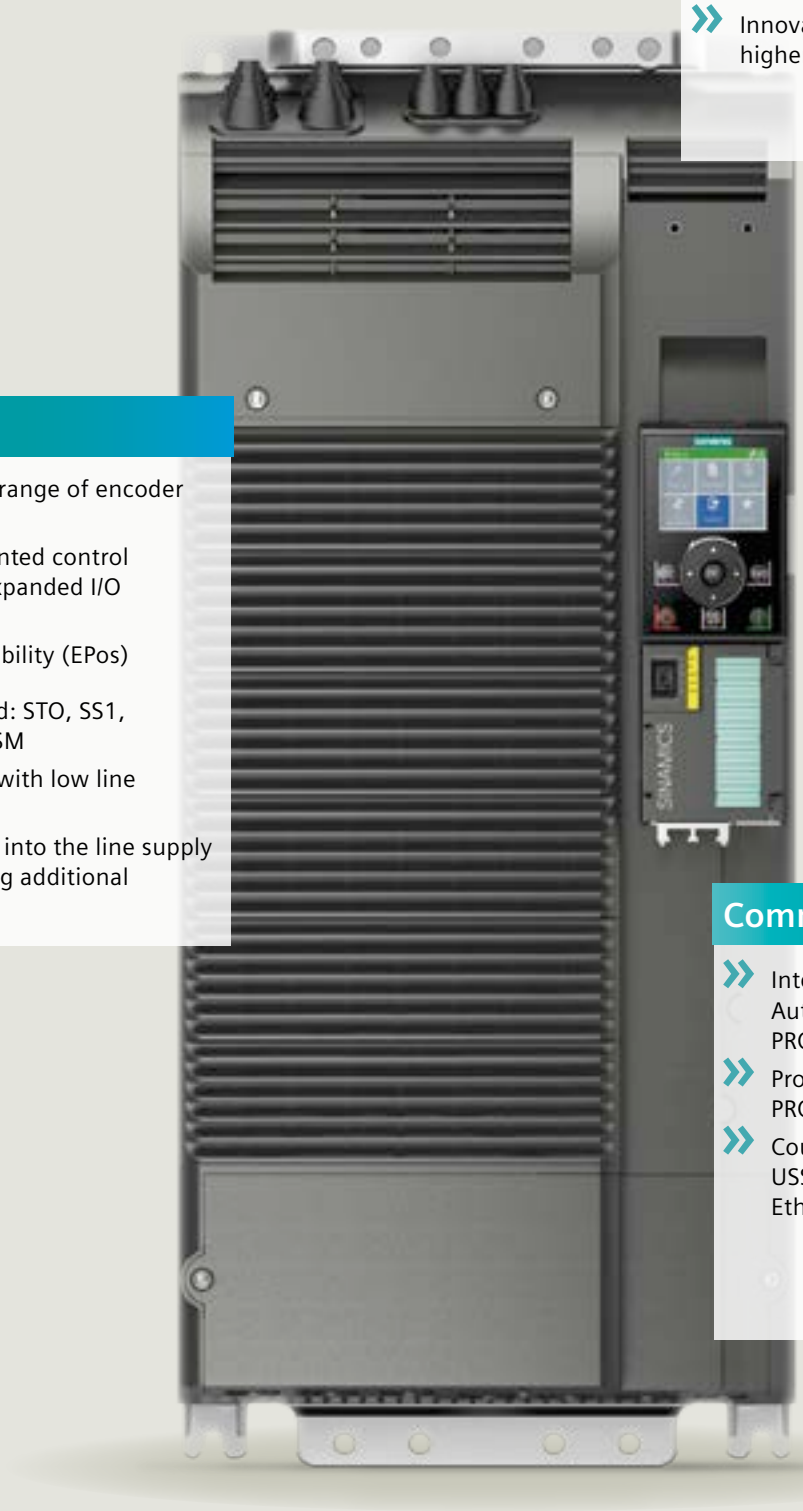
The advantages of the SINAMICS family – an overview:

- Wide range of power ratings from 0.05 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			Direct current 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
0.05 – 30 kW	0.37 – 6,600 kW	0.55 – 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

