SIEMENS

SINAMICS G120: The modular inverter

Energy-efficient, safe and rugged

siemens.com/sinamics-g120

Answers for industry.

SINAMICS G120

The modular, safe and energy-efficient inverter system

SINAMICS G120 is the universal drive to address the widest range of requirements in industry and the trades. Machinery construction, automotive, textiles, printing, packaging and the chemical industry – they all trust in the well-proven SINAMICS G120 solutions. They are also used around the world in higher-level applications, for instance in conveyor technology, in the steel, oil & gas and offshore areas as well as for regenerative energy recovery.

Its modular design, comprising Control Unit (CU) and Power Module (PM) for the power range extending from 0.37 kW up to 250 kW, make it the perfect system for standard applications. The wide range of available components allows you to optimally configure the inverter that you require for your particular application.

You simply combine the appropriate modules to address your requirements regarding hardware, communication or safety technology. The G120 system is being continually expanded to include additional innovative elements and options:

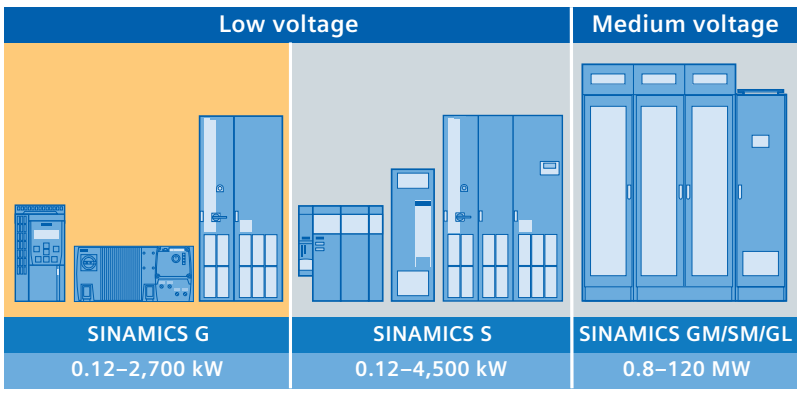
- User-friendly from installation up to maintenance
- Rugged and enduring for harsh environments
- Energy-efficient through numerous functions
- Many safety functions

Highlights
Mechanical system
• Modular design
• Innovative cooling concept for a higher degree of ruggedness
Electronics
• Energy recovery, low line harmonics, energy saving, no braking resistors
• Semiconductor temperature monitoring
• Safety Integrated (STO, SS1, SLS, SDI, SSM), without encoder
• Interchangeable MMC memory card
Communication
• PROFINET, PROFIBUS, PROFIsafe, Modbus RTU, CANopen, USS, BacNet, MS / TP
• Integral part of Totally Integrated Automation
• Optimum interaction with SIMATIC

SINAMICS G120 is a member of the SINAMICS family, which stands for innovative drive solutions that are fit for the future

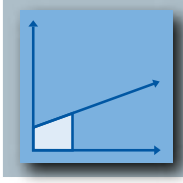
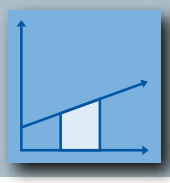
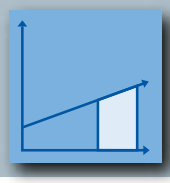
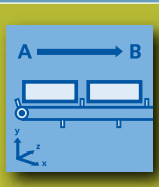
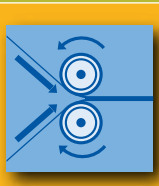
SINAMICS offers the optimum solution for every drive application. It goes without saying that all of the drives can be configured, parameterized, commissioned and operated in the same standard way.

- Wide range of power ratings from 0.12 kW to 120 MW
- Available in low-voltage as well as medium-voltage versions
- Standard and unified functionality as a result of the common hardware and software platform
- All of the drives are engineered in exactly the same way
  - SIZER for engineering
  - STARTER for parameterizing and commissioning
- High degree of flexibility and combinability

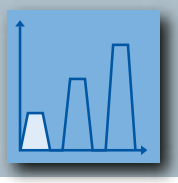
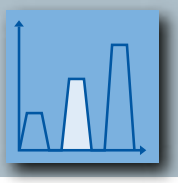
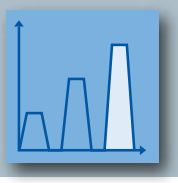


SINAMICS inverters – power and performance for every application

The modular SINAMICS G120 is especially suitable for the applications shown in the box.

Use \ Quality*)	Continuous motion		
	 Basic	 Medium	 High
 **Pumping/ ventilating/ compressing**	Centrifrugal pumps Radial/axial fans Compressors	Centrifrugal pumps Radial/axial fans Compressors	Eccentric screw pumps
 **Moving**	Conveyor belts Roller conveyors Chain conveyors	Conveyor belts Roller conveyors Chain conveyors Vertical material handling Elevators Escalators Gantry cranes Ship's drives Cable railways	Elevators Container cranes Mine hoists Open-cast mine excavators Test stands
 **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
 **Machining**	Main drives for • Turning • Milling • Drilling	Main drives for • Drilling • Sawing	Main drives for • Turning • Milling • Drilling • Gear cutting • Grinding

