SINAMICS G120 standard inverters 0.37 kW to 250 kW (0.5 hp to 400 hp)

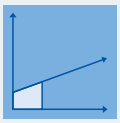
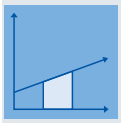
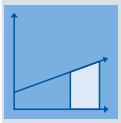
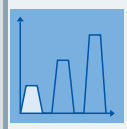
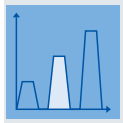
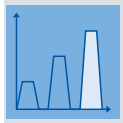
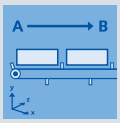
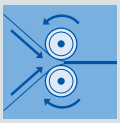
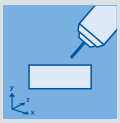
6

SINAMICS G120 standard inverters

0.37 kW to 250 kW (0.5 hp to 400 hp)

Introduction

Application

Application	Continuous motion			Non-continuous motion		
	Requirements for torque accuracy / speed accuracy / position accuracy / coordination of axes / functionality			Requirements for torque accuracy / speed accuracy / position accuracy / coordination of axes / functionality		
	Basic 	Medium 	High 	Basic 	Medium 	High 
Pumping, ventilating, compressing 	Centrifugal pumps Radial / axial fans Compressors	Centrifugal pumps Radial / axial fans Compressors	Eccentric screw pumps	Hydraulic pumps Metering pumps	Hydraulic pumps Metering pumps	Descaling pumps Hydraulic pumps
	G110, G120C (G130, G150, GM150, GL150)	**G120P, G120C, G120** (G130, G150, GM150, GL150)	**S120**	**S110**	**S110, S120**	**S120** (GM150)
Moving 	Conveyor belts Roller conveyors Chain conveyors	Conveyor belts Roller conveyors Chain conveyors Lifting/lowering devices Elevators Escalators/moving walkways Indoor cranes Marine drives Cable railways	Elevators Container cranes Mining hoists Excavators for open-cast mining Test bays	Acceleration conveyors Storage and retrieval machines	Acceleration conveyors Storage and retrieval machines Cross cutters Reel changers	Storage and retrieval machines Robotics Pick & place Rotary indexing tables Cross cutters Roll feeds Engagers/ disengagers
	G110, G110D, G120C (G130, G150, GM150)	**G120D, G120C, G120, S120** (G130, G150, S150, GM150, GL150, SM150, DCM, SIMATIC ET200S, SIMATIC ET200pro)	**S120** (S150, SM150, SL150, GM150, DCM)	**S110**	**S110, S120** (DCM)	**S120** (GM150)
Processing 	Mills Mixers Kneaders Crushers Agitators Centrifuges	Mills Mixers Kneaders Crushers Agitators Centrifuges Extruders Rotary furnaces	Extruders Winders and unwinders Lead/follower drives Calenders Main press drives Printing machines	Tubular bagging machines Single-axis motion control such as • Position profile • Path profile	Tubular bagging machines Single-axis motion control such as • Position profile • Path profile	Servo presses Rolling mill drives Multi-axis motion control such as • Multi-axis positioning • Cams • Interpolations
	G120C (G130, G150, GM150)	**G120C, G120** (G130, G150, S150, GM150, GL150, DCM)	**S120** (S150, DCM)	**S110**	**S110, S120**	**S120** (SM150, SL150, DCM)
Machining 	Main drives for • Turning • Drilling • Milling	Main drives for • Drilling • Sawing	Main drives for • Turning • Drilling • Milling • Gear cutting • Grinding	Axle drives for • Turning • Drilling • Milling	Axle drives for • Drilling • Sawing	Axle drives for • Turning • Drilling • Milling • Lasering • Gear cutting • Grinding • Nibbling and punching
	S110	**S110, S120**	**S120**	**S110**	**S110, S120**	**S120**

(Devices in brackets are not included in Catalog D 31)

The standard SINAMICS G120 inverter is especially well-suited

- as a universal drive in all industrial and commercial applications
- e.g. in the automotive, textile, printing and chemical industries
- for higher-level applications, e.g. in conveyor systems

More information

You may also be interested in these inverters/converters:

- Increased functional scope ⇒ SINAMICS S110 (chapter 9)
- Higher degree of protection ⇒ SINAMICS G110D (chapter 7), SINAMICS G120D (chapter 8)
- Special functions for pumps, fans, and compressors ⇒ SINAMICS G120P (chapter 5)

Overview

The SINAMICS G120 inverter is designed to provide precise and cost-effective speed/torque control of three-phase motors.

With different device versions (frame sizes FSA to FSGX) in an output range of 0.37 kW to 250 kW (0.5 hp to 400 hp), it is suitable for a wide variety of drive solutions.

SINAMICS G120, frame sizes FSA, FSB and FSC; each with Power Module, CU240E-2 F Control Unit and Basic Operator Panel BOP-2

SINAMICS G120, frame sizes FSD, FSE and FSF; each with Power Module, CU240E-2 F Control Unit and Basic Operator Panel BOP-2

SINAMICS G120 standard inverters

Overview

SINAMICS G120, frame size FSGX; with Power Module, CU240E-2 F Control Unit and Basic Operator Panel BOP-2

Operator-friendly design

SINAMICS G120 is a modular inverter system that essentially comprises two function units:

- Control Unit (CU)
- Power Module (PM)

The Control Unit controls and monitors the Power Module and the connected motor in several different modes. It supports communication with a local or central controller and monitoring devices.

The Power Module supplies the motor in the power range 0.37 kW to 250 kW (0.5 hp to 400 hp). It features state-of-the-art IGBT technology with pulse-width-modulated motor voltage and selectable pulse frequency. It also features a range of functions offering a high degree of protection for the Power Module and motor.

Safety Integrated

SINAMICS G120 standard inverters are available in different versions for safety-related applications. The PM240, PM250 and PM260 Power Modules are prepared for Safety Integrated. In conjunction with a fail-safe Control Unit, the drive can be turned into a Safety Integrated Drive.

The SINAMICS G120 fail-safe inverter provides 5 safety functions, certified in accordance with EN 954-1, Category 3 and IEC 61508 SIL 2 as well as ISO 13849-1 PLD:

- Safe Torque Off (STO)
  to protect against active movement of the drive
- Safe Stop 1 (SS1)
  for continuous monitoring of a safe braking ramp
- Safely Limited Speed (SLS)
  for protection against dangerous movements on exceeding a speed limit
- Safe direction (SDI)
  This function ensures that the drive can only rotate in the selected direction
- Safe speed monitoring (SSM)
  This function signals if a drive operates below a specific speed/feed velocity.

The Safe Stop 1 (SS1) and Safely Limited Speed functions can both be implemented without having to use a motor encoder; the implementation cost is minimal. Existing plants in particular can be updated with safety technology without the need to change the motor or mechanical system.

The Safe Torque Off (STO) function can be used without restriction for all applications. The SS1, SLS, SSM and SDI functions are only permissible for applications where the load can never accelerate when the inverter is switched off. They are therefore not permitted for applications involving pull-through loads such as hoisting gear and unwinders.

Additional information is provided in the chapter Highlights, section Safety Integrated.

Overview

Efficient Infeed Technology

The advanced Efficient Infeed Technology is employed in PM250 and PM260 Power Modules. This technology allows the energy produced by motors operating in generator mode connected to standard inverters to be fed back into the supply system. For control cabinets, an additional temperature rise can be avoided and the amount of space required can be reduced due to the fact that components such as braking resistors, braking choppers and line reactors can be eliminated. Further, wiring and engineering costs are significantly reduced. At the same time, energy consumption can be reduced and ongoing operating costs noticeably reduced.

Additional information is included in the chapter Highlights, section Efficient Infeed Technology.

Innovative cooling concept and varnishing of electronic modules

The new cooling system and varnishing of the electronic modules significantly increases the service life or useful life of the device.

- Disposal of all heat losses via an external heat sink
- Consequential convection cooling of the Control Unit, electronic modules are not located in the air duct
- All cooling air from the fan is directed through the heat sink

Energy efficiency

Integrated technologies help when optimizing the energy usage of the plant or system referred to the particular application:

- Energy-efficient, sensorless vector control
- Automatic flux reduction with *V/f* ECO mode
- Integrated energy saving computer

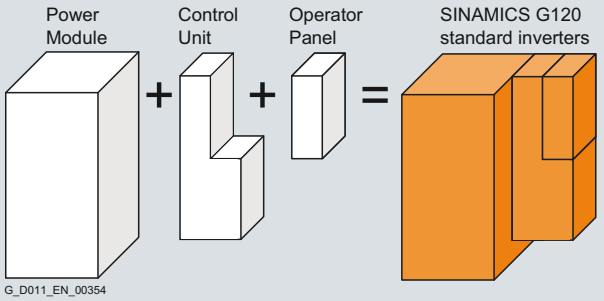
Benefits

- Modularity ensures flexibility for a drive concept that is fit for the future
  - Module replacement under voltage (hot swapping)
  - Pluggable terminals
  - The modules can be easily replaced, which makes the system extremely service friendly
- The integrated safety functions significantly reduce the costs when integrating drives into safety-oriented machines or systems
- Communications-capable via PROFINET or PROFIBUS with PROFIdrive Profile 4.0
  - Reduced number of interfaces
  - Plant-wide engineering
  - Easy to handle
- The innovative circuit design (bidirectional input rectifier with "pared-down" DC link) allows the kinetic energy of a load to be fed back into the supply system when PM250 and PM260 Power Modules are used. This feedback capability provides enormous potential for savings because generated energy no longer has to be converted into heat in a braking resistor
- Integrated USB interface for simplified, local commissioning and diagnostics
- Application-specific modules for pumps, fans and compressors are integrated, e.g.:
  - 4 freely-programmable PID controllers
  - Application-specific wizards
  - Ni1000/Pt1000 temperature sensor interface
  - 230 V relay
  - 3 freely-programmable digital time switches
- Integrated control functionality by using Bico technology
- Innovative SiC semiconductor technology ensures that when a PM260 Power Module is used, the inverter is more compact than a comparable standard inverter with an optional sine-wave filter for the same power rating
- An innovative cooling concept and coated electronic modules increase robustness and service life
  - External heat sink
  - Electronic components are not located in air duct
  - Control Unit that is completely cooled by convection
  - Additional coating of the most important components
- Simple unit replacement and quick copying of parameters using the optional Basic Operator Panel or the optional MMC memory card
- Quiet motor operation as a result of the high pulse frequency
- Compact, space-saving design
- Software parameters for simple adaptation to 50 Hz or 60 Hz motors (IEC or NEMA motors)
- 2/3-wire control for static/pulsed signals for universal control via digital inputs
- Fast engineering and commissioning by using standard engineering tools such as SIZER for Siemens Drives, STARTER and Drive ES – STARTER is integrated into STEP 7 using Drive ES Basic, with all of the benefits of central data management and totally integrated communication
- Certified worldwide for compliance with CE, UL, cUL, c-tick and Safety Integrated IEC 61508 SIL 2

Design

Application-orientated design of SINAMICS G120

SINAMICS G120 standard inverters are modular inverters for standard drives. Selection of the SINAMICS G120 is reduced to two or three steps thanks to the modular system used.



Selecting the Control Unit

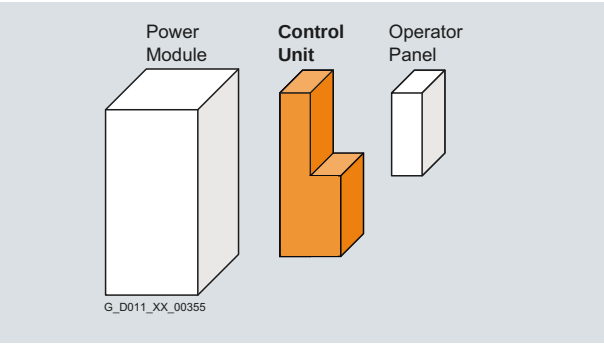
The optimum Control Unit is selected first, based on the number of I/Os and any additional functions required such as Safety Integrated or HVAC. The communication options are already integrated and do not have to be additionally ordered or plugged in. Two product series are available corresponding to the particular application.

CU230 Control Units

The CU230 Control Units have been specifically designed for pump, fan and compressor applications.

CU240 Control Units

The CU240 Control Units are suitable for a wide range of applications in general machine construction, such as conveyor belts, mixers and extruders.



Technology functions (selection)	Inputs	Outputs	Integrated safety technology	Digital inputs, fail-safe	Communication	Designation	**Control Unit** Order No.
CU230 series – the specialist for pumps, fans, compressors, water, buildings							
• Free function blocks (FFB) • 4 x PID controllers • Pump staging • Hibernation • Essential service mode • 2-zone 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 basic applications with variable-speed drives							
• Free function 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 and extruders							
• Free function blocks (FFB) • 1 x PID controller • Motor holding brake	6 digital 2 analog	3 digital 2 analog	STO	1 F-DI (opt. for each 2 DI)	RS485/USS / Modbus RTU	CU240E-2	**6SL3244-0BB12-1BA1**
					PROFIBUS DP PROFIsafe	CU240E-2 DP	**6SL3244-0BB12-1PA1**
			STO, SS1, SLS, SSM, SDI	3 F-DI (opt. for each 2 DI)	RS485/USS / Modbus RTU	CU240E-2 -F	**6SL3244-0BB13-1BA1**
					PROFIBUS DP PROFIsafe	CU240E-2 DP-F	**6SL3244-0BB13-1PA1**

Design

Selecting the Power Module

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

PM230 Power Modules – degree of protection IP55

PM230 Power Modules are designed for applications involving pumps, fans and compressors with a square characteristic. They do not have an integrated braking chopper (single-quadrant applications).

PM240 Power Modules – degree of protection IP20

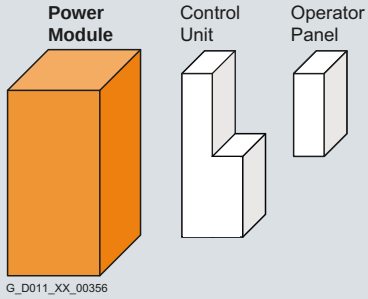
PM240 Power Modules have a braking chopper (four-quadrant applications) and are suitable for a large number of applications in general machinery construction.

PM250 Power Modules – degree of protection IP20

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

PM260 Power Modules – degree of protection IP20

PM260 Power Modules are designed for applications from 500 V to 690 V, are capable of energy recovery and include a sine-wave filter to reduce the stress on the motor and for long cable lengths.



		380 ... 480 V 3 AC				500 ... 690 V 3 AC	
Rated power [1]		Rated output current I_{rated} [2]	SINAMICS G120P PM230 Power Module degree of protection IP55, only CU230P-2 pluggable	SINAMICS G120 PM240 Power Module degree of protection IP20, all CUs pluggable	SINAMICS G120 PM250 Power Module degree of protection IP20, all CUs pluggable	Rated output current I_{rated} [2]	SINAMICS G120 PM260 Power Module degree of protection IP20, all CUs pluggable
kW	hp	A	Order No.	Order No.	Order No.	A	Order No.
0.37	0.50	1.3	6SL3223-0DE13-7■A0	6SL3224-0BE13-7UA0	–		–
0.55	0.75	1.7	6SL3223-0DE15-5■A0	6SL3224-0BE15-5UA0	–		–
0.75	1.0	2.2	6SL3223-0DE17-5■A0	6SL3224-0BE17-5UA0	–		–
1.1	1.5	3.1	6SL3223-0DE21-1■A0	6SL3224-0BE21-1UA0	–		–
1.5	2.0	4.1	6SL3223-0DE21-5■A0	6SL3224-0BE21-5UA0	–		–
2.2	3.0	5.9	6SL3223-0DE22-2■A0	6SL3224-0BE22-2■A0	–		–
3.0	4.0	7.7	6SL3223-0DE23-0■A0	6SL3224-0BE23-0■A0	–		–
4.0	5.0	10.2	6SL3223-0DE24-0■A0	6SL3224-0BE24-0■A0	–		–
5.5	7.5	13.2	6SL3223-0DE25-5■A0	–	–		–
7.5	10	18	6SL3223-0DE27-5■A0	6SL3224-0BE25-5■A0	6SL3225-0BE25-5AA1		–
11.0	15	25	6SL3223-0DE31-1■A0	6SL3224-0BE27-5■A0	6SL3225-0BE27-5AA1	14	6SL3225-0BH27-5■A1
15.0	20	32	6SL3223-0DE31-5■A0	6SL3224-0BE31-1■A0	6SL3225-0BE31-1AA1	19	6SL3225-0BH31-1■A1
18.5	25	38	6SL3223-0DE31-8■A0	6SL3224-0BE31-5■A0	6SL3225-0BE31-5■A0	23	6SL3225-0BH31-5■A1
22	30	45	6SL3223-0DE32-2■A0	6SL3224-0BE31-8■A0	6SL3225-0BE31-8■A0	–	–
30	40	60	6SL3223-0DE33-0■A0	6SL3224-0BE32-2■A0	6SL3225-0BE32-2■A0	35	6SL3225-0BH32-2■A1
37	50	75	6SL3223-0DE33-7■A0	6SL3224-0BE33-0■A0	6SL3225-0BE33-0■A0	42	6SL3225-0BH33-0■A1
45	60	90	6SL3223-0DE34-5■A0	6SL3224-0BE33-7■A0	6SL3225-0BE33-7■A0	–	–
55	75	110	6SL3223-0DE35-5■A0	6SL3224-0BE34-5■A0	6SL3225-0BE34-5■A0	62	6SL3225-0BH33-7■A1
75	100	145	6SL3223-0DE37-5■A0	6SL3224-0BE35-5■A0	6SL3225-0BE35-5■A0		–
90	125	178	6SL3223-0DE38-8■A0	6SL3224-0BE37-5■A0	6SL3225-0BE37-5■A0		–
110	150	205	–	6SL3224-0BE38-8UA0	–		–
132	200	250	–	6SL3224-0BE41-1UA0	–		–
160	250	302	–	6SL3224-0XE41-3UA0	–		–
200	300	370	–	6SL3224-0XE41-6UA0	–		–
250	400	477	–	6SL3224-0XE42-0UA0	–		–
Integrated line filter			↑	↑	↑		↑
Without (for IT systems)			Not supported	**U**	**U**		**U**
Class A (for TN systems)			**A**	**A**	**A**		**A**
Class B (for TN systems)			**B**	Are not available integrated	Are not available integrated		Not supported

Data based on a duty cycle with low overload (LO). **High overload (HO) see Power Modules from page 6/32 on.**

[1] The LO duty cycle is generally used for applications with square torque characteristic such as for pumps, fans and compressors; the HO duty cycle for constant torque characteristics, for example conveyor belts.

[2] These current values are applicable for 400 V (for PM230, PM240 and PM250 Power Modules) and for 690 V (for PM260 Power Modules).

Design

Selecting optional system components

Intelligent Operator Panel IOP

Graphic display with bar-type diagrams, e.g. for status values such as pressure or flowrate.

User-friendly commissioning, diagnostics and local operator control using a large plain text display, clear menu navigation and integrated application wizards.

Intelligent Operator Panel IOP Handheld

A handheld version of the IOP can be ordered for mobile use. In addition to the IOP, this includes a housing with rechargeable batteries, charging unit and RS232 connecting cable.

Basic Operator Panel BOP-2

Menu navigation and 2-line display permit fast and user-friendly commissioning of the inverter.

Simple basic commissioning by simultaneously displaying parameter and parameter value, as well as the option of filtering parameters.

Door mounting kit for IOP/BOP-2

Using the optionally available door mounting kit, the IOP/BOP-2 can be mounted in a control cabinet door with just a few manual operations (IP54/UL Type 12 degree of protection is achieved).

Memory cards

The parameter settings for an inverter can be stored on the SINAMICS micro memory card (MMC) or SIMATIC memory card (SD card). When service is required, e.g. after the inverter has been replaced, the drive system is immediately ready for use again.

Brake Relay

The Brake Relay allows the Power Module to be connected to an electromechanical motor brake, thereby allowing the motor brake to be driven directly by the Control Unit.

Adapter for mounting on DIN rails

The adapter for DIN rail mounting can be used to mount inverters, frame sizes FSA and FSB, on DIN mounting rails (2 units with a center-to-center distance of 100 mm/3.94 in).

PC inverter connection kit 2

For controlling and commissioning an inverter directly from a PC if the appropriate software (STARTER commissioning tool) has been installed.

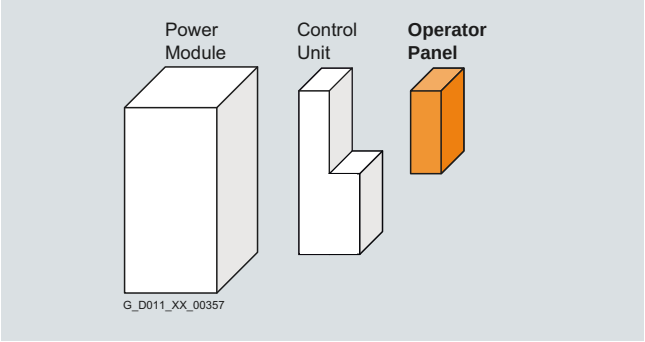
The STARTER commissioning tool on DVD-ROM is included in the scope of delivery of the PC inverter connection kit 2.

Shield connection kit for Power Modules

The shield connection kit makes it easier to connect the shields of supply and control cables, provides mechanical strain relief and thus ensures optimum EMC performance.

Shield connection kit for Control Units

The shield connection kit offers optimum shield connection and strain relief for all signal and communication cables. It includes a matching shield bonding plate and all of the necessary connecting and retaining elements for mounting.



Description	Order No.
Operator Panel IOP	**6SL3255-0AA00-4JA0**
Operator Panel IOP Handheld [1]	**6SL3255-0AA00-4HA0**
Operator Panel BOP-2	**6SL3255-0AA00-4CA1**
Door mounting kit [1] **for IOP/BOP-2**	**6SL3256-0AP00-0JA0**
Blanking cover for PM230	**6SL3256-1BA00-0AA0**
Memory cards [2]	
• SINAMICS micro memory card (MMC)	**6SL3254-0AM00-0AA0**
• SIMATIC memory card (SD card)	**6ES7954-8LB01-0AA0**
Brake Relay [1]	**6SL3252-0BB00-0AA0**
Adapter for mounting on DIN rails	
• For Power Modules, frame size FSA	**6SL3262-1BA00-0BA0**
• For Power Modules, frame size FSB	**6SL3262-1BB00-0BA0**
PC inverter connection kit 2	**6SL3255-0AA00-2CA0**
Shield connection kits for PM240 and PM250 Power Modules	
• Frame size FSA	**6SL3262-1AA00-0BA0**
• Frame size FSB	**6SL3262-1AB00-0DA0**
• Frame size FSC	**6SL3262-1AC00-0DA0**
• Frame sizes 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 CU240 . -2	**6SL3264-1EA00-0HA0**
STARTER commissioning tool on DVD-ROM	**6SL3072-0AA00-0AG0**

[1] Not possible in conjunction with the PM230 Power Module.

[2] Alternatively, an MMC or an SD card can be used.

Design

Line-side power components

The following line-side power components are available for SINAMICS G120 standard inverters:

Line filters

With one of the additional line filters, the Power Module reaches a higher radio interference class.

Line reactors
(for PM240 Power Modules only)

Line reactors are used to smooth voltage peaks or to bridge commutating dips.

Line reactors also reduce the effects of harmonics on the inverter and the line supply.

If the ratio of the rated inverter power to the line supply short-circuit power is less than 1 %, then it is recommended to use a line reactor to reduce the current peaks.

Recommended line-side power components

This is a recommendation for additional line-side components, such as fuses and circuit breakers (line-side components must be dimensioned in accordance with IEC standards).

Additional information about the listed fuses and circuit breakers can be found in Catalogs LV 1 AO, LV 10.1 and IC 10.

DC link components

The following DC link components are available for the SINAMICS G120 standard inverters:

Braking Modules
(only for PM240 Power Modules, frame size FSGX)

A Braking Module and the matching external braking resistor are required to bring drives with a PM240 Power Module, frame size FSGX, to a controlled standstill in the event of a power failure (e.g. emergency retraction or EMERGENCY STOP Category 1) or to limit the DC link voltage during a short period of generator operation. The Braking Module includes the power electronics and the associated control circuit.

Braking resistors
(for PM240 Power Modules only)

Excess energy in the DC link is dissipated in the braking resistor. The braking resistors are designed for use with PM240 Power Modules. They are equipped with an integrated braking chopper (electronic switch). There is an optional plug-in Braking Module for frame size FSGX.

Load-side power components

The following load-side power components are available for the SINAMICS G120 standard inverters. This means that during operation with output reactors or sine-wave filters, longer, shielded motor cables are possible and the motor service life can be extended:

Output reactors
(for PM240 and PM250 Power Modules only)

Output reactors reduce the voltage stress on the motor windings. At the same time, the capacitive charging/discharging currents, which place an additional load on the power unit when long motor cables are used, are reduced.

Sine-wave filters
(not for PM260 Power Modules)

The sine-wave filter limits the rate of rise of voltage and the capacitive charging/discharging currents that usually occur with inverter operation. An output reactor is not required.

Spare parts

Terminal cover kit

The kit includes a replacement cover for the terminals. The kit can be ordered for PM240/PM250 Power Modules, frame sizes FSD, FSE and FSF, as well as for the PM260, frame size FSF.

PM260 replacement connector

This spare part includes a connector for the input and output sides of the PM260 Power Module, frame size FSD.

SINAMICS G120 PM240 FSGX replacement door

A complete replacement door can be ordered for the PM240 Power Module, frame size FSGX.

Replacement fan

The Power Module fans are designed for extra long service life. Replacement fans can be ordered for special applications.

Configuration

The following electronic configuring aids and engineering tools are available for the SINAMICS G120 standard inverters:

Selection guide DT Configurator

The interactive catalog CA 01 – the offline mall of Siemens Industry Automation & Drive Technologies – contains over 100000 products with approximately 5 million possible drive system product variants. The DT Configurator has been developed to facilitate selection of the optimum motor and/or inverter from the wide spectrum of drives. It is provided on a DVD-ROM.

Online DT Configurator

In addition, the DT Configurator can be used in the Internet without requiring any installation
www.siemens.com/dt-configurator

SIZER for Siemens Drives engineering tool

The PC-based SIZER for Siemens Drives engineering tool makes it easy to engineer the SINAMICS and MICROMASTER 4 drive families. It provides support when selecting the hardware and firmware components necessary to implement a drive task. SIZER for Siemens Drives covers the full range of operations required to configure a complete drive system, from basic single drives to demanding multi-axis applications.

STARTER commissioning tool

The STARTER commissioning tool allows menu-prompted commissioning, optimization and diagnostics. In addition to SINAMICS drives, STARTER is also suitable for MICROMASTER 4 units and the drive converters for the distributed I/O SIMATIC ET 200S FC and SIMATIC ET 200pro FC.

SINAMICS StartDrive commissioning tool

SINAMICS StartDrive is a tool for configuring, commissioning, and diagnosing the SINAMICS family of drives and is integrated into the TIA Portal. The engineering tool has been optimized with regard to user friendliness and consistent use of the TIA Portal technologies. The two Control Units CU240B-2 DP and CU240E-2 DP of the SINAMICS G120 standard inverter are supported in the SINAMICS StartDrive V11 version.

Drive ES engineering system

Drive ES is the engineering system that can be used to integrate the communication, configuration and data management functions of Siemens drive technology into the SIMATIC automation world easily, efficiently and cost-effectively. The STEP 7 Manager user interface provides the ideal basis for this. A variety of software packages are available for SINAMICS – Drive ES Basic, Drive ES SIMATIC and Drive ES PCS 7.1.

Technical specifications

Unless explicitly specified otherwise, the following technical specifications are valid for all the following components of the SINAMICS G120 standard inverters.

Mechanical specifications	
Vibratory load	
• Transport [1] acc. to EN 60721-3-2	
- All units and components with the exception of frame size FSGX	Class 2M3
- Units, frame size FSGX	Class 2M2
• Operation Test values acc. to EN 60068-2-6	Test Fc: 10 … 58 Hz: Constant deflection 0.075 mm 58 … 200 Hz: Constant acceleration = 9.81 m/s^2 (1 × *g*)
Shock load	
• Transport [1] acc. to EN 60721-3-2	
- All units and components with the exception of frame size FSGX	Class 2M3
- Units, frame size FSGX	Class 2M2
• Operation Test values acc. to EN 60068-2-27	Test Ea:
- Frame sizes FSA to FSC	147 m/s^2 (15 × *g*)/11 ms
- Frame sizes FSD to FSF	49 m/s^2 (5 × *g*)/30 ms
- Frame size FSGX	98 m/s^2 (10 × *g*)/20 ms
Ambient conditions	
Protection class acc. to EN 61800-5-1	Class I (with protective conductor system) and class III (PELV)
Touch protection acc. to EN 61800-5-1	For the intended purpose
Permissible ambient and coolant temperature (air) during operation for line-side power components and Power Modules	
• Low overload (LO)	0 … 40 °C (32 … 104 °F) without derating >40 … 60 °C (>104 … 140 °F) see derating characteristics
• High overload (HO)	0 … 50 °C (32 … 122 °F) without derating (for PM240 frame size FSGX: 0 … 40 °C, 32 … 104 °F), >50 … 60 °C (>104 … 140 °F) see derating characteristics
Permissible ambient and coolant temperature (air) during operation for Control Units, additional system components and DC-link components	0 ... 50 °C (32 ... 122 °F) Exception: CU230P-2: 0 ... 60 °C (32 ... 140 °F) Up to 2000 m (6562 ft) above sea level
Climatic ambient conditions	
• Storage [1] acc. to EN 60721-3-1	Class 1K3 Temperature -25 … +55 °C (-13 ... +131 °F)
• Transport [1] acc. to EN 60721-3-2	Class 2K4 Temperature -40 … +70 °C (-40 ... +158 °F) Max. air humidity 95 % at 40 °C (104 °F)
• Operation acc. to EN 60721-3-3	Class 3K5 [2] Condensation, splashwater, and ice formation not permitted (EN 60204, Part 1)
Environmental class/harmful chemical substances	
• Storage [1] acc. to EN 60721-3-1	Class 1C2
• Transport [1] acc. to EN 60721-3-2	Class 2C2
• Operation acc. to EN 60721-3-3	Class 3C2
Organic/biological influences	
• Storage [1] acc. to EN 60721-3-1	Class 1B1
• Transport [1] acc. to EN 60721-3-2	Class 2B1
• Operation acc. to EN 60721-3-3	Class 3B1
Degree of pollution acc. to EN 61800-5-1	2

[1] In transport packaging.

[2] For Intelligent Operator Panel IOP, class 3K3

Technical specifications

Standards	
Compliance with standards	UL [1], cUL [2], CE, c-tick
CE marking	According to Low-Voltage Directive 2006/95/EC
EMC Directive acc. to EN 61800-3	
• Frame sizes FSA to FSGX without integrated line filter class A	Category C3 [3]
• Frame sizes FSB to FSF with integrated line filter class A	Category C2 [4] (corresponds to class A acc. to EN 55011 for conducted interference emission)
• Frame size FSA without integrated line filter and with additional line filter class A	Category C2 [4] (corresponds to class A acc. to EN 55011 for conducted interference emission)
• Frame size FSA with additional line filter class A and with additional line filter class B	Category C2 [4] (corresponds to class B acc. to EN 55011 for conducted interference emission)
• Frame sizes FSB and FSC with additional line filter class A and with additional line filter class B	Category C2 [4] (corresponds to class B acc. to EN 55011 for conducted interference emission)
• PM230: Frame sizes FSA to FSF with integrated line filter class A	Category C2 [4] (corresponds to class A acc. to EN 55011)
• PM230: Frame sizes FSA to FSF with integrated line filter class B	Category C1 [4] (corresponds to class B acc. to EN 55011 for conducted interference emission)

Note:

The EMC product standard EN 61800-3 does not apply directly to a frequency inverter but to a PDS (Power Drive System), which comprises the complete circuitry, motor and cables in addition to the inverter. The frequency inverters on their own do not generally require identification according to the EMC Directive.

[1] UL approval for frame sizes FSD to FSF will be available soon.

[2] Applies to PM240 and PM250 Power Modules.

[3] Unfiltered inverters can be used in industrial environments as long as they are part of a system that contains line filters on the higher-level infeed side. As a consequence, a PDS (Power Drive System) can be installed according to category C3.

[4] With shielded motor cable up to 25 m (82 ft).

Technical specifications

Compliance with standards

CE marking

CE

The SINAMICS G120 inverters meet the requirements of the Low-Voltage Directive 2006/95/EC.

Low-Voltage Directive

The inverters comply with the following standards listed in the official journal of the EU:

- EN 60204-1
  Safety of machinery, electrical equipment of machines
- EN 61800-5-1
  Electrical power drive systems with variable speed – Part 5-1: Requirements regarding safety – electrical, thermal, and energy requirements

UL listing

c UL us LISTED

Inverter devices in UL category NMMS certified to UL and cUL, in compliance with UL508C. UL list numbers E121068 and E192450. This data is applicable for the PM240 and PM250 Power Modules.

For use in environments with pollution degree 2.

On the Internet at www.ul.com

Machinery Directive

The inverters are suitable for installation in machines. Compliance with the Machinery Directive 2006/42/EC requires a separate certificate of conformity. This must be provided by the plant construction company or the organization marketing the machine.

EMC Directive

- EN 61800-3
  Variable-speed electric drives
  Part 3: EMC product standard including specific test methods

The EMC product standard EN 61800-3 for electric drive systems has been valid since July 1, 2005. The transition period for the predecessor standard EN 61800-3/A11 dated February 2001 ended on October 1, 2007. The following information applies to the Siemens SINAMICS G120 inverters:

- The EMC product standard EN 61800-3 does not apply directly to a frequency inverter but to a PDS (Power Drive System), which comprises the complete circuitry, motor and cables in addition to the inverter.
- Frequency inverters are normally only supplied to experts for installation in machines or systems. A frequency inverter must, therefore, only be considered as a component which, on its own, is not subject to the EMC product standard EN 61800-3. The inverter's operating instructions, however, specifies the conditions regarding compliance with the product standard if the frequency inverter is expanded to become a PDS. For a PDS, the EMC Directive in the EU is complied with by observing the product standard EN 61800-3 for variable-speed electric drive systems. The frequency inverters on their own do not generally require identification according to the EMC Directive.
- In the Standard EN 61800-3 of July 2005, a distinction is no longer made between "general availability" and "restricted availability". Instead, different categories C1 to C4 have been defined in accordance with the environment of the PDS at the operating location:
  - **Category C1:** Drive systems for rated voltages < 1000 V for use in the first environment
  - **Category C2:** Stationary drive systems not connected by means of a plug connector for rated voltages < 1000 V. When used in the first environment, the system must be installed and commissioned by personnel familiar with EMC requirements. A warning note is required.
  - **Category C3:** Drive systems for rated voltages < 1000 V for exclusive use in the second environment. A warning note is required.
  - **Category C4:** Drive systems for rated voltages ≥ 1000 V or for rated currents ≥ 400 A or for use in complex systems in the second environment. An EMC plan must be created.
- The EMC product standard EN 61800-3 also defines limit values for conducted interference and radiated interference for the "second environment" (= industrial power supply systems that do not supply households). These limit values are below the limit values of filter class A to EN 55011. Unfiltered inverters can be used in industrial environments as long as they are part of a system that contains line filters on the higher-level infeed side.
- With SINAMICS G120, Power Drive Systems (PDS) that fulfill the EMC product standard EN 61800-3 can be configured when observing the installation instructions in the product documentation.
- A differentiation must be made between the product standards for electrical drive systems (PDS) of the range of standards EN 61800 (of which Part 3 covers EMC topics) and the product standards for the devices/systems/machines, etc. This will probably not result in any changes in the practical use of frequency inverters. Since frequency inverters are always part of a PDS and these are part of a machine, the machine manufacturer must observe various standards depending on their type and environment (e.g. EN 61000-3-2 for line harmonics and EN 55011 for radio interference). The product standard for PDS on its own is, therefore, either insufficient or irrelevant.
- With respect to the compliance with limits for line supply harmonics, the EMC product standard EN 61800-3 for PDS refers to compliance with the EN 61000-3-2 and EN 61000-3-12 standards.
- Regardless of the configuration with SINAMICS G120 and its components, the machine construction company (OEM) can also apply other measures to ensure that the machine complies with the EU EMC Directive. The EU EMC Directive is generally fulfilled when the relevant EMC product standards are observed. If they are not available, the generic standards (e.g. DIN EN 61000-x-x) can be used instead. It is important that the conducted and emitted interference at the line connection point and outside the machine remain below the relevant limit values. Any suitable technical measures can be applied to ensure this.

SEMI F47

SEMI F47 is an industry standard relating to the immunity to voltage dips. This includes the requirement that industrial equipment must be able to tolerate defined dips or drops of the line supply voltage. As a result, industrial equipment that fulfills this standard is more reliable and productive. In the SINAMICS G120 product family, the PM240 and PM250 Power Modules fulfill the latest SEMI F47-0706 standard. In the case of a voltage dip defined in accordance with SEMI F47-0607, these drives either continue to supply a defined output current, or automatically restart and continue to operate as expected.

Overview

CU230P-2 Control Units

CU230P-2 HVAC Control Unit

The Control Unit performs closed-loop control functions for the inverter.

The CU230P-2 Control Units are designed for drives with integrated technological functions for pump, fan and compressor applications.

The I/O interface, the fieldbus interfaces and the additional software functions optimally support these applications. The integration of technological functions is a significant differentiating feature to the other Control Units of the SINAMICS G120 drive family.