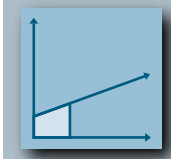
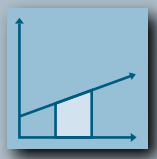
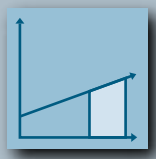
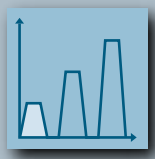
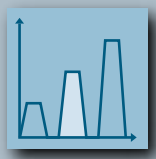
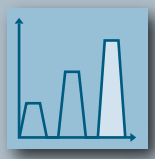
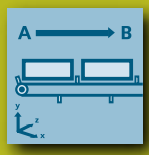
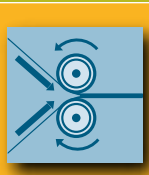
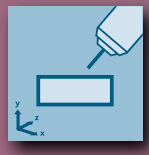
Communication

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

SINAMICS drives

for every application, power and performance

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

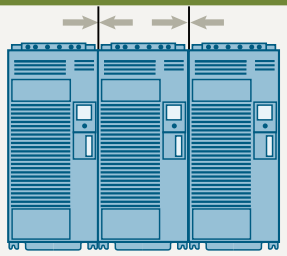
Performance*) / Purpose	Continuous motion			Discontinuous motion		
	 Basic	 Medium	 High	 Basic	 Medium	 High
 Pumping/ventilating/compressing	Centrifugal pumps Radial/axial fans Compressors	**Centrifugal pumps Radial/axial fans Compressors**	Excentric screw pumps	**Hydraulic pumps Dosing pumps**		Descaling 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 Storage and retrieval machines 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 position 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

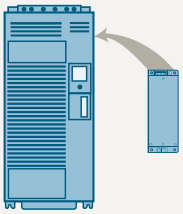
The well-conceived design and innovative technology make SINAMICS G120 especially compact.

Side-by-side mounting



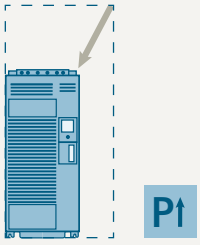
Cost reduction by saving space in the control cabinet

Same housing geometry for all voltages with and without filter A



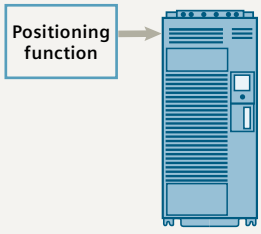
Space-saving as a result of the same frame size with integrated filter

Higher power density



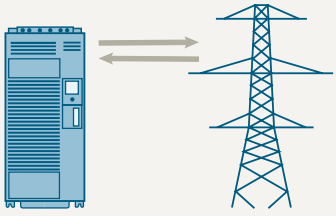
Space-saving as a result of a higher power rating in a smaller space

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	708	357
FSGX	326/–	1,533/–	547/–

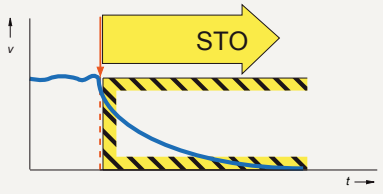
Mounting dimensions PM250 with/without integrated Class A line filter

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

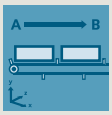
Safety functions in SINAMICS G120[1)]

Safe torque off (STO)



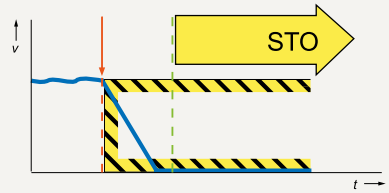
- STO safely sets the drive into a torque-free condition; an undesirable restart is safely prevented. STO acts directly. After STO has been deselected, the drive can quickly restart as the DC link remains active.

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



Conveyor belt

Safe stop 1 (SS1)

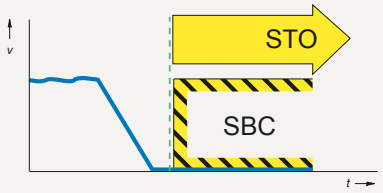


- The drive is quickly stopped and safely monitored, especially for high moments of inertia.

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

Saws

Safe brake control (SBC)

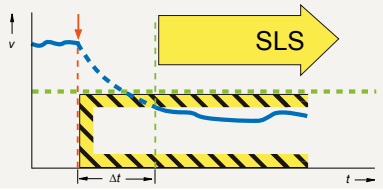


- A holding brake is safely controlled and monitored, especially for vertical axes; is always activated in parallel with STO.

e.g. cranes, winders

Crane

Safely limited speed (SLS)

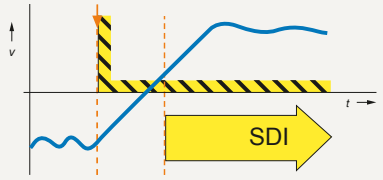


- A specific speed/velocity limit of a drive is safely monitored – and a configurable fault response initiated when a limit value is violated.