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

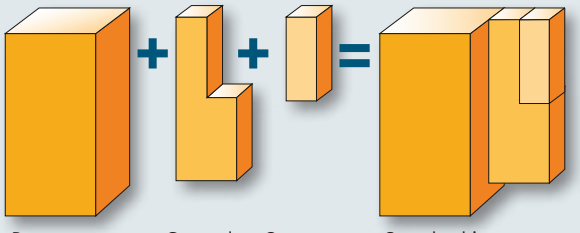
Discontinuous motion		
 **Basic**	 **Medium**	 **High**
Hydraulic pumps Dosing pumps		Descaling pumps Hydraulic pumps
Accelerating conveyors Rack feeders	Accelerating conveyors Rack feeders Crosscutters Roll changers	Rack feeders Robotics Pick-and-place Indexing tables Crosscutters Roller feeds Engaging/disengaging
Tubular bagging machines Single-axis motion control such as • Positioning profiles • Path profiles		Servo presses Rolling mill drives Coordinated multi-axis motion control such as • Multi-axis positioning • Cam discs • Interpolation
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

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.

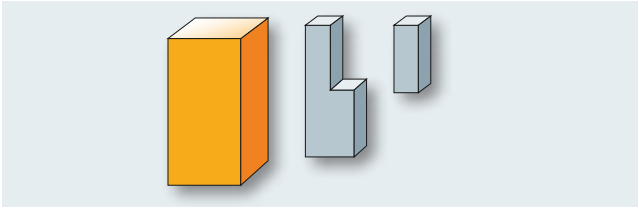
The modularity offers many advantages:

- 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



The perfect inverter in just a few steps

Select your Power Module



The optimum power unit can be quickly selected based on the required motor power, the supply voltage and the braking cycles expected.

Power Module PM230 – IP55 / IP20 degree of protection

Designed for use in pump, fan and compressor applications with a square-law characteristic, without being able to connect a braking resistor.

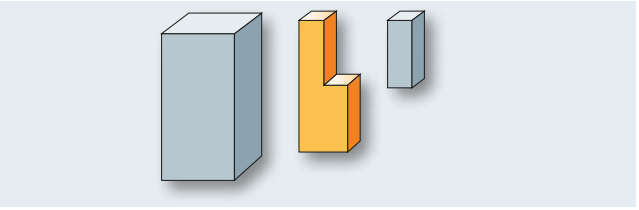
Power Module PM240 / PM240-2 – IP20 degree of protection

Suitable for many applications, with integrated braking chopper and the possibility of connecting a braking resistor.

Power Module PM250 – IP20 degree of protection

Identical application possibilities as the PM240 – any braking energy is directly fed back into the line supply.

Select your Control Unit



The optimum Control Unit is selected based on the number of I/Os and, if required, additional functions such as Safety Integrated or special pump/fan/compressor functions.

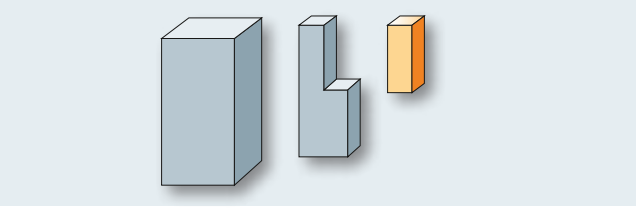
CU230P-2 Control Unit

Specifically designed for pump, fan and compressor applications.

CU240B-2 / CU240E-2 Control Units

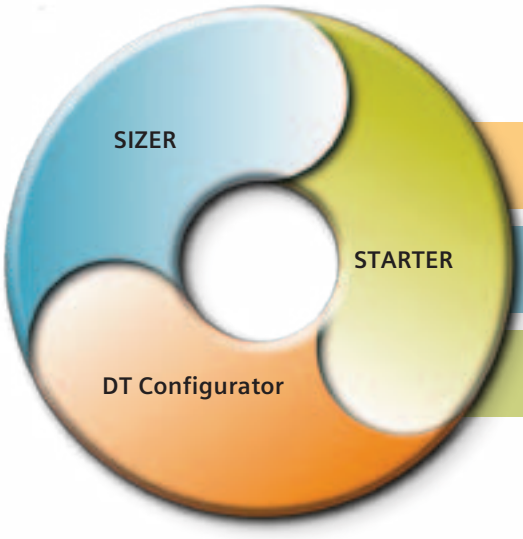
Suitable for a multitude of applications in general machinery construction – e.g. conveyor belts, mixers and extruders.

Select the optional components



Depending on the requirements, additional components can be selected, for example an operator panel (IOP or BOP-2) or blanking cover.

Standard software for user-friendly selection, commissioning and operator control



SINAMICS G120 is not only easy to configure, but already offers a high degree of operator friendliness when commissioning and in subsequent operation. The standard software makes this possible.