The CU230P-2 Control Units can be operated with the following Power Modules:

- PM230
- PM240
- PM250
- PM260

Typical, integrated HVAC/HLK functions

- Linear and square torque characteristic for fluid flow and positive displacement machines
- ECO mode for additional energy saving
- 2 analog inputs (current/voltage can be selected) to directly connect pressure/level sensors
- 2 additional analog inputs to connect Ni1000/Pt1000 temperature sensors
- Direct control of valves and flaps using two 230 V relays
- Automatic restart function after power failure
- Flying restart
- Skippable frequencies
- Energy saving through "hibernation"
- Load check function to monitor belts and flow
- Motor staging
- 4 integrated PID controllers (e.g. for temperature, pressure, air quality, level)
- Multi-zone controller
- Extended emergency mode
- Real time clock with three time generators

IOP wizards for special applications

- Pumps: Positive displacement (constant load torque) and centrifugal pumps (square load torque) with and without PID controller
- Fans: Radial and axial fans (square load torque) with and without PID controller
- Compressors: Positive displacement (constant load torque) and fluid flow machines (square load torque) with and without PID controller

Overview

CU240B-2 and CU240E-2 Control Units

CU240E-2 DP-F Control Unit

The Control Unit performs closed-loop control functions for the inverter.

The CU240B-2 and CU240E-2 Control Units are designed as standard Control Units for all of the usual applications involving *V/f* or vector control.

- CU240B-2 series with basic I/O quantity structure, ideal for a large number of applications
- CU240E-2 series with standard I/O quantity structure and integrated safety technology

The CU240B-2 and CU240E-2 Control Units can be operated with the following Power Modules:

- PM240
- PM250
- PM260

Safety Integrated functions

The Safety function "Safe Torque Off" (STO) (certified according to EN 954-1, Category 3 and IEC 61508 SIL 2 – as well as ISO 13849-1 PLd) is already integrated into the basic versions of the CU240E-2 series (CU240E-2 and CU240E-2 DP). The following extended Safety Integrated functions have been integrated into the CU240E-2 F and CU240E-2 DP-F Control Units.

- Safe Torque Off (STO)
  to protect against active movement of the drive
- Safe Stop 1 (SS1)
  for continuous monitoring of a safe braking ramp
- Safely Limited Speed (SLS)
  for protection against dangerous movements when a speed limit is exceeded (CU240E-2 DP-F Control Unit has up to 4 selectable SLS limit values)
- Safe direction (SDI)
  This function ensures that the drive can only rotate in the selected direction.
- Safe speed monitoring (SSM)
  This function signals if a drive operates below a specific speed/feed velocity (only CU240E-2 DP-F with PROFIsafe).

All integrated Safety functions can be implemented without having to use a motor encoder or encoder; implementation costs are minimal. Existing systems in particular can be simply updated with safety technology without the need to change the motor or mechanical system.

The STO function can be used without restriction for all applications. The SS1, SLS, SDI and SSM functions are only permissible for applications where the load can never accelerate when the inverter is switched off. They are therefore not permitted for applications involving pull-through loads such as hoisting gear and unwinders.

Additional information is provided in the chapter Highlights, section Safety Integrated.

Control Units

Selection and ordering data

Technology functions (selection)	Inputs	Outputs	Integrated safety technology	Digital inputs, fail-safe	Communication	Designation	**Control Unit** Order No.
CU230 series – the specialist for pumps, fans, compressors, water, buildings							
• Free function blocks (FFB) • 4 x PID controllers • Pump staging • Hibernation • Essential service mode • 2-zone 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 basic applications with variable-speed drives							
• Free function 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 and extruders							
• Free function blocks (FFB) • 1 x PID controller • Motor holding brake	6 digital 2 analog	3 digital 2 analog	STO	1 F-DI (opt. for each 2 DI)	RS485/USS / Modbus RTU	CU240E-2	**6SL3244-0BB12-1BA1**
					PROFIBUS DP PROFIsafe	CU240E-2 DP	**6SL3244-0BB12-1PA1**
			STO, SS1, SLS, SSM, SDI	3 F-DI (opt. for each 2 DI)	RS485/USS / Modbus RTU	CU240E-2 -F	**6SL3244-0BB13-1BA1**
					PROFIBUS DP PROFIsafe	CU240E-2 DP-F	**6SL3244-0BB13-1PA1**

Design

CU230P-2 HVAC, CU230P-2 DP and CU230P-2 CAN Control Units

CU230P-2 DP Control Unit with open terminal covers

Terminal No.	Signal	Features
Digital inputs (DI) – Standard		
69	DI Com	Reference potential for digital inputs
5 ... 8, 16, 17	DI0 ... DI5	Freely programmable isolated, inputs in compliance with IEC 61131-2
Digital outputs (DO)		
18	DO0, NC	Relay output 1 NC contact (2 A, 230 V AC)
19	DO0, NO	Relay output 1 NO contact (2 A, 230 V AC)
20	DO0, COM	Relay output 1 Common contact (2 A, 230 V AC)
21	DO1, NO	Relay output 2 NO contact (0.5 A, 30 V DC)
22	DO1, COM	Relay output 2 Common contact (0.5 A, 30 V DC)
23	DO2, NC	Relay output 3 NC contact (2 A, 230 V AC)
24	DO2, NO	Relay output 3 NO contact (2 A, 230 V AC)
25	DO2, COM	Relay output 3 Common contact (2 A, 230 V AC)

Terminal No.	Signal	Features
Analog inputs (AI)		
3	AI0+	Differential input, switchable between current, voltage Value range: 0 ... 10 V, -10 ... +10 V, 0/2 ... 10 V, 0/4 ... 20 mA
4	AI0-	
10	AI1+	Differential input, switchable between current, voltage Value range: 0 ... 10 V, -10 ... +10 V, 0/2 ... 10 V, 0/4 ... 20 mA
11	AI1-	
50	AI2+/ Ni1000	Non-isolated input, switchable between current, temperature sensors, type Ni1000/Pt1000 Value range: 0/4 ... 20 mA, Pt1000: -50 ... +250 °C (-58 ... +482 °F) Ni1000: -50 ... +150 °C (-58 ... +302 °F)
51	GND	Reference potential of the AI2/internal electronics ground
52	AI3+/ Ni1000	Non-isolated input for temperature sensors, type Ni1000/Pt1000 Value range: Pt1000: -50 ... +250 °C (-58 ... +482 °F) Ni1000: -50 ... +150 °C (-58 ... +302 °F)
53	GND	Reference potential of the AI3/internal electronics ground
Analog outputs (AO)		
12	AO0+	Non-isolated output Freely programmable Value range: 0 ... 10 V; 0/4 ... 20 mA
13	AO0-	Reference potential of the AO0/internal electronics ground
26	AO1+	Non-isolated output Freely programmable Value range: 0 ... 10 V; 0/4 ... 20 mA
27	AO1-	Reference potential of the AO1/internal electronics ground
Motor temperature sensor interface		
14	T1 motor	Positive input for motor temperature sensor Type: PTC, KTY sensor, Thermo-Click
15	T2 motor	Negative input for motor temperature sensor
Power supply		
9	+24 V OUT	Power supply output 24 V DC, max. 200 mA
28	GND	Reference potential of the power supply/internal electronics ground
1	+10 V OUT	Power supply output 10 V DC ±0.5 V, max. 10 mA
2	GND	Reference potential of the power supply/internal electronics ground
31	+24 V IN	Power supply input 18 ... 30 V DC, max. 1500 mA
32	GND IN	Reference potential of the power supply input
35	+10 V OUT	Power supply output 10 V DC ±0.5 V, max. 10 mA
36	GND	Reference potential of the power supply/internal electronics ground

Design

CU240B-2, CU240B-2 DP Control Units

CU240B-2 Control Unit with open and closed terminal covers

Terminal No.	Signal	Features
Digital inputs (DI)		
5 … 8	DI0 … DI3	Freely programmable (isolated) 5.5 mA/24 V
69	DI COM	Reference potential for digital inputs
Digital output (DO)		
18	DO0, NC	Relay output DO0 NC contact (0.5 A, 30 V DC)
19	DO0, NO	Relay output DO0 NO contact (0.5 A, 30 V DC)
20	DO0, COM	Relay output DO0 Common contact (0.5 A, 30 V DC)
Analog input (AI)		
3	AI0+	Differential input, switchable between current, voltage Value range: 0 ... 10 V, -10 ... +10 V, 0/2 ... 10 V, 0/4 ... 20 mA
4	AI0-	
Analog output (AO)		
12	AO0+	Non-isolated output Freely programmable Value range: 0 ... 10 V; 0/4 ... 20 mA
13	AO0-	Reference potential of the AO0/internal electronics ground
Motor temperature sensor interface		
14	T1 motor	Positive input for motor temperature sensor Type: PTC, KTY sensor, Thermo-Click
15	T2 motor	Negative input for motor temperature sensor
Power supply		
9	+24 V OUT	Power supply output 24 V DC, max. 200 mA
28	GND	Reference potential of the power supply/internal electronics ground
1	+10 V OUT	Power supply output 10 V DC ±0.5 V, max. 10 mA
2	GND	Reference potential of the power supply/internal electronics ground
31	+24 V IN	Power supply input 18 ... 30 V DC, max. 1500 mA
32	GND IN	Reference potential of the power supply input

Design

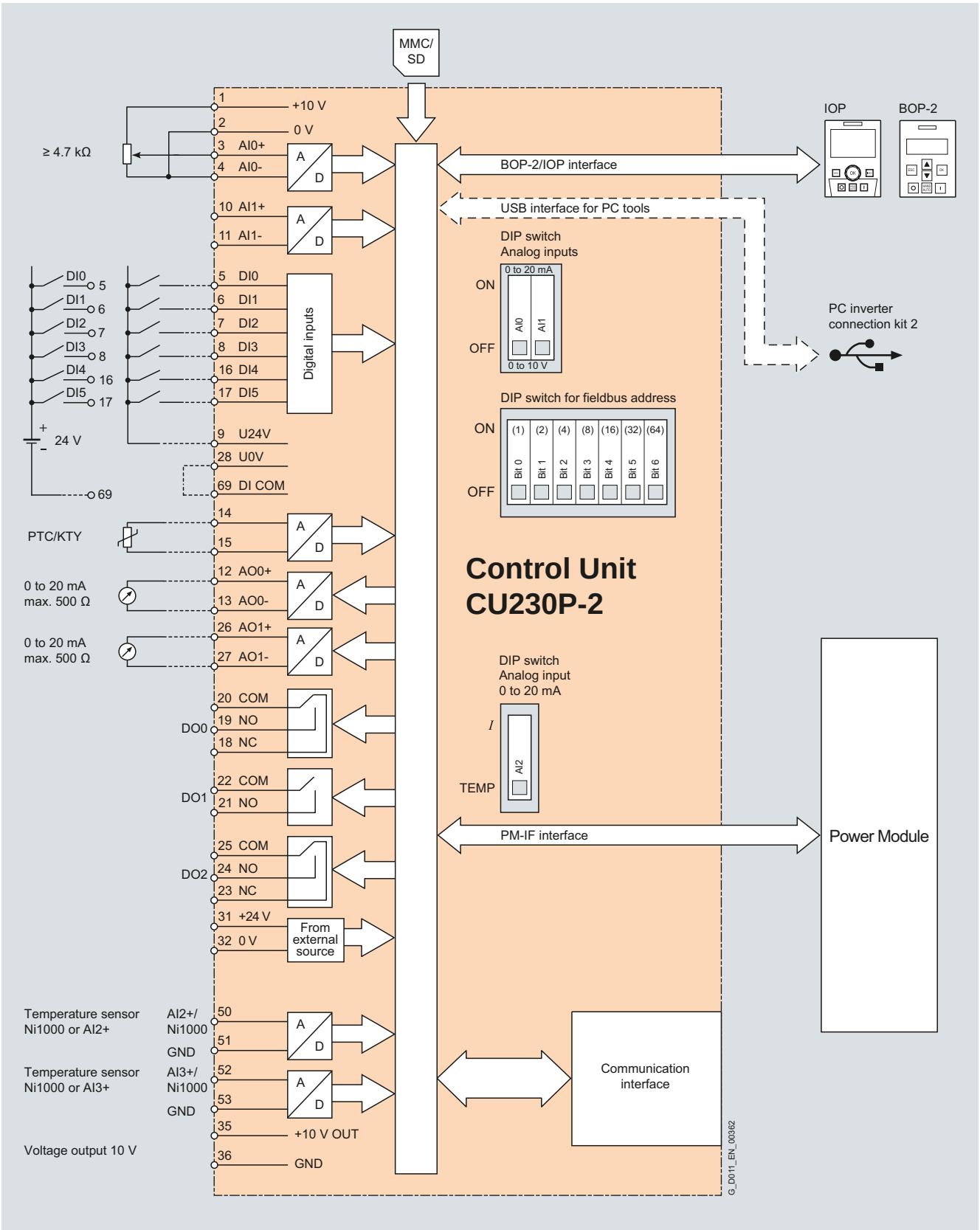
CU240E-2, CU240E-2 DP, CU240E-2-F and CU240E-2 DP-F Control Units

CU240E-2 Control Unit with open and closed terminal covers

Terminal No.	Signal	Features
Digital inputs (DI) – Standard		
5 … 8, 16, 17	DI0 … DI5	Freely programmable (isolated) 5.5 mA/24 V
69	DI COM1	Reference potential for digital inputs 0, 2, 4, 6
34	DI COM2	Reference potential for digital inputs 1, 3, 5, 7
Digital inputs (DI) – Fail-safe (formed from two standard inputs using the appropriate parameter setting)		
16, 17	F-DI0	Fail-safe digital inputs, 2 channels (redundant), freely programmable (isolated) 5.5 mA / 24 V
The following are only available for CU240E-2 F and CU240E-2 DP-F		
5, 6	F-DI1	Fail-safe digital inputs, 2 channels (redundant), freely programmable (isolated) 5.5 mA / 24 V
7, 8	F-DI2	Fail-safe digital inputs, 2 channels (redundant), freely programmable (isolated) 5.5 mA / 24 V
Digital outputs (DO)		
18	DO0, NC	Relay output DO0 NC contact (0.5 A, 30 V DC)
19	DO0, NO	Relay output DO0 NO contact (0.5 A, 30 V DC)
20	DO0, COM	Relay output DO0 Common contact (0.5 A, 30 V DC)
21	DO1+	Transistor output DO1 Positive (0.5 A, 30 V DC)
22	DO1-	Transistor output DO1 Negative (0.5 A, 30 V DC)
23	DO2, NC	Relay output DO2 NC contact (0.5 A, 30 V DC)
24	DO2, NO	Relay output DO2 NO contact (0.5 A, 30 V DC)
25	DO2, COM	Relay output DO2 Common contact (0.5 A, 30 V DC)

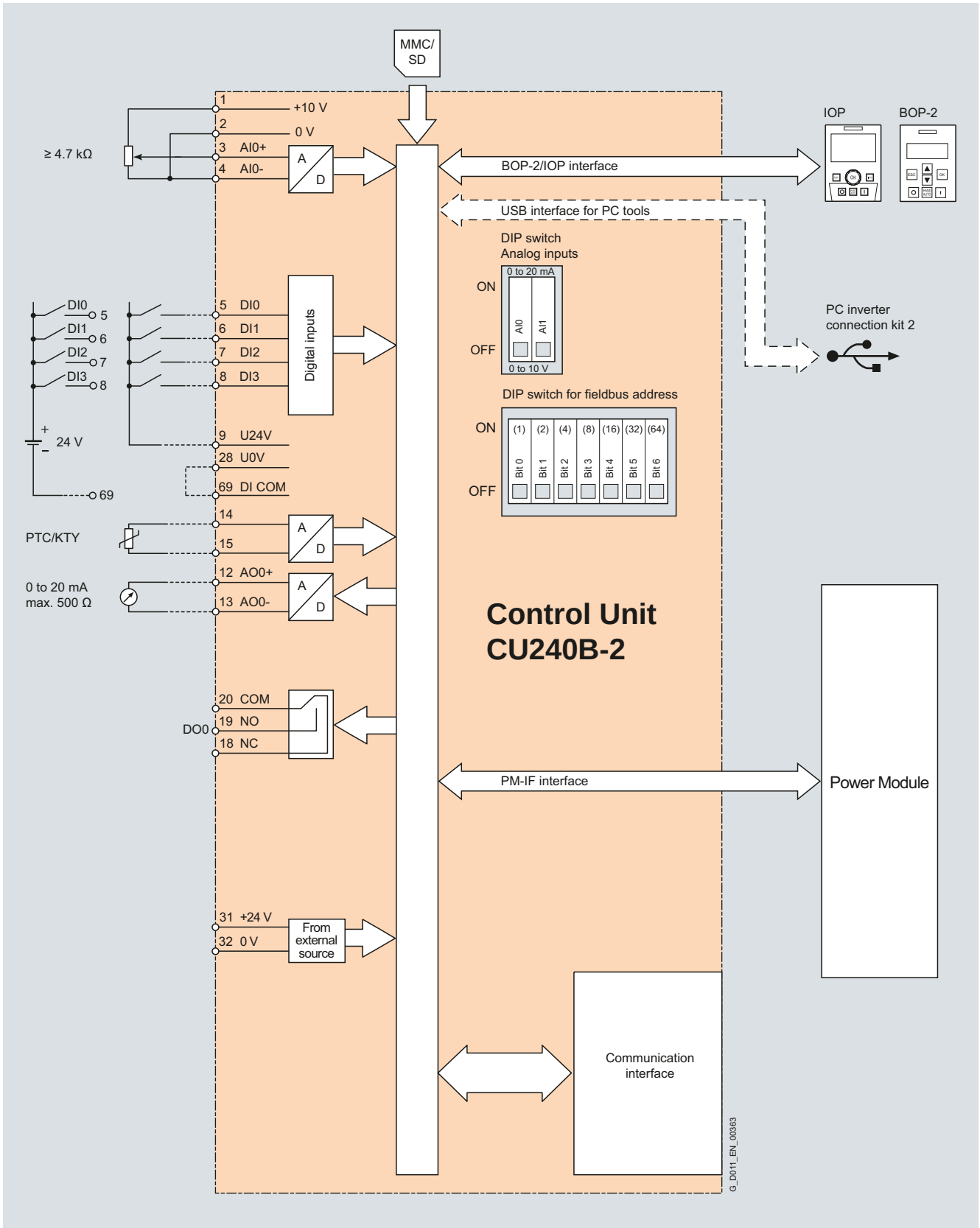
Terminal No.	Signal	Features
Analog inputs (AI)		
3	AI0+	Differential input, switchable between current, voltage Value range: 0 ... 10 V, -10 ... +10 V, 0/2 ... 10 V, 0/4 ... 20 mA
4	AI0-	
10	AI1+	Differential input, switchable between current, voltage Value range: 0 ... 10 V, -10 ... +10 V, 0/2 ... 10 V, 0/4 ... 20 mA
11	AI1-	
Analog outputs (AO)		
12	AO0+	Non-isolated output Freely programmable Value range: 0 ... 10 V; 0/4 ... 20 mA
13	AO0-	Reference potential of the AO0/internal electronics ground
26	AO1+	Non-isolated output Freely programmable Value range: 0 ... 10 V; 0/4 ... 20 mA
27	AO1-	Reference potential of the AO1/internal electronics ground
Motor temperature sensor interface		
14	T1 motor	Positive input for motor temperature sensor Type: PTC, KTY sensor, Thermo-Click
15	T2 motor	Negative input for motor temperature sensor
Power supply		
9	+24 V OUT	Power supply output 24 V DC, max. 200 mA
28	GND	Reference potential of the power supply/internal electronics ground
1	+10 V OUT	Power supply output 10 V DC ±0.5 V, max. 10 mA
2	GND	Reference potential of the power supply/internal electronics ground
31	+24 V IN	Power supply input 18 ... 30 V DC, max. 1500 mA
32	GND IN	Reference potential of the power supply input

Integration



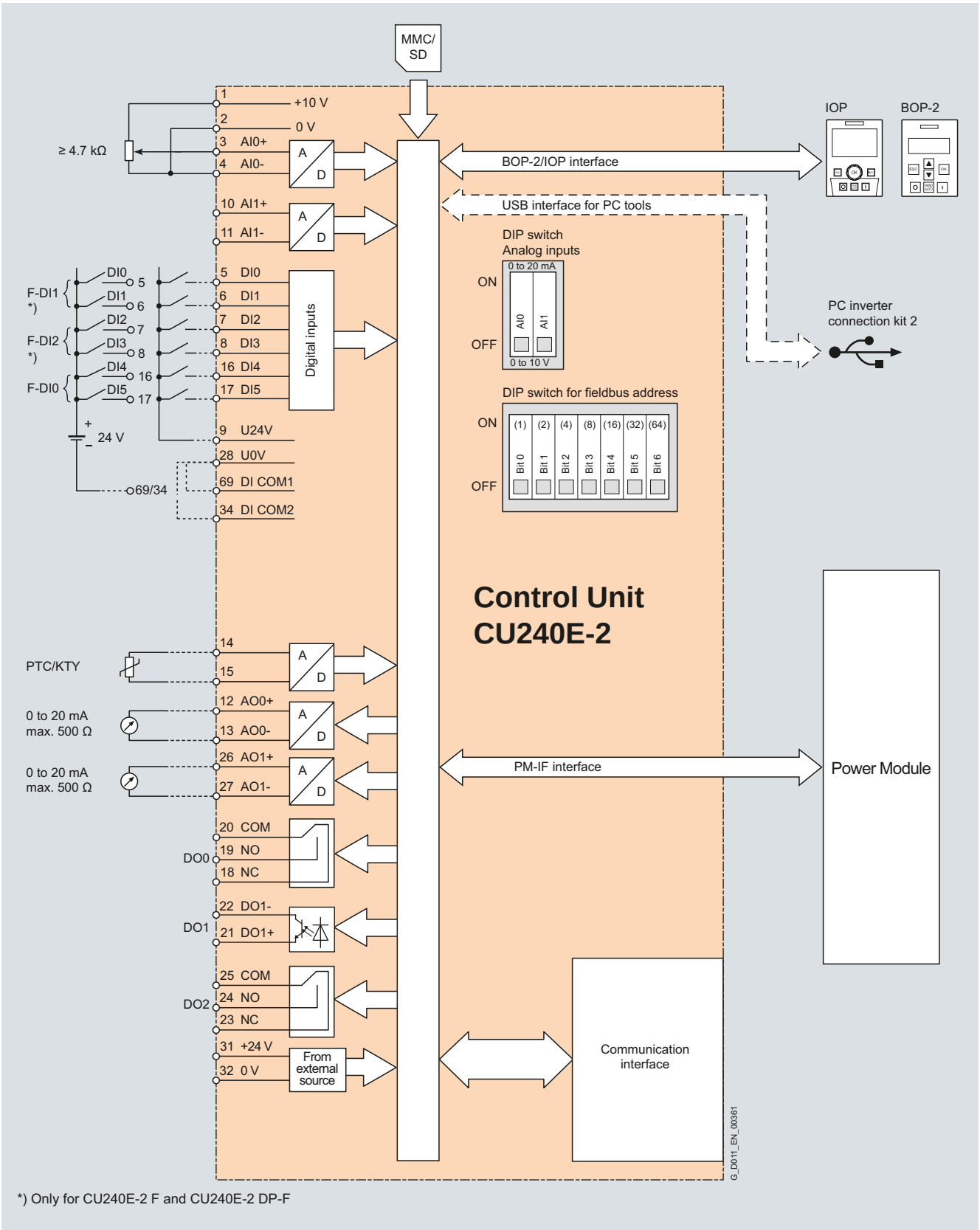
Connection diagram for the CU230P-2 Control Unit series

Integration



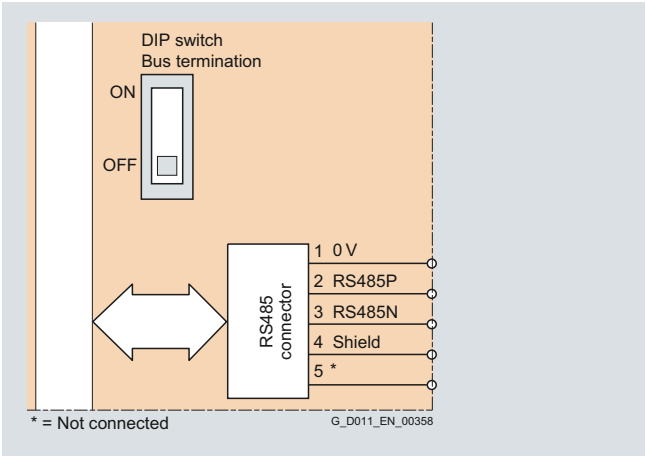
Connection diagram for the CU240B-2 Control Unit series

Integration

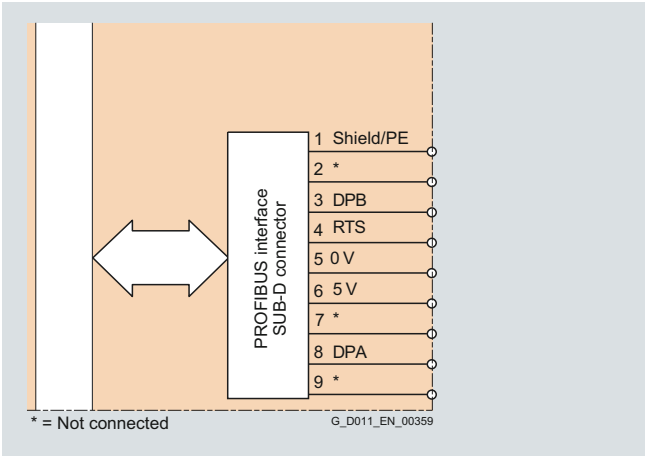


Connection diagram for the CU240E-2 Control Unit series

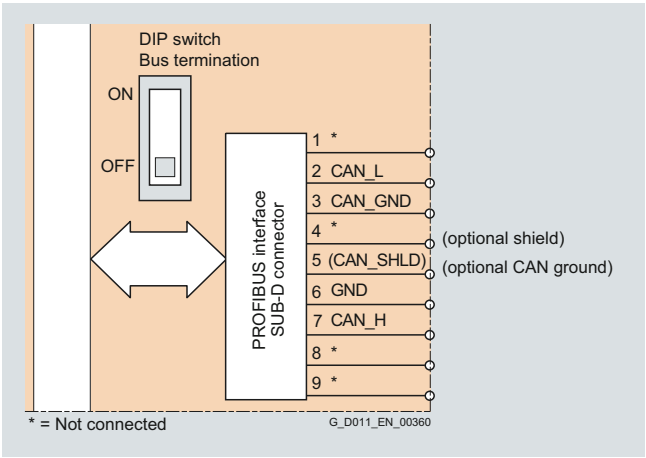
Integration



Communication interface
RS485 USS/Modbus RTU/BACnet MS/TP



Communication interface
PROFIBUS DP



Communication interface
CANopen

Technical specifications

Control Unit	CU230P-2 series 6SL3243-0BB30-1 . A2	CU240B-2 series 6SL3244-0BB00-1 . A1	CU240E-2 series 6SL3244-0BB1 . -1 . A1
Electrical specifications			
Operating voltage	24 V DC via the Power Module or by connecting to an external 18 ... 30 V DC power supply		
Current consumption, max.	0.5 A		
Protective insulation	PELV according to EN 50178 Protective separation from the line supply using double/reinforced insulation		
Power loss	<5.5 W		
Interfaces			
Digital inputs – Standard	6 isolated inputs	4 isolated inputs	6 isolated inputs
	Optically isolated, free reference potential (own potential group), max. input current 15 mA		
	NPN/PNP logic can be selected using the wiring Switching level: 0 → 1: 11 V Switching level: 1 → 0: 5 V		
Digital inputs – Fail-safe	–	–	1 (use of 2 × DI standard) Max. 3 (use of 6 × DI standard) for CU240E-2 F and CU240E-2 DP-F
Digital outputs	2 relay change-over contacts 250 V AC, 2 A (inductive load), 30 V DC, 5 A (ohmic load) 1 relay NO contact 30 V DC, 0.5 A (ohmic load)	1 transistor 30 V DC, 0.5 A (ohmic load)	1 transistor 30 V DC, 0.5 A (ohmic load) 2 relay change-over contacts 30 V DC, 0.5 A (ohmic load)
Analog inputs – Standard	2 differential inputs	1 differential input	2 differential inputs
	Switchable using DIP switch between voltage and current: -10 ... +10 V, 0/4 ... 20 mA, 10-bit resolution		
	The differential analog inputs can be configured as additional digital inputs. Switching thresholds: 0 → 1: Rated voltage 4 V 1 → 0: Rated voltage 1.6 V		
	Analog inputs are protected against inputs in a voltage range of ± 30 V and have a common-mode voltage in the ± 15 V range		
Analog inputs – Expanded	1 non-isolated input, switchable using DIP switch between current and temperature sensor, type Ni1000/Pt1000, 0/4 ... 20 mA; 10-bit resolution 1 non-isolated input, temperature sensor, type Ni1000/Pt1000, 10-bit resolution	–	–
Analog outputs	2 non-isolated outputs	1 non-isolated output	2 non-isolated outputs
	Switchable between voltage and current using parameter setting: 0 ... 10 V, 0/4 ... 20 mA		
	Voltage mode: 10 V, min. burden 10 kΩ Current mode: 20 mA, max. burden 500 Ω		
	The analog outputs have short circuit protection		
PTC/KTY interface	1 motor temperature sensor input, sensors that can be connected: PTC, KTY and Thermo-Click, accuracy ±5 °C		
Removable terminal connector for I/O interface	–	✓	✓

Technical specifications

Control Unit	CU230P-2 series 6SL3243-0BB30-1 . A2	CU240B-2 series 6SL3244-0BB00-1 . A1	CU240E-2 series 6SL3244-0BB1 . -1 . A1
Integrated bus interface			
USS/Modbus RTU RS485 connected at a terminal, isolated, bus terminating resistors can be switched in, slave address can be set using DIP switches USS: max. 187.5 kBaud Modbus RTU:19.2 kBaud	CU230P-2 HVAC 6SL3243-0BB30-1HA2	CU240B-2 6SL3244-0BB00-1BA1	CU240E-2 6SL3244-0BB12-1BA1 CU240E-2 F 6SL3244-0BB13-1BA1
BACnet MS/TP RS485 connected to a terminal, isolated, bus terminating resistors can be switched in Max. 187.5 kBaud	CU230P-2 HVAC 6SL3243-0BB30-1HA2	–	–
PROFIBUS DP 9-pin SUB-D connector, isolated, PROFIdrive profile V4.1, slave address can be set using DIP switches Max. 12 Mbit/s	CU230P-2 DP 6SL3243-0BB30-1PA2	CU240B-2 DP 6SL3244-0BB00-1PA1	CU240E-2 DP 6SL3244-0BB12-1PA1 CU240E-2 DP-F 6SL3244-0BB13-1PA1
CANopen 9-pin SUB-D socket, isolated, slave address can be set using DIP switches Max. 1 Mbit/s	CU230P-2 HVAC 6SL3243-0BB30-1CA2	–	–
Tool interfaces			
Memory card	1 SINAMICS micro memory card (MMC) or 1 SIMATIC memory card (SD card)		
Operator panels	• IOP Supported connection options between CU230P-2 and IOP: can be directly plugged on, door mounting or handheld (IOP Handheld not possible in combination with PM230) • BOP-2 Supported connection options between CU230P-2 and BOP-2: can be directly plugged on or door-mounted		
PC interface	USB (connection via PC inverter connection kit 2)		
Open-loop/closed-loop control techniques			
***V/f* linear/square/ parameterizable**	✓		
***V/f* with flux current control (FCC)**	✓		
***V/f* ECO linear/square**	✓		
Vector control, sensorless	✓		
Vector control, with sensor	–		
Torque control, sensorless	✓		
Torque control, with sensor	–		

Technical specifications

Control Unit	CU230P-2 series 6SL3243-0BB30-1 . A2	CU240B-2 series 6SL3244-0BB00-1 . A1	CU240E-2 series 6SL3244-0BB1 . -1 . A1
Software functions			
Application macro	✓		
Setpoint input, can be parameterized	✓		
Fixed frequencies	16, parameterizable		
JOG	✓		
Digital motorized potentiometer (MOP)	✓		
Ramp smoothing	✓		
Extended ramp-function generator (with ramp smoothing Off3)	✓		
Slip compensation	✓		
Signal interconnection with BICO technology	✓		
Trace	✓		
Energy saving display	✓		
Switchable drive data sets (DDS)	✓ (4)		
Switchable command data sets (CDS)	✓ (4)		
Free function blocks (FFB) for logical and arithmetic operations	✓		
Technology controller (internal PID)	✓		
3 additional, free PID controllers	✓	–	–
2-zone controller	✓	–	–
Flying restart	✓		
Automatic restart after line supply failure or operating fault (AR)	✓		
Energy-saving function (hibernation) with internal PID controller	✓	–	–
Energy-saving function (hibernation) with external PID controller	✓	–	–
Belt monitoring with and without sensor (load torque monitoring)	✓	–	–
Dry-running/overload protection monitoring (load torque monitoring)	✓	–	–
Thermal motor protection	✓ (I^2t, sensor: PTC/KTY/Thermo-Click)		
Thermal inverter protection	✓		
Motor identification	✓		
Motor holding brake	–	✓	✓
Auto-ramping (V_{dcmax} controller)	✓		
Kinetic buffering (V_{dcmin} controller)	✓		
Braking functions for PM240 • DC braking • Compound braking • Dynamic braking with integrated braking chopper	✓		
Braking functions for PM250/PM250-2 Regenerative feedback	✓		

Technical specifications

Control Unit	CU230P-2 series 6SL3243-0BB30-1 . A2	CU240B-2 series 6SL3244-0BB00-1 . A1	CU240E-2 series 6SL3244-0BB1 . -1 . A1
Mechanical specifications and ambient conditions			
Degree of protection	IP20		
Signal cable cross-section			
• Min.	0.15 mm^2 (AWG28)	0.05 mm^2 (AWG30)	0.05 mm^2 (AWG30)
• Max.	1.5 mm^2 (AWG16)	1.5 mm^2 (AWG16)	1.5 mm^2(AWG16)
Operating temperature	0 ... 60 °C (32 ... 140 °F)	0 ... 50 °C (32 ... 122 °F)	0 ... 50 °C (32 ... 122 °F)
Storage temperature	-40 ... +70 °C (-40 ... +158 °F)		
Relative humidity	<95 % RH, condensation not permissible		
Dimensions			
• Width	73 mm (2.87 in)	73 mm (2.87 in)	73 mm (2.87 in)
• Height	199 mm (7.83 in)	199 mm (7.83 in)	199 mm (7.83 in)
• Depth	65.5 mm (2.58 in)	46 mm (1.81 in)	46 mm (1.81 in)
Weight, approx.	0.61 kg (1.35 lb)	0.49 kg (1.08 lb)	0.49 kg (1.08 lb)

Overview

PM230 Power Modules – 0.37 kW to 90 kW (0.5 hp to 125 hp), IP54/IP55 degree of protection

PM230 Power Modules, frame sizes FSA to FSF

PM230 Power Modules are designed for applications involving pumps, fans and compressors. They do not have an integrated braking chopper (single-quadrant applications).

The PM230 Power Module only generates low line harmonics and apparent power losses. In addition to the energy-related advantages, environmental stressing is also reduced.

- Line harmonics are reduced significantly.
  - The harmonics and the THD (Total Harmonic Distortion) are below the limits required by the EN 61000-3-12 or IEC 61000-3-12 standards.
  - Additional components such as line reactors are not required. As a consequence, low envelope dimensions are obtained for space-saving designs.
- The active power component is very high, i.e. the devices draw less current from the supply for the same drive power. As a consequence, smaller supply cables can be used.

Frame sizes FSA to FSF of the PM230 Power Module in the degree of protection IP55/UL Type 12 are available with integrated line filter class A for C2 installations or integrated line filter class B for C1 installations.

In order to maintain EMC categories C2 (line filter A) or C1 table 14 (line filter B, conducted), the permissible shielded cable length between the inverter and motor is limited to max. 25 m (82 ft).

The line system configurations that are supported are symmetrical systems with grounded neutral point.

The PM230 Power Module is not approved for safety-oriented applications.

Overview

PM240 Power Modules – 0.37 kW to 250 kW (0.5 hp to 400 hp), IP20 degree of protection

PM240 Power Modules, frame sizes FSA to FSGX

PM240 Power Modules have a braking chopper (four-quadrant applications) and are suitable for a large number of applications in general machinery construction.

The braking chopper is already integrated in frame sizes FSA up to FSF. For frame size FSGX, an optional pluggable Braking Module can be ordered (see DC link components).

The permissible cable lengths between inverter and motor are limited. Longer cables can be used if output reactors are connected (see load-side power components).

Line reactors are available to minimize line harmonics as well as voltage and current peaks (see line-side components).

Frame size FSA of the PM240 Power Module is available only without integrated line filter class A. A base filter is therefore available so that class A can be achieved. A class B base filter is also available so that class B can be achieved (see line-side components).

Frame sizes FSB and FSC of the PM240 Power Module are available both with and without integrated line filter to class A. To achieve class B, PM240 Power Modules with integrated line filter class A must be additionally equipped with a base filter class B (see line-side components).

The PM240 Power Module is suitable for safety-oriented applications. In conjunction with a fail-safe Control Unit, the drive can be transformed into a Safety Integrated drive (see Control Units).

Power Modules with integrated line filter class A are suitable for connection to TN systems. Power Modules without integrated line filter can be connected to grounded TN/TT systems and non-grounded IT systems.

Overview

PM250 Power Modules – 7.5 kW to 75 kW (10 hp to 100 hp), IP20 degree of protection

PM250 Power Modules, frame sizes FSC to FSF

PM250 Power Modules are suitable for many applications in general machinery construction, the same as for the PM240. Any braking energy is directly fed back into the line supply (four quadrant applications – a braking chopper is not required).