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

Press

Safe direction (SDI)

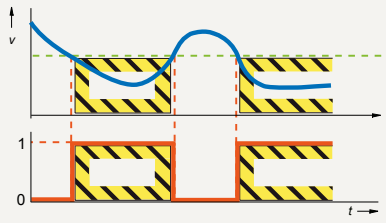


- It is safely monitored that the drive can only move in the permissible direction; if the drive moves in the incorrect direction, then a configured stop response integrated in the drive is initiated.

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

Loading gantry

Safe speed monitor (SSM)



- Supplies a safety-related signal as long as the drive operates below a specified speed/feed velocity.

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

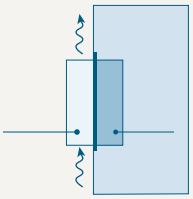
Milling tool

[1)] SINAMICS G120 safety functions can be implemented without encoder.

Rugged

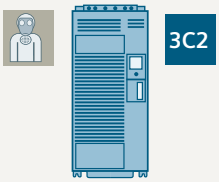
SINAMICS G120 is the reliable system for a multitude of applications.

Push-through versions



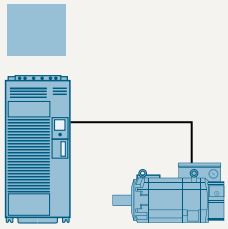
- Lower temperature rise in the control cabinet
- Flexible control cabinet concepts

Components resistant to aggressive gases and coated modules



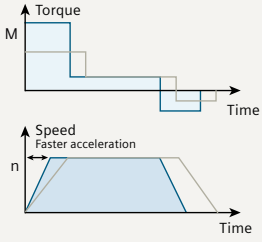
- Compliance with environmental class 3C2 (3C3 with SIPLUS)

Optimized Power Module design



- Longer motor cables possible
  – shielded: up to 300 m
  – unshielded: up to 450 m
- Elimination of an output reactor as a result of the integrated DC link reactor
- Insensitive to line fluctuations

Closed-loop control



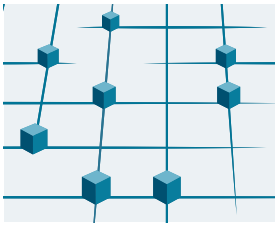
- Rugged open-loop and closed-loop control response for drives with low dynamic requirements – as well as for demanding drives with speed and torque control

Integrated, intelligent and innovative

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

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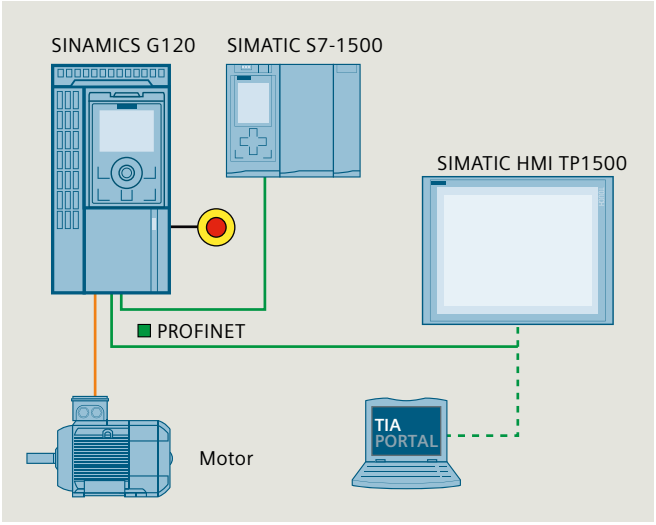
siemens.com/startdrive

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 competitiveness.



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A systematic approach to higher energy efficiency

UP TO
65%
ENERGY SAVING POTENTIAL

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

With Efficient Infeed Technology, we offer an innovative feature, that 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 controlle

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

Ready for SIMATIC Energy Suite

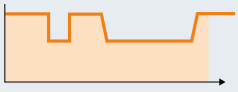
SIMATIC Energy Suite as integrated option for the TIA Portal efficiently links energy management with the automation, therefore making energy usage transparent in your production environment.