DT Configurator: Your tool for fast product selection and ordering

SIZER: Your tool for efficiently engineering a complete drive system

STARTER: Your tool for simple configuration and DT Configurator commissioning

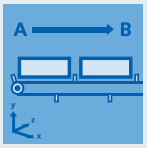
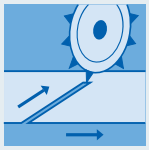
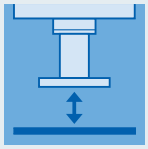
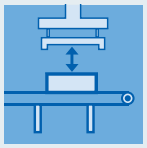
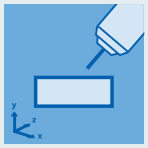
User-friendly operator control: Intelligent Operator Panel and Basic Operator Panel

Operator panel	IOP (Intelligent Operator Panel)	BOP-2 (Basic Operator Panel)
Fast commissioning without expert knowledge	• Series commissioning using the clone function • User-defined parameter list where users can select the number of parameters	
	• Standard applications can be simply commissioned using application-specific wizards – no parameter know-how required • Simple commissioning on site using a handheld terminal	• Good overview by simultaneously displaying parameters and parameter values
High degree of operator friendliness and intuitive operation	• The drive can be manually operated – it is possible to simply toggle between automatic and manual modes	
	• Graphic display of status values, e.g. pressure and flow in bar-type diagrams	• 2-line display for up to 2 process values with text
	• Status display with freely selectable units to specify physical values	• Status display of predefined units
Minimizing wait times	• Diagnostics using a plain text display, without any documentation and locally on site	• Diagnostics with menu prompting with 7-segment display
	• Simple update of languages, wizards and firmware via USB	
Can be flexibly used	• Can be mounted directly on the Control Unit, installed in the door or as handheld terminal (depends on the inverter type)	• Can be mounted directly on the Control Unit or installed in the door (depends on the inverter type)

Safety Integrated: The intelligent response to increased safety demands

There is an increased risk of injury to personnel and damage to the machine wherever there are rotating units – such as saws, rolls and spindles. This is also the case for linear handling axes and machine slides, frequently with high velocities. Safety Integrated is the safety concept that reliably masters the specific dangerous situation. It has significantly shorter response times and a higher degree of functionality – productivity is mostly undiminished but occasionally even increased. The components are certified according to IEC 61508/SIL2, EN ISO 13849-1 Cat. 3 and PL d.

Safety functions in the G120

	Safe, electronic shutdown with Safe Torque Off (STO)	Safe, specific stopping with Safe Stop (SS1)	Safely Limited Speed (SLS)	Safe Direction (SDI)	Safe Speed Monitoring (SSM)
Benefit	• Prevents the drive from inadvertently starting (there is no electrical isolation between the motor and the inverter) • The drive is safely switched into a no-torque condition	• Fast and safely monitored stopping of the drive • Independent and continuous monitoring guarantees the shortest response times • An encoder is not required	• Reduction and continuous monitoring of the drive speed • An encoder is not required	• The function ensures that the drive can only rotate in the selected direction	• The function signals if a drive is operating below a specified speed/feed velocity
Applications	• Baggage/package transport, feeding, removing	• Sawing, unwinding, grinding machines, centrifuges, hoisting gear, extruders, stacker cranes, transverse trolleys	• Presses, punches, conveyor belts, grinding machines • Directly working at the system or machine during operation, when setting up or when carrying out maintenance work	• Stacker cranes, presses, unwinders	• Grinding machines, drills, milling tools
	Conveyor belt 	Saws 	Presses 	Loading gantry 	Milling tool 

A systematic approach to more energy efficiency

By controlling the speed as a function of the application and by recovering the braking energy, our inverters save up to 65% energy. Further, the integrated energy-saving functions allow you to further minimize your power costs.

Efficient Infeed Technology

Efficient Infeed Technology represents a unique innovation in the compact class of inverters worldwide, which means that also small, light and favorably priced devices are capable of energy recovery.

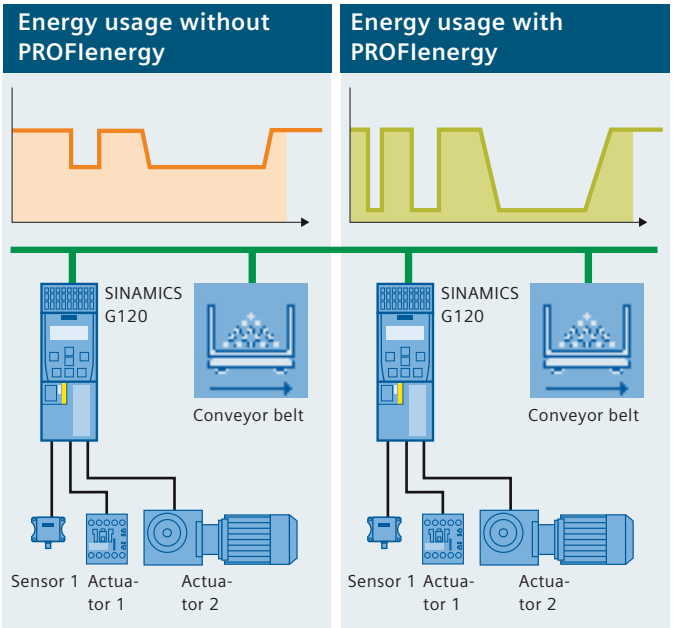
They are used wherever a braking resistor is used, for instance in applications with vertical motion, drives for conveyor technology and high inertia machines, for example, centrifuges. They are also employed in the renewable energy area, such as hydroelectric and wind power.