The PM250 Power Module features an absolutely unique technology – Efficient Infeed Technology. This feature provides the ability to feed energy back into the supply system in the generator mode (electronic braking) so that the energy is not wasted in a braking resistor. This saves space in the control cabinet. The time-consuming process of dimensioning the braking resistor and the expense of the extra wiring are eliminated. Furthermore, heat losses in the control cabinet are reduced.

Additional information is included in the chapter Highlights, section Efficient Infeed Technology.

Further, the innovative circuit design reduces the line harmonics. There is no need to use an optional line reactor at the supply infeed. This saves space and costs for engineering and procurement.

The permissible cable lengths between inverter and motor are limited. Longer cables can be used if output reactors are connected (see load-side power components).

Frame sizes FSD to FSF of the PM250 Power Modules are available both with as well as without integrated line filter class A.

For frame size FSC of the PM250 Power Module with an integrated line filter class A, an additional base filter class B is available for achieving class B (see line-side components).

The PM250 Power Module is also designed for safety-oriented applications. In conjunction with a fail-safe Control Unit, the drive can be transformed into a Safety Integrated drive (see Control Units).

The PM250 Power Modules with integrated line filter class A are suitable for connection to TN supply systems. Power Modules without integrated line filter can be connected to grounded TN/TT systems and non-grounded IT systems.

Overview

PM260 Power Modules – 11 kW to 55 kW (15 hp to 75 hp), IP20 degree of protection

PM260 Power Module, frame size FSD

PM260 Power Modules have been designed for applications from 500 V to 690 V. They are capable of energy recovery and include a sine-wave filter to reduce the stress on the motor and for long cable lengths.

The PM260 Power Module features an absolutely unique technology – Efficient Infeed Technology. This feature provides the ability to feed energy back into the supply system in the generator mode (electronic braking) so that the energy is not wasted in a braking resistor. This saves space in the control cabinet. The time-consuming process of dimensioning the braking resistor and the expense of the extra wiring are eliminated. Furthermore, heat losses in the control cabinet are reduced.

Additional information is included in the chapter Highlights, section Efficient Infeed Technology.

The innovative circuit design used in Efficient Infeed Technology reduces the line harmonics. There is no need to use an optional line reactor at the supply infeed. This saves space and costs for engineering and procurement.

The PM260 Power Modules are also characterized by a higher rated pulse frequency combined with a high efficiency and an integrated sine-wave filter. The integrated sine-wave filter ensures that the inverter output current is sinusoidal and supports cable lengths of up to 200 m (656 ft) shielded and 300 m (984 ft) unshielded. An output reactor is therefore not required. Furthermore, lower bearing currents flow and there is a lower voltage stress that reduces the overall stress on the motor.

The use of SiC free-wheeling diodes – an absolutely unique innovation – makes the PM260 Power Module extremely compact. It is also highly resistant to thermal loading and operates very quietly as a result of the high clock frequencies.

Standard motors can be used in conjunction with the PM260 Power Module. The winding system insulation strength does not have to be increased.

The PM260 Power Module is suitable for safety-oriented applications. In conjunction with a fail-safe Control Unit, the drive can be transformed into a Safety Integrated drive (see Control Units).

The PM260 Power Modules with integrated line filter class A are suitable for connection to TN supply systems. Power Modules without integrated line filter can be connected to grounded TN/TT systems and non-grounded IT systems.

Customer benefits

- Low switching losses at high fundamental frequency
- High speeds possible
- Quiet operation thanks to the 16 kHz pulse frequency
- High thermal load capacity (small heat sinks)
- Very compact units
- Increased ruggedness
- High efficiency
- Low forward losses
- Integrated sine-wave filter, so that long unshielded cables can be used
- Can be used with motors without a special insulation
- Very low bearing currents, no bearing insulation required

Selection and ordering data

To ensure that a suitable Power Module is selected, the following currents should be used for applications:

- **Rated output current for applications with low overload (LO)**
- **Base load current for applications with high overload (HO)**

With reference to the rated output current, the modules support at least 2-pole to 6-pole low-voltage motors, e.g. the new 1LE1 motor series. The rated power is merely a guide value. For a description of the overload performance, please refer to the general technical specifications of the Power Modules.

PM230 Power Modules

Rated power [1]		Rated output current I_{rated} [2]	Power based on the base load current [3]		Base load current I_H [3]	Frame size	PM230 Power Module with integrated line filter class A	PM230 Power Module with integrated line filter class B
kW	hp	A	kW	hp	A		Order No.	Order No.
380 … 480 V 3 AC								
0.37	0.5	1.3	**0.25**	0.33	0.9	FSA	**6SL3223-0DE13-7AA0**	**6SL3223-0DE13-7BA0**
0.55	0.75	1.7	**0.37**	0.5	1.3	FSA	**6SL3223-0DE15-5AA0**	**6SL3223-0DE15-5BA0**
0.75	1.0	2.2	**0.55**	0.75	1.7	FSA	**6SL3223-0DE17-5AA0**	**6SL3223-0DE17-5BA0**
1.1	1.5	3.1	**0.75**	1.0	2.2	FSA	**6SL3223-0DE21-1AA0**	**6SL3223-0DE21-1BA0**
1.5	2.0	4.1	**1.1**	1.5	3.1	FSA	**6SL3223-0DE21-5AA0**	**6SL3223-0DE21-5BA0**
2.2	3.0	5.9	**1.5**	2.0	4.1	FSA	**6SL3223-0DE22-2AA0**	**6SL3223-0DE22-2BA0**
3.0	4.0	7.7	**2.2**	3.0	5.9	FSA	**6SL3223-0DE23-0AA0**	**6SL3223-0DE23-0BA0**
4.0	5.0	10.2	**3.0**	4.0	7.7	FSB	**6SL3223-0DE24-0AA0**	**6SL3223-0DE24-0BA0**
5.5	7.5	13.2	**4.0**	5.0	10.2	FSB	**6SL3223-0DE25-5AA0**	**6SL3223-0DE25-5BA0**
7.5	10	18	**5.5**	7.5	13.2	FSB	**6SL3223-0DE27-5AA0**	**6SL3223-0DE27-5BA0**
11.0	15	26	**7.5**	10	18	FSC	**6SL3223-0DE31-1AA0**	**6SL3223-0DE31-1BA0**
15.0	20	32	**11.0**	15	26	FSC	**6SL3223-0DE31-5AA0**	**6SL3223-0DE31-5BA0**
18.5	25	38	**15.0**	20	32	FSC	**6SL3223-0DE31-8AA0**	–
						FSD	–	**6SL3223-0DE31-8BA0**
22	30	45	**18.5**	25	38	FSD	**6SL3223-0DE32-2AA0**	**6SL3223-0DE32-2BA0**
30	40	60	**22**	30	45	FSD	**6SL3223-0DE33-0AA0**	**6SL3223-0DE33-0BA0**
37	50	75	**30**	40	60	FSE	**6SL3223-0DE33-7AA0**	**6SL3223-0DE33-7BA0**
45	60	90	**37**	50	75	FSE	**6SL3223-0DE34-5AA0**	**6SL3223-0DE34-5BA0**
55	75	110	**45**	60	90	FSF	**6SL3223-0DE35-5AA0**	**6SL3223-0DE35-5BA0**
75	100	145	**55**	75	110	FSF	**6SL3223-0DE37-5AA0**	**6SL3223-0DE37-5BA0**
90	125	178	**75**	100	145	FSF	**6SL3223-0DE38-8AA0**	**6SL3223-0DE38-8BA0**

PM250 Power Modules

Rated power [1]		Rated output current I_{rated} [2]	Power based on the base load current [3]		Base load current I_H [3]	Frame size	PM250 Power Module without integrated line filter	PM250 Power Module with integrated line filter class A
kW	hp	A	kW	hp	A		Order No.	Order No.
380 … 480 V 3 AC								
7.5	10	18	**5.5**	7.5	13.2	FSC	–	**6SL3225-0BE25-5AA1**
11.0	15	25	**7.5**	10	19	FSC	–	**6SL3225-0BE27-5AA1**
15.0	20	32	**11.0**	15	26	FSC	–	**6SL3225-0BE31-1AA1**
18.5	25	38	**15.0**	20	32	FSD	**6SL3225-0BE31-5UA0**	**6SL3225-0BE31-5AA0**
22	30	45	**18.5**	25	38	FSD	**6SL3225-0BE31-8UA0**	**6SL3225-0BE31-8AA0**
30	40	60	**22**	30	45	FSD	**6SL3225-0BE32-2UA0**	**6SL3225-0BE32-2AA0**
37	50	75	**30**	40	60	FSE	**6SL3225-0BE33-0UA0**	**6SL3225-0BE33-0AA0**
45	60	90	**37**	50	75	FSE	**6SL3225-0BE33-7UA0**	**6SL3225-0BE33-7AA0**
55	75	110	**45**	60	90	FSF	**6SL3225-0BE34-5UA0**	**6SL3225-0BE34-5AA0**
75	100	145	**55**	75	110	FSF	**6SL3225-0BE35-5UA0**	**6SL3225-0BE35-5AA0**
90	125	178	**75**	100	145	FSF	**6SL3225-0BE37-5UA0**	**6SL3225-0BE37-5AA0**

[1] Rated power based on the rated output current I_{rated}. The rated output current I_{rated} is based on the duty cycle for low overload (LO).

[2] The rated output current I_{rated} is based on the duty cycle for low overload (LO). These current values are valid for 400 V and are specified on the rating plate of the Power Module.

[3] The base load current I_H is based on the duty cycle for high overload (HO).

Selection and ordering data

PM240 Power Modules

Rated power [1]		Rated output current I_{rated} [2]	Power based on the base load current [3]		Base load current I_H [3]	Frame size	PM240 Power Module without integrated line filter	PM240 Power Module with integrated line filter class A
kW	hp	A	kW	hp	A		Order No.	Order No.
380 … 480 V 3 AC								
0.37	0.50	1.3	**0.37**	0.50	1.3	FSA	**6SL3224-0BE13-7UA0**	–
0.55	0.75	1.7	**0.55**	0.75	1.7	FSA	**6SL3224-0BE15-5UA0**	–
0.75	1.0	2.2	**0.75**	1.0	2.2	FSA	**6SL3224-0BE17-5UA0**	–
1.1	1.5	3.1	**1.1**	1.5	3.1	FSA	**6SL3224-0BE21-1UA0**	–
1.5	2.0	4.1	**1.5**	2.0	4.1	FSA	**6SL3224-0BE21-5UA0**	–
2.2	3.0	5.9	**2.2**	3.0	5.9	FSB	**6SL3224-0BE22-2UA0**	**6SL3224-0BE22-2AA0**
3.0	4.0	7.7	**3.0**	4.0	7.7	FSB	**6SL3224-0BE23-0UA0**	**6SL3224-0BE23-0AA0**
4.0	5.0	10.2	**4.0**	5.0	10.2	FSB	**6SL3224-0BE24-0UA0**	**6SL3224-0BE24-0AA0**
7.5	10	18	**5.5**	7.5	13.2	FSC	**6SL3224-0BE25-5UA0**	**6SL3224-0BE25-5AA0**
11.0	15	25	**7.5**	10	19	FSC	**6SL3224-0BE27-5UA0**	**6SL3224-0BE27-5AA0**
15.0	20	32	**11.0**	15	26	FSC	**6SL3224-0BE31-1UA0**	**6SL3224-0BE31-1AA0**
18.5	25	38	**15.0**	20	32	FSD	**6SL3224-0BE31-5UA0**	**6SL3224-0BE31-5AA0**
22	30	45	**18.5**	25	38	FSD	**6SL3224-0BE31-8UA0**	**6SL3224-0BE31-8AA0**
30	40	60	**22**	30	45	FSD	**6SL3224-0BE32-2UA0**	**6SL3224-0BE32-2AA0**
37	50	75	**30**	40	60	FSE	**6SL3224-0BE33-0UA0**	**6SL3224-0BE33-0AA0**
45	60	90	**37**	50	75	FSE	**6SL3224-0BE33-7UA0**	**6SL3224-0BE33-7AA0**
55	75	110	**45**	60	90	FSF	**6SL3224-0BE34-5UA0**	**6SL3224-0BE34-5AA0**
75	100	145	**55**	75	110	FSF	**6SL3224-0BE35-5UA0**	**6SL3224-0BE35-5AA0**
90	125	178	**75**	100	145	FSF	**6SL3224-0BE37-5UA0**	**6SL3224-0BE37-5AA0**
110	150	205	**90**	125	178	FSF	**6SL3224-0BE38-8UA0**	–
132	200	250	**110**	150	205	FSF	**6SL3224-0BE41-1UA0**	–
160	250	302	**132**	200	250	FSGX	**6SL3224-0XE41-3UA0**	–
200	300	370	**160**	250	302	FSGX	**6SL3224-0XE41-6UA0**	–
250	400	477	**200**	300	370	FSGX	**6SL3224-0XE42-0UA0**	–

PM260 Power Modules

Rated power [1]		Rated output current I_{rated} [4]	Power based on the base load current [3]		Base load current I_H [3]	Frame size	PM260 Power Module without integrated line filter	PM260 Power Module with integrated line filter class A
kW	hp	A	kW	hp	A		Order No.	Order No.
500 … 690 V 3 AC								
11.0	15	14	**7.5**	10	10	FSD	**6SL3225-0BH27-5UA1**	**6SL3225-0BH27-5AA1**
15.0	20	19	**11**	15	14	FSD	**6SL3225-0BH31-1UA1**	**6SL3225-0BH31-1AA1**
18.5	25	23	**15**	20	19	FSD	**6SL3225-0BH31-5UA1**	**6SL3225-0BH31-5AA1**
30	40	35	**22**	30	26	FSF	**6SL3225-0BH32-2UA1**	**6SL3225-0BH32-2AA1**
37	50	42	**30**	40	35	FSF	**6SL3225-0BH33-0UA1**	**6SL3225-0BH33-0AA1**
55	75	62	**37**	50	42	FSF	**6SL3225-0BH33-7UA1**	**6SL3225-0BH33-7AA1**

[1] Rated power based on the rated output current I_{rated}. The rated output current I_{rated} is based on the duty cycle for low overload (LO).

[2] The rated output current I_{rated} is based on the duty cycle for low overload (LO). These current values are valid for 400 V and are specified on the rating plate of the Power Module.

[3] The base load current I_H is based on the duty cycle for high overload (HO).

[4] The rated output current I_{rated} is based on the duty cycle for low overload (LO). These current values are valid for 690 V and are specified on the rating plate of the Power Module.

Integration

All Power Modules have the following connections and interfaces:

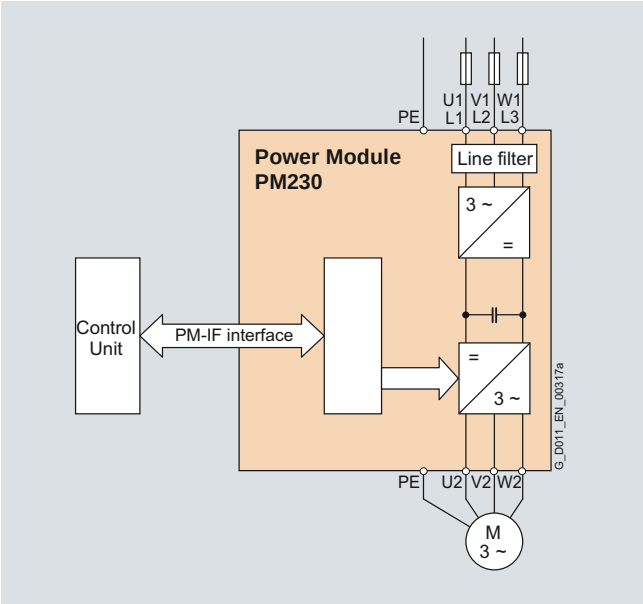
- PM-IF interface to connect the Power Module to the Control Unit. The Power Module also supplies power to the Control Unit using an integrated power supply
- Motor connection using screw terminals or screw studs
- 2 PE/protective conductor connections

Specific PM240 Power Module interfaces are:

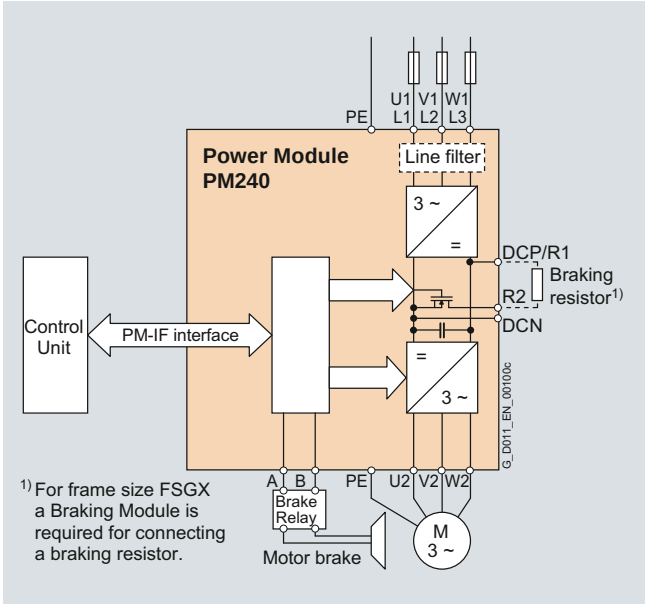
- Terminals DCP/R1 and R2 to connect an external braking resistor, applicable for frame sizes FSA to FSF. For frame size FSGX, an external plug-in braking unit (Braking Module) is required to connect a braking resistor
- Control for the Brake Relay for controlling a motor brake

Specific PM250 and PM260 Power Module interface is:

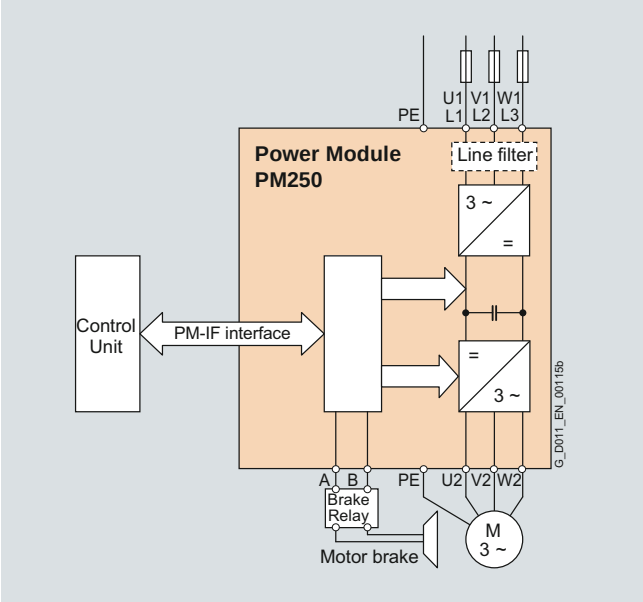
- Control for the Brake Relay for controlling a motor brake



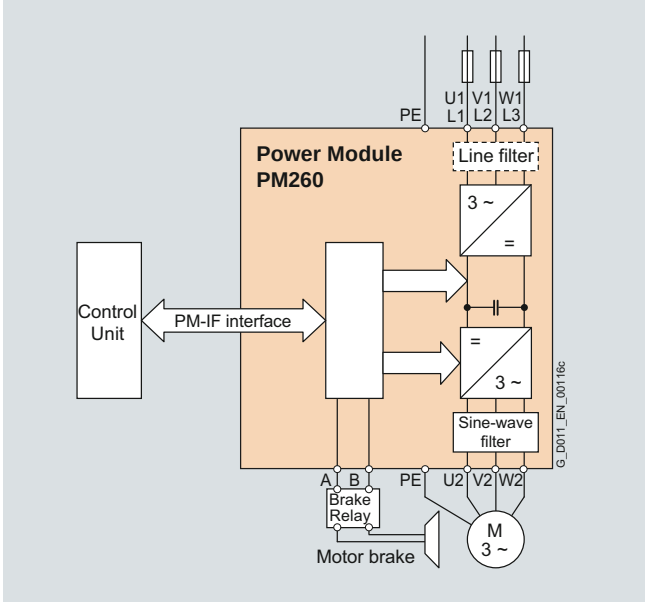
PM230 Power Module connection diagram with integrated line filter class A or B



PM240 Power Module connection diagram with or without integrated line filter class A



PM250 Power Module connection diagram with or without integrated line filter class A



PM260 Power Module connection diagram with or without integrated line filter class A

Integration

Power and DC link components that are optionally available depending on the Power Module used

The following line-side power components, DC link components and load-side power components are optionally available in the appropriate frames sizes for the Power Modules:

	Frame size						
	FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**	**FSGX**
PM230 Power Module (IP54/IP55)							
Line filter class A	I	I	I	I	I	I	I
Line filter class B	I	I	I	I	I	I	I
PM240 Power Module with integrated braking chopper							**without integrated braking chopper**
Available frame sizes	✓	✓	✓	✓	✓	✓	✓
Line-side power components							
Line filter class A	U	F	F	F	F	F/S [3]	S [3]
Line filter class B	U	U	U	–	–	–	–
Line reactor	U	U	U	U	U	S	S
DC link components							
Braking resistor	U	U	S	S	S	S	S
Braking Module	–	–	–	–	–	–	I (option)
Load-side power components							
Output reactor	U	U	U	S	S	S	S
Sine-wave filter	U	U	U	S	S	S	S
PM250 Power Module with line-commutated energy recovery							
Available frame sizes	–	–	✓	✓	✓	✓	–
Line-side power components							
Line filter class A	–	–	I	F	F	F	–
Line filter class B	–	–	U	–	–	–	–
Line reactor [1]	–	–	– [1]	– [1]	– [1]	– [1]	–
DC link components							
Braking resistor [2]	–	–	– [2]	– [2]	– [2]	– [2]	–
Load-side power components							
Output reactor	–	–	U	S	S	S	–
Sine-wave filter	–	–	U	S	S	S	–
PM260 Power Module with line-commutated energy recovery and integrated sine-wave filter							
Available frame sizes	–	–	–	✓	–	✓	–
Line-side power components							
Line filter class A	–	–	–	F	–	F	–
Line filter class B	–	–	–	–	–	–	–
Line reactor [1]	–	–	–	– [1]	–	– [1]	–
DC link components							
Braking resistor [2]	–	–	–	– [2]	–	– [2]	–
Load-side power components							
Output reactor	–	–	–	–	–	–	–
Sine-wave filter	–	–	–	I	–	I	–

U = Base component
S = Lateral mounting
I = Integrated
– = Not possible
F = Power Modules available with and without integrated filter class A

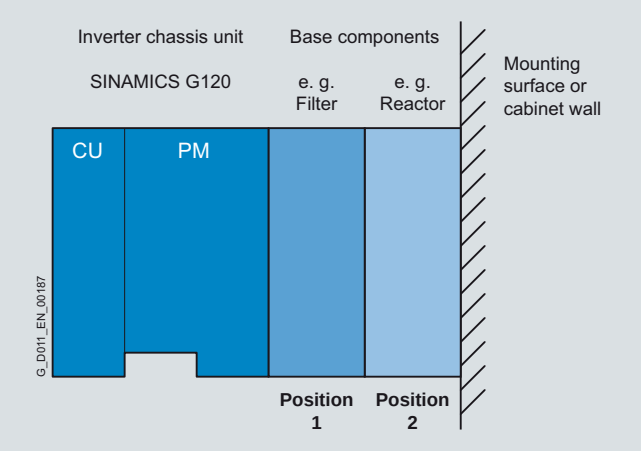
[1] A line reactor is not required and must not be used in conjunction with a Power Module of type PM250 or PM260.

[2] PM250 and PM260 Power Modules are capable of line-commutated energy feedback. A braking resistor cannot be connected and is not necessary.

[3] PM240 FSF Power Modules from 110 kW and higher and FSGX, are available only without an integrated filter class A. An optional line filter class A for lateral mounting is available instead.

Integration

General design information



Inverter comprising a Power Module (PM) and a Control Unit (CU) and two base components at position 1 and position 2 (side view)

- A maximum of two base components plus inverter are possible.
- If at all possible, the line filter should be mounted directly below the inverter (position 1).
- With lateral mounting, the line-side components have to be mounted on the left side of the inverter, and the load-side components on the right side.
- Braking resistors have to be mounted directly on the control cabinet wall due to heating issues.
- This mounting type is always used for the PM240 and PM250 built-in units.

6

Recommended installation combinations of the inverter and optional power and DC link components

Power Module	**Base**		**Lateral mounting**	
Frame size	**Position 1**	**Position 2**	Left of the inverter (for line-side power components)	Right of the inverter (for load-side power components and DC link components)
FSA	Line filter	Line reactor	–	Output reactor or sine-wave filter and/or braking resistor
	Line filter or line reactor	Output reactor or sine-wave filter	–	Braking resistor
	Line filter or line reactor	Braking resistor	–	–
	Line filter or line reactor or braking resistor	–	–	–
FSA and FSB	Line filter	Line reactor	–	Output reactor or sine-wave filter and/or braking resistor
	Line filter or line reactor	Output reactor	–	Braking resistor
	Line filter or line reactor	Braking resistor	–	–
	Line filter or line reactor or braking resistor or sine-wave filter	–	–	–
FSC	Line filter	Line reactor	–	Output reactor or sine-wave filter and/or braking resistor
	Line filter or line reactor	Output reactor	–	Braking resistor
FSD and FSE	Line reactor	–	Line filter	Output reactor or sine-wave filter and/or braking resistor
FSF	–	–	Line filter and/or line reactor	Output reactor or sine-wave filter and/or braking resistor
FSGX	–	–	Line filter and/or line reactor	Output reactor or sine-wave filter and/or braking resistor

Integration

Maximum permissible cable lengths from the motor to the inverter when using output reactors or sine-wave filters depending on the voltage range and the Power Module being used

The following load-side power components in the appropriate frame sizes are optionally available for the Power Modules and result in the following maximum cable lengths:

	Maximum permissible motor cable lengths (shielded/unshielded) in m (ft)						
Frame size	FSA	FSB	FSC	FSD	FSE	FSF	FSGX
PM240 Power Module with integrated braking chopper							**without integrated braking chopper**
Available frame sizes	✓	✓	✓	✓	✓	✓	✓
Without output reactor/sine-wave filter	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)	100/100 (328/328)	150/150 (492/492)	300/450 (984/1476)
With optional output reactor							
• At 380 -10 % ... 400 V 3 AC	150/225 (492/738)	150/225 (492/738)	150/225 (492/738)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	300/340 (984/1116)
• At 401 ... 480 V 3 AC +10 %	100/150 (328/492)	100/150 (328/492)	100/150 (328/492)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	300/340 (984/1116)
With optional sine-wave filter							
• At 380 -10 % ... 400 V 3 AC	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	300/340 (984/1116)
• At 401 ... 480 V 3 AC +10 %	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	300/340 (984/1116)
PM250 Power Module with line-commutated energy recovery							
Available frame sizes	–	–	✓	✓	✓	✓	–
Without output reactor/sine-wave filter	–	–	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)	50/100 (164/328)	–
With optional output reactor							
• At 380 -10 % ... 400 V 3 AC	–	–	150/225 (492/738)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	–
• At 401 ... 480 V 3 AC +10 %	–	–	100/150 (328/492)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	–
With optional sine-wave filter							
• At 380 -10 % ... 400 V 3 AC	–	–	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	–
• At 401 ... 480 V 3 AC +10 %	–	–	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	200/300 (656/984)	–
PM260 Power Module with line-commutated energy recovery and integrated sine-wave filter							
Available frame sizes	–	–	–	✓	–	✓	–
With integrated sine-wave filter							
• At 500 ... 690 V 3 AC ±10 %	–	–	–	200/300 (656/984)	–	200/300 (656/984)	–

Technical specifications

General technical specifications

Power Modules	PM230	PM240	PM250	PM260
System operating voltage	380 ... 480 V 3 AC ±10 %	380 ... 480 V 3 AC ±10 %	380 ... 480 V 3 AC ±10 %	500 … 690 V 3 AC ±10 % For operation with 500 V -10 % linearly reduced – see derating characteristics
Line supply requirements **Line short circuit voltage u_K**	u_K < 1 % or R_{sc} > 100	For u_K < 1 %, a line reactor is recommended	u_K < 1 %	u_K < 1 %
Input frequency	47 … 63 Hz	47 … 63 Hz	47 … 63 Hz	47 … 63 Hz
Output frequency				
• Control type *V/f*	0 … 650 Hz	0 … 650 Hz	0 … 650 Hz	0 … 200 Hz
• Control type Vector	0 … 200 Hz	0 … 200 Hz	0 … 200 Hz	0 … 200 Hz
Pulse frequency	4 kHz Higher pulse frequencies up to 16 kHz, see derating data	Up to 75 kW HO: 4 kHz From 90 kW HO: 2 kHz Higher pulse frequencies up to 16 kHz, see derating data	4 kHz (standard) Higher pulse frequencies up to 16 kHz, see derating data	16 kHz (standard)
Power factor	0.9	0.7 ... 0.85	0.9	0.95
cos φ	0.95	0.95	1.05	1.05
Inverter efficiency	86 ... 98 %	95 ... 98 %	95 ... 97 %	95 ... 97 %
Output voltage, max.	0 ... 95 % of input voltage	0 ... 95 % of input voltage	0 ... 87 % of input voltage	0 ... 87 % of input voltage
Overload capability				
• Low overload (LO)	1.1 × rated output current (i.e. 110 % overload) for 57 s with a cycle time of 300 s 1.5 × rated output current (i.e. 150 % overload) for 3 s with a cycle time of 300 s	1.1 × rated output current (i.e. 110 % overload) for 57 s with a cycle time of 300 s 1.5 × rated output current (i.e. 150 % overload) for 3 s with a cycle time of 300 s	1.1 × rated output current (i.e. 110 % overload) for 57 s with a cycle time of 300 s 1.5 × rated output current (i.e. 150 % overload) for 3 s with a cycle time of 300 s	1.1 x rated output current (i.e. 110 % overload) for 57 s with a cycle time of 300 s 1.4 × rated output current (i.e. 140 % overload) for 3 s with a cycle time of 300 s
• High overload (HO)	1.5 x rated output current (i.e. 150 % overload) for 57 s with a cycle time of 300 s 2 × rated output current (i.e. 200 % overload) for 3 s with a cycle time of 300 s	Up to 75 kW (HO): 1.5 x rated output current (i.e. 150 % overload) for 57 s with a cycle time of 300 s 2 × rated output current (i.e. 200 % overload) for 3 s with a cycle time of 300 s From 90 kW (HO): 1.36 x rated output current (i.e. 136 % overload) for 57 s with a cycle time of 300 s 1.6 × rated output current (i.e. 160 % overload) for 3 s with a cycle time of 300 s	1.5 x rated output current (i.e. 150 % overload) for 57 s with a cycle time of 300 s 2 × rated output current (i.e. 200 % overload) for 3 s with a cycle time of 300 s	1.5 x rated output current (i.e. 150 % overload) for 57 s with a cycle time of 300 s 2 × rated output current (i.e. 200 % overload) for 3 s with a cycle time of 300 s
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 is available	Optional line filter class A or B acc. to EN 55011 is available	Optional line filter class A acc. to EN 55011 is available
Possible braking methods	DC braking	DC braking Compound braking Dynamic braking with integrated braking chopper (optional for frame size FSGX)	Regenerative feedback in generator mode	Regenerative feedback in generator mode
Degree of protection	IP55/UL Type 12	IP20	IP20	IP20

Technical specifications

General technical specifications

Power Modules	PM230	PM240	PM250	PM260
Operating temperature				
• Low overload (LO)	0 … 40 °C (32 … 104 °F) without derating >40 … 60 °C (>104 … 140 °F) see derating characteristics	Frame sizes FSA to FSF: 0 … 40 °C (32 … 104 °F) without derating >40 … 60 °C (>104 … 140 °F) see derating characteristics Frame size FSGX: 0 … 40 °C (32 … 104 °F) without derating >40 … 55 °C (>104 … 131 °F) see derating characteristics	0 … 40 °C (32 … 104 °F) without derating >40 … 60 °C (>104 … 140 °F) see derating characteristics	0 … 40 °C (32 … 104 °F) without derating >40 … 60 °C (>104 … 140 °F) see derating characteristics
• High overload (HO)	0 … 50 °C (32 … 122 °F) without derating >50 … 60 °C (>122 … 140 °F) see derating characteristics	Frame sizes FSA to FSF: 0 … 50 °C (32 … 122 °F) without derating >50 … 60 °C (>122 … 140 °F) see derating characteristics Frame size FSGX: 0 … 40 °C (32 … 104 °F) without derating >40 … 55 °C (>104 … 131 °F) see derating characteristics	0 … 50 °C (32 … 122 °F) without derating >50 … 60 °C (>122 … 140 °F) see derating characteristics	0 … 50 °C (32 … 122 °F) without derating >50 … 60 °C (>122 … 140 °F) see derating characteristics
Storage temperature	-40 … +70 °C (-40 … +158 °F)			
Relative humidity	<95 % RH, condensation not permissible			
Cooling	Power units with increased air cooling using integrated fans	Internal ventilation, power units with increased air cooling by built-in fans	Internal ventilation, power units with increased air cooling by built-in fans	Internal ventilation, power units with increased air cooling by built-in fans
Installation altitude	Up to 1000 m (3281 ft) above sea level without power reduction, > 1000 m (3281 ft) see derating characteristics			
Protection functions	• Undervoltage • Overvoltage • Overcontrol/overload • Ground fault • Short circuit • Stall protection • Motor blocking protection • Motor overtemperature • Inverter overtemperature • Parameter locking			
Standard SCCR (Short Circuit Current Rating) [1]	–	65 kA	Frame size FSC 10 kA Frame sizes FSD up to FSF 42 kA	42 kA
Compliance with standards	UL [2], CE, c-tick	UL, cUL, CE, c-tick, SEMI F47	UL, cUL, CE, c-tick	CE
CE marking	According to Low-Voltage Directive 2006/95/EC			

[1] Applies to industrial control cabinet installations to NEC article 409/UL 508A.

[2] UL approval for frame sizes FSD to FSF will be available soon.

Technical specifications

PM230 Power Modules

Line voltage 380 … 480 V 3 AC		PM230 Power Modules 6SL3223-...				
With integrated line filter class A		0DE13-7AA0	0DE15-5AA0	0DE17-5AA0	0DE21-1AA0	0DE21-5AA0
With integrated line filter class B		0DE13-7BA0	0DE15-5BA0	0DE17-5BA0	0DE21-1BA0	0DE21-5BA0
Output current at 50 Hz 400 V 3 AC						
• Rated current I_{rated} [1]	A	1.3	1.7	2.2	3.1	4.1
• Base load current I_L [1]	A	1.3	1.7	2.2	3.1	4.1
• Base load current I_H [2]	A	0.9	1.3	1.7	2.2	3.1
• I_{max}	A	2.0	2.6	3.4	4.7	6.2
Rated power						
• Based on I_L	kW (hp)	0.37 (0.5)	0.55 (0.75)	0.75 (1.0)	1.1 (1.5)	1.5 (2.0)
• Based on I_H	kW (hp)	0.25 (0.33)	0.37 (0.5)	0.55 (0.75)	0.75 (1.0)	1.1 (1.5)
Rated pulse frequency	kHz	4	4	4	4	4
Efficiency η		0.86	0.90	0.92	0.94	0.95
Power loss at rated current	kW	0.06	0.06	0.06	0.07	0.08
Cooling air requirement	m^3/s (ft^3/s)	0.007 (0.25)	0.007 (0.25)	0.007 (0.25)	0.007 (0.25)	0.007 (0.25)
Sound pressure level L_{pA} (1 m)	dB	61.9	61.9	61.9	61.9	61.9
24 V DC power supply for the Control Unit	A	1	1	1	1	1
Input current [3]						
• Rated current	A	1.3	1.8	2.3	3.2	4.2
• Based on I_H	A	0.9	1.3	1.8	2.3	3.2
Line supply connection U1/L1, V1/L2, W1/L3		Screw terminals, plug-in	Screw terminals, plug-in	Screw terminals, plug-in	Screw terminals, plug-in	Screw terminals, plug-in
• Conductor cross-section	mm^2	1 … 2.5	1 … 2.5	1 … 2.5	1 … 2.5	1 … 2.5
Motor connection U2, V2, W2		Screw terminals, plug-in	Screw terminals, plug-in	Screw terminals, plug-in	Screw terminals, plug-in	Screw terminals, plug-in
• Conductor cross-section	mm^2	1 … 2.5	1 … 2.5	1 … 2.5	1 … 2.5	1 … 2.5
Motor cable length, max. [4]						
• Shielded	m (ft)	25 (82)	25 (82)	25 (82)	25 (82)	25 (82)
• Unshielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)
Degree of protection		IP55/UL Type 12	IP55/UL Type 12	IP55/UL Type 12	IP55/UL Type 12	IP55/UL Type 12
Dimensions						
• Width	mm (in)	154 (6.06)	154 (6.06)	154 (6.06)	154 (6.06)	154 (6.06)
• Height	mm (in)	460 (18.11)	460 (18.11)	460 (18.11)	460 (18.11)	460 (18.11)
• Depth						
- Without operator panel	mm (in)	249 (9.80)	249 (9.80)	249 (9.80)	249 (9.80)	249 (9.80)
- With operator panel, max.	mm (in)	264 (10.39)	264 (10.39)	264 (10.39)	264 (10.39)	264 (10.39)
Frame size		FSA	FSA	FSA	FSA	FSA
Weight, approx. With integrated line filter	kg (lb)	4.3 (9.48)	4.3 (9.48)	4.3 (9.48)	4.3 (9.48)	4.3 (9.48)

[1] The rated output current I_{rated} and the base load current I_L are based on the duty cycle for low overload (LO).

[2] The base load current I_H is based on the duty cycle for high overload (HO).

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

[4] Max. motor cable length 25 m (82 ft) (shielded) for PM230 Power Modules with integrated line filter to maintain the limit values of EN 61800-3 Category C2 (filter A) or C1 table 14 (filter B). With unshielded cables, Categories C2 and C1 are not maintained.