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 on the SIMATIC Energy Suite at www.siemens.com/energysuitee

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 software tools.

DT Configurator

Fast product selection and ordering

siemens.com/dt-configurator

SIZER

Efficient engineering of a complete drive system

siemens.com/sizer

STARTER / SINAMICS Startdrive

Configuration and commissioning in the Totally Integrated Automation Portal

siemens.com/startdrive

SINAMICS IOP-2 – the new generation of the Intelligent Operator Panel for SINAMICS G

NEW:
Configuration and support – simple and quick!

- Simple configuration of an Ethernet-based fieldbus interface
- The device name of the fieldbus interface can be changed at the virtual IOP-2 keyboard
- Product information of the current drive system can be quickly accessed (Power Module, Control Unit, IOP-2)
- Direct contact to customer support via the Industry Online Support App
- Connection can be simply established to mobile devices (e.g. smartphones, tablets) using a two-dimensional code (data matrix or QR code)

SINAMICS IOP-2

14 user interface languages are available

siemens.com/sinamics-accessories

SINAMICS G120 – new frame size FSG

NEW from 2018:

The new frame size FSG of the PM240-2 Power Module series extends these innovative Power Modules up to 250 kW in the voltage ranges 380 V – 480 V as well as 500 V – 690 V.

- Depending on the particular application, the PM240-2 Power Module, frame size FSG, just the same as Power Modules, frame sizes FSA – FSF, can be flexibly combined with the appropriate Control Unit and the supplementary components.
- Cable lengths of up to 450 m without additional output options, as well as the integrated DC link reactor as standard, save space and costs.
- Integrated safety technology, for example, STO (SIL 3, PL e, Cat.3) facilitates the safe use of this converter in drive applications.
- EMC Category EN61800-3 to C2 is complied with.
- A central element of Totally Integrated Automation and Integrated Drive Systems.

PM240-2 Power Module, frame size FSG 3AC 380 V – 480 V: 160 kW – 250 kW

PM240-2 Power Module, frame size FSG 3AC 500 V – 690 V: 160 kW – 250 kW

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Power Modules PM240/PM240-2

What power is required? (LO = Low Overload; HO = High Overload) – definition of HO/LO, see p.18	Is a filtered Class A device required?	Are additional external line filters required (for example to m
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 also used to maintain cable-conducted interference voltages and 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.

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 number)		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	6SL321□-1PC26-8UL0	–		–	–
22	30	80	68	FSE	6SL3210-1PC28-0UL0	–		–	–
30	40	104	80	FSE	6SL321□-1PC31-1UL0	–		–	–
37	50	130	104	FSF	6SL3210-1PC31-3UL0	–		–	–
45	60	154	130	FSF	6SL3210-1PC31-6UL0	–		–	–
55	60	178	154	FSF	6SL321□-1PC31-8UL0	–		–	–

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 filtered device up to 132 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** 400V 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	13.2	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	6SL321□-1PE27-5UL0	6SL321□-1PE27-5AL0		integrated	–
45	60	90	75	FSE	6SL3210-1PE28-8UL0	6SL3210-1PE28-8AL0		integrated	–
55	75	110	90	FSE	6SL321□-1PE31-1UL0	6SL321□-1PE31-1AL0		integrated	–
75	100	145	110	FSF	6SL3210-1PE31-5UL0	6SL3210-1PE31-5AL0		integrated	–
90	125	178	145	FSF	6SL3210-1PE31-8UL0	6SL3210-1PE31-8AL0		integrated	–
110	150	205	178	FSF	6SL3210-1PE32-1UL0	6SL3210-1PE32-1AL0		integrated	–
132	200	250	205	FSF	6SL321□-1PE32-5UL0	6SL321□-1PE32-5AL0		integrated	–
160	250	302	250	FSGX[2]	6SL3224-0XE41-3UA0	–		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

0
1

aintain specific EMC values)?	Is a braking resistor required as a result of the application?	Should output filters be used, to reduce voltage stress, for example? [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 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. In some instances, the cable lengths between the converter 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] (Article number)	Braking resistors side-mounted (Article number)	Output reactors[1] side-mounted (Article number)	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	JJY:023422620002	6SE6400-3TC07-5ED0	included[6]
	integrated	JJY:023422620002	6SE6400-3TC07-5ED0	included[6]
	integrated	JJY:023422620002	6SE6400-3TC07-5ED0	included[6]
	integrated	JJY:023423320001	6SE6400-3TC14-5FD0	included[6]
	integrated	JJY:023423320001	6SE6400-3TC14-5FD0	included[6]
	integrated	JJY:023434020003	6SE6400-3TC14-5FD0	included[6]
	integrated	JJY:023434020003	6SE6400-3TC14-5FD0	included[6]
	integrated	JJY:023434020003	6SE6400-3TC14-5FD0	included[6]