	Standard Technology	Efficient Infeed Technology
Line reactor and braking resistor	Required	Not necessary
Configuring and installation costs	Standard	Low
Generated harmonics	Standard	Low
Heat generated when braking	Yes	No
Current consumption and power drawn	Standard	Approx. 22% less/lower
Energy efficiency	Standard	Good

PROFIenergy for sustainability

SINAMICS G120 with PROFINET interface supports PROFIenergy. PROFIenergy is a data interface based on PROFINET. Independent of any particular manufacturer and device, this allows loads to be centrally shut down in a coordinated fashion in non-operational periods.

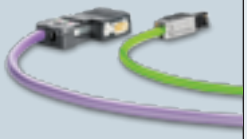
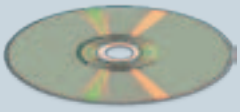
- Power costs are allocated to the various loads
- Loads that are not required are shut down
- Expensive load peaks are reduced
- The energy band is reduced – therefore lower tariffs

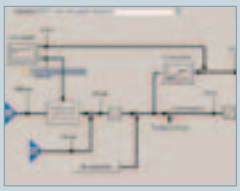


Additional energy-saving functions

- V/f Eco mode: To reduce the motor currents in the partial load range; saves up to 5% energy
- Hibernation mode: The inverter is automatically switched on and switched off depending on the process requirements
- DC link topology: Reduces the line current as a result of the high active power component

Additional customer benefits

	Functions	Benefits
Modularity		
	• Components can be simply combined, also locally on site • Only part of the inverter must be replaced • The customer only pays for the functions that he actually requires • Modules can be replaced under voltage and without software reinstallation • Power rating and functions can be expanded by replacing individual components • All typical applications can be addressed using one inverter	• Lower costs – initial purchase price – when stocking parts – when replacing devices/parts • Fast replacement when service is required • Favorably priced and fast system upgrade • Simple selection of the optimum inverter
User-friendly installation and commissioning		
	• Integrated USB port • Pluggable operator panels can be selected – with graphic display – with 2-line display • Depending on the application, advanced or basic panel can be selected • Micro memory card slot (MMC) • Pluggable terminal strips and power connectors	• Going online is intuitive and simplifies engineering and diagnostics • Fast commissioning without any expert know-how • Minimized maintenance work times • Simplified, central commissioning, maintenance and diagnostics • Simple series commissioning and data backup when service is required • Simple installation without special tools
Communication (PROFINET, PROFIBUS, Modbus RTU, CANopen, USS, BacNet)		
	• PROFINET IO features – Neighboring device detection (LLDP) – Wireless communication with Industrial Wireless LAN – Ring-type structure possible (MRP, MRPD) – PROFIenergy – PROFIsafe – Shared device • 2 integrated PROFINET ports – Standard and fail-safe I/Os can be used as distributed I/O for the control • Many nodes and different network topologies without requiring any additional components • Direct integration of the communication in the converter	• PROFINET IO features – Fast communication with innovative functions – High degree of plant/system availability – Diagnostics capability; energy management – Simple replacement when a fault occurs • Line-type structure without any additional components – reduced wiring costs – cost-saving • Simple handling • Fewer interfaces • High performance, no interface problems
Integrated software functions		
	• Integrated PLC functions for local control tasks • Freely parameterizable PID controller • Buffering of brief line failures using kinetic buffering • Automatic restart after a power failure • Flying restart • Energy saving using the hibernation mode • Load monitoring to monitor belts and flow	• Flexible use of integrated functions • Mini PLC functionality without additional components • Operation can be maintained even on unstable line supplies • Numerous software functions for flexible use in a wide range of applications

	Functions	Benefits
Application-specific modules for pumps, fans and compressors		
	• Application-specific wizards in the operator panel and in the STARTER software • 4 integrated, freely programmable PID controllers • 3 freely programmable, digital time switches • NI1000 / PT1000 temperature sensor interface • Direct connection of a 230 V relay • Linear and square-law torque characteristic for fluid-flow and displacement machines • Direct connection of 3 pressure/level sensors	• Simple commissioning based on process values in the user's language, also for complex applications such as cooling towers or tank levels • Distributed closed-loop control for motor-independent process control without PLC • Control of freely selectable day and week programs • Direct connection of temperature sensors without using an external interface unit • Direct control of auxiliary equipment, e.g. throttle actuator or valve drives • Control performance adapted to the application • Connection of actuators generally used in the application without any additional components
Increased reliability		
	• Push-through version for selected power units • Dissipation of power loss by means of external heat sink • Electronic modules not in the air duct • Varnished, especially rugged electronic modules • Wide permissible voltage range 380 V–480 V ± 10 % • Use up to ambient temperatures of 60 °C • The air flow only flows through the heat sink	• Power loss is dissipated to the outside, saving space in the cabinet • Significantly increased ruggedness and reliability • Use even under high climatic stress
Requirement-optimized operating behavior		
	• Voltage/frequency characteristics for constant, square-law torque and with programmable interpolation points for manual optimization	• Basic control techniques for drives with low dynamic requirements, such as – belt drives – crushers – mixers – agitators – centrifugal pumps – fans – radial compressors • Operation of special motors with non-linear magnetization
	• Flux Current Control	• The basic control technique with field orientation ensures a rugged and precise speed behavior with sufficient dynamic performance, even for fluctuating loads
	• Encoderless vector control	• Field-oriented control technique for demanding drives with closed-loop speed control and high requirements on the dynamic performance, such as – Reciprocating pumps and compressors – Lifting/lowering equipment – Gantry cranes – Centrifuges – Extruders
	• Supplementary boost function to increase the starting torque	• Providing a breakaway torque at low speeds