Technical specifications

Line voltage 380 … 480 V 3 AC		PM230 Power Modules 6SL3223-...				
With integrated line filter class A		0DE22-2AA0	0DE23-0AA0	0DE24-0AA0	0DE25-5AA0	0DE27-5AA0
With integrated line filter class B		0DE22-2BA0	0DE23-0BA0	0DE24-0BA0	0DE25-5BA0	0DE27-5BA0
Output current at 50 Hz 400 V 3 AC						
• Rated current I_{rated} [1]	A	5.9	7.7	10.2	13.2	18
• Base load current I_L [1]	A	5.9	7.7	10.2	13.2	18
• Base load current I_H [2]	A	4.1	5.9	7.7	10.2	13.2
• I_{max}	A	8.9	11.8	15.4	20.4	27
Rated power						
• Based on I_L	kW (hp)	2.2 (3.0)	3 (4.0)	4 (5.0)	5.5 (7.5)	7.5 (10)
• Based on I_H	kW (hp)	1.5 (2.0)	2.2 (3.0)	3 (4.0)	4 (5.0)	5.5 (7.5)
Rated pulse frequency	kHz	4	4	4	4	4
Efficiency η		0.96	0.96	0.97	0.97	0.97
Power loss at rated current	kW	0.1	0.12	0.14	0.18	0.24
Cooling air requirement	m^3/s (ft^3/s)	0.007 (0.25)	0.007 (0.25)	0.009 (0.32)	0.009 (0.32)	0.009 (0.32)
Sound pressure level L_{pA} (1 m)	dB	61.9	61.9	62.8	62.8	62.8
24 V DC power supply for the Control Unit	A	1	1	1	1	1
Input current [3]						
• Rated current	A	6.1	8.0	11	14	19
• Based on I_H	A	4.2	6.1	8.0	11	14
Line supply connection U1/L1, V1/L2, W1/L3		Screw terminals, plug-in	Screw terminals, plug-in	Screw terminals, plug-in	Screw terminals, plug-in	Screw terminals, plug-in
• Conductor cross-section	mm^2	1 … 2.5	1 … 2.5	2.5 … 6	4 … 6	4 … 6
Motor connection U2, V2, W2		Screw terminals, plug-in	Screw terminals, plug-in	Screw terminals, plug-in	Screw terminals, plug-in	Screw terminals, plug-in
• Conductor cross-section	mm^2	1 … 2.5	1 … 2.5	2.5 … 6	4 … 6	4 … 6
Motor cable length, max. [4]						
• Shielded	m (ft)	25 (82)	25 (82)	25 (82)	25 (82)	25 (82)
• Unshielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)
Degree of protection		IP55/UL Type 12	IP55/UL Type 12	IP55/UL Type 12	IP55/UL Type 12	IP55/UL Type 12
Dimensions						
• Width	mm (in)	154 (6.06)	154 (6.06)	180 (7.09)	180 (7.09)	180 (7.09)
• Height	mm (in)	460 (18.11)	460 (18.11)	540 (21.26)	540 (21.26)	540 (21.26)
• Depth						
- Without operator panel	mm (in)	249 (9.80)	249 (9.80)	249 (9.80)	249 (9.80)	249 (9.80)
- With operator panel, max.	mm (in)	264 (10.39)	264 (10.39)	264 (10.39)	264 (10.39)	264 (10.39)
Frame size		FSA	FSA	FSB	FSB	FSB
Weight, approx. With integrated line filter	kg (lb)	4.3 (9.48)	4.3 (9.48)	6.3 (13.9)	6.3 (13.9)	6.3 (13.9)

[1] The rated output current I_{rated} and the base load current I_L are based on the duty cycle for low overload (LO).

[2] The base load current I_H is based on the duty cycle for high overload (HO)

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

[4] Max. motor cable length 25 m (82 ft) (shielded) for PM230 Power Modules with integrated line filter to maintain the limit values of EN 61800-3 Category C2 (filter A) or C1 table 14 (filter B). With unshielded cables, Categories C2 and C1 are not maintained.

Technical specifications

Line voltage 380 … 480 V 3 AC		PM230 Power Modules 6SL3223-...					
With integrated line filter class A		0DE31-1AA0	0DE31-5AA0	0DE31-8AA0	–	0DE32-2AA0	0DE33-0AA0
With integrated line filter class B		0DE31-1BA0	0DE31-5BA0	–	0DE31-8BA0	0DE32-2BA0	0DE33-0BA0
Output current at 50 Hz 400 V 3 AC							
• Rated current I_{rated} [1]	A	26	32	38	38	45	60
• Base load current I_L [1]	A	26	32	38	38	45	60
• Base load current I_H [2]	A	18	26	32	32	38	45
• I_{max}	A	39	52	64	64	76	90
Rated power							
• Based on I_L	kW (hp)	11 (15)	15 (20)	18.5 (25)	18.5 (25)	22 (30)	30 (40)
• Based on I_H	kW (hp)	7.5 (10)	11 (15)	15 (20)	15 (20)	18.5 (25)	22 (30)
Rated pulse frequency	kHz	4	4	4	4	4	4
Efficiency η		0.97	0.97	0.98	0.97	0.97	0.97
Power loss at rated current	kW	0.32	0.39	0.46	0.52	0.52	0.68
Cooling air requirement	m^3/s (ft^3/s)	0.020 (0.71)	0.020 (0.71)	0.020 (0.71)	0.039 (1.38)	0.039 (1.38)	0.039 (1.38)
Sound pressure level L_{pA} (1 m)	dB	66.1	66.1	66.1	56	56	56
24 V DC power supply for the Control Unit	A	1	1	1	1	1	1
Input current [3]							
• Rated current	A	27	33	39	39	42	56
• Based on I_H	A	19	27	33	33	36	42
Line supply connection U1/L1, V1/L2, W1/L3		Screw terminals, plug-in	Screw terminals, plug-in	Screw terminals, plug-in	M6 screw stud	M6 screw stud	M6 screw stud
• Conductor cross-section	mm^2	6 … 16	10 … 16	10 … 16	16 … 35	16 … 35	16 … 35
Motor connection U2, V2, W2		Screw terminals, plug-in	Screw terminals, plug-in	Screw terminals, plug-in	M6 screw stud	M6 screw stud	M6 screw stud
• Conductor cross-section	mm^2	6 … 16	10 … 16	10 … 16	16 … 35	16 … 35	16 … 35
Motor cable length, max. [4]							
• Shielded	m (ft)	25 (82)	25 (82)	25 (82)	25 (82)	25 (82)	25 (82)
• Unshielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)
Degree of protection		IP55/UL Type 12	IP55/UL Type 12	IP55/UL Type 12	IP55/UL Type 12	IP55/UL Type 12	IP55/UL Type 12
Dimensions							
• Width	mm (in)	230 (9.06)	230 (9.06)	230 (9.06)	320 (12.60)	320 (12.60)	320 (12.60)
• Height	mm (in)	620 (24.41)	620 (24.41)	620 (24.41)	640 (25.20)	640 (25.20)	640 (25.20)
• Depth							
- Without operator panel	mm (in)	249 (9.80)	249 (9.80)	249 (9.80)	329 (12.95)	329 (12.95)	329 (12.95)
- With operator panel, max.	mm (in)	264 (10.39)	264 (10.39)	264 (10.39)	344 (13.54)	344 (13.54)	344 (13.54)
Frame size		FSC	FSC	FSC	FSD	FSD	FSD
Weight, approx. With integrated line filter	kg (lb)	9.5 (20.9)	9.5 (20.9)	9.5 (20.9)	31 (68.4)	31 (68.4)	31 (68.4)

[1] The rated output current I_{rated} and the base load current I_L are based on the duty cycle for low overload (LO).

[2] The base load current I_H is based on the duty cycle for high overload (HO).

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

[4] Max. motor cable length 25 m (82 ft) (shielded) for PM230 Power Modules with integrated line filter to maintain the limit values of EN 61800-3 Category C2 (filter A) or C1 table 14 (filter B). With unshielded cables, Categories C2 and C1 are not maintained.

Technical specifications

Line voltage 380 … 480 V 3 AC		PM230 Power Modules 6SL3223-...				
With integrated line filter class A		0DE33-7AA0	0DE34-5AA0	0DE35-5AA0	0DE37-5AA0	0DE38-8AA0
With integrated line filter class B		0DE33-7BA0	0DE34-5BA0	0DE35-5BA0	0DE37-5BA0	0DE38-8BA0
Output current at 50 Hz 400 V 3 AC						
• Rated current I_{rated} [1]	A	75	90	110	145	178
• Base load current I_L [1]	A	75	90	110	145	178
• Base load current I_H [2]	A	60	75	90	110	145
• I_{max}	A	120	150	180	220	290
Rated power						
• Based on I_L	kW (hp)	37 (50)	45 (60)	55 (75)	75 (100)	90 (125)
• Based on I_H	kW (hp)	30 (40)	37 (50)	45 (60)	55 (75)	75 (100)
Rated pulse frequency	kHz	4	4	4	4	4
Efficiency η		0.97	0.97	0.97	0.97	0.97
Power loss at rated current	kW	0.99	1.2	1.4	1.9	2.3
Cooling air requirement	m^3/s (ft^3/s)	0.039 (1.38)	0.039 (1.38)	0.117 (4.13)	0.117 (4.13)	0.117 (4.13)
Sound pressure level L_{pA} (1 m)	dB	56	56	61	61	61
24 V DC power supply for the Control Unit	A	1	1	1	1	1
Input current [3]						
• Rated current	A	70	84	102	135	166
• Based on I_H	A	56	70	84	102	135
Line supply connection U1/L1, V1/L2, W1/L3		M6 screw stud	M6 screw stud	M8 screw stud	M8 screw stud	M8 screw stud
• Conductor cross-section	mm^2	25 … 50	25 … 50	35 … 120	35 … 120	35 … 120
Motor connection U2, V2, W2		M6 screw stud	M6 screw stud	M8 screw stud	M8 screw stud	M8 screw stud
• Conductor cross-section	mm^2	25 … 50	25 … 50	35 … 120	35 … 120	35 … 120
Motor cable length, max. [4]						
• Shielded	m (ft)	25 (82)	25 (82)	25 (82)	25 (82)	25 (82)
• Unshielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)
Degree of protection		IP55/UL Type 12	IP55/UL Type 12	IP55/UL Type 12	IP55/UL Type 12	IP55/UL Type 12
Dimensions						
• Width	mm (in)	320 (12.60)	320 (12.60)	410 (16.14)	410 (16.14)	410 (16.14)
• Height	mm (in)	751 (29.57)	751 (29.57)	915 (36.02)	915 (36.02)	915 (36.02)
• Depth						
- Without operator panel	mm (in)	329 (12.95)	329 (12.95)	416 (16.38)	416 (16.38)	416 (16.38)
- With operator panel, max.	mm (in)	344 (13.54)	344 (13.54)	431 (16.97)	431 (16.97)	431 (16.97)
Frame size		FSE	FSE	FSF	FSF	FSF
Weight, approx. With integrated line filter	kg (lb)	37 (81.6) (with filter class A) 38 (83.8) (with filter class B)	37 (81.6) (with filter class A) 38 (83.8) (with filter class B)	70 (154)	70 (154)	70 (154)

[1] The rated output current I_{rated} and the base load current I_L are based on the duty cycle for low overload (LO).

[2] The base load current I_H is based on the duty cycle for high overload (HO).

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

[4] Max. motor cable length 25 m (82 ft) (shielded) for PM230 Power Modules with integrated line filter to maintain the limit values of EN 61800-3 Category C2 (filter A) or C1 table 14 (filter B). With unshielded cables, Categories C2 and C1 are not maintained.

Technical specifications

PM240 Power Modules

Line voltage 380 … 480 V 3 AC		**PM240 Power Modules** 6SL3224-				
Without integrated line filter		0BE13-7UA0	0BE15-5UA0	0BE17-5UA0	0BE21-1UA0	0BE21-5UA0
Output current at 50 Hz 400 V 3 AC						
• Rated current I_{rated} [1]	A	1.3	1.7	2.2	3.1	4.1
• Base load current I_L [1]	A	1.3	1.7	2.2	3.1	4.1
• Base load current I_H [2]	A	1.3	1.7	2.2	3.1	4.1
• I_{max}	A	2.6	3.4	4.4	6.2	8.2
Rated power						
• Based on I_L	kW (hp)	0.37 (0.5)	0.55 (0.75)	0.75 (1.0)	1.1 (1.5)	1.5 (2.0)
• Based on I_H	kW (hp)	0.37 (0.5)	0.55 (0.75)	0.75 (1.0)	1.1 (1.5)	1.5 (2.0)
Rated pulse frequency	kHz	4	4	4	4	4
Efficiency η		0.97	0.97	0.97	0.97	0.97
Power loss at rated current	kW	0.09	0.1	0.1	0.1	0.11
Cooling air requirement	m^3/s (ft^3/s)	0.005 (0.18)	0.005 (0.18)	0.005 (0.18)	0.005 (0.18)	0.005 (0.18)
Sound pressure level L_{pA} (1 m)	dB	<45	<45	<45	<45	<45
24 V DC power supply for the Control Unit	A	1	1	1	1	1
Rated input current [3]						
• With line reactor	A	1.4	1.8	2.3	3.2	4.3
• Without line reactor	A	1.7	2.1	2.6	3.9	4.9
Length of cable to braking resistor, max.	m (ft)	15 (49)	15 (49)	15 (49)	15 (49)	15 (49)
Line supply connection U1/L1, V1/L2, W1/L3		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	1 … 2.5	1 … 2.5	1 … 2.5	1 … 2.5	1 … 2.5
Motor connection U2, V2, W2		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	1 … 2.5	1 … 2.5	1 … 2.5	1 … 2.5	1 … 2.5
DC link connection, connection for the braking resistor DCP/R1, DCN, R2		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	1 … 2.5	1 … 2.5	1 … 2.5	1 … 2.5	1 … 2.5
PE connection		On housing with M4 screw	On housing with M4 screw	On housing with M4 screw	On housing with M4 screw	On housing with M4 screw
Motor cable length [4], **max.**						
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	50 (164)	50 (164)
• Unshielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	73 (2.87)	73 (2.87)	73 (2.87)	73 (2.87)	73 (2.87)
• Height	mm (in)	173 (6.81)	173 (6.81)	173 (6.81)	173 (6.81)	173 (6.81)
• Depth						
- Without Control Unit	mm (in)	145 (5.71)	145 (5.71)	145 (5.71)	145 (5.71)	145 (5.71)
- With Control Unit	mm (in)	210 (8.27)	210 (8.27)	210 (8.27)	210 (8.27)	210 (8.27)
Frame size		FSA	FSA	FSA	FSA	FSA
Weight, approx.	kg (lb)	1.1 (2.43)	1.1 (2.43)	1.1 (2.43)	1.1 (2.43)	1.1 (2.43)

[1] The rated output current I_{rated} and the base load current I_L are based on the duty cycle for low overload (LO).

[2] The base load current I_H is based on the duty cycle for high overload (HO).

[3] The input current depends on the motor load and line impedance. The input currents apply for rated power loading (based on I_{rated}) for a line impedance corresponding to u_K = 1 %. These current values without line reactor are specified on the rating plate of the Power Module.

[4] Max. motor cable length 25 m (82 ft) (shielded) for PM240 Power Modules with integrated line filter to maintain the limit values acc. to EN 61800-3 Category C2.

Technical specifications

Line voltage 380 … 480 V 3 AC		PM240 Power Modules 6SL3224-...				
Without integrated line filter		0BE22-2UA0	0BE23-0UA0	0BE24-0UA0	0BE25-5UA0	0BE27-5UA0
With integrated line filter		0BE22-2AA0	0BE23-0AA0	0BE24-0AA0	0BE25-5AA0	0BE27-5AA0
Output current at 50 Hz 400 V 3 AC						
• Rated current I_{rated} [1]	A	5.9	7.7	10.2	18	25
• Base load current I_L [1]	A	5.9	7.7	10.2	18	25
• Base load current I_H [2]	A	5.9	7.7	10.2	13.2	19
• I_{max}	A	11.8	15.4	20.4	26.4	38
Rated power						
• Based on I_L	kW (hp)	2.2 (3.0)	3 (4)	4 (5)	7.5 (10)	11 (15)
• Based on I_H	kW (hp)	2.2 (3.0)	3 (4)	4 (5)	5.5 (7.5)	7.5 (10)
Rated pulse frequency	kHz	4	4	4	4	4
Efficiency η		0.95	0.95	0.95	0.95	0.95
Power loss at rated current	kW	0.14	0.16	0.18	0.24	0.30
Cooling air requirement	m^3/s (ft^3/s)	0.024 (0.85)	0.024 (0.85)	0.024 (0.85)	0.055 (1.94)	0.055 (1.94)
Sound pressure level L_{pA} (1 m)	dB	<50	<50	<50	<60	<60
24 V DC power supply for the Control Unit	A	1	1	1	1	1
Rated input current [3]						
• With line reactor	A	6.1	8	10.4	18.7	26
• Without line reactor	A	7.6	10.2	13.4	21.9	31.5
Length of cable to braking resistor, max.	m (ft)	15 (49)	15 (49)	15 (49)	15 (49)	15 (49)
Line supply connection U1/L1, V1/L2, W1/L3		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	1 … 6	1 … 6	1 … 6	2.5 … 10	2.5 … 10
Motor connection U2, V2, W2		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	1 … 6	1 … 6	1 … 6	2.5 … 10	2.5 … 10
DC link connection, connection for the braking resistor DCP/R1, DCN, R2		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	1 … 6	1 … 6	1 … 6	2.5 … 10	2.5 … 10
PE connection		On housing with M5 screw	On housing with M5 screw	On housing with M5 screw	On housing with M5 screw	On housing with M5 screw
Motor cable length [4], **max.**						
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	50 (164)	50 (164)
• Unshielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	153 (6.02)	153 (6.02)	153 (6.02)	189 (7.44)	189 (7.44)
• Height	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	334 (13.15)	334 (13.15)
• Depth						
- Without Control Unit	mm (in)	165 (6.50)	165 (6.50)	165 (6.50)	185 (7.28)	185 (7.28)
- With Control Unit	mm (in)	230 (9.06)	230 (9.06)	230 (9.06)	250 (9.84)	250 (9.84)
Frame size		FSB	FSB	FSB	FSC	FSC
Weight, approx.	kg (lb)	4 (8.8)	4 (8.8)	4 (8.8)	7 (15.4)	7 (15.4)

[1] The rated output current I_{rated} and the base load current I_L are based on the duty cycle for low overload (LO).

[2] The base load current I_H is based on the duty cycle for high overload (HO).

[3] The input current depends on the motor load and line impedance. The input currents apply for rated power loading (based on I_{rated}) for a line impedance corresponding to u_K = 1 %. These current values without line reactor are specified on the rating plate of the Power Module.

[4] Max. motor cable length 25 m (82 ft) (shielded) for PM240 Power Modules with integrated line filter to maintain the limit values acc. to EN 61800-3 Category C2.

Technical specifications

Line voltage 380 … 480 V 3 AC		PM240 Power Modules 6SL3224-...				
Without integrated line filter		0BE31-1UA0	0BE31-5UA0	0BE31-8UA0	0BE32-2UA0	0BE33-0UA0
With integrated line filter		0BE31-1AA0	0BE31-5AA0	0BE31-8AA0	0BE32-2AA0	0BE33-0AA0
Output current at 50 Hz 400 V 3 AC						
• Rated current I_{rated} [1]	A	32	38	45	60	75
• Base load current I_L [1]	A	32	38	45	60	75
• Base load current I_H [2]	A	26	32	38	45	60
• I_{max}	A	52	64	76	90	124
Rated power						
• Based on I_L	kW (hp)	15 (20)	18.5 (25)	22 (30)	30 (40)	37 (50)
• Based on I_H	kW (hp)	11 (15)	15 (20)	18.5 (25)	22 (30)	30 (40)
Rated pulse frequency	kHz	4	4	4	4	4
Efficiency η		>0.97	>0.97	>0.97	>0.97	>0.97
Power loss at rated current	kW	0.4	0.42	0.52	0.69	0.99
Cooling air requirement	m^3/s (ft^3/s)	0.055 (1.94)	0.055 (1.94)	0.055 (1.94)	0.055 (1.94)	0.055 (1.94)
Sound pressure level L_{pA} (1 m)	dB	<60	<60	<60	<61	<60
24 V DC power supply for the Control Unit	A	1	1	1	1	1
Rated input current [3]						
• With line reactor	A	33	40	47	63	78
• Without line reactor	A	39	46	53	72	88
Length of cable to braking resistor, max.	m (ft)	15 (49)	15 (49)	15 (49)	15 (49)	15 (49)
Line supply connection U1/L1, V1/L2, W1/L3		Screw terminals	M6 screw stud	M6 screw stud	M6 screw stud	M6 screw stud
• Conductor cross-section	mm^2	2.5 … 10	10 … 50	10 … 50	10 … 50	10 … 50
Motor connection U2, V2, W2		Screw terminals	M6 screw stud	M6 screw stud	M6 screw stud	M6 screw stud
• Conductor cross-section	mm^2	2.5 … 10	10 … 50	10 … 50	10 … 50	10 … 50
DC link connection, connection for the braking resistor DCP/R1, DCN, R2		Screw terminals	M6 screw stud	M6 screw stud	M6 screw stud	M6 screw stud
• Conductor cross-section	mm^2	2.5 … 10	10 … 50	10 … 50	10 … 50	10 … 50
PE connection		On housing with M5 screw	On housing with M6 screw	On housing with M6 screw	On housing with M6 screw	On housing with M6 screw
Motor cable length [4], **max.**						
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	50 (164)	100 (328)
• Unshielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	189 (7.44)	275 (10.83)	275 (10.83)	275 (10.83)	275 (10.83)
• Height						
- Without integrated line filter	mm (in)	334 (13.15)	419 (16.50)	419 (16.50)	419 (16.50)	499 (19.65)
- With integrated line filter	mm (in)	334 (13.15)	512 (20.16)	512 (20.16)	512 (20.16)	635 (25.0)
• Depth						
- Without Control Unit	mm (in)	185 (7.28)	204 (8.03)	204 (8.03)	204 (8.03)	204 (8.03)
- With Control Unit	mm (in)	250 (9.84)	260 (10.24)	260 (10.24)	260 (10.24)	260 (10.24)
Frame size		FSC	FSD	FSD	FSD	FSE
Weight, approx.						
• Without integrated line filter	kg (lb)	7 (15.4)	13 (28.7)	13 (28.7)	13 (28.7)	16 (35.3)
• With integrated line filter	kg (lb)	7 (15.4)	16 (35.3)	16 (35.3)	16 (35.3)	23 (50.7)

[1] The rated output current I_{rated} and the base load current I_L are based on the duty cycle for low overload (LO).

[2] The base load current I_H is based on the duty cycle for high overload (HO).

[3] The input current depends on the motor load and line impedance. The input currents apply for rated power loading (based on I_{rated}) for a line impedance corresponding to u_K = 1 %. These current values without line reactor are specified on the rating plate of the Power Module.

[4] Max. motor cable length 25 m (82 ft) (shielded) for PM240 Power Modules with integrated line filter to maintain the limit values acc. to EN 61800-3 Category C2.

Technical specifications

Line voltage 380 … 480 V 3 AC		PM240 Power Modules 6SL3224-...					
Without integrated line filter		0BE33-7UA0	0BE34-5UA0	0BE35-5UA0	0BE37-5UA0	0BE38-8UA0	0BE41-1UA0
With integrated line filter		0BE33-7AA0	0BE34-5AA0	0BE35-5AA0	0BE37-5AA0	–	–
Output current at 50 Hz 400 V 3 AC							
• Rated current I_{rated} [1]	A	90	110	145	178	205	250
• Base load current I_L [1]	A	90	110	145	178	205	250
• Base load current I_H [2]	A	75	90	110	145	178	205
• I_{max}	A	150	180	220	290	308	375
Rated power							
• Based on I_L	kW (hp)	45 (60)	55 (75)	75 (100)	90 (125)	110 (150)	132 (200)
• Based on I_H	kW (hp)	37 (50)	45 (60)	55 (75)	75 (100)	90 (125)	110 (150)
Rated pulse frequency	kHz	4	4	4	4	2	2
Efficiency η		>0.97	>0.97	>0.97	>0.97	>0.97	>0.97
Power loss at rated current	kW	1.21	1.42	1.93	2.31	2.43	2.53
Cooling air requirement	m^3/s (ft^3/s)	2 × 0.055 (1.94)	0.15 (5.3)	0.15 (5.3)	0.15 (5.3)	0.15 (5.3)	0.15 (5.3)
Sound pressure level L_{pA} (1 m)	dB	<62	<60	<60	<65	<65	<65
24 V DC power supply for the Control Unit	A	1	1	1	1	1	1
Rated input current [3]							
• With line reactor	A	94	115	151	186	210	250
• Without line reactor	A	105	129	168	204	245	299
Length of cable to braking resistor, max.	m (ft)	15 (49)	15 (49)	15 (49)	15 (49)	15 (49)	15 (49)
Line supply connection U1/L1, V1/L2, W1/L3		M6 screw stud	M8 screw stud	M8 screw stud	M8 screw stud	M8 screw stud	M8 screw stud
• Conductor cross-section	mm^2	10 … 50	25 … 120	25 … 120	25 … 120	25 … 120	25 … 120
Motor connection U2, V2, W2		M6 screw stud	M8 screw stud	M8 screw stud	M8 screw stud	M8 screw stud	M8 screw stud
• Conductor cross-section	mm^2	10 … 50	25 … 120	25 … 120	25 … 120	25 … 120	25 … 120
DC link connection, connection for the braking resistor DCP/R1, DCN, R2		M6 screw stud	M8 screw stud	M8 screw stud	M8 screw stud	M8 screw stud	M8 screw stud
• Conductor cross-section	mm^2	10 … 50	25 … 120	25 … 120	25 … 120	25 … 120	25 … 120
PE connection		On housing with M6 screw	On housing with M8 screw	On housing with M8 screw	On housing with M8 screw	On housing with M8 screw	On housing with M8 screw
Motor cable length [4], **max.**							
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	50 (164)	50 (164)	50 (164)
• Unshielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20
Dimensions							
• Width	mm (in)	275 (10.83)	350 (13.78)	350 (13.78)	350 (13.78)	350 (13.78)	350 (13.78)
• Height							
- Without integrated line filter	mm (in)	499 (19.65)	634 (24.96)	634 (24.96)	634 (24.96)	634 (24.96)	634 (24.96)
- With integrated line filter	mm (in)	635 (25.0)	934 (36.77)	934 (36.77)	934 (36.77)	–	–
• Depth							
- Without Control Unit	mm (in)	204 (8.03)	316 (12.44)	316 (12.44)	316 (12.44)	316 (12.44)	316 (12.44)
- With Control Unit	mm (in)	260 (10.24)	372 (14.65)	372 (14.65)	372 (14.65)	372 (14.65)	372 (14.65)
Frame size		FSE	FSF	FSF	FSF	FSF	FSF
Weight, approx.							
• Without integrated line filter	kg (lb)	16 (35.3)	36 (79.4)	36 (79.4)	36 (79.4)	39 (86)	39 (86)
• With integrated line filter	kg (lb)	23 (50.7)	52 (115)	52 (115)	52 (115)	–	–

[1] The rated output current I_{rated} and the base load current I_L are based on the duty cycle for low overload (LO).

[2] The base load current I_H is based on the duty cycle for high overload (HO).

[3] The input current depends on the motor load and line impedance. The input currents apply for rated power loading (based on I_{rated}) for a line impedance corresponding to u_K = 1 %. These current values without line reactor are specified on the rating plate of the Power Module.

[4] Max. motor cable length 25 m (82 ft) (shielded) for PM240 Power Modules with integrated line filter to maintain the limit values acc. to EN 61800-3 Category C2.

Technical specifications

Line voltage 380 … 480 V 3 AC		PM240 Power Modules 6SL3224-...		
Without integrated line filter		0XE41-3UA0	0XE41-6UA0	0XE42-0UA0
Output current at 50 Hz 400 V 3 AC				
• Rated current I_{rated} [1]	A	302	370	477
• Base load current I_L [1]	A	302	370	477
• Base load current I_H [2]	A	250	302	370
• I_{max}	A	400	483	592
Rated power				
• Based on I_L	kW (hp)	160 (250)	200 (300)	250 (400)
• Based on I_H	kW (hp)	132 (200)	160 (215)	200 (300)
Rated pulse frequency	kHz	2	2	2
Efficiency η		>0.98	>0.98	>0.98
Power loss at rated current	kW	3.9	4.4	5.5
Cooling air requirement	m^3/s (ft^3/s)	0.36 (12.7)	0.36 (12.7)	0.36 (12.7)
Sound pressure level L_{pA} (1 m)	dB	<69	<69	<69
24 V DC power supply for the Control Unit	A	1	1	1
Rated input current [3]				
• With line reactor	A	245	297	354
• Without line reactor	A	297	354	442
Length of cable to braking resistor, max.	m (ft)	50 (164)	50 (164)	50 (164)
Line supply connection U1/L1, V1/L2, W1/L3		M10 screw stud	M10 screw stud	M10 screw stud
• Conductor cross-section	mm^2	2 × 240	2 × 240	2 × 240
Motor connection U2, V2, W2		M10 screw stud	M10 screw stud	M10 screw stud
• Conductor cross-section	mm^2	2 × 240	2 × 240	2 × 240
PE connection		On housing with M10 screw	On housing with M10 screw	On housing with M10 screw
Motor cable length [4], **max.**				
• Shielded	m (ft)	300 (984)	300 (984)	300 (984)
• Unshielded	m (ft)	450 (1476)	450 (1476)	450 (1476)
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	326 (12.83)	326 (12.83)	326 (12.83)
• Height	mm (in)	1533 (60.35)	1533 (60.35)	1533 (60.35)
• Depth	mm (in)	547 (21.54)	547 (21.54)	547 (21.54)
Frame size		FSGX	FSGX	FSGX
Weight, approx.	kg (lb)	174 (384)	174 (384)	174 (384)

[1] The rated output current I_{rated} and the base load current I_L are based on the duty cycle for low overload (LO).

[2] The base load current I_H is based on the duty cycle for high overload (HO).

[3] The input current depends on the motor load and line impedance. The input currents apply for rated power loading (based on I_{rated}) for a line impedance corresponding to u_K = 1 %. These current values without line reactor are specified on the rating plate of the Power Module.

[4] Max. motor cable length 25 m (82 ft) (shielded) for PM240 Power Modules with integrated line filter to maintain the limit values acc. to EN 61800-3 Category C2.

Technical specifications

PM250 Power Modules

Line voltage 380 … 480 V 3 AC		PM250 Power Modules 6SL3225-...		
With integrated line filter		0BE25-5AA1	0BE27-5AA1	0BE31-1AA1
Output current at 50 Hz 400 V 3 AC				
• Rated current I_{rated} [1]	A	18	25	32
• Base load current I_L [1]	A	18	25	32
• Base load current I_H [2]	A	13.2	19	26
• I_{max}	A	26.4	38	52
Rated power				
• Based on I_L	kW (hp)	7.5 (10)	11 (15)	15 (20)
• Based on I_H	kW (hp)	5.5 (7.5)	7.5 (10)	11 (15)
Rated pulse frequency	kHz	4	4	4
Efficiency η		0.95	0.95	0.95
Power loss at rated current	kW	0.26	0.28	0.31
Cooling air requirement	m^3/s (ft^3/s)	0.038 (1.34)	0.038 (1.34)	0.038 (1.34)
Sound pressure level L_{pA} (1 m)	dB	<60	<60	<60
24 V DC power supply for the Control Unit	A	1	1	1
Input current [3]				
• Rated current	A	18	25	32
• Current based on I_H	A	13.2	19	26
Line supply connection U1/L1, V1/L2, W1/L3		Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	2.5 … 10	2.5 … 10	2.5 … 10
Motor connection U2, V2, W2		Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	2.5 … 10	2.5 … 10	2.5 … 10
PE connection		On housing with M5 screw	On housing with M5 screw	On housing with M5 screw
Motor cable length, max.				
• Shielded	m (ft)	25 (82)	25 (82)	25 (82)
• Unshielded	m (ft)	100 (328)	100 (328)	100 (328)
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	189 (7.44)	189 (7.44)	189 (7.44)
• Height	mm (in)	334 (13.15)	334 (13.15)	334 (13.15)
• Depth				
- Without Control Unit	mm (in)	185 (7.28)	185 (7.28)	185 (7.28)
- With Control Unit	mm (in)	250 (9.84)	250 (9.84)	250 (9.84)
Frame size		FSC	FSC	FSC
Weight, approx.	kg (lb)	7.5 (16.5)	7.5 (16.5)	7.5 (16.5)

[1] The rated output current I_{rated} and the base load current I_L are based on the duty cycle for low overload (LO).

[2] The base load current I_H is based on the duty cycle for high overload (HO).

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

Technical specifications

Line voltage 380 … 480 V 3 AC		PM250 Power Modules 6SL3225-...		
Without integrated line filter		0BE31-5UA0	0BE31-8UA0	0BE32-2UA0
With integrated line filter		0BE31-5AA0	0BE31-8AA0	0BE32-2AA0
Output current at 50 Hz 400 V 3 AC				
• Rated current I_{rated} [1]	A	38	45	60
• Base load current I_L [1]	A	38	45	60
• Base load current I_H [2]	A	32	38	45
• I_{max}	A	64	76	90
Rated power				
• Based on I_L	kW (hp)	18.5 (25)	22 (30)	30 (40)
• Based on I_H	kW (hp)	15 (20)	18.5 (25)	22 (30)
Rated pulse frequency	kHz	4	4	4
Efficiency η		>0.97	>0.97	>0.97
Power loss at rated current	kW	0.42	0.52	0.68
Cooling air requirement	m^3/s (ft^3/s)	0.022 (0.78)	0.022 (0.78)	0.039 (1.38)
Sound pressure level L_{pA} (1 m)	dB	<60	<60	<61
24 V DC power supply for the Control Unit	A	1	1	1
Input current [3]				
• Rated current	A	36	42	56
• Based on I_H	A	30	36	42
Line supply connection U1/L1, V1/L2, W1/L3		M6 screw stud	M6 screw stud	M6 screw stud
• Conductor cross-section	mm^2	10 … 35	10 … 35	10 … 35
Motor connection U2, V2, W2		M6 screw stud	M6 screw stud	M6 screw stud
• Conductor cross-section	mm^2	10 … 35	10 … 35	10 … 35
PE connection		On housing with M6 screw	On housing with M6 screw	On housing with M6 screw
Motor cable length [4], **max.**				
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)
• Unshielded	m (ft)	100 (328)	100 (328)	100 (328)
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	275 (10.83)	275 (10.83)	275 (10.83)
• Height				
- Without integrated line filter	mm (in)	419 (16.50)	419 (16.50)	419 (16.50)
- With integrated line filter	mm (in)	512 (20.16)	512 (20.16)	512 (20.16)
• Depth				
- Without Control Unit	mm (in)	204 (8.03)	204 (8.03)	204 (8.03)
- With Control Unit	mm (in)	260 (10.24)	260 (10.24)	260 (10.24)
Frame size		FSD	FSD	FSD
Weight, approx.				
• Without integrated line filter	kg (lb)	13 (28.7)	13 (28.7)	13 (28.7)
• With integrated line filter	kg (lb)	15 (33.1)	15 (33.1)	16 (35.3)

[1] The rated output current I_{rated} and the base load current I_L are based on the duty cycle for low overload (LO).

[2] The base load current I_H is based on the duty cycle for high overload (HO).

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

[4] Max. motor cable length 25 m (82 ft) (shielded) for PM250 Power Modules with integrated line filter to maintain the limit values of EN 61800-3 Category C2.

Technical specifications

Line voltage 380 … 480 V 3 AC		PM250 Power Modules 6SL3225-...				
Without integrated line filter		0BE33-0UA0	0BE33-7UA0	0BE34-5UA0	0BE35-5UA0	0BE37-5UA0
With integrated line filter		0BE33-0AA0	0BE33-7AA0	0BE34-5AA0	0BE35-5AA0	0BE37-5AA0
Output current at 50 Hz 400 V 3 AC						
• Rated current I_{rated} [1]	A	75	90	110	145	178
• Base load current I_L [1]	A	75	90	110	145	178
• Base load current I_H [2]	A	60	75	90	110	145
• I_{max}	A	120	150	180	220	290
Rated power						
• Based on I_L	kW (hp)	37 (50)	45 (60)	55 (75)	75 (100)	90 (125)
• Based on I_H	kW (hp)	30 (40)	37 (50)	45 (60)	55 (75)	75 (100)
Rated pulse frequency	kHz	4	4	4	4	4
Efficiency η		>0.97	>0.97	>0.97	>0.97	>0.97
Power loss at rated current	kW	0.99	1.21	1.42	1.93	2.31
Cooling air requirement	m^3/s (ft^3/s)	0.022 (0.78)	0.039 (1.38)	0.094 (3.32)	0.094 (3.32)	0.117 (4.13)
Sound pressure level L_{pA} (1 m)	dB	<60	<62	<60	<60	<65
24 V DC power supply for the Control Unit	A	1	1	1	1	1
Input current [3]						
• Rated current	A	70	84	102	135	166
• Based on I_H	A	56	70	84	102	135
Line supply connection U1/L1, V1/L2, W1/L3		M6 screw stud	M6 screw stud	M8 screw stud	M8 screw stud	M8 screw stud
• Conductor cross-section, max.	mm^2	10 … 50	10 … 50	25 … 120	25 … 120	25 … 120
Motor connection U2, V2, W2		M6 screw stud	M6 screw stud	M8 screw stud	M8 screw stud	M8 screw stud
• Conductor cross-section, max.	mm^2	10 … 50	10 … 50	25 … 120	25 … 120	25 … 120
PE connection		On housing with M6 screw	On housing with M6 screw	On housing with M8 screw	On housing with M8 screw	On housing with M8 screw
Motor cable length [4], **max.**						
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	50 (164)	50 (164)
• Unshielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	275 (10.83)	275 (10.83)	350 (13.78)	350 (13.78)	350 (13.78)
• Height						
- Without integrated line filter	mm (in)	499 (19.65)	499 (19.65)	634 (24.96)	634 (24.96)	634 (24.96)
- With integrated line filter	mm (in)	635 (25.0)	635 (25.0)	934 (36.77)	934 (36.77)	934 (36.77)
• Depth						
- Without Control Unit	mm (in)	204 (8.03)	204 (8.03)	316 (12.44)	316 (12.44)	316 (12.44)
- With Control Unit	mm (in)	260 (10.24)	260 (10.24)	372 (14.65)	372 (14.65)	372 (14.65)
Frame size		FSE	FSE	FSF	FSF	FSF
Weight, approx.						
• Without integrated line filter	kg (lb)	14 (30.9)	14 (30.9)	35 (77.2)	35 (77.2)	35 (77.2)
• With integrated line filter	kg (lb)	21 (46.3)	21 (46.3)	51 (112)	51 (112)	51 (112)

[1] The rated output current I_{rated} and the base load current I_L are based on the duty cycle for low overload (LO).