	3AC line reactor, side-mounted up to FSC[4]; integrated for FSD-FSF (Article number)	Braking resistors side-mounted (Article number)	Output reactors[1] side-mounted (Article number)	Shield plate for the Power Module (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	JJY:023422620001	6SE6400-3TC07-5ED0	included[6]
	integrated	JJY:023422620001	6SE6400-3TC07-5ED0	included[6]
	integrated	JJY:023424020001	6SE6400-3TC07-5ED0	included[6]
	integrated	JJY:023424020001	6SE6400-3TC07-5ED0	included[6]
	integrated	JJY:023434020001	6SE6400-3TC14-5FD0	included[6]
	integrated	JJY:023434020001	6SE6400-3TC14-5FD0	included[6]
	integrated	JJY:023454020001	6SE6400-3TC14-5FD0	included[6]
	integrated	JJY:023454020001	6SE6400-3TC14-5FD0	included[6]
	integrated	JJY:023464020001	6SL3000-2BE32-1AA0	included[6]
	integrated	JJY:023464020001	6SL3000-2BE32-6AA0	included[6]
	6SL3000-0CE33-3AA0	6SL3000-1BE31-3AA0[2]	6SL3000-2BE33-2AA0	–
	6SL3000-0CE35-1AA0	6SL3000-1BE32-5AA0[2]	6SL3000-2BE33-8AA0	–
	6SL3000-0CE35-1AA0	6SL3000-1BE32-5AA0[2]	6SL3000-2BE35-0AA0	–

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

What power is required? (LO = Low Overload; HO = High Overload)					Is a filtered Class A device required?			Are additional external line filters required (for example to m
PM240/PM240-2 Power Modules have an integrated braking chopper and are suitable for many applications in general machinery construction. PM240-2, 500V-690V have an integrated DC link reactor as standard. As a consequence, a line reactor can be omitted.					The integrated EMC filter (Class A filter) is also required to maintain cable-conducted interference voltages and radiated disturbances for installations in compliance with EN 61800-3 Category C2. PM240-2 690 V Power Modules, frame size FSF – only Category C3.			
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	–
75	75	80	62	**FSF**	6SL3210-1PH28-0UL0	6SL3210-1PH28-0AL0		integrated	–
90	100	100	80	**FSF**	6SL3210-1PH31-0UL0	6SL3210-1PH31-0AL0		integrated	–
110	100	115	100	**FSF**	6SL3210-1PH31-2UL0	6SL3210-1PH31-2AL0		integrated	–
132	125	142	115	**FSF**	6SL3210-1PH31-4UL0	6SL3210-1PH31-4AL0		integrated	–

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

What power is required? (LO = Low Overload; HO = High Overload)					Is a filtered Class A device required?			Are additional external line filters required (for example to m
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	–

[1] Frame size FSD-FSF – supplementary condition: Only rated frequency – or less than the permissible max. output frequency 150 Hz

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

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

4) 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.

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

Please find more information:
www.siemens.com/drives-options-partner

[6] For frame sizes FSD – FSF, the shield plate to connect the external braking resistor is not included in the scope of delivery. It can be obtained by ordering the spare parts pack – "Accessories pack/shield connection pack", see options.

aintain specific EMC values)?		Is a braking resistor required as a result of the application?	Should output filters be used, to reduce voltage stress, for example?		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.	The excess DC link energy 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 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 (Article number)**	**Output reactors (Article number)**	**du/dt filter plus VPL (Article number)**	**Shield plate for Power Modules**
	integrated	JJY:023424020002	not necessary	6SL3000-2DH31-0AA0	included[6]
	integrated	JJY:023424020002	not necessary	6SL3000-2DH31-0AA0	included[6]
	integrated	JJY:023424020002	not necessary	6SL3000-2DH31-0AA0	included[6]
	integrated	JJY:023424020002	not necessary	6SL3000-2DH31-0AA0	included[6]
	integrated	JJY:023424020002	not necessary	6SL3000-2DH31-0AA0	included[6]
	integrated	JJY:023424020002	not necessary	6SL3000-2DH31-0AA0	included[6]
	integrated	JJY:023434020002	not necessary	6SL3000-2DH31-0AA0	included[6]
	integrated	JJY:023434020002	not necessary	6SL3000-2DH31-0AA0	included[6]
	integrated	JJY:023464020002	6SL3000-2AH31-0AA0	6SL3000-2DH31-0AA0	included[6]
	integrated	JJY:023464020002	6SL3000-2AH31-0AA0	6SL3000-2DH31-0AA0	included[6]
	integrated	JJY:023464020002	6SL3000-2AH31-5AA0	6SL3000-2DH31-5AA0	included[6]
	integrated	JJY:023464020002	6SL3000-2AH31-5AA0	6SL3000-2DH31-5AA0	included[6]