Technical data

Power Modules

Power Modules	PM230 IP55 Restricted braking behavior	PM230 IP20 Restricted braking behavior	PM240/PM240-2 IP20 Braking with a braking resistor	PM250 IP20 Braking with energy recovery
Line supply voltage	3 AC 380 ... 480 V ± 10 %			
Power rating HO = High Overload LO = Low Overload	Filtered / filter B: 0.25...75 kW (HO) 0.37...90 kW (LO)	0.25...55 kW (HO) 0.37...75 kW (LO)	Non-filtered 0.37 ... 200 kW (HO) 0.55 ... 250 kW (LO) Filtered 0.37 ... 75 kW (HO) 0.55 ... 90 kW (LO)	Non-filtered 15 ... 75 kW (HO) 18.5 ... 90 kW (LO) Filtered 5.5 ... 75 kW (HO) 7.5 ... 90 kW (LO)
Rated input current (dependent on the motor load and line impedance)	0.9 ... 135 A (HO) 1.3 ... 166 A (LO)	0.9 ... 102 A (HO) 1.3 ... 135 A (LO)	PM240 FS A-GX (400 V) unfiltered: 2/2.3 ... 442 A (HO/LO) PM240 FS B-F (400 V) filtered: 2/2.3 ... 204 A (HO/LO)	13.2 ... 135 A (HO) 18 ... 166 A (LO)
Rated output current (derating for ambient temperatures > 40 °C (LO) or > 50 °C (HO))	0.9 ... 145 A (HO) 1.3 ... 178 A (LO)	0.9 ... 110 A (HO) 1.3 ... 145 A (LO)	PM240 FS A-GX (400 V) unfiltered: 1.3 ... 370 A (HO), 1.7 ... 477 A (LO) PM240 FS B-F (400 V) filtered: 1.3 ... 145 A (HO), 1.7 ... 178 A (LO)	1.3 ... 145 A (HO) 1.7 ... 178 A (LO)
Mounting dimensions (W x H x D) in mm Depth without Control Unit	Filtered (power in LO): A: 0.37 ... 3 kW: 154 x 460 x 249 B: 4.0 ... 7.5 kW: 180 x 540 x 249 C: 11 ... 18.5 kW: 230 x 620 x 249 D: 22 ... 30 kW: 320 x 640 x 329 E: 37 ... 45 kW: 320 x 751 x 329 F: 55 ... 90 kW: 410 x 915 x 416 Filtered, filter B (power in LO): A: 0.37 ... 3 kW: 154 x 460 x 249 B: 4.0 ... 7.5 kW: 180 x 540 x 249 C: 11 ... 15 kW: 230 x 620 x 249 D: 18.5 ... 30 kW: 320 x 640 x 329 E: 37 ... 45 kW: 320 x 751 x 329 F: 55 ... 90 kW: 410 x 915 x 416	Unfiltered (power in LO): A: 0.37 ... 3 kW: 73 x 196 x 165 B: 4.0 ... 7.5 kW: 100 x 292 x 165 C: 11 ... 18.5 kW: 140 x 355 x 165 D: 22 ... 37 kW: 275 x 419 x 204 E: 45 ... 55 kW: 275 x 499 x 204 F: 75 ... 90 kW: 350 x 634 x 316 Filtered (power in LO): A: 0.37 ... 3 kW: 73 x 196 x 165 B: 4.0 ... 7.5 kW: 100 x 292 x 165 C: 11 ... 18.5 kW: 140 x 355 x 165 D: 22 ... 37 kW: 275 x 512 x 204 E: 45 ... 55 kW: 275 x 635 x 204 F: 75 ... 90 kW: 350 x 934 x 316	Unfiltered (power in LO): A: 0.55 ... 3 kW: 73 x 196 x 165[1] B: 4.0 kW: 153 x 270 x 165 C: 7.5 ... 15.0 kW: 189 x 334 x 185 D: 18.5 ... 30 kW: 275 x 419 x 204 E: 37 ... 45 kW: 275 x 499 x 204 F: 55 ... 132 kW: 350 x 634 x 316 GX: 160 ... 250 kW: 326 x 1,533 x 547 Filtered (power in LO): A: 0.55 ... 2.2 kW: 73 x 196 x 165[1] B: 3.0 ... 4.0 kW: 153 x 270 x 165 C: 7.5 ... 15.0 kW: 189 x 334 x 185 D: 18.5 ... 30 kW: 275 x 512 x 204 E: 37 ... 45 kW: 275 x 635 x 204 F: 55 ... 90 kW: 350 x 934 x 316	Unfiltered (power in LO): D: 18.5 ... 30 kW: 275 x 419 x 204 E: 37 ... 45 kW: 275 x 499 x 204 F: 55 ... 90 kW: 350 x 634 x 316 Filtered (power in LO): C: 7.5 ... 15.5 kW: 189 x 334 x 185 D: 18.5 ... 30 kW: 275 x 512 x 204 E: 37 ... 45 kW: 275 x 635 x 204 F: 55 ... 90 kW: 350 x 934 x 316
Increase in depth as a result of the CU in mm	0	CU230: 58	CU230: 58 CU240: 40 Exception FSGX: 0	
Increase in depth as a result of the panel in mm	BOP-2: 5 IOP: 15	BOP-2: 12 IOP: 25 Exception FSGX: 0		
Conformance with standards	UL, CE, c-tick		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			
Overload capability	Low Overload (LO): 150 % for 3s plus 110 % for 57s within a 300s duty cycle. High Overload (HO): 200 % for 3s plus 150 % for 57s within a 300s duty cycle. When used for overload, no reduction of the continuous output current [2]			
Output frequency	0 ... 650 Hz (control mode V/f and FCC)			
Pulse frequency	4 kHz (standard) or 4 ... 16 kHz (derating)			4 kHz (standard) or 4 kHz ... 16 kHz (derating) FS F: 4 kHz (standard) or 4 kHz ... 8 kHz (derating)
Inverter efficiency	86 ... 98 %		96 ... 97 %	95 ... 97 %
Electromagnetic compatibility	Integrated line filter, Class A or B acc. to EN 61800-3 C2 and EN 61800-3 C1 Table 14	Optional line filter, Class A or B acc. to EN 55011 available		
Functions				
Brake functions	DC braking		Dynamic braking, DC braking, motor holding brake, compound brake	Energy recovery in regenerative operation
Motors that can be connected	Three-phase induction motors and three-phase synchronous motors			
Protection functions	Undervoltage, protective functions, overvoltage, overcontrolled/overload, ground fault, short circuit, stall protection, motor blocked protection, motor overtemperature, inverter overtemperature, parameter interlocking			
Degree of protection	IP55 / UL Type 12	IP20		