[2] The base load current I_H is based on the duty cycle for high overload (HO).

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

[4] Max. motor cable length 25 m (82 ft) (shielded) for PM250 Power Modules with integrated line filter to maintain the limit values of EN 61800-3 Category C2.

Technical specifications

PM260 Power Modules

Line voltage 500 … 690 V 3 AC		**PM260 Power Modules** 6SL3225-...		
Without integrated line filter		0BH27-5UA1	0BH31-1UA1	0BH31-5UA1
With integrated line filter		0BH27-5AA1	0BH31-1AA1	0BH31-5AA1
Output current at 50 Hz 690 V 3 AC				
• Rated current I_{rated} [1]	A	14	19	23
• Base load current I_L [1]	A	14	19	23
• Base load current I_H [2]	A	10	14	19
• I_{max}	A	20	28	38
Rated power				
• Based on I_L	kW (hp)	11 (15)	15 (20)	18.5 (25)
• Based on I_H	kW (hp)	7.5 (10)	11 (15)	15 (20)
Rated pulse frequency	kHz	16	16	16
Efficiency η		0.95	0.95	0.95
Power loss at rated current	kW	0.58	0.72	0.82
Cooling air requirement	m^3/s (ft^3/s)	0.044 (1.55)	0.044 (1.55)	0.044 (1.55)
Sound pressure level L_{pA} (1 m)	dB	<64	<64	<64
24 V DC power supply for the Control Unit	A	1	1	1
Input current [3]				
• Rated current	A	13	18	22
• Based on I_H	A	10	13	18
Line supply connection U1/L1, V1/L2, W1/L3		Terminal strip	Terminal strip	Terminal strip
• Conductor cross-section	mm^2	2.5 … 16	2.5 … 16	2.5 … 16
Motor connection U2, V2, W2		Terminal strip	Terminal strip	Terminal strip
• Conductor cross-section	mm^2	2.5 … 16	2.5 … 16	2.5 … 16
PE connection		On housing with M6 screw	On housing with M6 screw	On housing with M6 screw
Motor cable length, max. [4]				
• Shielded	m (ft)	200 (656)	200 (656)	200 (656)
• Unshielded	m (ft)	300 (984)	300 (984)	300 (984)
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	275 (10.83)	275 (10.83)	275 (10.83)
• Height	mm (in)	512 (20.16)	512 (20.16)	512 (20.16)
• Depth				
- Without Control Unit	mm (in)	204 (8.03)	204 (8.03)	204 (8.03)
- With Control Unit	mm (in)	260 (10.24)	260 (10.24)	260 (10.24)
Frame size		FSD	FSD	FSD
Weight, approx.				
• Without integrated line filter	kg (lb)	22 (48.5)	22 (48.5))	22 (48.5))
• With integrated line filter	kg (lb)	23 (50.7)	23 (50.7)	23 (50.7)

[1] The rated output current I_{rated} and the base load current I_L are based on the duty cycle for low overload (LO).

[2] The base load current I_H is based on the duty cycle for high overload (HO).

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

[4] Shielded motor cables must be used in order to maintain the limit values for field-conducted disturbances according to EN 61800-3 Class C2.

Technical specifications

Line voltage 500 … 690 V 3 AC		PM260 Power Modules 6SL3225-...		
Without integrated line filter		0BH32-2UA1	0BH33-0UA1	0BH33-7UA1
With integrated line filter		0BH32-2AA1	0BH33-0AA1	0BH33-7AA1
Output current at 50 Hz 690 V 3 AC				
• Rated current I_{rated} [1]	A	35	42	62
• Base load current I_L [1]	A	35	42	62
• Base load current I_H [2]	A	26	35	42
• I_{max}	A	52	70	84
Rated power				
• Based on I_L	kW (hp)	30 (40)	37 (50)	55 (75)
• Based on I_H	kW (hp)	22 (30)	30 (40)	37 (50)
Rated pulse frequency	kHz	16	16	16
Efficiency η		0.95	0.95	0.95
Power loss at rated current	kW	1.13	1.29	1.73
Cooling air requirement	m^3/s (ft^3/s)	0.131 (4.63)	0.131 (4.63)	0.131 (4.63)
Sound pressure level L_{pA} (1 m)	dB	<70	<70	<70
24 V DC power supply for the Control Unit	A	1	1	1
Input current [3]				
• Rated current	A	34	41	60
• Based on I_H	A	26	34	41
Line supply connection U1/L1, V1/L2, W1/L3		M6 screw stud	M6 screw stud	M6 screw stud
• Conductor cross-section	mm^2	10 … 50	10 … 50	10 … 50
Motor connection U2, V2, W2		M6 screw stud	M6 screw stud	M6 screw stud
• Conductor cross-section	mm^2	10 … 50	10 … 50	10 … 50
PE connection		On housing with M6 screw	On housing with M6 screw	On housing with M6 screw
Motor cable length, max. [4]				
• Shielded	m (ft)	200 (656)	200 (656)	200 (656)
• Unshielded	m (ft)	300 (984)	300 (984)	300 (984)
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	350 (13.78)	350 (13.78)	350 (13.78)
• Height	mm (in)	634 (24.96)	634 (24.96)	634 (24.96)
• Depth				
- Without Control Unit	mm (in)	316 (12.44)	316 (12.44)	316 (12.44)
- With Control Unit	mm (in)	372 (14.65)	372 (14.65)	372 (14.65)
Frame size		FSF	FSF	FSF
Weight, approx.				
• Without integrated line filter	kg (lb)	56 (123)	56 (123)	56 (123)
• With integrated line filter	kg (lb)	58 (128)	58 (128)	58 (128)

[1] The rated output current I_{rated} and the base load current I_L are based on the duty cycle for low overload (LO).

[2] The base load current I_H is based on the duty cycle for high overload (HO).

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

[4] Shielded motor cables must be used in order to maintain the limit values for field-conducted disturbances according to EN 61800-3 Class C2.

Characteristic curves

Derating data, PM230 Power Modules

Pulse frequency

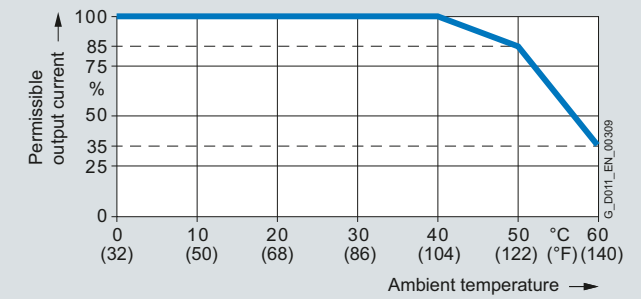
Rated power [1] at 50 Hz 400 V 3 AC		**Rated output current in A** for a pulse frequency of						
kW	hp	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
0.37	0.5	1.3	1.11	0.91	0.78	0.65	0.59	0.52
0.55	0.75	1.7	1.45	1.19	1.02	0.85	0.77	0.68
0.75	1.0	2.2	1.87	1.54	1.32	1.10	0.99	0.88
1.1	1.5	3.1	2.64	2.17	1.86	1.55	1.40	1.24
1.5	2.0	4.1	3.49	2.87	2.46	2.05	1.85	1.64
2.2	3.0	5.9	5.02	4.13	3.54	2.95	2.66	2.36
3.0	4.0	7.7	6.55	5.39	4.62	3.85	3.47	3.08
4.0	5.0	10.2	8.67	7.14	6.12	5.1	4.59	4.08
5.5	7.5	13.2	11.22	9.24	7.92	6.6	5.94	5.28
7.5	10	18.0	15.3	12.6	10.8	9.0	8.1	7.2
11.0	15	26.0	22.1	18.2	15.6	13.0	11.7	10.4
15.0	20	32.0	27.2	22.4	19.2	16.0	14.4	12.8
18.5	25	38.0	32.3	26.6	22.8	19.0	17.1	15.2
22	30	45.0	38.25	31.5	27.0	22.5	20.25	18.0
30	40	60.0	52.7	43.4	37.2	31.0	27.9	24.8
37	50	75.0	63.75	52.5	45.0	37.5	33.75	30.0
45	60	90.0	76.5	63.0	54.0	45.0	40.5	36.0
55	75	110	93.5	77.0	–	–	–	–
75	100	145	123.3	101.5	–	–	–	–
90	125	178	151.3	124.6	–	–	–	–

[1] Rated power based on the rated output current I_{rated}. The rated output current I_{rated} is based on the duty cycle for low overload (LO).

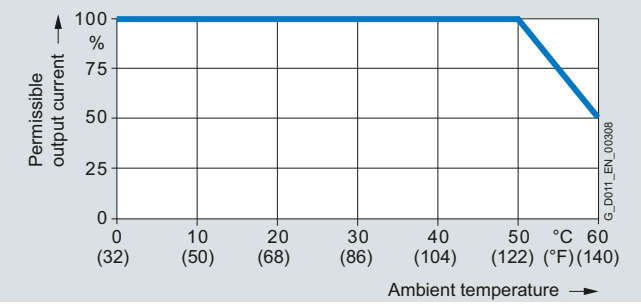
Characteristic curves

Derating data, PM230 Power Modules

Ambient temperature



Low overload (LO) for PM230 Power Modules, frame sizes FSA to FSF

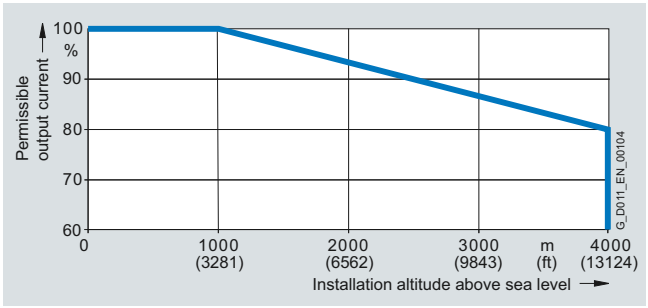


High overload (HO) for PM230 Power Modules, frame sizes FSA to FSF

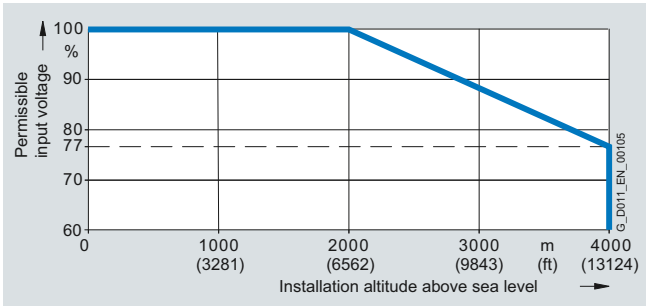
Note:

The operating temperature ranges of the Control Units should be taken into account. The temperature ranges are specified in the section Technical specifications under Control Units.

Installation altitude

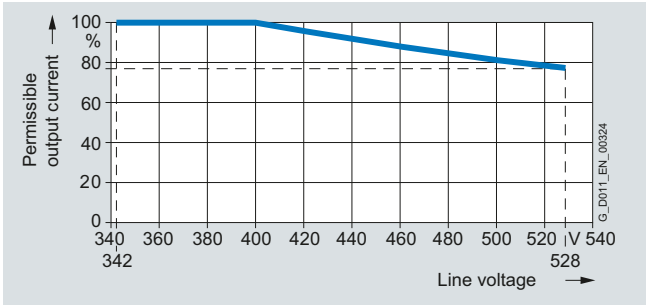


Permissible output current as a function of installation altitude

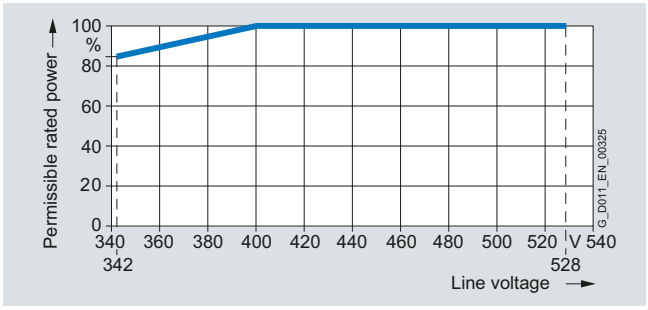


Permissible input voltage as a function of installation altitude

System operating voltage



Permissible output current as a function of the line voltage



Permissible rated power as a function of the line voltage

6

Characteristic curves

Derating data, PM240 Power Modules

Pulse frequency

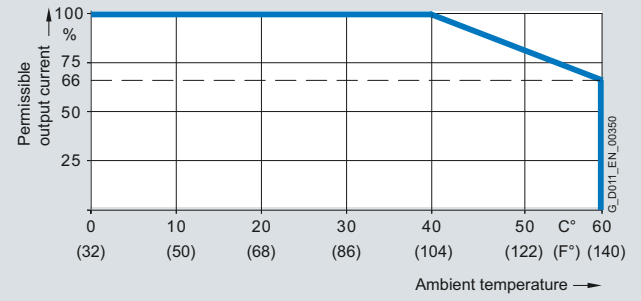
Rated power at 400 V 3 AC		**Rated output current in A** for a pulse frequency of							
kW	hp	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
0.37	0.50	–	1.3	1.1	0.9	0.8	0.7	0.6	0.5
0.55	0.75	–	1.7	1.4	1.2	1.0	0.9	0.8	0.7
0.75	1.0	–	2.2	1.9	1.5	1.3	1.1	1.0	0.9
1.1	1.5	–	3.1	2.6	2.2	1.9	1.6	1.4	1.2
1.5	2.0	–	4.1	3.5	2.9	2.5	2.1	1.8	1.6
2.2	3.0	–	5.9	5.0	4.1	3.5	3.0	2.7	2.4
3.0	4.0	–	7.7	6.5	5.4	4.6	3.9	3.5	3.1
4.0	5.0	–	10.2	8.7	7.1	6.1	5.1	4.6	4.1
7.5	10	–	18.0	16.2	13.3	11.4	9.5	8.6	7.6
11.0	15	–	25.0	22.1	18.2	15.6	13.0	11.7	10.4
15.0	20	–	32.0	27.2	22.4	19.2	16.0	14.4	12.8
18.5	25	–	38.0	32.3	26.6	22.8	19.0	17.1	15.2
22.0	30	–	45.0	38.3	31.5	27.0	22.5	20.3	18.0
30.0	40	–	62.0	52.7	43.4	37.2	31.0	27.9	24.8
37.0	50	–	75.0	63.8	52.5	45.0	37.5	33.8	30.0
45.0	60	–	90.0	76.5	63.0	54.0	45.0	40.5	36.0
55.0	75	–	110.0	93.5	77.0	–	–	–	–
75.0	100	–	145.0	123.3	101.5	–	–	–	–
90.0	125	–	178.0	151.3	124.6	–	–	–	–
110.0	150	205.0 [1]	178.0	–	–	–	–	–	–
132.0	200	250.0 [1]	202.0	–	–	–	–	–	–
160.0	250	302.0 [1]	250.0	–	–	–	–	–	–
200.0	300	370.0 [1]	302.0	–	–	–	–	–	–
250.0	400	477.0 [1]	370.0	–	–	–	–	–	–

[1] The pulse frequency can only be switched over from 4 kHz (default) to 2 kHz for the low overload (LO) duty cycle.

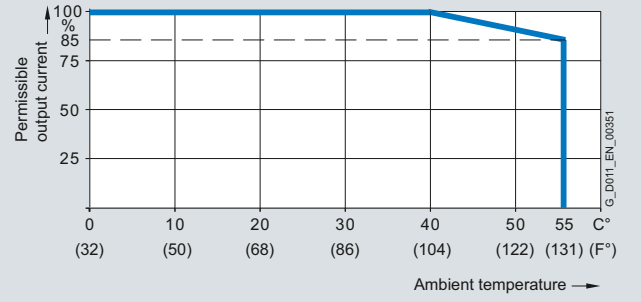
Characteristic curves

Derating data, PM240 Power Modules

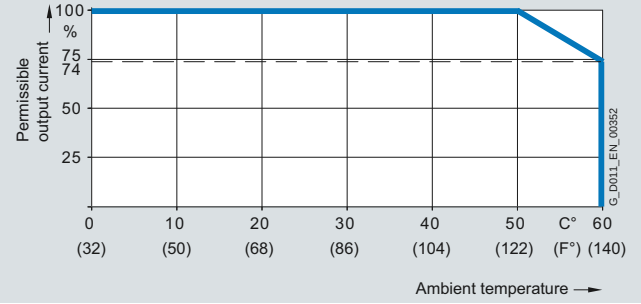
Ambient temperature



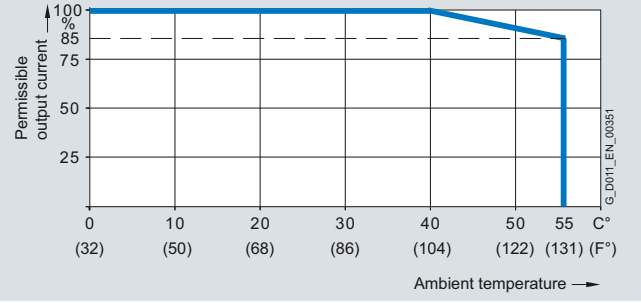
Low overload (LO) for PM240 Power Modules, frame sizes FSA to FSF



Low overload (LO) for PM240 Power Modules, frame size FSGX



High overload (HO) for PM240 Power Modules, frame sizes FSA to FSF

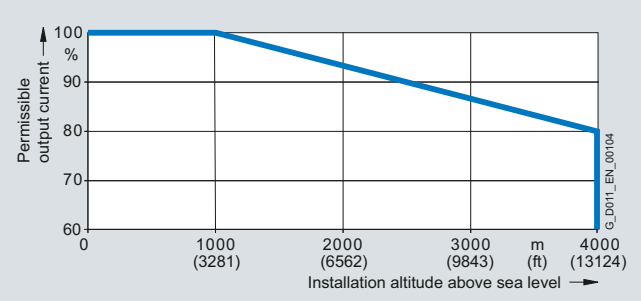


High overload (HO) for PM240 Power Modules, frame size FSGX

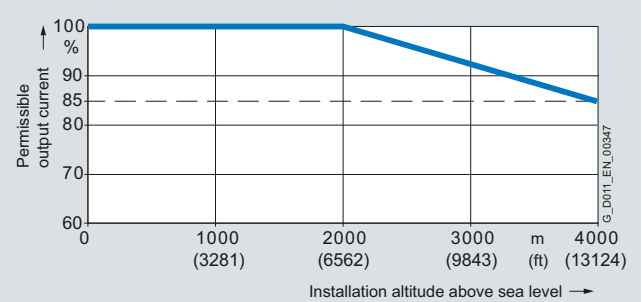
Note:

The operating temperature ranges of the Control Units should be taken into account. The temperature ranges are specified in the section Technical specifications under Control Units.

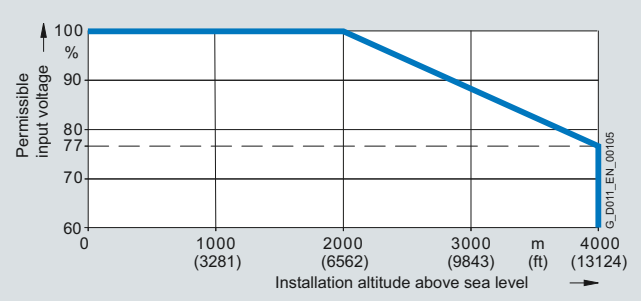
Installation altitude



Permissible output current as a function of the installation altitude for PM240 Power Modules, frame sizes FSA to FSF



Permissible output current as a function of the installation altitude for PM240 Power Modules, frame size FSGX



Permissible input voltage as a function of the installation altitude for PM240 Power Modules, frame sizes FSA to FSGX

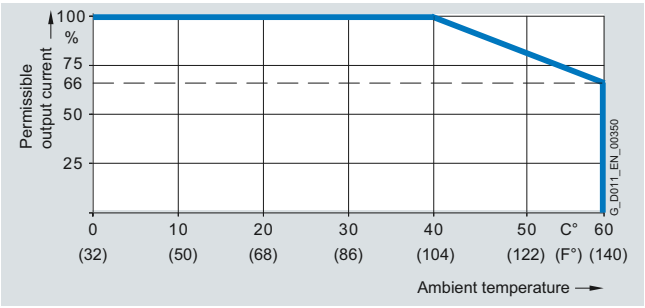
Characteristic curves

Derating data, PM250 Power Modules

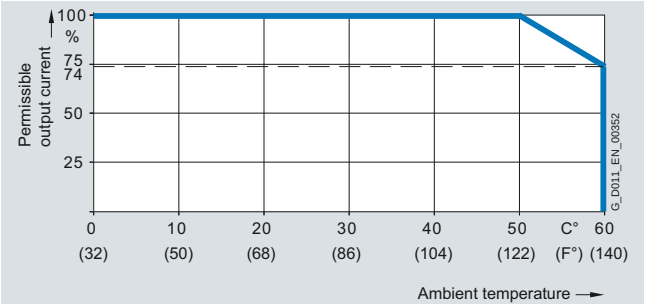
Pulse frequency

Rated power at 400 V 3 AC		**Rated output current in A** for a pulse frequency of						
kW	hp	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
7.5	10	18	12.5	11.9	10.6	9.2	7.9	6.6
11.0	15	25	18.1	17.1	15.2	13.3	11.4	9.5
15.0	20	32	24.7	23.4	20.8	18.2	15.6	13
18.5	25	38	32	27	23	19	17	15
22.0	30	45	38	32	27	23	20	18
30.0	40	60	51	42	36	30	27	24
37.0	50	75	64	53	45	38	34	30
45.0	60	90	77	63	54	45	41	36
55.0	75	110	94	77	–	–	–	–
75.0	100	145	123	102	–	–	–	–
90.0	125	178	151	125	–	–	–	–

Ambient temperature



Low overload (LO) for PM250 Power Modules, frame sizes FSC to FSF

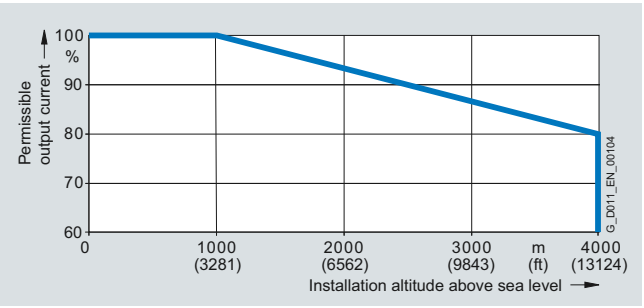


High overload (HO) for PM250 Power Modules, frame sizes FSC to FSF

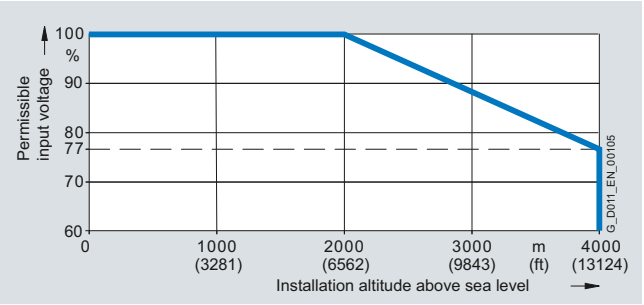
Note:

The operating temperature ranges of the Control Units should be taken into account. The temperature ranges are specified in the section Technical specifications under Control Units.

Installation altitude



Permissible output current as a function of the installation altitude for PM250 Power Modules, frame sizes FSC to FSF



Permissible input voltage as a function of the installation altitude for PM250 Power Modules, frame sizes FSC to FSF

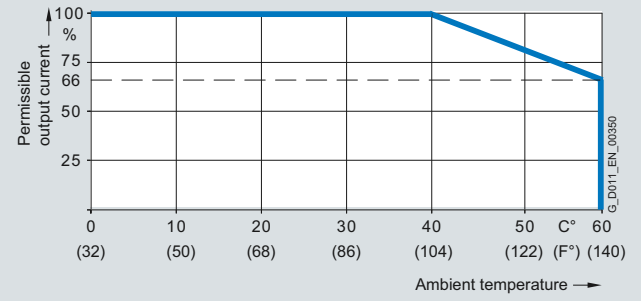
Characteristic curves

Derating data, PM260 Power Modules

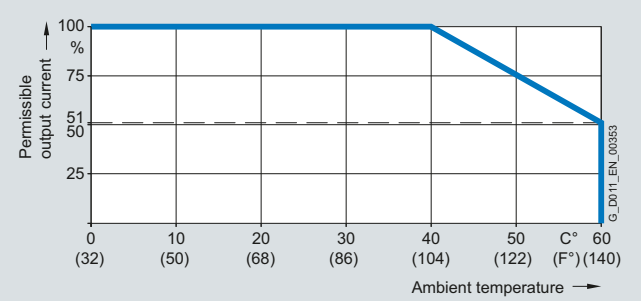
Pulse frequency

No pulse frequency derating, as the PM260 Power Modules continuously operate with 16 kHz.

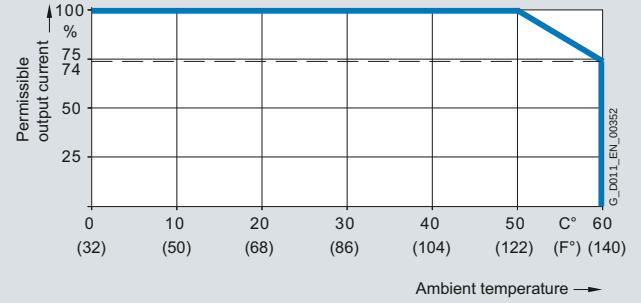
Ambient temperature



Low overload (LO) for PM260 Power Modules, frame size FSD



Low overload (LO) for PM260 Power Modules, frame size FSF

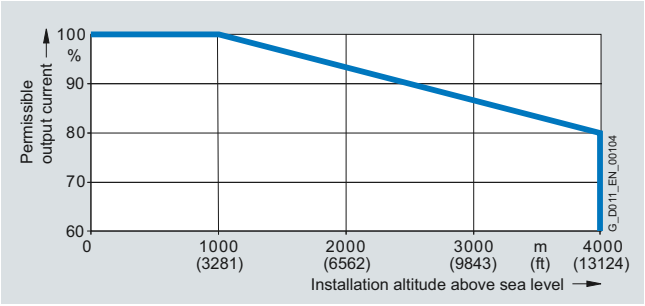


High overload (HO) for PM260 Power Modules, frame sizes FSD and FSF

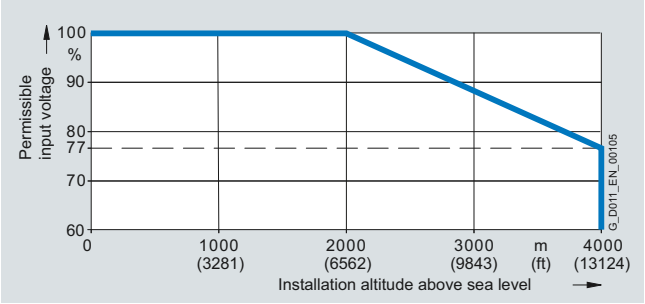
Note:

The operating temperature ranges of the Control Units should be taken into account. The temperature ranges are specified in the section Technical specifications under Control Units.

Installation altitude

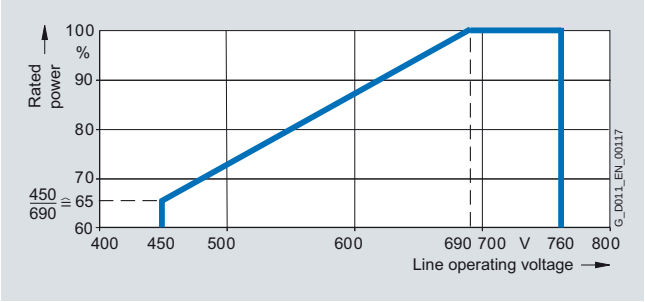


Permissible output current as a function of the installation altitude for PM260 Power Modules, frame sizes FSD and FSF



Permissible input voltage as a function of the installation altitude for PM260 Power Modules, frame sizes FSD and FSF

System operating voltage

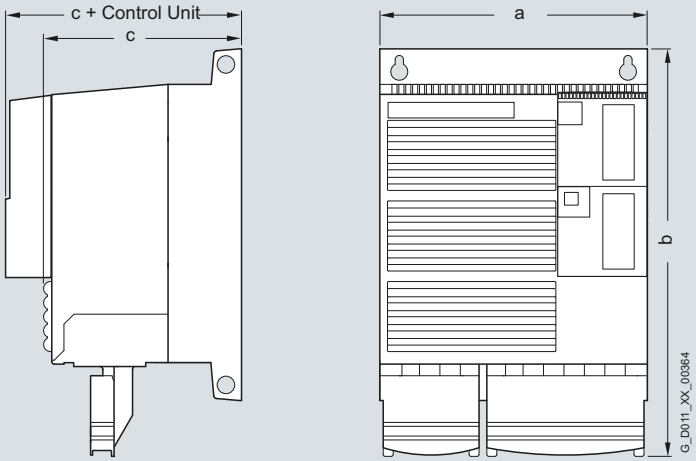


Permissible rated power as a function of the system operating voltage for PM260 Power Modules, frame sizes FSD and FSF

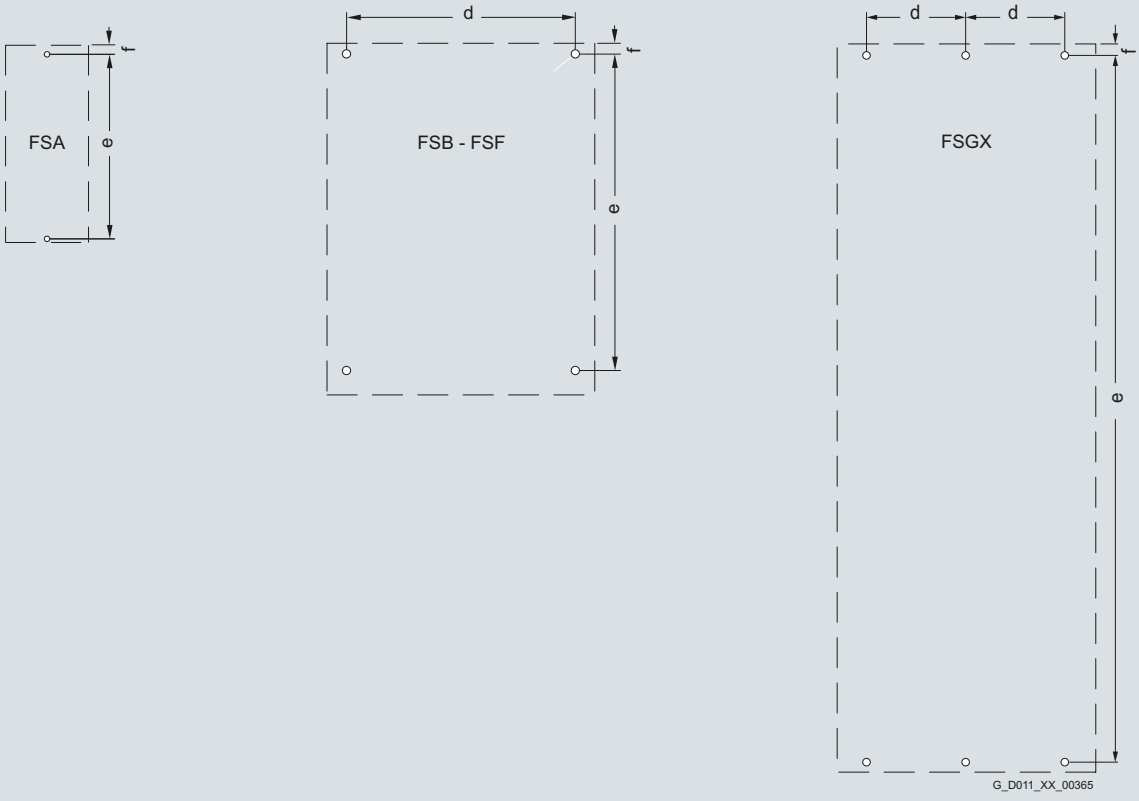
Note:

The power units can be operated with 500 V -10 %. In this case, the power is correspondingly linearly reduced.

Dimensional drawings



Principle dimension drawing



Drill pattern

Dimensional drawings

PM230 Power Modules – IP54/IP55 degree of protection

Frame size	Line filter		Dimensions in mm (inches)			Drilling dimensions in mm (inches)			Cooling clearance in mm (inches)			Mounting With bolts, nuts and washers
	Without	With	a (width)	b (height)	c (depth)	d	e	f	top/bottom	front	side	
FSA	✓	✓	154 (6.06)	460 (18.11)	249 (9.8)	132 (5.19)	445 (17.51)	11 (0.43)	100 (3.94)	0 (0)	0 (0)	4 × M4
FSB	✓	✓	180 (7.08)	540 (21.25)	249 (9.8)	158 (5.9)	524 (20.62)	11 (0.43)	100 (3.94)	0 (0)	0 (0)	4 × M4
FSC	✓	✓	230 (9.05)	620 (24.4)	249 (9.8)	208 (8.18)	604 (23.77)	11 (0.43)	125 (4.92)	0 (0)	0 (0)	4 × M5
FSD	✓	✓	320 (12.59)	640 (25.19)	329 (12.95)	285 (11.22)	600 (23.62)	17.5 (0.69)	300 (11.81)	0 (0)	50 (1.97) [1]	4 × M8
FSE	✓	✓	320 (12.59)	751 (29.56)	329 (12.95)	285 (11.22)	710 (27.95)	17.5 (0.69)	300 (11.81)	0 (0)	50 (1.97) [1]	4 × M8
FSF	✓	✓	410 (16.14)	915 (36.02)	416 (16.38)	370 (14.56)	870 (34.25)	20 (0.79)	350 (13.78)	0 (0)	50 (1.97) [1]	4 × M8

PM240 and PM250 Power Modules – IP20 degree of protection

Frame size	Line filter		Dimensions in mm (inches)			Drilling dimensions in mm (inches)			Cooling clearance in mm (inches)			Mounting With bolts, nuts and washers
	Without	With	a (width)	b (height)	c (depth)	d	e	f	top/bottom	front	side	
FSA	✓	✓	73 (2.87)	173 (6.81)	145 (5.71)	36.5 (1.44)	160 (6.3)	6 (0.24)	100 (3.94)	0 (0)	30 (1.18) [1]	2 × M4
FSB	✓	✓	153 (6.02)	270 (10.63)	165 (6.5)	133 (5.24)	258 (10.16)	6 (0.24)	100 (3.94)	0 (0)	40 (1.57) [1]	4 × M4
FSC	✓	✓	189 (7.44)	334 (13.15)	185 (7.28)	167 (6.57)	323 (12.72)	6 (0.24)	125 (4.92)	0 (0)	50 (1.97) [1]	4 × M5
FSD	✓	–	275 (10.83)	419 (16.5)	204 (8.03)	235 (9.25)	325 (12.8)	11 (0.43)	300 (11.81)	0 (0)	0 (0)	4 × M8
FSD	–	✓	275 (10.83)	512 (20.16)	204 (8.03)	235 (9.25)	419 (16.5)	11 (0.43)	300 (11.81)	0 (0)	0 (0)	4 × M8
FSE	✓	–	275 (10.83)	499 (19.65)	204 (8.03)	235 (9.25)	405 (15.94)	11 (0.43)	300 (11.81)	0 (0)	0 (0)	4 × M8
FSE	–	✓	275 (10.83)	635 (25)	204 (8.03)	235 (9.25)	541 (21.3)	11 (0.43)	300 (11.81)	0 (0)	0 (0)	4 × M8
FSF	✓	–	350 (13.78)	634 (24.96)	316 (12.44)	300 (11.81)	598 (23.54)	11 (0.43)	350 (13.78)	0 (0)	0 (0)	4 × M8
FSF	–	✓	350 (13.78)	934 (36.77)	316 (12.44)	300 (11.81)	899 (35.39)	11 (0.43)	350 (13.78)	0 (0)	0 (0)	4 × M8
FSGX	✓	–	326 (12.9)	1533 (60.35)	547 (21.6)	125 (4.92)	1506 (59.29)	14.5 (0.57)	250/150 (9.84/5.91)	50 (1.97)	0 (0)	6 × M8

PM260 Power Modules – IP20 degree of protection

Frame size	Line filter		Dimensions in mm (inches)			Drilling dimensions in mm (inches)			Cooling clearance in mm (inches)			Mounting With bolts, nuts and washers
	Without	With	a (width)	b (height)	c (depth)	d	e	f	top/bottom	front	side	
FSD	✓	✓	275 (10.83)	512 (20.16)	204 (8.03)	235 (9.25)	419 (16.5)	11 (0.43)	300 (11.81)	0 (0)	0 (0)	4 × M8
FSF	✓	✓	350 (13.78)	634 (24.96)	316 (12.44)	300 (11.81)	598 (23.54)	11 (0.43)	350 (13.78)	0 (0)	0 (0)	4 × M8

Increased mounting depth

PM230 Power Modules

When the IOP is plugged on, the depth increases by 15 mm (0.59 inches).
When the BOP-2 or a blanking cover is mounted, the depth increases by 5 mm (0.2 inches).

