MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

6SL3210-1PE18-0AL1

FILTERED INVERTER POWER MODULE

Used with the applicable SINAMICS PM240-2 FSA configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens PM240-2 Hardware Installation Manual A5E33294624B AJ, January 2018; filtered FSA 400 V table 6-17 and common installation data.

3.4.2 Dimension drawings and drilling dimensions for built-in units - IP20 devices

The following dimension drawings and drilling patterns are not to scale.

Frame sizes FSA ... FSC

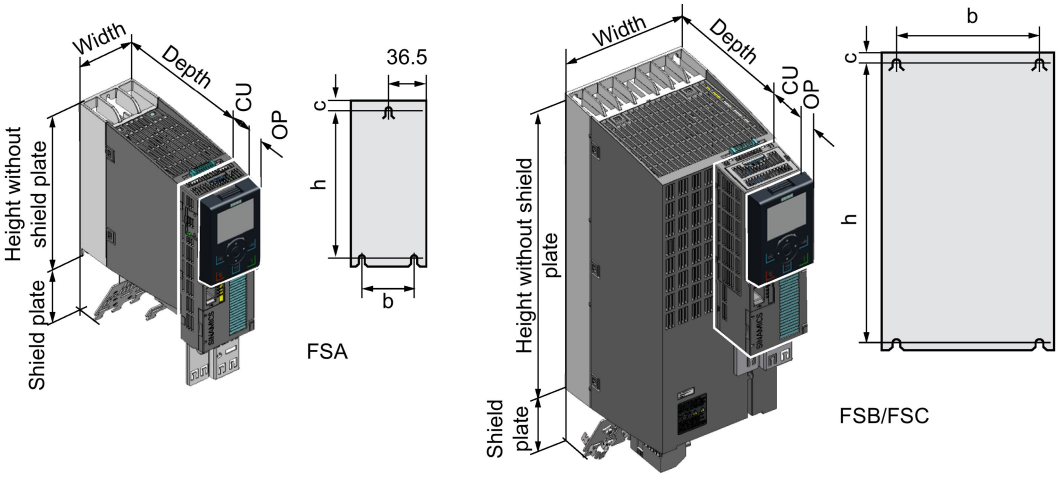


Table 3- 1 Dimensions depend on the Control Unit (CU) and HMI device [mm]

Frame size	Width [mm]	Height [mm]		Depth [mm]			
		without shield plate	with shield plate	without CU	with CU230P-2 [1]	with CU240B-2 [1] / CU240E-2 [1]	with CU250S-2 [1]
FSA	73	196	276	165	224	206	227
FSB	100	292	370	165	224	206	227
FSC	140	355	432	165	224	206	227

[1] With a Smart Access Module plus 9 mm
With blanking cover or with Operator Panel plus 11 mm.

Table 3- 2 Drilling dimensions, cooling clearances and fixing

Frame size	Drilling dimensions [mm]			Cooling air clearances [mm] [1]			Fixing/torque [Nm]
	h	b	c	Top	Bottom	Front	
FSA	186	62.3	6	80	100	100	3 x M4 / 2.5
FSB	281	80	6	80	100	100	4 x M4 / 2.5
FSC	343	120	6	80	100	100	4 x M5 / 3.5

[1] The Power Module is designed for mounting without any lateral cooling air clearance. For tolerance reasons, we recommend a lateral clearance of approx. 1 mm.

6.3 Overload capability of the inverter

Overload capability is the property of the inverter to temporarily supply a current that is higher than the rated current to accelerate a load. Two typical load cycles are defined to clearly demonstrate the overload capability: "Low Overload" and "High Overload"

Definitions

Base load

Constant load between the accelerating phases of the drive

Low Overload

- **LO base load input current**
  Permissible input current for a "Low Overload" load cycle
- **LO base load output current**
  Permissible output current for a "Low Overload" load cycle
- **LO base load power**
  Rated power based on the LO base load output current

High Overload

- **HO base load input current**
  Permissible input current for a "High Overload" load cycle
- **HO base load output current**
  Permissible output current for a "High Overload" load cycle
- **HO base load power**
  Rated power based on the HO base load output current

If not specified otherwise, the power and current data in the technical data always refer to a load cycle according to Low Overload.

We recommend the "SIZER" engineering software to select the inverter.

You can find additional information about SIZER on the Internet:

Download SIZER
(http://support.automation.siemens.com/WW/view/en/10804987/130000)

Load cycles and typical applications:

"Low Overload" load cycle

The "Low Overload" load cycle assumes a uniform base load with low requirements placed on brief accelerating p phases. Typical applications when designing according to "Low Overload" include:

- Pumps, fans and compressors
- Wet or dry blasting technology
- Mills, mixers, kneaders, crushers, agitators
- Basic spindles
- Rotary kilns
- Extruders

"High Overload" load cycle

The "High Overload" load cycle permits, for reduced base load, dynamic accelerating phases. Typical applications when designing according to "High Overload" include:

- Horizontal and vertical conveyor technology (conveyor belts, roller conveyors, chain conveyors)
- Centrifuges
- Escalators/moving stairways
- Lifters/Lowerers
- Elevators
- Gantry cranes
- Cable railways
- Storage and retrieval machines