[1] Lower size for push-through version [2] Reduced overload duty cycle PM230 IP20 from 22 kW (HO and LO) and PM240 from 90 kW (HO), refer to the documentation for details

Control Units

Control Units	CU230 optimized for pumps, fans, compressors	CU240 optimized for general applications in machinery construction, such as conveyor belts, mixers, extruders	
Architecture	Application-optimized number of I/O	Basic number of I/O	Standard number of I/O with integrated safety technology
Mounting dimensions [WxHxD]	73 x 199 x 58.4	73 x 199 x 46	73 x 199 x 46
Communication functions			
PROFINET	–		CU240E-2 PN, CU240E-2 PN-F
PROFIBUS	CU230P-2 DP	CU240B-2 DP	CU240E-2 DP, CU240E-2 DP-F
PROFIsafe	–	–	CU240E-2 DP-F, CU240E-2 PN-F
Serial RS 485 interfaces with Modbus RTU and USS protocol	CU230P-2 HVAC	CU240B-2	CU240E-2, CU240E-2 F
BACnet MS/TP	CU230P-2 HVAC	–	–
CANopen	CU230P-2 CAN	–	–
USB interface	4	4	4
Safety functions acc. to Category 3 of EN 954-1 or acc. to SIL2 of IEC 61508			
Safety functions: STO STO, SS1, SLS, SDI STO, SS1, SLS, SDI, SSM	 – – –	 – – –	 CU240E-2, CU240E-2 DP, CU240E-2 PN CU240E-2 F CU240E-2 DP-F, CU240E-2 PN-F
Electrical data			
Supply voltage	24 V DC (via Power Module or externally)		
Digital inputs, parameterizable, electrically isolated	6	4	6
Digital inputs, fail safe parameterizable, electrically isolated	–	–	CU240E-2, CU240E-2 DP: 1 CU240E-2 DP-F: 3
Analog inputs, parameterizable	2, can be switched between –10 to +10 V and 0/4 to 20 mA, can be used as digital inputs 1, can be switched between 0/4 to 20 mA and NI1000 / PT1000 1, NI1000 / PT1000	1 0 to 10 V, 0 to 20 mA and can be switched between –10 and +10 V Can be used as additional digital inputs	2 0 to 10 V, 0 to 20 mA and can be switched between –10 and +10 V 0 to 10 V and 0 to 20 mA Can be used as additional digital inputs
Digital outputs, parameterizable, electrically isolated	2 (relay, changeover contacts), 250 V AC, 2 A, 30 V DC, 5 A 1 (relay, NO contact), 30 V DC, 0.5 A	1 (transistor), 30 V DC, 0.5 A	3 (1 x transistor, 2 x relay, changeover contact), 30 V DC, 0.5 A
Analog outputs, parameterizable	2, can be switched between 0 to 10 V and 0/4 to 20 mA	1 (AO0: 0 to 10 V and 0 to 20 mA)	2 (AO0: 0 to 10 V and 0 to 20 mA, AO1: 0 mA to 20 mA)
Functions			
Skip frequency range	4, programmable		
Fixed frequencies	16, programmable		
Closed-loop control technique/ open-loop control modes	Vector (SLVC), V/f (linear, square-law, free, FCC, ECO)	Vector (SLVC), V/f (linear, square-law, free, FFC, ECO), closed-loop torque control	
Operating functions	PID controller, hibernation, 3x freely programmable digital time switches, automatic restart, flying restart, slip compensation, kinetic buffering (only in conjunction with PM240 Power Modules), and many more	Positioning down ramp, automatic restart, flying restart, slip compensation, jogging, kinetic buffering, motor temperature monitoring, free function blocks, and many more	
Protection functions	Motor temperature monitoring with and without temperature sensor		
Mechanical data			
Degree of protection	IP20		
Software			
STARTER, SIZER, DT Configurator	x	x	x
Startdrive		CU240B-2 DP	CU240E-2 DP
Accessories			
	IOP, BOP-2, shield connection plate, PC Connection Kit-2, memory card (MMC or SD)		

Ordering data

Power Modules

PM230 Power Modules – IP20 / IP55 degree of protection

PM230 Power Modules are designed for use in pump, fan and compressor applications with square-law torque characteristics. They do not have an integrated braking chopper (single-quadrant applications).