PM240, PM250 and PM260 Power Modules

When the CU230 Control Unit is mounted, the depth increases by 65 mm (2.56 inches).
When the CU240 Control Unit is mounted, the depth increases by 46 mm (1.81 inches).

When the IOP is plugged on, the depth increases by an additional 22 mm (0.87 inches).
When the BOP-2 or a blanking cover is mounted, the depth increases by an additional 12 mm (0.47 inches).

For the PM240 Power Module, frame size FSGX, the mounting depth does not increase when devices are plugged on.

[1] Up to 40 °C (104 °F) without any lateral clearance.

Overview

Line filter for Power Modules, frame size FSA

Line filter for PM240 Power Modules, frame size FSGX

With one of the additional line filters, the Power Module reaches a higher radio interference class.

Selection and ordering data

Rated power		SINAMICS G120 PM240 Power Module		Line filter class A according to EN 55011
kW	hp	Type 6SL3224-...	Frame size	Order No.
380 … 480 V 3 AC				
0.37	0.50	0BE13-7UA0	FSA	**6SE6400-2FA00-6AD0**
0.55	0.75	0BE15-5UA0		
0.75	1.0	0BE17-5UA0		
1.1	1.5	0BE21-1UA0		
1.5	2.0	0BE21-5UA0		
110	150	0BE38-8UA0	FSF	**6SL3203-0BE32-5AA0**
132	200	0BE41-1UA0		
160	250	0XE41-3UA0	FSGX	**6SL3000-0BE34-4AA0**
200	300	0XE41-6UA0		
250	400	0XE42-0UA0	FSGX	**6SL3000-0BE36-0AA0**

Rated power		SINAMICS G120 PM240 Power Module		Line filter class B according to EN 55011
kW	hp	Type 6SL3224-...	Frame size	Order No.
380 … 480 V 3 AC				
0.37	0.50	0BE13-7UA0	FSA	**6SE6400-2FB00-6AD0**
0.55	0.75	0BE15-5UA0		
0.75	1.0	0BE17-5UA0		
1.1	1.5	0BE21-1UA0		
1.5	2	0BE21-5UA0		
2.2	3	0BE22-2AA0	FSB	**6SL3203-0BE21-6SA0**
3.0	4	0BE23-0AA0		
4.0	5	0BE24-0AA0		
7.5	10	0BE25-5AA0	FSC	**6SL3203-0BD23-8SA0**
11	15	0BE27-5AA0		
15	20	0BE31-1AA0		

Rated power		SINAMICS G120 PM250 Power Module		Line filter class B according to EN 55011
kW	hp	Type 6SL3225-...	Frame size	Order No.
380 … 480 V 3 AC				
7.5	10	0BE25-5AA1	FSC	**6SL3203-0BD23-8SA0**
11	15	0BE27-5AA1		
15	20	0BE31-1AA1		

Integration

Frame size FSA of the PM240 Power Module is available only without integrated line filter class A. A base filter is therefore available so that class A can be achieved. A base filter class B is also available so that class B can be achieved.

Frame sizes FSB and FSC of the PM240 Power Module are available both with and without integrated line filter class A. For compliance with class B, PM240 Power Modules with integrated line filter class A must be fitted additionally with a base filter class B.

An external line filter class A is available for frame size FSGX of the PM240 Power Module.

Frame sizes FSC of the PM250 Power Module are available only with integrated line filter class A. To achieve class B, PM250 Power Modules must be additionally fitted with a base filter class B.

No additional line filters class B are available for the PM260 Power Module.

Line filters that are optionally available depending on the Power Module used

	Frame size						
	FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**	**FSGX**
PM240 Power Module with integrated braking chopper							**without integrated braking chopper**
Available frame sizes	✓	✓	✓	✓	✓	✓	✓
Line-side power components							
Line filter class A	U	F	F	F	F	F/S [1]	S [1]
Line filter class B	U	U	U	–	–	–	–
PM250 Power Module with line-commutated energy recovery							
Available frame sizes	–	–	✓	✓	✓	✓	–
Line-side power components							
Line filter class A	–	–	I	F	F	F	–
Line filter class B	–	–	U	–	–	–	–
PM260 Power Module with line-commutated energy recovery and integrated sine-wave filter							
Available frame sizes	–	–	–	✓	–	✓	–
Line-side power components							
Line filter class A	–	–	–	F	–	F	–
Line filter class B	–	–	–	–	–	–	–

U = Base component
S = Lateral mounting
I = Integrated
– = Not possible
F = Power Modules available with and without integrated filter class A

[1] PM240 FSF Power Modules from 110 kW and higher and FSGX, are available only without an integrated filter class A. An optional line filter class A for lateral mounting is available instead.

Technical specifications

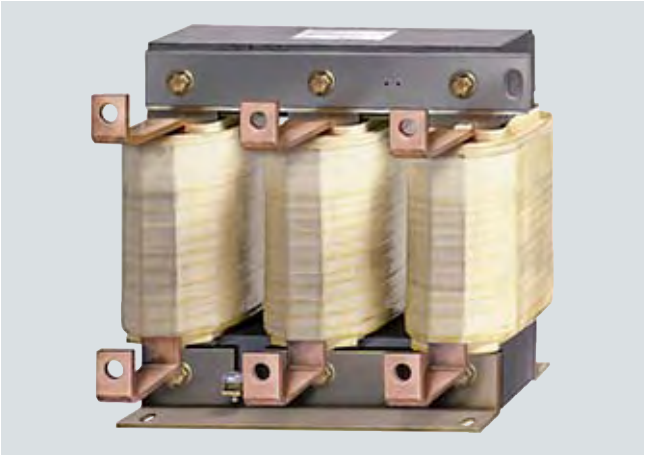
Line voltage 380 … 480 V 3 AC		Line filter class A			
		6SE6400-2FA00-6AD0	6SL3203-0BE32-5AA0	6SL3000-0BE34-4AA0	6SL3000-0BE36-0AA0
Rated current	A	6	250	440	600
Line supply connection L1, L2, L3		Screw terminals	On housing with M8 screw stud	1 x hole for M10 Provided for busbar connection	1 x hole for M10 Provided for busbar connection
• Conductor cross-section	mm^2	2.5	–	–	–
Load connection U, V, W		Shielded cable	On housing with M8 screw stud	On housing with M10 screw stud	On housing with M10 screw stud
• Conductor cross-section	mm^2	3 × 2.5	–	–	–
• Length	m (ft)	0.4 (1.31)	–	–	–
PE connection		On housing with M4 screw stud	Flat connector for M10 screw	1 x hole for M8	1 x hole for M10
Degree of protection		IP20	IP00	IP00	IP00
Dimensions					
• Width	mm (in)	73 (2.87)	240 (9.45)	360 (14.17)	400 (15.75)
• Height	mm (in)	200 (7.87)	360 (14.17)	240 (9.45)	265 (10.43)
• Depth	mm (in)	42.5 (1.67)	116 (4.57)	116 (4.57)	140 (5.51)
Possible as base component		Yes	No	No	No
Weight, approx.	kg (lb)	0.5 (1.10)	12.4 (27.3)	12.3 (27.1)	19 (41.9)
Suitable for PM240 Power Module	Type	6SL3224-0BE13-7UA0 6SL3224-0BE15-5UA0 6SL3224-0BE17-5UA0 6SL3224-0BE21-1UA0 6SL3224-0BE21-5UA0	6SL3224-0BE38-8UA0 6SL3224-0BE41-1UA0	6SL3224-0XE41-3UA0 6SL3224-0XE41-6UA0	6SL3224-0XE42-0UA0
Suitable for PM250 Power Module		–	–	–	–
• Frame size		FSA	FSF	FSGX	FSGX

Line voltage 380 … 480 V 3 AC		Line filter class B		
		6SE6400-2FB00-6AD0	6SL3203-0BE21-6SA0	6SL3203-0BD23-8SA0
Rated current	A	6	10.2	39.4
Line supply connection L1, L2, L3		Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	2.5	2.5	4
Load connection U, V, W		Shielded cable	Shielded cable	Shielded cable
• Conductor cross-section	mm^2	3 × 2.5	3 × 2.5	3 × 4
• Length	m (ft)	0.4 (1.31)	0.4 (1.31)	0.4 (1.31)
PE connection		On housing with M4 screw stud	On housing with M4 screw stud	On housing with M4 screw stud
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	73 (2.87)	153 (6.02)	190 (7.48)
• Height	mm (in)	200 (7.87)	296 (11.65)	362 (14.25)
• Depth	mm (in)	42.5 (1.67)	50 (1.97)	55 (2.17)
Possible as base component		Yes	Yes	Yes
Weight, approx.	kg (lb)	0.5 (1.10)	1.5 (3.31)	2.3 (5.07)
Suitable for PM240 Power Module	Type	6SL3224-0BE13-7UA0 6SL3224-0BE15-5UA0 6SL3224-0BE17-5UA0 6SL3224-0BE21-1UA0 6SL3224-0BE21-5UA0	6SL3224-0BE22-2AA0 6SL3224-0BE23-0AA0 6SL3224-0BE24-0AA0	6SL3224-0BE25-5AA0 6SL3224-0BE27-5AA0 6SL3224-0BE31-1AA0
Suitable for PM250 Power Module		–	–	6SL3225-0BE25-5AA1 6SL3225-0BE27-5AA1 6SL3225-0BE31-1AA1
• Frame size		FSA	FSB	FSC

Overview

Line reactors for Power Modules, frame sizes FSA to FSE

Power Module, frame size FSB, with base line reactor and shield connection plate



Line reactor for PM240 Power Modules, frame size FSGX

Line reactors are used to smooth voltage peaks or to bridge commutating dips. Line reactors also reduce the effects of harmonics on the inverter and the line supply.

Note:

A line reactor must not be used in combination with a PM250 or PM260 Power Module.

Selection and ordering data

Rated power		SINAMICS G120 PM240 Power Module		Line reactor
kW	hp	Type 6SL3224-...	Frame size	Order No.
380 … 480 V 3 AC				
0.37	0.50	0BE13-7UA0	FSA	**6SE6400-3CC00-2AD3**
0.55	0.75	0BE15-5UA0		
0.75	1.0	0BE17-5UA0	FSA	**6SE6400-3CC00-4AD3**
1.1	1.5	0BE21-1UA0		
1.5	2	0BE21-5UA0	FSA	**6SE6400-3CC00-6AD3**
2.2	3	0BE22-2 . A0	FSB	**6SL3203-0CD21-0AA0**
3.0	4	0BE23-0 . A0		
4.0	5	0BE24-0 . A0	FSB	**6SL3203-0CD21-4AA0**
7.5	10	0BE25-5 . A0	FSC	**6SL3203-0CD22-2AA0**
11.0	15	0BE27-5 . A0		
15.0	20	0BE31-1 . A0	FSC	**6SL3203-0CD23-5AA0**
18.5	25	0BE31-5 . A0	FSD	**6SL3203-0CJ24-5AA0**
22	30	0BE31-8 . A0		
30	40	0BE32-2 . A0	FSD	**6SL3203-0CD25-3AA0**
37	50	0BE33-0 . A0	FSE	**6SL3203-0CJ28-6AA0**
45	60	0BE33-7 . A0		
55	75	0BE34-5 . A0	FSF	**6SE6400-3CC11-2FD0**
75	100	0BE35-5 . A0		
90	125	0BE37-5 . A0	FSF	**6SE6400-3CC11-7FD0**
110	150	0BE38-8UA0	FSF	**6SL3000-0CE32-3AA0**
132	200	0BE41-1UA0	FSF	**6SL3000-0CE32-8AA0**
160	250	0XE41-3UA0	FSGX	**6SL3000-0CE33-3AA0**
200	300	0XE41-6UA0	FSGX	**6SL3000-0CE35-1AA0**
250	400	0XE42-0UA0		

Line-side components
Line reactors

Benefits

Only AC reactors are available as reactors for the inverter.

- Only an AC reactor provides protection for the input rectifier of the inverter.
- The capacitor lifetime of the inverter increases by a factor of 2 when using an AC reactor instead of a DC reactor.
- The harmonic behavior of AC reactors remains almost constant over the complete lifetime. Over time (months), the harmonic behavior of DC reactors changes.
- An AC reactor reduces possible asymmetries between the current phases. In this case, a DC reactor would not be effective.

Integration

The line reactors for PM240 Power Modules of frame sizes FSA to FSE are designed as base components. The line reactor is attached to the mounting surface and the Power Module is mounted directly on the line reactor.

The cables to the Power Module are already connected at the line reactor.

The line reactor is connected to the line supply through terminals.

Line reactors that are optionally available depending on the Power Module used

	Frame size						
	FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**	**FSGX**
PM240 Power Module with integrated braking chopper							**without integrated braking chopper**
Available frame sizes	✓	✓	✓	✓	✓	✓	✓
Line-side power components							
Line reactor	U	U	U	U	U	S	S
PM250 Power Module with line-commutated energy recovery							
Available frame sizes	–	–	✓	✓	✓	✓	–
Line-side power components							
Line reactor [1]	–	–	– [1]	– [1]	– [1]	– [1]	–
PM260 Power Module with line-commutated energy recovery and integrated sine-wave filter							
Available frame sizes	–	–	–	✓	–	✓	–
Line-side power components							
Line reactor [1]	–	–	–	– [1]	–	– [1]	–

U = Base component
S = Lateral mounting
– = Not possible

[1] A line reactor is not required and must not be used in conjunction with a PM250 or PM260 Power Module.

Technical specifications

Line voltage 380 … 480 V 3 AC		Line reactor			
		6SE6400-3CC00-2AD3	6SE6400-3CC00-4AD3	6SE6400-3CC00-6AD3	6SL3203-0CD21-0AA0
Rated current	A	1.9	3.5	4.8	9
Power loss at 50/60 Hz, approx.	W	6/7	12.5/15	7.5/9	9/11
Line supply connection U1, V1, W1		Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	6	6	6	6
Load connection		Cable	Cable	Cable	Cable
• Conductor cross-section		4 × AWG16 (1.5 mm^2)	4 × AWG16 (1.5 mm^2)	4 × AWG16 (1.5 mm^2)	4 × AWG16 (1.5 mm^2)
• Length, approx.	m (ft)	0.38 (1.25)	0.38 (1.25)	0.38 (1.25)	0.46 (1.51)
PE connection		On housing with M5 screw stud	On housing with M5 screw stud	On housing with M5 screw stud	On housing with M5 screw stud
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	75.5 (2.97)	75.5 (2.97)	75.5 (2.97)	153 (6.02)
• Height	mm (in)	200 (7.87)	200 (7.87)	200 (7.87)	290 (11.42)
• Depth	mm (in)	50 (1.97)	50 (1.97)	50 (1.97)	50 (1.97)
Possible as base component		Yes	Yes	Yes	Yes
Weight, approx.	kg (lb)	0.6 (1.32)	0.8 (1.76)	0.6 (1.32)	3.4 (7.5)
Suitable for PM240 Power Module	Type	6SL3224-0BE13-7UA0 6SL3224-0BE15-5UA0	6SL3224-0BE17-5UA0 6SL3224-0BE21-1UA0	6SL3224-0BE21-5UA0	6SL3224-0BE22-2 . A0 6SL3224-0BE23-0 . A0
• Frame size		FSA	FSA	FSA	FSB

Line voltage 380 … 480 V 3 AC		Line reactor			
		6SL3203-0CD21-4AA0	6SL3203-0CD22-2AA0	6SL3203-0CD23-5AA0	6SL3203-0CJ24-5AA0
Rated current	A	11.6	25	31.3	47
Power loss at 50/60 Hz, approx.	W	27/32	98/118	37/44	90/115
Line supply connection U1, V1, W1		Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	6	6	16	16
Load connection		Cable	Cable	Cable	Cable
• Conductor cross-section		4 × AWG16 (1.5 mm^2)	4 × AWG10 (2.5 mm^2)	4 × AWG10 (2.5 mm^2)	4 × 16 mm^2
• Length, approx.	m (ft)	0.46 (1.51)	0.49 (1.61)	0.49 (1.61)	0.7 (2.3)
PE connection		On housing with M5 screw stud	On housing with M5 screw stud	On housing with M5 screw stud	On housing with M8 screw
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	153 (6.02)	189 (7.44)	189 (7.44)	275 (10.83)
• Height	mm (in)	290 (11.42)	371 (14.61)	371 (14.61)	455 (17.91)
• Depth	mm (in)	50 (1.97)	50 (1.97)	50 (1.97)	84 (3.31)
Possible as base component		Yes	Yes	Yes	Yes
Weight, approx.	kg (lb)	3.4 (7.5)	5.2 (11.5)	5.9 (13)	13 (28.7)
Suitable for PM240 Power Module	Type	6SL3224-0BE24-0 . A0	6SL3224-0BE25-5 . A0 6SL3224-0BE27-5 . A0	6SL3224-0BE31-1 . A0	6SL3224-0BE31-5 . A0 6SL3224-0BE31-8 . A0
• Frame size		FSB	FSC	FSC	FSD

Technical specifications

Line voltage 380 … 480 V 3 AC		Line reactor					
		6SL3203-0CD25-3AA0	6SL3203-0CJ28-6AA0	6SE6400-3CC11-2FD0	6SE6400-3CC11-7FD0	6SL3000-0CE32-3AA0	6SL3000-0CE32-8AA0
Rated current	A	63	94	151	186	224	278
Power loss at 50/60 Hz, approx.	W	90/115	170/215	280/360	280/360	240/270	210/250
Line supply connection U1, V1, W1		Screw terminals	Screw terminals	Flat connector for M10 cable lug	Flat connector for M10 cable lug	Flat connector for M10 screw	Flat connector for M10 screw
• Conductor cross-section	mm^2	16	50	–	–	–	–
Load connection		Cable	Cable	Flat connector for M10 cable lug	Flat connector for M10 cable lug	Flat connector for M10 screw	Flat connector for M10 screw
• Conductor cross-section	mm^2	4 × 16	4 × 35	–	–	–	–
• Length, approx.	m (ft)	0.7 (2.3)	0.7 (2.3)	–	–	–	–
PE connection		On housing with M8 screw	On housing with M8 screw	On housing with M8 screw stud	On housing with M8 screw stud	M6 screw	M6 screw
Degree of protection		IP20	IP20	IP00	IP00	IP00	IP00
Dimensions							
• Width	mm (in)	275 (10.83)	275 (10.83)	240 (9.45)	240 (9.45)	270 (10.63)	270 (10.63)
• Height	mm (in)	455 (17.91)	577 (22.72)	228 (8.98)	228 (8.98)	248 (9.76)	248 (9.76)
• Depth	mm (in)	84 (3.31)	94 (3.70)	141 (5.55)	141 (5.55)	200 (7.87)	200 (7.87)
Possible as base component		Yes	Yes	No	No	No	No
Weight, approx.	kg (lb)	13 (28.7)	19 (41.9)	25 (55.1)	25 (55.1)	24 (52.9)	24 (52.9)
Suitable for PM240 Power Module	Type	6SL3224-0BE32-2 . A0	6SL3224-0BE33-0 . A0 6SL3224-0BE33-7 . A0	6SL3224-0BE34-5 . A0 6SL3224-0BE35-5 . A0	6SL3224-0BE37-5 . A0	6SL3224-0BE38-8UA0	6SL3224-0BE41-1UA0
• Frame size		FSD	FSE	FSF	FSF	FSF	FSF

Line voltage 380 … 480 V 3 AC		Line reactor	
		6SL3000-0CE33-3AA0	6SL3000-0CE35-1AA0
Rated current	A	331	508
Power loss at 50/60 Hz, approx.	W	267	365
Line supply connection U1, V1, W1		1 x hole for M10 Provided for busbar connection	1 × hole for M12 Provided for busbar connection
Load connection		Provided for busbar connection	Provided for busbar connection
PE connection		M6 screw	M6 screw
Degree of protection		IP00	IP00
Dimensions			
• Width	mm (in)	270 (10.63)	300 (11.81)
• Height	mm (in)	248 (9.76)	269 (10.59)
• Depth	mm (in)	200 (7.87)	212 (8.35)
Possible as base component		No	No
Weight, approx.	kg (lb)	27.8 (61.3)	38.0 (83.8)
Suitable for PM240 Power Module	Type	6SL3224-0XE41-3UA0	6SL3224-0XE41-6UA0 6SL3224-0XE42-0UA0
• Frame size		FSGX	FSGX

Selection and ordering data

The following table lists recommendations for additional line-side components, such as fuses and circuit breakers

Note for use in compliance with IEC standards:

3NA3 fuses are recommended for European countries. The 3NE1 fuses are UL-compliant (corresponds to UL). The values in the table take into account the overload capability of the inverter.

Note for use in compliance with UL regulations:

Fuses for use in North America must be UL-certified, such as the Class NON fuse series from Bussmann or approved circuit breakers from the SIRIUS 3RV and SENTRON 3VL series according to UL 489 (category control number CCN: DiV Q).

Additional information about the listed fuses and circuit breakers can be found in Catalogs LV 1 AO, LV 10.1 and IC 10.

Rated power [1]		SINAMICS G120 PM230 Power Modules IP55/UL Type 12		**Fuse**		**Circuit breaker**
kW	hp	Type 6SL3223-...	Frame size	**Type 3NA3** Order No.	**Type 3NE1 (UL)** Order No.	Order No.
380 … 480 V 3 AC						
0.37	0.50	0DE13-7 . A0	FSA	**3NA3803**	**3NE1813-0**	**3RV1021-1CA10**
0.55	0.75	0DE15-5 . A0	FSA			**3RV1021-1DA10**
0.75	1.0	0DE17-5 . A0	FSA			**3RV1021-1FA10**
1.1	1.5	0DE21-1 . A0	FSA			**3RV1021-1GA10**
1.5	2	0DE21-5 . A0	FSA			**3RV1021-1JA10**
2.2	3	0DE22-2 . A0	FSA			**3RV1021-1KA10**
3.0	4	0DE23-0 . A0	FSA			**3RV1021-4AA10**
4.0	5	0DE24-0 . A0	FSB	**3NA3805**		**3RV1021-4BA10**
5.5	7.5	0DE25-5 . A0	FSB	**3NA3807**	**3NE1814-0**	**3RV1021-4BA10**
7.5	10	0DE27-5 . A0	FSB	**3NA3810**	**3NE1815-0**	**3RV1031-4EA10**
11.0	15	0DE31-1 . A0	FSC	**3NA3814**	**3NE1803-0**	**3RV1031-4FA10**
15.0	20	0DE31-5 . A0	FSC	**3NA3820**	**3NE1817-0**	**3RV1031-4HA10**
18.5	25	0DE31-8AA0	FSC			**3RV1042-4KA10**
22	30	0DE32-2 . A0	FSD	**3NA3822**	**3NE1818-0**	
30	40	0DE33-0 . A0	FSD	**3NA3824**	**3NE1820-0**	**3RV1042-4MA10**
37	50	0DE33-7 . A0	FSE	**3NA3830**	**3NE1021-0**	**3VL1712-.DD33-....**
45	60	0DE34-5 . A0	FSE	**3NA3832**	**3NE1022-0**	**3VL1716-.DD33-....**
55	75	0DE35-5 . A0	FSF	**3NA3836**	**3NE1224-0**	**3VL3720-.DC36-....**
75	100	0DE37-5 . A0	FSF	**3NA3140**	**3NE1225-0**	**3VL3725-.DC36-....**
90	125	0DE38-8 . A0	FSF	**3NA3144**	**3NE1227-0**	**3VL4731-.DC36-....**

[1] Rated power based on the rated output current I_{rated}. The rated output current I_{rated} is based on the duty cycle for low overload (LO).

Selection and ordering data

Rated power [1]		SINAMICS G120 PM240 Power Modules		Fuse		Circuit breaker
kW	hp	Type 6SL3224-...	Frame size	Type 3NA3 Order No.	Type 3NE1 (UL) Order No.	Order No.
380 … 480 V 3 AC						
0.37	0.50	0BE13-7UA0	FSA	**3NA3803**	UL-listed fuses such as the Class NON fuse series from Bussmann are required for North America.	**3RV1021-1CA10**
0.55	0.75	0BE15-5UA0	FSA			**3RV1021-1DA10**
0.75	1.0	0BE17-5UA0	FSA			**3RV1021-1FA10**
1.1	1.5	0BE21-1UA0	FSA			**3RV1021-1GA10**
1.5	2	0BE21-5UA0	FSA			**3RV1021-1JA10**
2.2	3	0BE22-2 . A0	FSB	**3NA3805**		**3RV1021-1KA10**
3.0	4	0BE23-0 . A0	FSB			**3RV1021-4AA10**
4.0	5	0BE24-0 . A0	FSB	**3NA3807**		**3RV1021-4BA10**
7.5	10	0BE25-5 . A0	FSC			**3RV1031-4EA10**
11.0	15	0BE27-5 . A0	FSC	**3NA3812**		**3RV1031-4FA10**
15.0	20	0BE31-1 . A0	FSC	**3NA3814**		**3RV1031-4HA10**
18.5	25	0BE31-5 . A0	FSD	**3NA3820**	**3NE1817-0**	**3RV1042-4KA10**
22	30	0BE31-8 . A0	FSD	**3NA3822**	**3NE1818-0**	
30	40	0BE32-2 . A0	FSD	**3NA3824**	**3NE1820-0**	**3RV1042-4MA10**
37	50	0BE33-0 . A0	FSE	**3NA3830**	**3NE1021-0**	**3VL1712-.DD33-....**
45	60	0BE33-7 . A0	FSE	**3NA3832**	**3NE1022-0**	**3VL1716-.DD33-....**
55	75	0BE34-5 . A0	FSF	**3NA3836**	**3NE1224-0**	**3VL3720-.DC36-....**
75	100	0BE35-5 . A0	FSF	**3NA3140**	**3NE1225-0**	**3VL3725-.DC36-....**
90	125	0BE37-5 . A0	FSF	**3NA3144**	**3NE1227-0**	**3VL4731-.DC36-....**
110	150	0BE38-8UA0	FSF	–		
132	200	0BE41-1UA0	FSF	–	**3NE1230-0**	
160	250	0XE41-3UA0	FSGX	**3NA3254**	**3NE1333-2**	**3VL4740-.DC36-....**
200	300	0BE41-6UA0	FSGX	**3NA3260**		**3VL5750-.DC36-....**
250	400	0BE42-0UA0	FSGX	**3NA3372**	**3NE1436-2**	

[1] Rated power based on the rated output current I_{rated}. The rated output current I_{rated} is based on the duty cycle for low overload (LO).

Selection and ordering data

Rated power [1]		SINAMICS G120 PM250 Power Modules		Fuse		Circuit breaker
kW	hp	Type 6SL3225-...	Frame size	Type 3NA3 Order No.	Type 3NE1 (UL) Order No.	Order No.
380 … 480 V 3 AC						
7.5	10	0BE25-5AA1	FSC	**3NA3807**	UL-listed fuses such as the Class NON fuse series from Bussmann are required for North America.	**3RV1031-4EA10**
11.0	15	0BE27-5AA1	FSC	**3NA3812**		**3RV1031-4FA10**
15.0	20	0BE31-1AA1	FSC	**3NA3814**		**3RV1031-4HA10**
18.5	25	0BE31-5 . A0	FSD	**3NA3820**	**3NE1817-0**	**3RV1042-4KA10**
22	30	0BE31-8 . A0	FSD	**3NA3822**	**3NE1818-0**	
30	40	0BE32-2 . A0	FSD	**3NA3824**	**3NE1820-0**	**3RV1042-4MA10**
37	50	0BE33-0 . A0	FSE	**3NA3830**	**3NE1021-0**	**3VL1712-.DD33-....**
45	60	0BE33-7 . A0	FSE	**3NA3832**	**3NE1022-0**	**3VL1716-.DD33-....**
55	75	0BE34-5 . A0	FSF	**3NA3836**	**3NE1224-0**	**3VL3720-.DC36-....**
75	100	0BE35-5 . A0	FSF	**3NA3140**	**3NE1225-0**	**3VL3725-.DC36-....**
90	125	0BE37-5 . A0	FSF	**3NA3144**	**3NE1227-0**	**3VL4731-.DC36-....**

Rated power [1]		SINAMICS G120 PM260 Power Modules		Fuse		Circuit breaker
kW	hp	Type 6SL3225-...	Frame size	Type 3NA3 Order No.	Type 3NE1 (UL) Order No.	Order No.
500 … 690 V 3 AC						
11.0	15	0BH27-5 . A1	FSD	**3NA3120-6**	–	**3RV1041-4FA10**
15.0	20	0BH31-1 . A1	FSD			
18.5	25	0BH31-5 . A1	FSD			
30	40	0BH32-2 . A1	FSF	**3NA3122-6**		**3RV1041-4JA10**
37	50	0BH33-0 . A1	FSF			**3RV1041-4KA10**
55	75	0BH33-7 . A1	FSF	**3NA3130-6**		**3RV1041-4MA10**

[1] Rated power based on the rated output current I_{rated}. The rated output current I_{rated} is based on the duty cycle for low overload (LO).

Overview

Braking resistors for Power Modules, frame sizes FSA and FSC

Braking resistor for PM240 Power Modules, frame size FSGX

Excess energy in the DC link is dissipated in the braking resistor. The braking resistors are intended for use with PM240 Power Modules which feature an integrated braking chopper, but cannot regenerate energy to the supply system. There is an optional plug-in Braking Module for frame size FSGX. For regenerative operation, e.g. the braking of a rotating mass with high moment of inertia, a braking resistor must be connected to convert the resulting energy into heat.

The braking resistors can be installed at the side next to the PM240 Power Modules. The braking resistors for the FSA and FSB frame sizes are designed as base components. If the PM240 Power Modules of the FSA or FSB frame size are operated without line reactor, the braking resistors can also be installed under the Power Modules.

The braking resistors for the Power Modules, frame sizes FSC to FSGX, should be placed outside the control cabinet or outside the switchgear room so that the heat is dissipated away from the Power Modules. The level of air conditioning required is therefore reduced.

Every braking resistor has a temperature switch (UL-listed). The temperature switch can be evaluated to prevent consequential damage if the braking resistor overheats.

Selection and ordering data

Rated power		SINAMICS G120 PM240 Power Module		Braking resistor
kW	hp	Type 6SL3224-...	Frame size	Order No.
380 … 480 V 3 AC				
0.37	0.50	0BE13-7UA0	FSA	**6SE6400-4BD11-0AA0**
0.55	0.75	0BE15-5UA0		
0.75	1.0	0BE17-5UA0		
1.1	1.5	0BE21-1UA0		
1.5	2	0BE21-5UA0		
2.2	3	0BE22-2 . A0	FSB	**6SL3201-0BE12-0AA0**
3.0	4	0BE23-0 . A0		
4.0	5	0BE24-0 . A0		
7.5	10	0BE25-5 . A0	FSC	**6SE6400-4BD16-5CA0**
11.0	15	0BE27-5 . A0		
15.0	20	0BE31-1 . A0		
18.5	25	0BE31-5 . A0	FSD	**6SE6400-4BD21-2DA0**
22	30	0BE31-8 . A0		
30	40	0BE32-2 . A0		
37	50	0BE33-0 . A0	FSE	**6SE6400-4BD22-2EA1**
45	60	0BE33-7 . A0		
55	75	0BE34-5 . A0	FSF	**6SE6400-4BD24-0FA0**
75	100	0BE35-5 . A0		
90	125	0BE37-5 . A0		
110	150	0BE38-8UA0	FSF	**6SE6400-4BD26-0FA0**
132	200	0BE41-1UA0		
160	250	0XE41-3UA0	FSGX [1]	**6SL3000-1BE31-3AA0**
200	300	0XE41-6UA0	FSGX [1]	**6SL3000-1BE32-5AA0**
250	400	0XE42-0UA0		

[1] A Braking Module must be additionally ordered for connection.

Integration

Braking resistors that are optionally available depending on the Power Module used

	Frame size						
	FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**	**FSGX**
PM240 Power Module with integrated braking chopper							**without integrated braking chopper**
Available frame sizes	✓	✓	✓	✓	✓	✓	✓
DC link components							
Braking resistor	U	U	S	S	S	S	S
PM250 Power Module with line-commutated energy recovery							
Available frame sizes	–	–	✓	✓	✓	✓	–
DC link components							
Braking resistor [1]	–	–	– [1]	– [1]	– [1]	– [1]	–
PM260 Power Module with line-commutated energy recovery and integrated sine-wave filter							
Available frame sizes	–	–	–	✓	–	✓	–
DC link components							
Braking resistor [1]	–	–	–	– [1]	–	– [1]	–

U = Base component
S = Lateral mounting
– = Not possible

Technical specifications

Line voltage 380 V … 480 V 3 AC		**Braking resistor**		
		6SE6400-4BD11-0AA0	6SL3201-0BE12-0AA0	6SE6400-4BD16-5CA0
Resistance	Ω	390	160	56
Rated power P_{DB}	kW	0.1	0.2	0.65
Peak power P_{max} (cycle time 12 s)	kW	2	4	11
Power connections		Shielded cable	Shielded cable	Shielded cable
• Conductor cross-section	mm^2	3 × 2.5	3 × 2.5	3 × 2.5
• Length	m (ft)	0.5 (1.64)	0.5 (1.64)	0.9 (2.95)
Thermostatic switch		NC contact	NC contact	NC contact
• Contact load, max.		250 V AC/2.5 A	250 V AC/2.5 A	250 V AC/2.5 A
Degree of protection		IP20	IP20	IP20
Frame size		FSA	FSB	FSC
Dimensions				
• Width	mm (in)	72 (2.83)	153 (6.02)	185 (7.28)
• Height	mm (in)	230 (9.06)	329 (12.95)	285 (11.22)
• Depth	mm (in)	43.5 (1.71)	43.5 (1.71)	150 (5.91)
Possible as base component		Yes	Yes	No
Weight, approx.	kg (lb)	1 (2.21)	2 (4.41)	3.8 (8.38)
Suitable for PM240 Power Module	Type	6SL3224-0BE13-7UA0 6SL3224-0BE15-5UA0 6SL3224-0BE17-5UA0 6SL3224-0BE21-1UA0 6SL3224-0BE21-5UA0	6SL3224-0BE22-2.A0 6SL3224-0BE23-0.A0 6SL3224-0BE24-0.A0	6SL3224-0BE25-5.A0 6SL3224-0BE27-5.A0 6SL3224-0BE31-1.A0
• Frame size		FSA	FSB	FSC

[1] PM250 and PM260 Power Modules are capable of line-commutated energy feedback. A braking resistor cannot be connected and is not necessary.

Technical specifications

Line voltage 380 V … 480 V 3 AC		Braking resistor			
		6SE6400-4BD21-2DA0	6SE6400-4BD22-2EA1	6SE6400-4BD24-0FA0	6SE6400-4BD26-0FA0
Resistance	Ω	27	15	8.2	5.5
Rated power P_{DB}	kW	1.2	2.2	4	5.6
Peak power P_{max} (cycle time 12 s)	kW	24	44	80	120
Power connections		M6 screw stud	M6 screw stud	M6 screw stud	M6 screw stud
Thermostatic switch		NC contact	NC contact	NC contact	NC contact
• Contact load, max.		250 V AC/2.5 A	250 V AC/2.5 A	250 V AC/2.5 A	250 V AC/2.5 A
Degree of protection		IP20	IP20	IP20	IP20
Frame size		FSD	FSE	FSF	FSF
Dimensions					
• Width	mm (in)	270 (10.63)	326 (12.83)	395 (15.55)	526 (20.71)
• Height	mm (in)	515 (20.28)	301 (11.85)	650 (25.59)	301 (11.85)
• Depth	mm (in)	175 (6.89)	484 (19.06)	315 (12.40)	484 (19.06)
Possible as base component		No	No	No	No
Weight, approx.	kg (lb)	7.4 (16.3)	11 (24.3)	16.7 (36.8)	17.5 (38.6)
Suitable for PM240 Power Module	Type	6SL3224-0BE31-5.A0 6SL3224-0BE31-8.A0 6SL3224-0BE32-2.A0	6SL3224-0BE33-0.A0 6SL3224-0BE33-7.A0	6SL3224-0BE34-5.A0 6SL3224-0BE35-5.A0 6SL3224-0BE37-5.A0	6SL3224-0BE38-8UA0 6SL3224-0BE41-1UA0
• Frame size		FSD	FSE	FSF	FSF

Line voltage 380 V … 480 V 3 AC		Braking resistor	
		6SL3000-1BE31-3AA0	6SL3000-1BE32-5AA0
Resistance	Ω	4.4	2.2
Rated power P_{DB}	kW	25	50
Peak power P_{max} (cycle time 12 s every 90 s)	kW	125	250
Power connections		M10 screw stud	M10 screw stud
Thermostatic switch		NC contact	NC contact
• Contact load, max.		250 V AC/2.5 A	250 V AC/2.5 A
Degree of protection		IP20	IP20
Frame size		FSGX	FSGX
Dimensions			
• Width	mm (in)	740 (29.13)	810 (31.89)
• Height	mm (in)	605 (23.82)	1325 (52.17)
• Depth	mm (in)	485 (19.09)	485 (19.09)
Possible as base component		No	No
Weight, approx.	kg (lb)	50 (110)	120 (265)
Suitable for PM240 Power Module	Type	6SL3224-0XE41-3UA0	6SL3224-0XE41-6UA0 6SL3224-0XE42-0UA0
• Frame size		FSGX	FSGX

Overview

A Braking Module and the matching external braking resistor are required to bring drives to a controlled standstill in the event of a power failure (e.g. emergency retraction or EMERGENCY STOP Category 1) or to limit the DC link voltage during a short period of generator operation. The Braking Module includes the power electronics and the associated control circuit. During operation, the DC link power is converted into heat loss in an external braking resistor. Braking Modules function autonomously.