aintain 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.
		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 the Power Module (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 replaced faster 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	The ideal Power Module for applications requiring energy recovery

2

Select your Control Unit

CU230P-2 Control Unit	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-2 or BOP-2) or a blanking cover

The optimum inverter SINAMICS G120 has now been configured!

* You can find information about PM230 Power Modules at siemens.com/sinamics-g120p

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.

Control Unit CU250S-2

Is an encoder used for signal feedback? Is integrated positioning capability required?			
No			Yes (EPos positioning functionality using an extended function license)
CU230P-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	**CU240E-2**	**CU240E-2 F**	**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 F**	**CU250S-2**

What type of communication/bus system is required?				
USS, Modbus RTU	CU230P-2 HVAC	CU240E-2	CU240E-2 F	CU250S-2
	6SL3243-0BB30-1HA3	6SL3244-0BB12-1BA1	6SL3244-0BB13-1BA1	6SL3246-0BA22-1BA0
BACnet MS/TP	CU230P-2 HVAC	–	–	–
	6SL3243-0BB30-1HA3			
PROFIBUS DP	CU230P-2 DP	CU240E-2 DP	CU240E-2 DP-F	CU250S-2 DP
	6SL3243-0BB30-1PA3	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	–	–	–	CU250S-2 CAN
				6SL3246-0BA22-1CA0

Permissible combinations with Power Modules				
PM240[1)]	Yes	Yes	Yes	Yes
PM240-2	Yes	Yes	Yes	Yes
PM250	Yes	Yes	Yes	Yes

What 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

[1)] The PM240 Power Modules, frame size FSGX (i.e. from 160 kW and higher) have only been released for the Basic Safety functions (STO, SS1 and SBC)

Optional additional components

Description	Article number
IOP-2 Intelligent Operator Panel with 14 user interface languages: German, English, French, Italian, Spanish, Portuguese, Dutch, Swedish, Russian, Czech, Polish, Turkish, Finnish, Chinese	6SL3255-0AA00-4JA2
IOP-2 mobile handheld device connected through a cable, includes: IOP-2 (6SL3255-0AA00-4JA2), handheld 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-2 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 mard (SD card)	6SL3054-4AG00-2AA0
SINAMICS G120 multicard (SD card) plus license V4.7 SP9 HF1	6SL3054-7TE00-2BA0
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
Supplementary licenses for CU250S-2 plus firmware 4.7 SP9 HF1 – SD card + license Extended Functions Safety (SLS, SSM, SDI)+ FW 4.7 SP9 HF1 – SD card + license Extended Functions basic positioning (EPos)+ FW 4.7 SP9 HF1 – SD card + license Extended Functions Safety + basic positioning+ FW 4.7 SP9 HF1	 6SL3054-7TE00-2BA0-Z F01 6SL3054-7TE00-2BA0-Z E01 6SL3054-7TE00-2BA0-Z F01 + E01
PC connecting 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 frames for PM240-2 Power Modules – Frame size FSA – Frame size FSB – Frame size FSC	 6SL3260-6AA00-0DA0 6SL3260-6AB00-0DA0 6SL3260-6AC00-0DA0
Push-through mounting frames for PM240-2 Power Modules – Frame size FSD – Frame size FSE – Frame size FSF	 6SL3200-0SM17-0AA0 6SL3200-0SM18-0AA0 6SL3200-0SM20-0AA0
Mounting handles for PM240-2 Push-through Power Modules, frame sizes FSD-FSF	6SL3200-0SM22-0AA0
Accessories pack / shield connection (includes the shield connecting plate for an external braking resistor) – Frame size FSD – Frame size FSE – Frame size FSF	 6SL3262-1AD01-0DA0 6SL3262-1AE01-0DA0 6SL3262-1AF01-0DA0