PM240 / PM240-2 Power Modules – IP20 degree of protection

PM240 Power Modules have an integrated braking chopper (four-quadrant applications) and are suitable for many applications in general machinery construction.

PM250 Power Module – IP20 degree of protection

PM250 Power Modules are suitable for precisely the same applications as for the PM240. Any braking energy is directly fed back into the line supply (four-quadrant applications – a braking chopper is not required).

Power Module							
Rated power[1]		Rated output current I_N[2]	Frame size	PM230 Power Modules, IP20 degree of protection[3] all Control Units can be inserted	PM230 Power Module, IP55 degree of protection only CU230P-2 can be inserted	PM240 / PM240-2 Power Modules, IP20 degree of protection all Control Units can be inserted	PM250 Power Module, IP20 degree of protection all Control Units can be inserted
kW	hp	A		Order number	Order number	Order number	Order number
0.37	0.5	1.3	FSA	6SL3210-1NE11-3□L0	6SL3223-0DE13-7□A0	6SL3210-1PE11-8□L0[8]	–
0.55	0.75	1.7		6SL3210-1NE11-7□L0	6SL3223-0DE15-5□A0	6SL3210-1PE11-8□L0[8]	–
0.75	1.0	2.2		6SL3210-1NE12-2□L0	6SL3223-0DE17-5□A0	6SL3210-1PE12-3□L0[8]	–
1.1	1.5	3.1		6SL3210-1NE13-1□L0	6SL3223-0DE21-1□A0	6SL3210-1PE13-2□L0[8]	–
1.5	2.0	4.1		6SL3210-1NE14-1□L0	6SL3223-0DE21-5□A0	6SL3210-1PE14-3□L0[8]	–
2.2	3.0	5.9		6SL3210-1NE15-8□L0	6SL3223-0DE22-2□A0	6SL321□-1PE16-1□L0[4][8]	–
3.0	4.0	7.7		6SL3210-1NE17-7□L0	6SL3223-0DE23-0□A0	6SL321□-1PE18-0UL0[5][8]	–
3.0	4.0	7.7	FSB	–	–	6SL3224-0BE23-0AA0[6]	–
4.0	5.0	10.2		6SL3210-1NE21-0□L0	6SL3223-0DE24-0□A0	6SL3224-0BE24-0□A0	–
5.5	7.5	13.2		6SL3210-1NE21-3□L0	6SL3223-0DE25-5□A0	–	–
7.5	10	18		6SL3210-1NE21-8□L0	6SL3223-0DE27-5□A0	–	–
7.5	10	18	FSC	–	–	6SL3224-0BE25-5□A0	6SL3225-0BE25-5AA1
11.0	15	26		6SL3210-1NE22-6□L0	6SL3223-0DE31-1□A0	6SL3224-0BE27-5□A0	6SL3225-0BE27-5AA1
15.0	20	32		6SL3210-1NE23-2□L0	6SL3223-0DE31-5□A0	6SL3224-0BE31-1□A0	6SL3225-0BE31-5AA1
18.5	25	38		6SL3210-1NE23-8□L0	6SL3223-0DE31-8AA0[6]	–	–
18.5	25	38	FSD	–	6SL3223-0DE31-8BA0[7]	6SL3224-0BE31-5□A0	6SL3225-0BE31-5□A0
22	30	45		6SL3210-1NE24-5□L0	6SL3223-0DE32-2□A0	6SL3224-0BE31-8□A0	6SL3225-0BE31-8□A0
30	40	60		6SL3210-1NE26-0□L0	6SL3223-0DE33-0□A0	6SL3224-0BE32-2□A0	6SL3225-0BE32-2□A0
37	50	75	FSE	6SL3210-1NE27-5□L0	6SL3223-0DE33-7□A0	6SL3224-0BE33-0□A0	6SL3225-0BE33-0□A0
45	60	90		6SL3210-1NE28-8□L0	6SL3223-0DE34-5□A0	6SL3224-0BE33-7□A0	6SL3225-0BE33-7□A0
55	75	110	FSF	6SL3210-1NE31-1□L0	6SL3223-0DE35-5□A0	6SL3224-0BE34-5UA0	6SL3225-0BE34-5□A0
75	100	145		6SL3210-1NE31-5□L0	6SL3223-0DE37-5□A0	6SL3224-0BE35-5UA0	6SL3225-0BE35-5□A0
90	125	178		–	6SL3223-0DE38-8□A0	6SL3224-0BE37-5UA0	6SL3225-0BE37-5□A0
110	150	205		–	–	6SL3224-0BE38-8UA0	–
132	200	250		–	–	6SL3224-0BE41-1UA0	–
160	250	302	FSGX	–	–	6SL3224-0XE41-3UA0	–
200	300	370		–	–	6SL3224-0XE41-6UA0	–
250	400	477		–	–	6SL3224-0XE42-0UA0	–

Integrated line filter:				
Unfiltered	U		U	U
Class A (for TN systems)	A	A	A	A
Class B (for TN systems)		B		
Heat sink versions:				
Standard			0	
Push-through			1	

1) Specified rated power corresponds to the Low Overload (LO) duty cycle. It generally applies to applications with square-law torque characteristics, such as pumps, fans and compressors. The High Overload (HO) duty cycle generally applies to applications with a constant torque characteristic, as is the case for conveyor belts (data, see Catalog D31).