The Braking Module is designed for installation in the PM240 Power Modules, frame size FSGX, and is cooled using the Power Module fan. The supply voltage for the electronics is taken from the DC link. The Braking Module is connected to the DC link using the busbar sets included in the scope of delivery.

The activation threshold of the Braking Module can be adjusted by means of a DIP switch. The braking power values specified in the technical specifications apply to the upper activation threshold.

Design

The Braking Modules in chassis format feature the following connections and interfaces as standard:

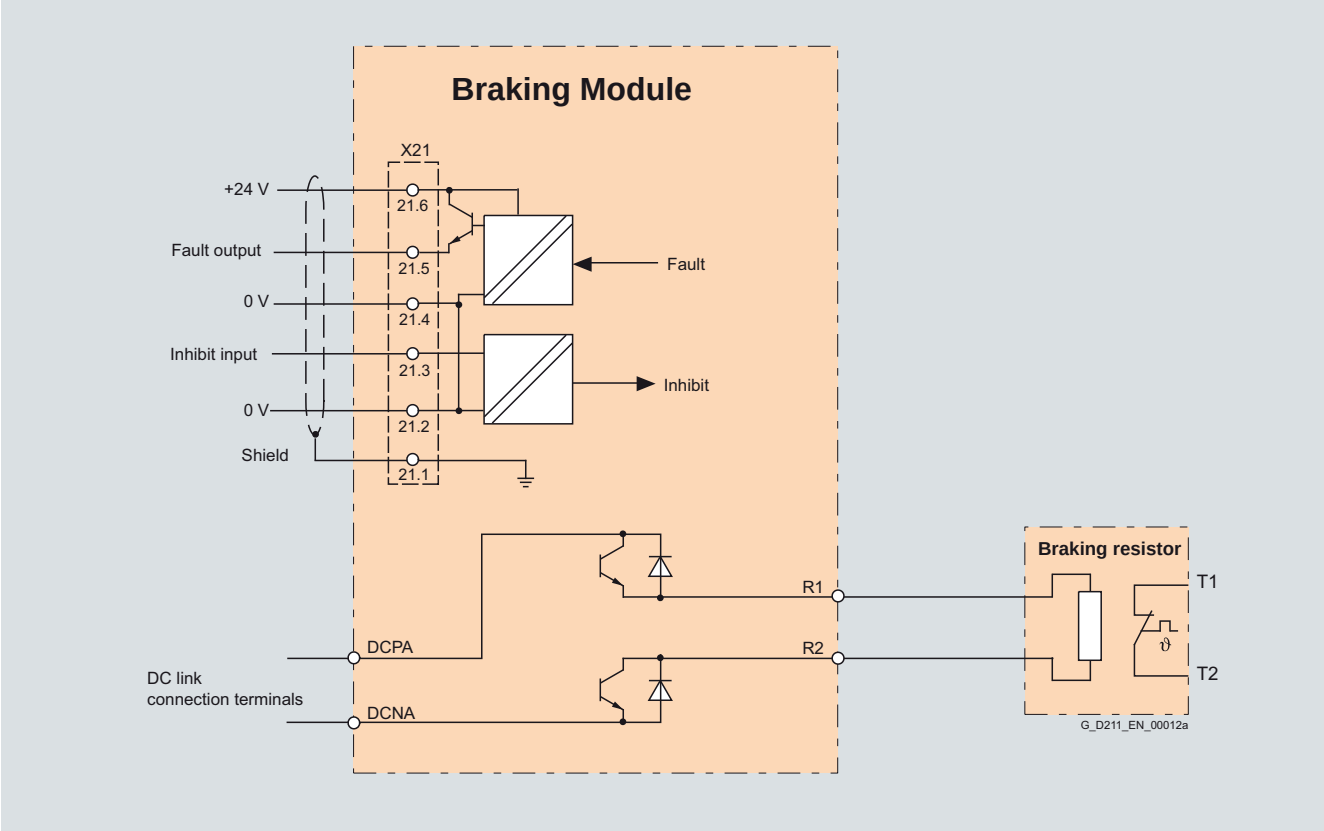
- 1 DC link connection
- 1 braking resistor connection
- 1 digital input (inhibit Braking Module/acknowledge fault)
- 1 digital output (Braking Module inhibited)
- 1 DIP switch for adjusting the application threshold

Selection and ordering data

Description	Order No.
DC link voltage 510 … 720 V DC	
Braking Module 50 kW/250 kW	**6SL3300-1AE32-5AA0**

6

Integration



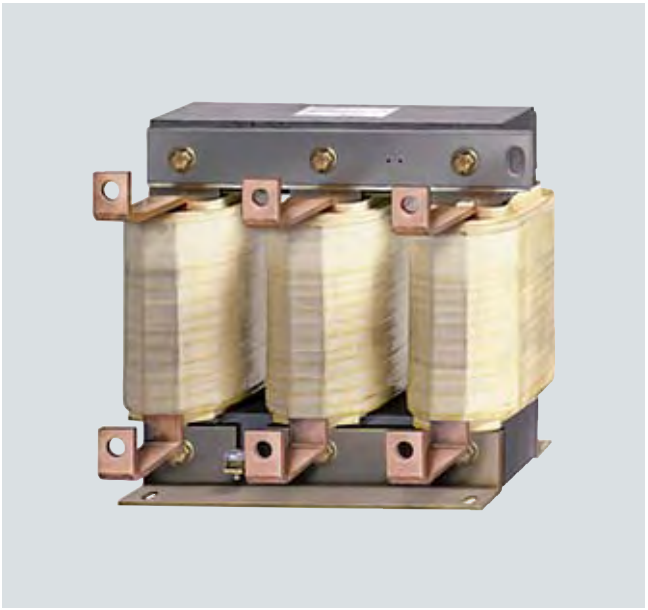
Connection example of a Braking Module

Technical specifications

DC link voltage 510 … 720 V DC	Braking Module
	6SL3300-1AE32-5AA0
Power	
• Rated power P_{DB}	50 kW
• Peak power P_{15}	250 kW
• Power P_{20}	200 kW
• Power P_{40}	100 kW
Activation thresholds Adjustable via DIP switch	774 V (factory setting) or 673 V
Cable length to braking resistor, max.	50 m (164 ft)
Digital inputs In accordance with IEC 61131-2 Type 1	
• Voltage	-3 … +30 V
• Low level (an open digital input is interpreted as "low")	-3 … +5 V
• High level	15 … 30 V
• Current consumption at 24 V DC, typ.	10 mA
• Conductor cross-section, max.	1.5 mm^2
Digital outputs continuously short-circuit-proof	
• Voltage	24 V DC
• Load current per digital output, max.	500 mA
• Conductor cross-section, max.	1.5 mm^2
R1/R2 connection	M8 screw
• Conductor cross-section, max.	50 mm^2
Weight, approx.	7.3 kg (16.1 lb)
Approvals	cURus
Suitable for installation in a PM240 Power Module	Frame size FSGX

Overview

Output reactors for Power Modules, frame sizes FSA and FSB



Output reactor for PM240 Power Modules, frame size FSGX

Output reactors reduce the voltage stress on the motor windings. At the same time, the capacitive charging/discharging currents, which place an additional load on the power unit when long motor cables are used, are reduced.

Output reactors are only provided for the PM240 and PM250 Power Modules. An output reactor is not required for the PM260 Power Module due to its integrated sine-wave filter.

The maximum permissible output frequency is 150 Hz when an output reactor is used – the pulse frequency must not exceed 4 kHz.

The output reactor must be installed as close as possible to the Power Module.

Output reactors are approved for use only in conjunction with "Vector" and "*V/f* control" modes.

Selection and ordering data

Rated power		SINAMICS G120 PM240 Power Modules		Output reactor
kW	hp	Type 6SL3224-...	Frame size	Order No.
380 … 480 V 3 AC				
0.37	0.50	0BE13-7UA0	FSA	**6SE6400-3TC00-4AD2**
0.55	0.75	0BE15-5UA0		
0.75	1.0	0BE17-5UA0		
1.1	1.5	0BE21-1UA0		
1.5	2	0BE21-5UA0		
2.2	3	0BE22-2 . A0	FSB	**6SL3202-0AE21-0CA0**
3.0	4	0BE23-0 . A0		
4.0	5	0BE24-0 . A0		
7.5	10	0BE25-5 . A0	FSC	**6SL3202-0AJ23-2CA0**
11.0	15	0BE27-5 . A0		
15.0	20	0BE31-1 . A0		
18.5	25	0BE31-5 . A0	FSD	**6SE6400-3TC05-4DD0**
22	30	0BE31-8 . A0	FSD	**6SE6400-3TC03-8DD0**
30	40	0BE32-2 . A0	FSD	**6SE6400-3TC05-4DD0**
37	50	0BE33-0 . A0	FSE	**6SE6400-3TC08-0ED0**
45	60	0BE33-7 . A0	FSE	**6SE6400-3TC07-5ED0**
55	75	0BE34-5 . A0	FSF	**6SE6400-3TC14-5FD0**
75	100	0BE35-5 . A0	FSF	**6SE6400-3TC15-4FD0**
90	125	0BE37-5 . A0	FSF	**6SE6400-3TC14-5FD0**
110	150	0BE38-8UA0	FSF	**6SL3000-2BE32-1AA0**
132	200	0BE41-1UA0	FSF	**6SL3000-2BE32-6AA0**
160	250	0XE41-3UA0	FSGX	**6SL3000-2BE33-2AA0**
200	300	0XE41-6UA0	FSGX	**6SL3000-2BE33-8AA0**
250	400	0XE42-0UA0	FSGX	**6SL3000-2BE35-0AA0**

Rated power		SINAMICS G120 PM250 Power Module		Output reactor
kW	hp	Type 6SL3225-...	Frame size	Order No.
380 … 480 V 3 AC				
7.5	10	0BE25-5AA1	FSC	**6SL3202-0AJ23-2CA0**
11.0	15	0BE27-5AA1		
15.0	20	0BE31-1AA1		
18.5	25	0BE31-5 . A0	FSD	**6SE6400-3TC05-4DD0**
22	30	0BE31-8 . A0	FSD	**6SE6400-3TC03-8DD0**
30	40	0BE32-2 . A0	FSD	**6SE6400-3TC05-4DD0**
37	50	0BE33-0 . A0	FSE	**6SE6400-3TC08-0ED0**
45	60	0BE33-7 . A0	FSE	**6SE6400-3TC07-5ED0**
55	75	0BE34-5 . A0	FSF	**6SE6400-3TC14-5FD0**
75	100	0BE35-5 . A0	FSF	**6SE6400-3TC15-4FD0**
90	125	0BE37-5 . A0	FSF	**6SE6400-3TC14-5FD0**

Integration

Output reactors that are optionally available depending on the Power Module used

The following line-side power components, DC link components and load-side power components are optionally available in the appropriate frames sizes for the Power Modules:

	Frame size						
	FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**	**FSGX**
PM240 Power Module with integrated braking chopper							**without integrated braking chopper**
Available frame sizes	✓	✓	✓	✓	✓	✓	✓
Load-side power components							
Output reactor	U	U	U	S	S	S	S
PM250 Power Module with line-commutated energy recovery							
Available frame sizes	–	–	✓	✓	✓	✓	–
Load-side power components							
Output reactor	–	–	U	S	S	S	–
PM260 Power Module with line-commutated energy recovery and integrated sine-wave filter							
Available frame sizes	–	–	–	✓	–	✓	–
Load-side power components							
Output reactor [1)]	–	–	–	–	–	–	–

U = Base component
S = Lateral mounting
– = Not possible

[1)] PM260 Power Modules do not require output reactors as they are already equipped with sine-wave filters.

Technical specifications

Line voltage 380 … 480 V 3 AC		Output reactor (for a 4 kHz pulse frequency)				
		6SE6400-3TC00-4AD2				
Rated current	A	4	4	4	4	4
Power loss	kW	0.005	0.005	0.005	0.005	0.005
Connection to the Power Module		Cable	Cable	Cable	Cable	Cable
• Conductor cross-section		4 × AWG16 (1.5 mm^2)	4 × AWG16 (1.5 mm^2)	4 × AWG16 (1.5 mm^2)	4 × AWG16 (1.5 mm^2)	4 × AWG16 (1.5 mm^2)
• Length, approx.	m (ft)	0.3 (0.98)	0.3 (0.98)	0.3 (0.98)	0.3 (0.98)	0.3 (0.98)
Motor connection		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	6	6	6	6	6
PE connection		M5 screw studs	M5 screw studs	M5 screw studs	M5 screw studs	M5 screw studs
Cable length, max. between output reactor and motor						
• 380 -10 % ... 400 V 3 AC						
- Shielded	m (ft)	150 (492)	150 (492)	150 (492)	150 (492)	150 (492)
- Unshielded	m (ft)	225 (738)	225 (738)	225 (738)	225 (738)	225 (738)
• 401 ... 480 V 3 AC +10 %						
- Shielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)
- Unshielded	m (ft)	150 (492)	150 (492)	150 (492)	150 (492)	150 (492)
Dimensions						
• Width	mm (in)	75.5 (2.97)	75.5 (2.97)	75.5 (2.97)	75.5 (2.97)	75.5 (2.97)
• Height	mm (in)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)
• Depth	mm (in)	110 (4.33)	110 (4.33)	110 (4.33)	110 (4.33)	110 (4.33)
Possible as base component		Yes	Yes	Yes	Yes	Yes
Degree of protection		IP00	IP00	IP00	IP00	IP00
Weight, approx.	kg (lb)	2 (4.41)	2 (4.41)	2 (4.41)	2 (4.41)	2 (4.41)
Suitable for PM240 Power Module	Type	6SL3224-0BE13-7UA0	6SL3224-0BE15-5UA0	6SL3224-0BE17-5UA0	6SL3224-0BE21-1UA0	6SL3224-0BE21-5UA0
• Rated power of the Power Module	kW (hp)	0.37 (0.5)	0.55 (0.75)	0.75 (1.0)	1.1 (1.5)	1.5 (2.0)
• Rated current I_{rated} of the Power Module	A	1.3	1.7	2.2	3.1	4.1
• Frame size		FSA	FSA	FSA	FSA	FSA

Technical specifications

Line voltage 380 … 480 V 3 AC		Output reactor (for a 4 kHz pulse frequency)					
		6SL3202-0AE21-0CA0			6SL3202-0AJ23-2CA0		
Rated current	A	9.4	9.4	9.4	32	32	32
Power loss	kW	0.02	0.02	0.02	0.06	0.06	0.06
Connection to the Power Module		Cable	Cable	Cable	Cable	Cable	Cable
• Conductor cross-section		4 × AWG14 (1.5 mm^2)	4 × AWG14 (1.5 mm^2)	4 × AWG14 (1.5 mm^2)	4 × AWG14 (1.5 mm^2)	4 × AWG14 (1.5 mm^2)	4 × AWG14 (1.5 mm^2)
• Length, approx.	m (ft)	0.4 (1.31)	0.4 (1.31)	0.4 (1.31)	0.35 (1.15)	0.35 (1.15)	0.35 (1.15)
Motor connection		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	6	6	6	6	6	6
PE connection		M5 screw studs	M5 screw studs	M5 screw studs	M5 screw studs	M5 screw studs	M5 screw studs
Cable length, max. between output reactor and motor							
• 380 -10 % ... 400 V 3 AC							
- Shielded	m (ft)	150 (492)	150 (492)	150 (492)	150 (492)	150 (492)	150 (492)
- Unshielded	m (ft)	225 (738)	225 (738)	225 (738)	225 (738)	225 (738)	225 (738)
• 401 ... 480 V 3 AC +10 %							
- Shielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)
- Unshielded	m (ft)	150 (492)	150 (492)	150 (492)	150 (492)	150 (492)	150 (492)
Dimensions							
• Width	mm (in)	154 (6.06)	154 (6.06)	154 (6.06)	189 (7.44)	189 (7.44)	189 (7.44)
• Height	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	334 (13.15)	334 (13.15)	334 (13.15)
• Depth	mm (in)	70 (2.76)	70 (2.76)	70 (2.76)	80 (3.15)	80 (3.15)	80 (3.15)
Possible as base component		Yes	Yes	Yes	Yes	Yes	Yes
Degree of protection		IP00	IP00	IP00	IP00	IP00	IP00
Weight, approx.	kg (lb)	4.4 (9.7)	4.4 (9.7)	4.4 (9.7)	9.1 (20.1)	9.1 (20.1)	9.1 (20.1)
Suitable for PM240 Power Module	Type	6SL3224-0BE22-2UA0 6SL3224-0BE22-2AA0	6SL3224-0BE23-0UA0 6SL3224-0BE23-0AA0	6SL3224-0BE24-0UA0 6SL3224-0BE24-0AA0	6SL3224-0BE25-5UA0 6SL3224-0BE25-5AA0	6SL3224-0BE27-5UA0 6SL3224-0BE27-5AA0	6SL3224-0BE31-1UA0 6SL3224-0BE31-1AA0
Suitable for PM250 Power Module	Type	–	–	–	6SL3225-0BE25-5AA1	6SL3225-0BE27-5AA1	6SL3225-0BE31-1AA1
• Rated power of the Power Module	kW (hp)	2.2 (3.0)	3 (4)	4 (5)	7.5 (10)	11 (15)	15 (20)
• Rated current I_{rated} of the Power Module	A	5.9	7.7	10.2	18	25	32
• Frame size		FSB	FSB	FSB	FSC	FSC	FSC

Technical specifications

Line voltage 380 … 480 V 3 AC		Output reactor (for a 4 kHz pulse frequency)				
		6SE6400-3TC05-4DD0	6SE6400-3TC03-8DD0	6SE6400-3TC05-4DD0	6SE6400-3TC08-0ED0	6SE6400-3TC07-5ED0
Rated current	A	68 [1]	45 [1]	68 [1]	104 [1]	90 [1]
Power loss	kW	0.2	0.2	0.2	0.17	0.27
Connection to the Power Module		Flat connector for M6 cable lug	Flat connector for M6 cable lug	Flat connector for M6 cable lug	Flat connector for M6 cable lug	Flat connector for M6 cable lug
Motor connection		Flat connector for M6 cable lug	Flat connector for M6 cable lug	Flat connector for M6 cable lug	Flat connector for M6 cable lug	Flat connector for M6 cable lug
PE connection		M6 screw	M6 screw	M6 screw	M6 screw	M6 screw
Cable length, max. between output reactor and motor						
• 380 -10 % ... 400 V 3 AC						
- Shielded	m (ft)	200 (656)	200 (656)	200 (656)	200 (656)	200 (656)
- Unshielded	m (ft)	300 (984)	300 (984)	300 (984)	300 (984)	300 (984)
• 401 ... 480 V 3 AC +10 %						
- Shielded	m (ft)	200 (656)	200 (656)	200 (656)	200 (656)	200 (656)
- Unshielded	m (ft)	300 (984)	300 (984)	300 (984)	300 (984)	300 (984)
Dimensions						
• Width	mm (in)	225 (8.86)	225 (8.86)	225 (8.86)	225 (8.86)	270 (10.63)
• Height	mm (in)	210 (8.27)	210 (8.27)	210 (8.27)	210 (8.27)	248 (9.76)
• Depth	mm (in)	150 (5.91)	179 (7.05)	150 (5.91)	150 (5.91)	209 (8.23)
Possible as base component		No	No	No	No	No
Degree of protection		IP00	IP00	IP00	IP00	IP00
Weight, approx.	kg (lb)	10.7 (23.6)	16.1 (35.5)	10.7 (23.6)	10.4 (22.9)	24.9 (54.9)
Suitable for PM240 Power Module	Type	6SL3224-0BE31-5UA0 6SL3224-0BE31-5AA0	6SL3224-0BE31-8UA0 6SL3224-0BE31-8AA0	6SL3224-0BE32-2UA0 6SL3224-0BE32-2AA0	6SL3224-0BE33-0UA0 6SL3224-0BE33-0AA0	6SL3224-0BE33-7UA0 6SL3224-0BE33-7AA0
Suitable for PM250 Power Module	Type	6SL3225-0BE31-5 . A0	6SL3225-0BE31-8 . A0	6SL3225-0BE32-2 . A0	6SL3225-0BE33-0 . A0	6SL3225-0BE33-7 . A0
• Rated power of the Power Module	kW (hp)	18.5 (25)	22 (30)	30 (40)	37 (50)	45 (60)
• Rated current I_{rated} of the Power Module	A	38	45	60	75	90
• Frame size		FSD	FSD	FSD	FSE	FSE

[1] On the rating plate of the reactor the current is specified according to high overload HO, which is lower than the indicated value for the low overload current of the Power Module.

Technical specifications

Line voltage 380 … 480 V 3 AC		Output reactor (for a 4 kHz pulse frequency)				
		6SE6400-3TC14-5FD0	6SE6400-3TC15-4FD0	6SE6400-3TC14-5FD0	6SL3000-2BE32-1AA0	6SL3000-2BE32-6AA0
Rated current	A	178 [1]	178 [1]	178 [1]	210	260
Power loss	kW	0.47	0.25	0.47	0.49	0.5
Connection to the Power Module		Flat connector for M8 cable lug	Flat connector for M8 cable lug	Flat connector for M8 cable lug	Flat connector for M10 screw	Flat connector for M10 screw
Motor connection		Flat connector for M8 cable lug	Flat connector for M8 cable lug	Flat connector for M8 cable lug	Flat connector for M10 screw	Flat connector for M10 screw
PE connection		M8 screw	M6 screw	M8 screw	M8 screw	M8 screw
Cable length, max. between output reactor and motor						
• 380 -10 % ... 400 V 3 AC						
- Shielded	m (ft)	200 (656)	200 (656)	200 (656)	200 (656)	200 (656)
- Unshielded	m (ft)	300 (984)	300 (984)	300 (984)	300 (984)	300 (984)
• 401 ... 480 V 3 AC +10 %						
- Shielded	m (ft)	200 (656)	200 (656)	200 (656)	200 (656)	200 (656)
- Unshielded	m (ft)	300 (984)	300 (984)	300 (984)	300 (984)	300 (984)
Dimensions						
• Width	mm (in)	350 (13.78)	270 (10.63)	350 (13.78)	300 (11.81)	300 (11.81)
• Height	mm (in)	321 (12.64)	248 (9.76)	321 (12.64)	285 (11.22)	315 (12.40)
• Depth	mm (in)	288 (11.34)	209 (8.23)	288 (11.34)	257 (10.12)	277 (10.91)
Possible as base component		No	No	No	No	No
Degree of protection		IP00	IP00	IP00	IP00	IP00
Weight, approx.	kg (lb)	51.5 (114)	24 (52.9)	51.5 (114)	60 (132)	66 (146)
Suitable for PM240 Power Module	Type	6SL3224-0BE34-5UA0 6SL3224-0BE34-5AA0	6SL3224-0BE35-5UA0 6SL3224-0BE35-5AA0	6SL3224-0BE37-5UA0 6SL3224-0BE37-5AA0	6SL3224-0BE38-8UA0	6SL3224-0BE41-1UA0
Suitable for PM250 Power Module	Type	6SL3225-0BE34-5 . A0	6SL3225-0BE35-5 . A0	6SL3225-0BE37-5 . A0	–	–
• Rated power of the Power Module	kW (hp)	55 (75)	75 (100)	90 (125)	110 (150)	132 (200)
• Rated current I_{rated} of the Power Module	A	110	145	178	205	250
• Frame size		FSF	FSF	FSF	FSF	FSF

[1] On the rating plate of the reactor the current is specified according to high overload HO, which is lower than the indicated value for the low overload current of the Power Module.

Technical specifications

Line voltage 380 … 480 V 3 AC		Output reactor (for a 4 kHz pulse frequency)		
		6SL3000-2BE33-2AA0	6SL3000-2BE33-8AA0	6SL3000-2BE35-0AA0
Rated current	A	310	380	490
Power loss	kW	0.470	0.500	0.500
Connection to the Power Module		1 x hole for M10	1 x hole for M10	1 × hole for M12
Motor connection		1 x hole for M10	1 x hole for M10	1 × hole for M12
PE connection		M6 screw	M6 screw	M6 screw
Cable length, max. between output reactor and motor				
• 380 -10 % ... 400 V 3 AC				
- Shielded	m (ft)	300 (984)	300 (984)	300 (984)
- Unshielded	m (ft)	450 (1476)	450 (1476)	450 (1476)
• 401 ... 480 V 3 AC +10 %				
- Shielded	m (ft)	300 (984)	300 (984)	300 (984)
- Unshielded	m (ft)	450 (1476)	450 (1476)	450 (1476)
Dimensions				
• Width	mm (in)	300 (11.81)	300 (11.81)	300 (11.81)
• Height	mm (in)	285 (11.22)	285 (11.22)	365 (14.37)
• Depth	mm (in)	257 (10.12)	277 (10.91)	277 (10.91)
Possible as base component		No	No	No
Degree of protection		IP00	IP00	IP00
Weight, approx.	kg (lb)	66 (146)	73 (161)	100 (221)
Suitable for PM240 Power Module	Type	6SL3224-0XE41-3UA0	6SL3224-0XE41-6UA0	6SL3224-0XE42-0UA0
Suitable for PM250 Power Module	Type	–	–	–
• Rated power of the Power Module	kW (hp)	160 (250)	200 (300)	250 (400)
• Rated current I_{rated} of the Power Module	A	302	370	477
• Frame size		FSGX	FSGX	FSGX

Overview

Sine-wave filter for PM240 Power Modules, frame size FSGX

A sine-wave filter limits the rate of rise of voltage and the capacitive charging/discharging currents that usually occur with inverter operation. An output reactor is not required. Sine-wave filters are only provided for the PM240 and PM250 Power Modules. PM260 Power Modules already have an integrated sine-wave filter and an additional sine-wave filter is not required.

The sine-wave filter at the inverter output supplies almost perfect sinusoidal voltages at the motor so that standard motors can be used without special cables. Standard cables can be used. The maximum permissible motor feeder cable length is 300 m (984 ft). The maximum output frequency is 150 Hz at 380 V to 480 V.

When using sine-wave filters, the following should be observed:

- Operation permissible with pulse frequencies from 4 kHz to 8 kHz (sine-wave filter from 160 kW (250 hp), only for 4 kHz)
- It must be ensured that the automatic pulse frequency reduction functions are also deactivated
- A derating of 5 % must be observed when selecting a suitable inverter
- The output frequency is limited to 150 Hz.
- Operation and commissioning may only be performed with the motor connected as the sine-wave filter is not no-load proof

Selection and ordering data

Rated power		SINAMICS G120 PM240 Power Module		Sine-wave filter
kW	hp	Type 6SL3224-...	Frame size	Order No.
380 … 480 V 3 AC				
0.37	0.50	0BE13-7UA0	FSA	**6SL3202-0AE20-3SA0**
0.55	0.75	0BE15-5UA0		
0.75	1.0	0BE17-5UA0		
1.1	1.5	0BE21-1UA0	FSA	**6SL3202-0AE20-6SA0**
1.5	2.0	0BE21-5UA0		
2.2	3.0	0BE22-2 . A0	FSB	**6SL3202-0AE21-1SA0**
3.0	4.0	0BE23-0 . A0		
4.0	5.0	0BE24-0 . A0	FSB	**6SL3202-0AE21-4SA0**
7.5	10	0BE25-5 . A0	FSC	**6SL3202-0AE22-0SA0**
11.0	15	0BE27-5 . A0	FSC	**6SL3202-0AE23-3SA0**
15.0	20	0BE31-1 . A0		
18.5	25	0BE31-5 . A0	FSD	**6SL3202-0AE24-6SA0**
22	30	0BE31-8 . A0		
30	40	0BE32-2 . A0	FSD	**6SL3202-0AE26-2SA0**
37	50	0BE33-0 . A0	FSE	**6SL3202-0AE28-8SA0**
45	60	0BE33-7 . A0		
55	75	0BE34-5 . A0	FSF	**6SL3202-0AE31-5SA0**
75	100	0BE35-5 . A0		
90	125	0BE37-5 . A0	FSF	**6SL3202-0AE31-8SA0**
110	150	0BE38-8UA0	FSF	**6SL3000-2CE32-3AA0**
132	200	0BE41-1UA0		
160	250	0XE41-3UA0	FSGX	**6SL3000-2CE32-8AA0**
200	300	0XE41-6UA0	FSGX	**6SL3000-2CE33-3AA0**
250	400	0XE42-0UA0	FSGX	**6SL3000-2CE34-1AA0**

Rated power		SINAMICS G120 PM250 Power Module		Sine-wave filter
kW	hp	Type 6SL3225-...	Frame size	Order No.
380 … 480 V 3 AC				
7.5	10	0BE25-5AA1	FSC	**6SL3202-0AE22-0SA0**
11.0	15	0BE27-5AA1	FSC	**6SL3202-0AE23-3SA0**
15.0	20	0BE31-1AA1		
18.5	25	0BE31-5 . A0	FSD	**6SL3202-0AE24-6SA0**
22	30	0BE31-8 . A0		
30	40	0BE32-2 . A0	FSD	**6SL3202-0AE26-2SA0**
37	50	0BE33-0 . A0	FSE	**6SL3202-0AE28-8SA0**
45	60	0BE33-7 . A0		
55	75	0BE34-5 . A0	FSF	**6SL3202-0AE31-5SA0**
75	100	0BE35-5 . A0		
90	125	0BE37-5 . A0	FSF	**6SL3202-0AE31-8SA0**

Integration

Sine-wave filters that are optionally available depending on the Power Module used

	Frame size						
	FSA	**FSB**	**FSC**	**FSD**	**FSE**	**FSF**	**FSGX**
PM240 Power Module with integrated braking chopper							**without integrated braking chopper**
Available frame sizes	✓	✓	✓	✓	✓	✓	✓
Load-side power components							
Sine-wave filter	U	U	U	S	S	S	S
PM250 Power Module with line-commutated energy recovery							
Available frame sizes	–	–	✓	✓	✓	✓	–
Load-side power components							
Sine-wave filter	–	–	U	S	S	S	–
PM260 Power Module with line-commutated energy recovery and integrated sine-wave filter							
Available frame sizes	–	–	–	✓	–	✓	–
Load-side power components							
Sine-wave filter	–	–	–	I	–	I	–

U = Base component
S = Lateral mounting
I = Integrated
– = Not possible

Technical specifications

Line voltage 380 ... 480 V 3 AC		Sine-wave filter (for pulse frequencies 4 kHz ... 8 kHz)				
		6SL3202-0AE20-3SA0			6SL3202-0AE20-6SA0	
Rated current	A	3.5	3.5	3.5	6.0	6.0
Power loss	kW	0.027	0.027	0.027	0.049	0.049
Connection to the Power Module		Cable	Cable	Cable	Cable	Cable
• Conductor cross-section	mm^2	6	6	6	6	6
• Length, approx.	m (ft)	0.5 (1.64)	0.5 (1.64)	0.5 (1.64)	0.5 (1.64)	0.5 (1.64)
Motor connection		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	6	6	6	6	6
PE connection		M5 screw studs	M5 screw studs	M5 screw studs	M5 screw studs	M5 screw studs
Cable length, max. between sine-wave filter and motor						
• 380 ... 480 V 3 AC ±10 %						
- Shielded	m (ft)	200 (656)	200 (656)	200 (656)	200 (656)	200 (656)
- Unshielded	m (ft)	300 (984)	300 (984)	300 (984)	300 (984)	300 (984)
Dimensions						
• Width	mm (in)	75.5 (2.97)	75.5 (2.97)	75.5 (2.97)	75.5 (2.97)	75.5 (2.97)
• Height	mm (in)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)
• Depth	mm (in)	110 (4.33)	110 (4.33)	110 (4.33)	110 (4.33)	110 (4.33)
Possible as base component		Yes	Yes	Yes	Yes	Yes
Degree of protection		IP20	IP20	IP20	IP20	IP20
Weight, approx.	kg (lb)	2.6 (5.73)	2.6 (5.73)	2.6 (5.73)	3.0 (6.62)	3.0 (6.62)
Suitable for PM240 Power Module	Type	6SL3224-0BE13-7UA0	6SL3224-0BE15-5UA0	6SL3224-0BE17-5UA0	6SL3224-0BE21-1UA0	6SL3224-0BE21-5UA0
• Rated power of the Power Module	kW (hp)	0.37 (0.5)	0.55 (0.75)	0.75 (1.0)	1.1 (1.5)	1.5 (2.0)
• Rated current I_{rated} of the Power Module	A	1.3	1.7	2.2	3.1	4.1
• Frame size		FSA	FSA	FSA	FSA	FSA

Technical specifications

Line voltage 380 ... 480 V 3 AC		Sine-wave filter (for pulse frequencies 4 kHz ... 8 kHz)					
		6SL3202-0AE21-1SA0		6SL3202-0AE21-4SA0	6SL3202-0AE22-0SA0	6SL3202-0AE23-3SA0	
Rated current	A	9.0	9.0	14.0	20.0	33.0	33.0
Power loss	kW	0.052	0.052	0.085	0.099	0.151	0.151
Connection to the Power Module		Cable	Cable	Cable	Cable	Cable	Cable
• Conductor cross-section	mm^2	6	6	6	10	10	10
• Length, approx.	m (ft)	0.5 (1.64)	0.5 (1.64)	0.5 (1.64)	0.5 (1.64)	0.5 (1.64)	0.5 (1.64)
Motor connection		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	6	6	6	6	6	6
PE connection		M5 screw studs	M5 screw studs	M5 screw studs	M5 screw studs	M5 screw studs	M5 screw studs
Cable length, max. between sine-wave filter and motor							
• 380 ... 480 V 3 AC ±10 %							
- Shielded	m (ft)	200 (656)	200 (656)	200 (656)	200 (656)	200 (656)	200 (656)
- Unshielded	m (ft)	300 (984)	300 (984)	300 (984)	300 (984)	300 (984)	300 (984)
Dimensions							
• Width	mm (in)	153 (6.02)	153 (6.02)	153 (6.02)	189 (7.44)	189 (7.44)	189 (7.44)
• Height	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	336 (13.23)	336 (13.23)	336 (13.23)
• Depth	mm (in)	100 (3.94)	100 (3.94)	100 (3.94)	140 (5.51)	140 (5.51)	140 (5.51)
Possible as base component		Yes	Yes	Yes	Yes	Yes	Yes
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20
Weight, approx.	kg (lb)	6 (13.2)	6 (13.2)	10 (22.1)	12 (26.5)	23 (50.7)	23 (50.7)
Suitable for PM240 Power Module	Type	6SL3224-0BE22-2UA0 6SL3224-0BE22-2AA0	6SL3224-0BE23-0UA0 6SL3224-0BE23-0AA0	6SL3224-0BE24-0UA0 6SL3224-0BE24-0AA0	6SL3224-0BE25-5UA0 6SL3224-0BE25-5AA0	6SL3224-0BE27-5UA0 6SL3224-0BE27-5AA0	6SL3224-0BE31-1UA0 6SL3224-0BE31-1AA0
Suitable for PM250 Power Module	Type	–	–	–	6SL3225-0BE25-5AA1	6SL3225-0BE27-5AA1	6SL3225-0BE31-1AA1
• Rated power of the Power Module	kW (hp)	2.2 (3)	3 (4)	4 (5)	7.5 (10)	11 (15)	15 (20)
• Rated current I_{rated} of the Power Module	A	5.9	7.7	10.2	18	25	32
• Frame size		FSB	FSB	FSB	FSC	FSC	FSC

Technical specifications

Line voltage 380 ... 480 V 3 AC		Sine-wave filter (for pulse frequencies 4 kHz ... 8 kHz)				
		6SL3202-0AE24-6SA0		6SL3202-0AE26-2SA0	6SL3202-0AE28-8SA0	
Rated current	A	47	47	61.8	92	92
Power loss	kW	0.185	0.185	0.152	0.251	0.251
Connection to the Power Module		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	50	50	50	95	95
Motor connection		Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm^2	50	50	50	95	95
PE connection		M6 screw	M6 screw	M6 screw	M8 screw	M8 screw
Cable length, max. between sine-wave filter and motor						
• 380 ... 480 V 3 AC ±10 %						
- Shielded	m (ft)	200 (656)	200 (656)	200 (656)	200 (656)	200 (656)
- Unshielded	m (ft)	300 (984)	300 (984)	300 (984)	300 (984)	300 (984)
Dimensions						
• Width	mm (in)	250 (9.84)	250 (9.84)	250 (9.84)	275 (10.83)	275 (10.83)
• Height	mm (in)	315 (12.40)	315 (12.40)	305 (12.01)	368 (14.49)	368 (14.49)
• Depth	mm (in)	262 (10.31)	262 (10.31)	262 (10.31)	275 (10.83)	275 (10.83)
Possible as base component		No	No	No	No	No
Degree of protection		IP00	IP00	IP00	IP00	IP00
Weight, approx.	kg (lb)	24.0 (52.9)	24.0 (52.9)	34.0 (75)	45.0 (99.2)	45.0 (99.2)
Suitable for PM240 Power Module	Type	6SL3224-0BE31-5UA0 6SL3224-0BE31-5AA0	6SL3224-0BE31-8UA0 6SL3224-0BE31-8AA0	6SL3224-0BE32-2UA0 6SL3224-0BE32-2AA0	6SL3224-0BE33-0UA0 6SL3224-0BE33-0AA0	6SL3224-0BE33-7UA0 6SL3224-0BE33-7AA0
Suitable for PM250 Power Module	Type	6SL3225-0BE31-5 . A0	6SL3225-0BE31-8 . A0	6SL3225-0BE32-2 . A0	6SL3225-0BE33-0 . A0	6SL3225-0BE33-7 . A0
• Rated power of the Power Module	kW (hp)	18.5 (25)	22 (30)	30 (40)	37 (50)	45 (60)
• Rated current I_{rated} of the Power Module	A	38	45	60	75	90
• Frame size		FSD	FSD	FSD	FSE	FSE