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 on products and options is provided in the current Catalog D 31 in Chapter "SINAMICS G120 standard inverters" or in the Siemens industry Mall:
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Technical data

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**	**LO**	**HO**	**LO**
HO = High Overload **LO = Low Overload**	**200 ... 240 V** 1 AC 0.37 ... 3 kW 3 AC 0.37 ... 45 kW **380 ... 480 V** 3 AC 0.37 ... 200 kW **500 ... 690 V** 3 AC 7.5 ... 110 kW	**200 ... 240 V** 1 AC 0.55 ... 4 kW 3 AC 0.55 ... 55 kW **380 ... 480 V** 3 AC 0.55 ... 250 kW **500 ... 690 V** 3 AC 11 ... 132 kW	**Unfiltered** 15 ... 75 kW **Filtered** 5.5 ... 75 kW	**Unfiltered** 18.5 ... 90 kW **Filtered** 7.5 ... 90 kW
Rated input current	**HO**	**LO**	**HO**	**LO**
(dependent on the motor load and line impedance)	**200 ... 240 V** 1 AC 6.6 ... 37.5 A 3 AC 3.8 ... 164 A **380 ... 480 V** 3 AC 2.0 ... 354[1]/442 A **500 ... 690 V** 3 AC 11 ... 122 A	**200 ... 240 V** 1 AC 7.5 ... 43 A 3 AC 4.3 ... 172 A **380 ... 480 V** 3 AC 2.3 ... 354[1]/442 A **500 ... 690 V** 3 AC 14 ... 137 A	13.2 ... 135 A	18 ... 166 A
Rated output current	**HO**	**LO**	**HO**	**LO**
derating for ambient temperatures > 40 °C (LO) or > 50 °C (HO)	**200 ... 240 V** 1 AC 2.3 ... 13.6 A 3 AC 2.3 ... 154 A **380 ... 480 V** 3 AC 1.3 ... 370 A **500 ... 690 V** 3 AC 11 ... 115 A	**200 ... 240 V** 1 AC 3.2 ... 17.5 A 3 AC 3.2 ... 178 A **380 ... 480 V** 3 AC 1.7 ... 477 A **500 ... 690 V** 3 AC 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	Acc. to the Low-Voltage Directive 2006/95/EC			
Electrical data				
Line frequency	47 ... 63 Hz			
Low Overload	Generally applicable for applications requiring a low dynamic performance (continuous operation), square law load torque with low breakaway torque and low speed accuracy. Example: centrifugal/vacuum pumps, radial/axial fans, rotary piston blowers, radial compressors, agitators ...			
Overload capability (for Low Overload)	1.5 x rated output current (150 %) for 3 s plus 1.1 x rated output current (110 %) for 57 s plus 1.0 x rated output current (100 %) for 240 s within a cycle time of 300 s			
High Overload	Generally applicable for applications requiring a higher dynamic performance (cyclic operation) – and a constant torque characteristic with high breakaway torque. Example: conveyor belts, gear/excentric worm pumps, mills, mixers, crushers, vertical conveyors, centrifuges ...			
Overload capability (for High Overload)	2.0 x rated output current (200 %) for 3 s plus 1.5 x rated output current (150 %) for 57 s plus 1.0 x rated output current (100 %) for 240 s within a cycle time of 300 s			
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)	
Functions				
Braking 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 reluctance motors[2]			
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] Depending on the particular Control Unit

Control Units			
Control Units	CU230P-2 optimized for pumps, fans, compressors	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	Standard number of I/O with integrated safety technology	Extended number of I/O, integrated safety technology and basic positioning function
Communication functions			
PROFINET / EtherNet/IP	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
Modbus RTU and USS	CU230P-2 HVAC	CU240E-2, CU240E-2 F	CU250S-2
BACnet MS/TP	CU230P-2 HVAC	–	–
CANopen	–	–	CU250S-2 CAN
USB interface	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
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	6	11
Fail-safe digital inputs	–	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)	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) 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 relays: NO: 30 V DC, 0.5 A 2 x relays: 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 to 20 mA)	2 x (0 to 10 V, 0/4 to 20 mA)
Functions			
Open-loop/closed-loop control modes	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 with fault value and instant in 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
Accessories			
	IOP-2, 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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