2) These current values are applicable for 400 V

3) PM230 IP20 from 22 kW and higher: can be ordered from June 2012

4) Push-through only available with filter

5) Unfiltered

6) Integrated Class A filter

7) Integrated Class B filter

8) Use the line reactor and braking resistor of the G120C (see Catalog D31), presently there is no output reactor available

Control Units

CU230P-2 Control Unit

CU230P-2 Control Units have been specifically designed for pump, fan and compressor applications.

CU240B-2 / CU240E-2 Control Units

The CU240B-2 / CU240E-2 Control Units are suitable for a wide variety of applications in general machinery construction, such as conveyor belts, mixers and extruders.

Control Units							
Technology functions (selection)	Inputs	Outputs	Integrated safety technology	Digital inputs fail-safe	Communication	Designation	Control Unit Order number
CU230 series – the specialist for pumps, fans, compressors, water, buildings							
Freely assignable blocks (FFB) 4 x PID controllers Cascade control Hibernation Essential Service Mode 2-zone/multizone control	6 digital 4 analog	3 digital 2 analog	–	–	RS485 / USS / Modbus RTU / BACnet MS / TP	CU230P-2 HVAC	6SL3243-0BB30-1HA2
					PROFIBUS DP	CU230P-2 DP	6SL3243-0BB30-1PA2
					CANopen	CU230P-2 CAN	6SL3243-0BB30-1CA2
CU240 series – for basis applications with variable-speed drives							
Freely assignable blocks (FFB) 1 x PID controller Motor holding brake	4 digital 1 analog	1 digital 1 analog	–	–	RS485 / USS / Modbus RTU	CU240B-2	6SL3244-0BB00-1BA1
					PROFIBUS DP	CU240B-2 DP	6SL3244-0BB00-1PA1
CU240 series – for standard applications in general machinery construction, such as conveyor belts, mixers, extruders							
Freely assignable blocks (FFB) 1 x PID controller Motor holding brake	6 digital 2 analog	3 digital 2 analog	STO	1F-DI (opt. 2DI each)	RS485 / USS / Modbus RTU	CU240E-2	6SL3244-0BB12-1BA1
					PROFIBUS DP PROFIsafe	CU240E-2 DP	6SL3244-0BB12-1PA1
					PROFINET	CU240E-2 PN	6SL3244-0BB12-1FA0
			STO, SS1, SLS, SSM, SDI	3F-DI (opt. 2DI each)	RS485 / USS / Modbus RTU	CU240E-2-F	6SL3244-0BB13-1BA1
					PROFIBUS DP PROFIsafe	CU240E-2 DP-F	6SL3244-0BB13-1PA1
					PROFINET	CU240E-2 PN-F	6SL3244-0BB13-1FA0

Optional system components	
Description	Order No.
IOP Operator Panel	6SL3255-0AA00-4JA0
IOP handheld Operator Panel[1]	6SL3255-0AA00-4HA0
BOP-2 Operator Panel	6SL3255-0AA00-4CA1
Door mounting kit[1] for IOP/BOP-2	6SL3256-0AP00-0JA1
Blanking cover for PM230	6SL3256-1BA00-0AA0
Memory cards[2] SINAMICS Micro Memory Card (MMC) 64 MB SINAMICS Memory Card (SD)	 6SL3054-4AG00-0AA0 6ES7954-8LB01-0AA0
Brake Relay[1]	6SL3252-1BA00-0AA0
Adapter for mounting on a DIN rail	
For Power Modules, frame size FSA	6SL3262-1BA00-0BA0
For Power Modules, frame size FSB	6SL3262-1BB00-0BA0
PC inverter Connection Kit-2	6SL3255-1AA00-2CA0

1) When used in conjunction with PM230 IP55, degree of protection IP55 no longer applies.
2) Alternatively, an MMC or an SD card can be used.

Shield connection kits for PM240 and PM250 Power Modules	
	Order No.
Frame size FSA	6SL3262-1AA00-0BA0
Frame size FSB	6SL3262-1AB00-0DA0
Frame size FSC	6SL3262-1AC00-0DA0
Frame size FSD and FSE	6SL3262-1AD00-0DA0
Frame size FSF	6SL3262-1AF00-0DA0
Shield connection kits for PM260 Power Modules	
Frame size FSD	6SL3262-1FD00-0CA0
Frame size FSF	6SL3262-1FF00-0CA0
Shield connection kits for Control Units	
For CU230P-2	6SL3264-1EA00-0FA0
For CU240E-2 and CU240B-2	6SL3264-1EA00-0HA0
STARTER commissioning tool on DVD-ROM	6SL3072-0AA00-0AG0
Startdrive commissioning tool on DVD-ROM	6SL3072-4AA02-0XG0

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