Technical specifications

Line voltage 380 ... 480 V 3 AC		Sine-wave filter (for pulse frequencies 4 kHz ... 8 kHz, from 160 kW (250 hp), only 4 kHz)				
		6SL3202-0AE31-5SA0		6SL3202-0AE31-8SA0	6SL3000-2CE32-3AA0	
Rated current	A	150	150	182	225	225
Power loss	kW	0.43	0.43	0.47	0.221	0.221
Connection to the Power Module		Screw terminals	Screw terminals	Screw terminals	1 x hole for M10	1 x hole for M10
• Conductor cross-section	mm^2	150	150	150		
Motor connection		Screw terminals	Screw terminals	Screw terminals	1 x hole for M10	1 x hole for M10
• Conductor cross-section	mm^2	150	150	150		
PE connection		M8 screw	M6 screw	M8 screw	1 x hole for M10	1 x hole for M10
Cable length, max. between sine-wave filter and motor						
• 380 ... 480 V 3 AC ±10 %						
- Shielded	m (ft)	200 (656)	200 (656)	200 (656)	300 (984)	300 (984)
- Unshielded	m (ft)	300 (984)	300 (984)	300 (984)	450 (1476)	450 (1476)
Dimensions						
• Width	mm (in)	350 (13.78)	350 (13.78)	350 (13.78)	620 (24.41)	620 (24.41)
• Height	mm (in)	440 (17.32)	440 (17.32)	468 (18.43)	300 (11.81)	300 (11.81)
• Depth	mm (in)	305 (12.01)	305 (12.01)	305 (12.01)	320 (12.60)	320 (12.60)
Possible as base component		No	No	No	No	No
Degree of protection		IP00	IP00	IP00	IP00	IP00
Weight, approx.	kg (lb)	63.0 (139)	63.0 (139)	80.0 (176)	124 (273)	124 (273)
Suitable for PM240 Power Module	Type	6SL3224-0BE34-5UA0 6SL3224-0BE34-5AA0	6SL3224-0BE35-5UA0 6SL3224-0BE35-5AA0	6SL3224-0BE37-5UA0 6SL3224-0BE37-5AA0	6SL3224-0BE38-8UA0	6SL3224-0BE41-1UA0
Suitable for PM250 Power Module	Type	6SL3225-0BE34-5 . A0	6SL3225-0BE35-5 . A0	6SL3225-0BE37-5 . A0	–	–
• Rated power of the Power Module	kW (hp)	55 (75)	75 (100)	90 (125)	110 (150)	132 (200)
• Rated current I_{rated} of the Power Module	A	110	145	178	205	250
• Frame size		FSF	FSF	FSF	FSF	FSF

Technical specifications

Line voltage 380 ... 480 V 3 AC		Sine-wave filter (for pulse frequencies 4 kHz ... 8 kHz, from 160 kW (250 hp), only 4 kHz)		
		6SL3000-2CE32-8AA0	6SL3000-2CE33-3AA0	6SL3000-2CE34-1AA0
Rated current	A	276	333	408
Power loss	kW	0.235	0.245	0.34
Connection to the Power Module		1 x hole for M10	1 x hole for M10	1 x hole for M10
Motor connection		1 x hole for M10	1 x hole for M10	1 x hole for M10
PE connection		1 x hole for M10	1 x hole for M10	1 x hole for M10
Cable length, max. between sine-wave filter and motor				
• 380 ... 480 V 3 AC ±10 %				
- Shielded	m (ft)	300 (984)	300 (984)	300 (984)
- Unshielded	m (ft)	450 (1476)	450 (1476)	450 (1476)
Dimensions				
• Width	mm (in)	620 (24.41)	620 (24.41)	620 (24.41)
• Height	mm (in)	300 (11.81)	370 (14.57)	370 (14.57)
• Depth	mm (in)	320 (12.60)	360 (14.17)	360 (14.17)
Possible as base component		No	No	No
Degree of protection		IP00	IP00	IP00
Weight, approx.	kg (lb)	127 (280)	136 (300)	198 (437)
Suitable for PM240 Power Module	Type	6SL3224-0XE41-3UA0	6SL3224-0XE41-6UA0	6SL3224-0XE42-0UA0
Suitable for PM250 Power Module	Type	–	–	–
• Rated power of the Power Module	kW (hp)	160 (250)	200 (300)	250 (400)
• Rated current I_{rated} of the Power Module	A	302	370	477
• Frame size		FSGX	FSGX	FSGX

Overview

Operator panel	Intelligent Operator Panel IOP and IOP Handheld	Basic Operator Panel BOP-2
		
Description	Thanks to the large plain text display, menu-based operation and the application wizards, commissioning of the standard drives is easy. Integrated application wizards guide the user interactively through the commissioning process for important applications such as pumps, fans, compressors and conveyor systems.	Commissioning of standard drives is easy with the menu-prompted dialog on a 2-line display. Simultaneous display of the parameter and parameter value, as well as parameter filtering, means that basic commissioning of a drive can be performed easily and, in most cases, without a printed parameter list.
Possible applications	• Directly mounted on SINAMICS G120 • Can be mounted in the control cabinet door using a door mounting kit (achievable degree of protection is IP54/ UL Type 12) • Available as handheld version • 5 languages available	• Directly mounted on SINAMICS G120 • Can be mounted in the control cabinet door using a door mounting kit (achievable degree of protection is IP55/UL Type 12)
Quick commissioning without expert knowledge	• Standard commissioning using the clone function • User-defined parameter list with a reduced number of self-selected parameters • Simple commissioning of standard applications using application-specific wizards, it is not necessary to know the parameter structure • Simple local commissioning using the handheld version • Commissioning largely without documentation	• Standard commissioning using the clone function
High degree of operator friendliness and intuitive operation	• Direct manual operation of the drive – you can simply toggle between the automatic and manual modes • Intuitive navigation using a rotary knob – just like in everyday applications • Graphic display to show status values such as pressure or flow in bar-type diagrams • Status display with freely selectable units to specify physical values	• Direct manual operation of the drive – you can simply toggle between the automatic and manual modes – • 2-line display for showing up to 2 process values with text • Status display of predefined units
Minimization of maintenance times	• Diagnostics using plain text display, can be used locally on-site without documentation • Simple update of languages, wizards and firmware via USB	• Diagnostics with menu prompting with 7-segment display

Overview

Intelligent Operator Panel IOP

The Intelligent Operator Panel IOP is a very user-friendly and powerful operator panel for the SINAMICS G120, SINAMICS G120C, SINAMICS G120D, SINAMICS G120P standard drives and SIMATIC ET 200 frequency converters.

The IOP supports both entry-level personnel and drive experts. Thanks to the large plain text display, the menu-based operation and the application wizards, it is easy to commission standard drives.
A drive can be essentially commissioned without having to use a printed parameter list – as the parameters are displayed in plain text, and explanatory help texts and the parameter filtering function are provided.

Application wizards interactively guide you when commissioning important applications such as conveyor technology, pumps, fans and compressors. There are quick commissioning wizards for general commissioning.

The drives are easily controlled manually using directly assigned buttons and the navigation wheel. The IOP has a dedicated switchover button to switch from automatic to manual mode.

The inverter can be diagnosed in a user-friendly fashion using the plain text display of faults and alarms. Help texts can be obtained by pressing the INFO button.

Up to 2 process values can be displayed graphically or numerically on the status screen/status display. Process values can also be displayed in technological units.

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

The IOP includes the following language packages: English, French, German, Italian and Spanish.

The IOP can be installed in control cabinet doors using the optionally available door mounting kit (not possible in conjunction with the PM230 Power Module).

The operating temperature of the IOP is 0 ... 50 °C (32 ... 122 °F).

IOP Handheld

A handheld version of the IOP can be ordered for mobile use. In addition to the IOP, this includes a housing with rechargeable batteries, charging unit and RS232 connecting cable. The charging unit is supplied with connector adapters for Europe, the US and UK. When the batteries are fully charged, the operating time is up to 8 hours.

To connect the IOP Handheld to SINAMICS G110D and SINAMICS G120D, the RS232 connecting cable with optical interface is required in addition.

The IOP Handheld cannot be used in conjunction with the PM230 Power Module.

Updating the IOP

The IOP can be updated and expanded using the integrated USB interface.

Data to support future drive systems can be transferred from the PC to the IOP via drag & drop. Further, the USB interface allows user languages and wizards that become available in the future to be subsequently downloaded and the firmware to be updated for the IOP.

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

Selection and ordering data

Description	Order No.
Intelligent Operator Panel IOP	**6SL3255-0AA00-4JA0**
IOP Handheld For use with SINAMICS G120, SINAMICS G110D, SINAMICS G120D, SIMATIC ET 200S FC or SIMATIC ET 200pro FC Included in the scope of delivery: • IOP • Handheld housing • Rechargeable batteries (4 × AA) • Charging unit (international) • RS232 connecting cable (3 m/9.84 ft long, can only be used for SINAMICS G120 and SIMATIC ET 200S FC) • USB cable (1 m/3.28 ft long)	**6SL3255-0AA00-4HA0**
Accessories	
Door mounting kit IP54 degree of protection for mounting an operator panel in control cabinet doors with sheet steel thicknesses of 1 … 3 mm (0.04 ...0.12 in) IP54 degree of protection for IOP IP55 degree of protection for BOP-2 Included in the scope of delivery: • Seal • Mounting material • Connecting cable (5 m/16.41 ft long)	**6SL3256-0AP00-0JA0**
RS232 connecting cable With optical interface to connect the SINAMICS G110D, SINAMICS G120D or SIMATIC ET 200pro FC inverters to the IOP Handheld (2.5 m/8.2 ft long)	**3RK1922-2BP00**

Benefits

- Simple commissioning of standard applications using wizards, it is not necessary to know the parameter structure
- Diagnostics using plain text display; can be used locally on-site without documentation
- Direct manual operation of the drive; you can toggle between the automatic and manual modes
- Status display with freely selectable units; display of real physical values
- Intuitive navigation using a wheel – just like in everyday applications
- Graphic display with bar charts e.g. for status values such as pressure or flowrate
- Quickly and simply mounted in the door – mechanically and electrically
- Simple local commissioning on-site using the handheld version
- Commissioning without documentation using the integrated help function
- Standard commissioning using the clone function (parameter set data is saved for fast replacement)
- User-defined parameter list with a reduced number of self-selected parameters (to generate your own commissioning screens)
- 5 integrated languages
- Simple update of languages, wizards and firmware updates via USB

Integration

Using the IOP with the inverters

	SINAMICS G120 with CU230P-2, CU240B-2 or CU240E-2 Control Units	SINAMICS G120P (PM230) with CU230P-2 Control Unit	SINAMICS G110D and SINAMICS G120D
Plugging the IOP onto the inverter (power supply from the Control Unit)	✓	✓	–
Door mounting with door mounting kit (power supply from the Control Unit)	✓	–	–
Mobile use of the IOP Handheld (supplied from rechargeable batteries)	✓	–	✓ (RS232 connecting cable with optical interface required)

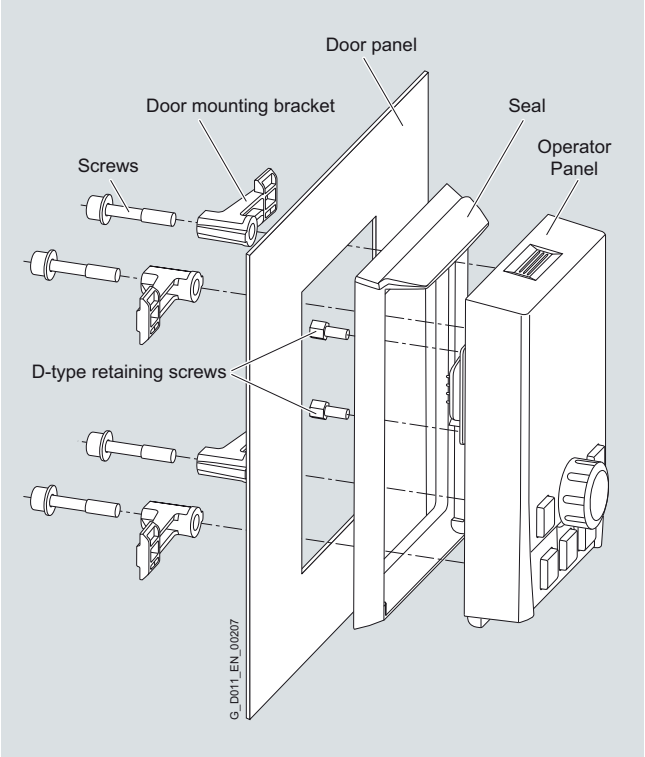
Mounting the IOP on a Control Unit

The IOP can be directly plugged onto the Control Unit.

CU230P-2 Control Unit with plugged-on IOP

Door mounting

Using the optionally available door mounting kit, the IOP can be simply mounted in a control cabinet door with just a few manual operations (presently only available in conjunction with SINAMICS G120 and CU230P-2, CU240B-2, CU240E-2 Control Units). Degree of protection IP54/UL Type 12 is achieved for door mounting.



Door mounting kit with plugged-on IOP

Overview

Basic Operator Panel BOP-2

The Basic Operator Panel BOP-2 can be used to commission drives, monitor drives in operation and input individual parameter settings.

Commissioning of standard drives is easy with the menu-prompted dialog on a 2-line display. Simultaneous display of the parameter and parameter value, as well as parameter filtering, means that basic commissioning of a drive can be performed easily and, in most cases, without a printed parameter list.

The drives are easily controlled manually using directly assigned navigation buttons. The BOP-2 has a dedicated switchover button to switch from automatic to manual mode.

Diagnostics can easily be performed on the connected inverter by following the menus.

Up to two process values can be numerically visualized simultaneously.

BOP-2 supports standard commissioning of identical drives. For this purpose, a parameter list can be copied from an inverter into the BOP-2 and when required, downloaded into other drive units of the same type.

The operating temperature of the BOP-2 is 0 ... 50 °C (32 ... 122 °F).

Selection and ordering data

Description	Order No.
Basic Operator Panel BOP-2	**6SL3255-0AA00-4CA1**
Accessories	
Door mounting kit For mounting an operator panel in control cabinet doors with sheet steel thicknesses of 1 … 3 mm (0.04 ...0.12 in) IP54 degree of protection for IOP IP55 degree of protection for BOP-2 Included in the scope of delivery: • Seal • Mounting material • Connecting cable (5 m/16.41 ft long)	**6SL3256-0AP00-0JA0**

Benefits

- Shorten commissioning times – Easy commissioning of standard drives using basic commissioning wizards (setup)
- Minimize standstill times – Fast detection and rectification of errors (Diagnostics)
- Greater transparency in the process – The status display of the BOP-2 makes process variable monitoring easy (Monitoring)
- Direct mounting on the inverter (also see IOP)
- User-friendly user interface:
  - Easy navigation using clear menu structure and clearly assigned control keys
  - Two-line display

Integration

Using the BOP-2 with SINAMICS G120 inverters

	CU230P-2	CU240B-2	CU240E-2
Plugging the BOP-2 onto the inverter	✓	✓	✓
Door mounting with door mounting kit	✓	✓	✓

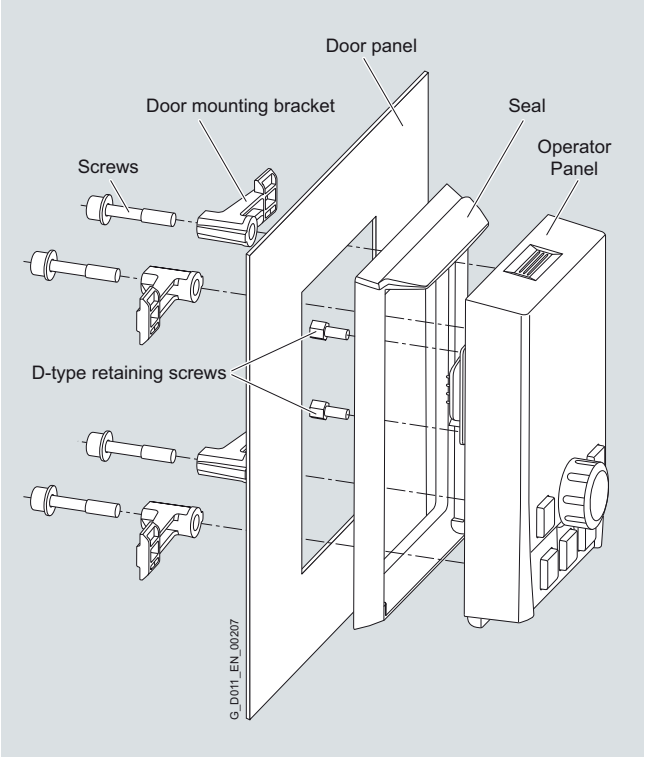
Mounting a BOP-2 on a CU2 . 0 . -2 Control Unit

The BOP-2 can be directly plugged onto a Control Unit "-2" (e.g. CU230P-2, CU240B-2, CU240E-2).

CU240E-2 Control Unit with plugged-on BOP-2

Door mounting

Using the optionally available door mounting kit, the BOP-2 can be simply mounted in a control cabinet door with just a few manual operations (presently only available in conjunction with SINAMICS G120 and CU230P-2, CU240B-2, CU240E-2 Control Units). Degree of protection IP55 is achieved for door mounting.



Door mounting kit with plugged-on operator panel

Supplementary system components
Blanking cover for PM230 Power Module

Overview

SINAMICS G120P, frame size FSC, with blanking cover

The blanking cover is mounted on the inverter in place of an operator panel, if an operator panel is not required. When the blanking cover is plugged onto the PM230 Power Module, degree of protection IP55/UL Type 12 is achieved.

Selection and ordering data

Description	Order No.
Blanking cover For PM230 Power Module	**6SL3256-1BA00-0AA0**

Supplementary system components
Memory cards

Overview

SINAMICS micro memory card (MMC)/SIMATIC memory card (SD card)

The parameter settings for an inverter can be stored on the SINAMICS micro memory card (MMC) or SIMATIC memory card (SD card). When service is required, e.g. after the converter has been replaced and the data has been downloaded from the memory card, the drive system is immediately ready for use once more.

- Parameter settings can be written from the memory card to the inverter or saved from the inverter to the memory card.
- Up to 100 parameter sets can be stored.
- The memory card supports standard commissioning without the use of an operator panel such as the BOP-2 or the STARTER commissioning tool.

Note:

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

Selection and ordering data

Description	Order No
SINAMICS micro memory card (MMC)	**6SL3254-0AM00-0AA0**
SIMATIC memory card (SD card) For SINAMICS G120C and the SINAMICS G120 CU2 . 0 . -2 Control Units	**6ES7954-8LB01-0AA0**

Overview

The Brake Relay allows the Power Module to be connected to an electromechanical motor brake, thereby allowing the motor brake to be driven directly by the Control Unit.

Selection and ordering data

Description	Order No.
Brake Relay Including cable harness for connection with the Power Module	**6SL3252-0BB00-0AA0**

Technical specifications

	Brake Relay 6SL3252-0BB00-0AA0
Switching capability of the NO contact, max.	440 V AC / 3.5 A 30 V DC / 12 A
Conductor cross-section, max.	2.5 mm^2
Degree of protection	IP20
Dimensions	
• Width	68 mm (2.68 in)
• Height	63 mm (2.48 in)
• Depth	33 mm (1.30 in)
Weight, approx.	0.17 kg (0.37 lb)

6

Integration

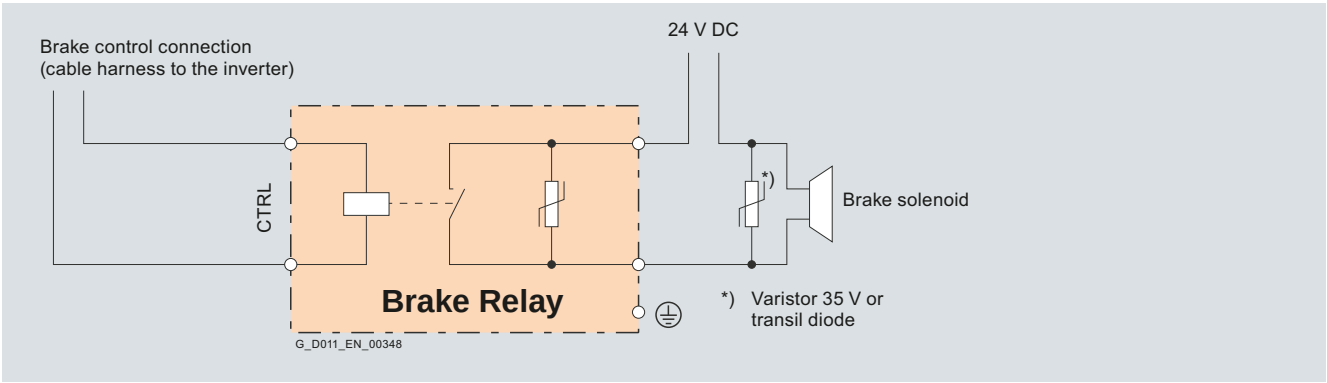
The Brake Relay has the following interfaces:

- A switch contact (NO contact) to control the motor brake solenoid
- A connection for the cable harness (CTRL) for connection to the Power Module

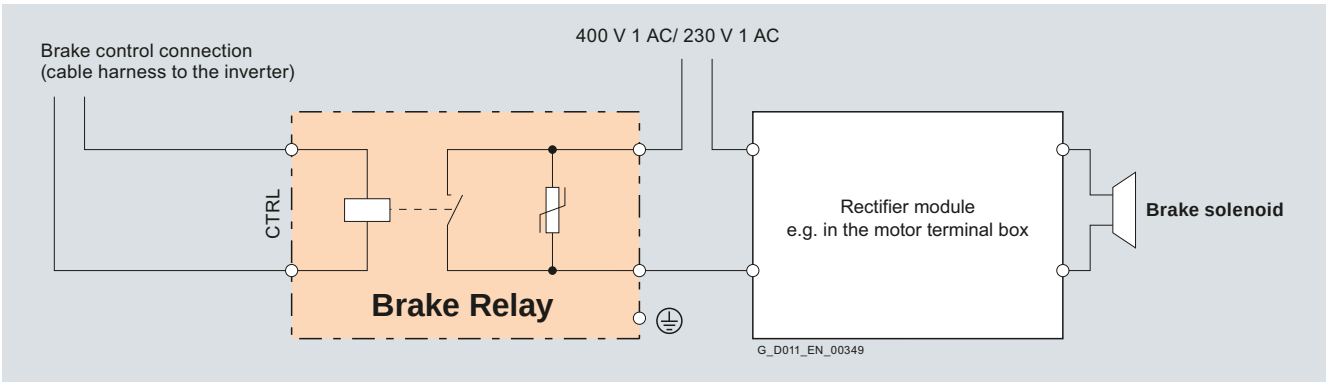
The Brake Relay can be installed on the shield bonding plate near the power terminals of the Power Module.

The supplied Brake Relay includes the cable harness for connection with the Power Module.

The 24 V DC solenoid of the motor brake is connected via an external power supply. For 24 V DC, external surge arrestors are required (e.g. varistor, transil diode).



Connection example of 24 V DC Brake Relay



Connection example of 230 ... 400 V 1 AC Brake Relay

Supplementary system components
Adapter for mounting on DIN rails

Overview

The adapter for DIN rail mounting can be used to mount inverters, frame sizes FSA and FSB, on DIN mounting rails (2 units with a center-to-center distance of 100 mm/3.94 in).

Furthermore, the motor cable shield connection and other cable shields required for mounting inverters on DIN rails comply with the same standards for emissions and conducted emissions as if the inverter were directly installed in a control cabinet.

The adapter for inverter frame size FSA can be used to mount converters singly or with matching line filter.

The adapter for inverter frame size FSB can be used to mount inverters with or without an integrated line filter.

Selection and ordering data

Description	Order No.
Adapter for mounting on DIN rails	
• For Power Module, frame size FSA	**6SL3262-1BA00-0BA0**
• For Power Module, frame size FSB	**6SL3262-1BB00-0BA0**

Supplementary system components
PC inverter connection kit 2

Overview

For controlling and commissioning an inverter directly from a PC if the STARTER commissioning tool has been installed on the PC. With this, the inverter can be

- parameterized (commissioning, optimization)
- monitored (diagnostics)
- controlled (master control via the STARTER commissioning tool for test purposes).

A USB cable (3 m/9.84 ft) and the STARTER commissioning tool [1] on DVD-ROM are included in the scope of delivery.

The PC inverter connection kit 2 is suitable for the following SINAMICS G120 Control Units:

- CU230P-2 HVAC
- CU230P-2 DP
- CU230P-2 CAN
- CU240B-2
- CU240B-2 DP
- CU240E-2
- CU240E-2 DP
- CU240E-2 F
- CU240E-2 DP-F

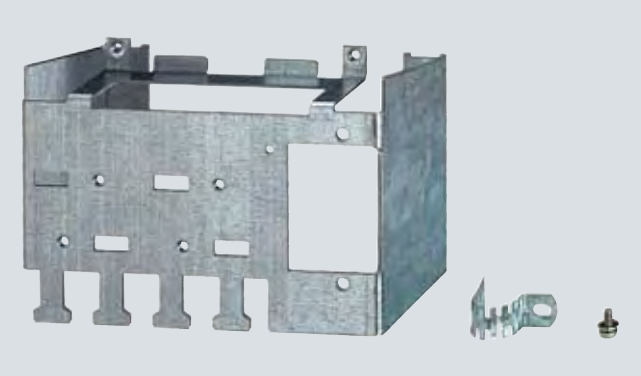
Selection and ordering data

Description	Order No.
PC inverter connection kit 2 For CU2.0.-2 Control Units Including USB cable (3 m/9.84 ft) and STARTER commissioning tool [1] on DVD-ROM	**6SL3255-0AA00-2CA0**

[1] The STARTER commissioning tool is also available on the Internet at http://support.automation.siemens.com/WW/view/en/10804985/133100

Supplementary system components
Shield connection kits for Power Modules

Overview



Shield connection kit for Power Module, frame size FSB

The shield connection kit

- makes it easier to connect the shields of supply and control cables
- provides mechanical strain relief
- ensures optimum EMC performance
- is used to attach the Brake Relay

The shield connection kit includes

- a shield bonding plate for the required Power Module
- a shield bonding plate for a CU240E Control Unit (exception: CU240E-2)
- connection elements and clamps for mounting
- Mounting device for Brake Relay, frame sizes FSB to FSF

Selection and ordering data

Description	Order No.
Shield connection kit For PM240 and PM250 Power Modules	
• Frame size FSA	**6SL3262-1AA00-0BA0**
• Frame size FSB	**6SL3262-1AB00-0DA0**
• Frame size FSC	**6SL3262-1AC00-0DA0**
• Frame sizes FSD and FSE	**6SL3262-1AD00-0DA0**
• Frame size FSF	**6SL3262-1AF00-0DA0**
Shield connection kit For PM260 Power Modules	
• Frame size FSD	**6SL3262-1FD00-0CA0**
• Frame size FSF	**6SL3262-1FF00-0CA0**

Supplementary system components
Shield connection kits for Control Units

Overview

The shield connection kits offer for all signal and communication cables

- Optimum shield connection
- Strain relief

A shield connection kit contains the following:

- A matching shield bonding plate
- All of the necessary connecting and retaining elements for mounting

The shield connection kit 1 is suitable for the following SINAMICS G120 Control Units:

- CU230P-2 HVAC
- CU230P-2 DP
- CU230P-2 CAN

The shield connection kit 2 is suitable for the following SINAMICS G120 Control Units:

- CU240B-2
- CU240B-2 DP
- CU240E-2
- CU240E-2 DP
- CU240E-2 F
- CU240E-2 DP-F

Selection and ordering data

Description	Order No.
Shield connection kit 1 For CU230P-2 Control Units	**6SL3264-1EA00-0FA0**
Shield connection kit 2 For CU240 . -2 Control Units	**6SL3264-1EA00-0EA0**

Overview

The following parts are supplied from the factory for each PM230 Power Module in degree of protection IP55/UL Type 12:

Frame sizes FSA to FSC	Frame sizes FSD to FSF
• 1 SUB-D connector with mounting material for connecting the CU230P-2 HVAC/DP/CAN Control Units to the operator panel (e.g. IOP) • 1 motor connector and 1 power supply connector • 2 serrated strips including mounting material for connecting the shield • 3 sleeves for inserting in the cutouts for the signal cables of the cable bonding plate • Ferrite cores (only necessary for devices with integrated line filter class B) • 2-page Quick Start Guide with mounting instructions	• 1 adapter cable for connecting the CU230P-2 HVAC/DP/CAN Control Units to the operator panel (e.g. IOP) • 4 clips to connect the shields of signal cables • 6 serrated strips including mounting material for the motor and supply cables • 4 sleeves (pre-installed in the cutouts for the signal cables of the cable bonding plate) • 1 cable bonding plate without cutouts for customers to configure their own connection system • 1 cabinet key • 2-page Quick Start Guide with mounting instructions

A **mounting set** can be ordered for every frame size in degree of protection IP55/UL Type 12. It contains the following parts:

Frame sizes FSA to FSC	Frame sizes FSD to FSF
• 1 SUB-D connector with mounting material • 1 motor connector and 1 power supply connector • 2 serrated strips including mounting material for connecting the shield • 3 sleeves for inserting in the cutouts for the signal cables of the cable bonding plate • Ferrite cores (only necessary for devices with integrated line filter class B) • Screws for fixing the cable bonding plate and the cover	• 1 adapter cable including mounting material • 6 serrated strips including mounting material for the motor and supply cables • 1 cabinet key

Selection and ordering data

Description	Order No.
Mounting set For PM230 Power Modules, degree of protection IP55/UL Type 12	
• Frame size FSA	**6SL3200-0SK02-0AA0**
• Frame size FSB	**6SL3200-0SK03-0AA0**
• Frame size FSC	**6SL3200-0SK04-0AA0**
• Frame size FSD	**6SL3200-0SK05-0AA0**
• Frame size FSE	**6SL3200-0SK06-0AA0**
• Frame size FSF	**6SL3200-0SK07-0AA0**

Spare parts
Replacement door for PM240, frame size FSGX

Overview

Complete replacement door for the PM240 Power Module, frame size FSGX

Selection and ordering data

Description	Order No.
Replacement door For PM240 Power Modules, frame size FSGX	**6SL3200-0SM10-0AA0**

Spare parts
Terminal cover kit for frame sizes FSD and FSE

Overview

The terminal cover kit includes a replacement cover for the connecting terminals.

The terminal cover kit is suitable for the following SINAMICS G120 Power Modules:

- PM240, frame sizes FSD and FSE
- PM250, frame sizes FSD and FSE

Selection and ordering data

Description	Order No.
Terminal cover kit For frame sizes FSD and FSE	**6SL3200-0SM11-0AA0**

Spare parts
Replacement connector

Overview

Replacement connector for the input and output sides.

The replacement connector is suitable for SINAMICS G120 PM260 Power Modules, frame size FSD.

Selection and ordering data

Description	Order No.
Replacement connector For PM260 Power Modules, frame size FSD	**6SL3200-0ST04-0AA1**

Spare parts
Terminal cover kit for frame size FSF

Overview

The terminal cover kit includes a replacement cover for the connecting terminals.

The terminal cover kit is suitable for the following SINAMICS G120 Power Modules:

- PM240, frame size FSF
- PM250, frame size FSF
- PM260, frame size FSF

Selection and ordering data

Description	Order No.
Terminal cover kit For frame size FSF	**6SL3200-0SM12-0AA0**

Overview

The Power Module fans are designed for extra long service life. For special requirements, replacement fans are available that can be exchanged quickly and easily. The following pictures show the mounting location of the internal or external fan units as an example:

PM230 Power Module, frame size FSC, with external fan unit in the heat sink

PM230 Power Module, frame size FSC, with internal fan unit above the CU230P-2 Control Unit

Selection and ordering data

Rated power (LO)		PM230 Power Module		External fan unit	Internal fan unit
kW	hp	Type 6SL3223-...	Frame size	Order No.	Order No.
380 … 480 V 3 AC ±10 %					
0.37	0.50	0DE13-7 . A0	FSA	**6SL3200-0SF21-0AA0**	**6SL3200-0SF31-0AA0**
0.55	0.75	0DE15-5 . A0			
0.75	1.0	0DE17-5 . A0			
1.1	1.5	0DE21-1 . A0			
1.5	2.0	0DE21-5 . A0			
2.2	3.0	0DE22-2 . A0			
3.0	4.0	0DE23-0 . A0			
4.0	5.0	0DE24-0 . A0	FSB	**6SL3200-0SF22-0AA0**	
5.5	7.5	0DE25-5 . A0			
7.5	10	0DE27-5 . A0			
11.0	15	0DE31-1 . A0	FSC	**6SL3200-0SF23-0AA0**	
15.0	20	0DE31-5 . A0			
18.5	25	0DE31-8AA0			
22	30	0DE32-2 . A0	FSD	**6SL3200-0SF24-0AA0**	**6SL3200-0SF32-0AA0**
30	40	0DE33-0 . A0			
37	50	0DE33-7 . A0	FSE		
45	60	0DE34-5 . A0			
55	75	0DE35-5 . A0	FSF	**6SL3200-0SF26-0AA0**	
75	100	0DE37-5 . A0			
90	125	0DE38-8UA0			

Spare parts
Replacement fans

Overview

The Power Module fans are designed for extra long service life. Replacement fans can be ordered.

Selection and ordering data

Rated power		SINAMICS G120 PM240 Power Module		Replacement fan
kW	hp	Type 6SL3224-...	Frame size and number of fans	Order No.
380 … 480 V 3 AC				
0.37	0.50	0BE13-7UA0	FSA, 1 fan	**6SL3200-0SF01-0AA0** (includes 1 replacement fan)
0.55	0.75	0BE15-5UA0		
0.75	1.0	0BE17-5UA0		
1.1	1.5	0BE21-1UA0		
1.5	2	0BE21-5UA0		
2.2	3	0BE22-2 . A0	FSB, 2 fans [1]	
3.0	4	0BE23-0 . A0		
4.0	5	0BE24-0 . A0		
7.5	10	0BE25-5 . A0	FSC, 2 fans [1]	**6SL3200-0SF03-0AA0** (includes 1 replacement fan)
11.0	15	0BE27-5 . A0		
15.0	20	0BE31-1 . A0		
18.5	25	0BE31-5 . A0	FSD, 2 fans	**6SL3200-0SF04-0AA0** (includes 2 replacement fans)
22	30	0BE31-8 . A0		
30	40	0BE32-2 . A0		**6SL3200-0SF05-0AA0** (includes 2 replacement fans)
37	50	0BE33-0 . A0	FSE, 2 fans	**6SL3200-0SF04-0AA0** (includes 2 replacement fans)
45	60	0BE33-7 . A0		**6SL3200-0SF05-0AA0** (includes 2 replacement fans)
55	75	0BE34-5 . A0	FSF, 2 fans	**6SL3200-0SF06-0AA0** (includes 2 replacement fans)
75	100	0BE35-5 . A0		
90	125	0BE37-5 . A0		**6SL3200-0SF07-0AA0** (includes 2 replacement fans)
110	150	0BE38-8UA0		**6SL3200-0SF08-0AA0** (includes 2 replacement fans)
132	200	0BE41-1UA0		
160	250	0XE41-3UA0	FSGX, 2 fans	**6SL3362-0AG00-0AA1** (includes 2 replacement fans)
200	300	0XE41-6UA0		
250	400	0XE42-0UA0		

Rated power		SINAMICS G120 PM250 Power Module		Replacement fan
kW	hp	Type 6SL3225-...	Frame size and number of fans	Order No.
380 … 480 V 3 AC				
7.5	10	0BE25-5AA1	FSC, 2 fans [1]	**6SL3200-0SF03-0AA0** (includes 1 replacement fan)
11.0	15	0BE27-5AA1		
15.0	20	0BE31-1AA1		
18.5	25	0BE31-5 . A0	FSD, 2 fans	**6SL3200-0SF04-0AA0** (includes 2 replacement fans)
22	30	0BE31-8 . A0		
30	40	0BE32-2 . A0		**6SL3200-0SF05-0AA0** (includes 2 replacement fans)
37	50	0BE33-0 . A0	FSE, 2 fans	**6SL3200-0SF04-0AA0** (includes 2 replacement fans)
45	60	0BE33-7 . A0		**6SL3200-0SF05-0AA0** (includes 2 replacement fans)
55	75	0BE34-5 . A0	FSF, 2 fans	**6SL3200-0SF06-0AA0** (includes 2 replacement fans)
75	100	0BE35-5 . A0		
90	125	0BE37-5 . A0		**6SL3200-0SF08-0AA0** (includes 2 replacement fans)

Rated power		SINAMICS G120 PM260 Power Module		Replacement fan
kW	hp	Type 6SL3225-...	Frame size and number of fans	Order No.
660 … 690 V 3 AC				
11.0	15	0BH27-5 . A1	FSD, 2 fans	**6SL3200-0SF11-0AA0** (includes 2 replacement fans)
15.0	20	0BH31-1 . A1		
18.5	25	0BH31-5 . A1		
30	40	0BH32-2 . A1	FSF, 2 fans	**6SL3200-0SF07-0AA0** (includes 2 replacement fans)
37	50	0BH33-0 . A1		
55	75	0BH33-7 . A1		

[1] Recommendation: Even if only one fan on the Power Module is defective, it is advisable to replace both. In this case, the order quantity must be doubled.