Typical inverter load cycles

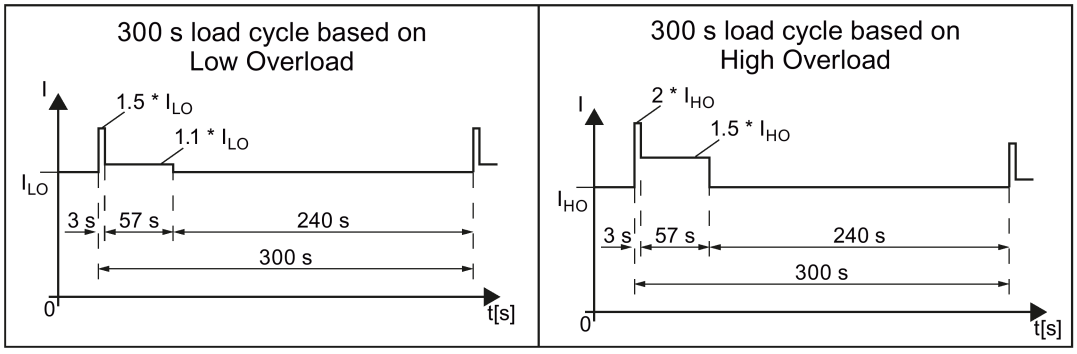


Figure 6-1 "Low Overload" and "High Overload" load cycles

6.6 Technical data, 400 V inverters

Motors for 400 V Power Modules

For the 400 V Power Modules, induction motors are permissible in the range from 25 % … 150 % of the inverter power without any restrictions.

Permissible motors

Note

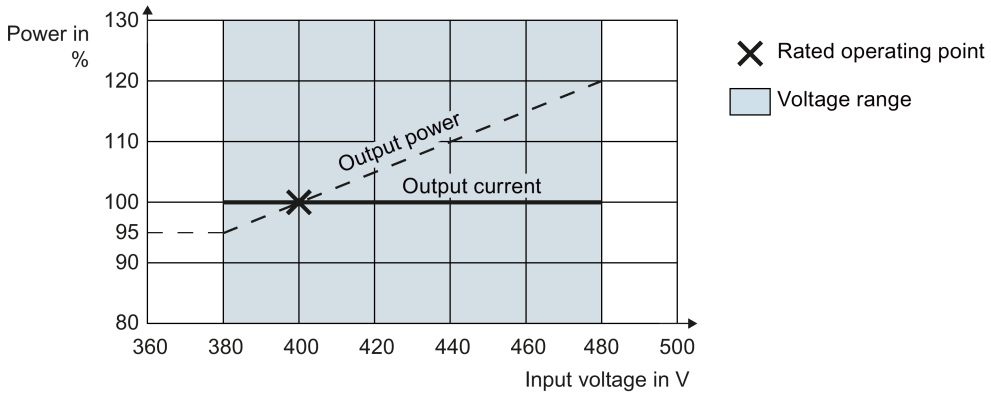
Motors for inverter operation

Only use motors that are suitable for operation with inverters with a DC link.

6.6.1 General data, 400 V inverters

Property	Version	
Line voltage	FSA … FSC	380 V … 480 V 3 AC ± 10%
	FSD … FSG	380 V … 480 V 3 AC ± 10% (in operation -20% < 1 min)
Line supply configurations	Grounded TN/TT line supplies or non-grounded IT line supplies Permissible line supplies (Page 50)	
Line impedance	FSA … FSC	1% ≤ Uk < 4%, for values smaller than 1%, we recommend a line reactor, or a Power Module with the next higher power rating.
	FSD … FSG	No restrictions
Power factor λ	FSA … FSC	0.7 without line reactor for Uk ≥ 1% 0.85 with line reactor for Uk < 1%
	FSD … FSG	> 0.9
Output voltage	0 V 3 AC … 0.95 x input voltage (max.)	
Input frequency	50 Hz … 60 Hz, ± 3 Hz	
Output frequency	0 … 550 Hz, depending on the control mode	
Inrush current	< LO base load input current	
Overvoltage category according to EN 61800-5-1	III for line supplies	
Pulse frequency	Factory setting • 4 kHz for devices with an LO base load power < 110 kW • 2 kHz for devices with an LO base load power ≥ 110 kW Can be adjusted in 2 kHz steps as follows: • 2 kHz … 16 kHz for devices with an LO base load power < 55 kW • 2 kHz … 8 kHz for devices with an LO base load output of 55 kW … 90 kW and ≥ 160 kW • 2 kHz … 4 kHz for devices with an LO base load power of 110 kW … 132 kW Current reduction as a function of the pulse frequency (Page 108) If you increase the pulse frequency, the inverter reduces the maximum output current.	
Short-circuit current (SCCR) and branch protection	Maximum permissible line short-circuit current ≤ 100 kA rms Minimum required short-circuit current ≥ 18 kA rms The length of the connecting cable from the line to the inverter may not reduce the minimum short-circuit current Branch protection and short-circuit strength according to UL and IEC (https://support.industry.siemens.com/cs/ww/en/view/109479152)	
Braking methods	DC braking, compound braking, dynamic braking with integrated braking chopper	
Degree of protection according to EN 60529	IP20 IP55 PT devices outside the control cabinet	
Protection class according to EN 61800-5-1	The inverters are devices with protection class I	
Touch protection according to EN 50274	DGUV regulation 3 when used for the intended purpose	
Cooling in compliance with EN 60146	Forced air cooling AF	

Dependent on the input voltage and output power



6.6.2 Specific technical data, 400 V inverters

Table 6- 16 PM240-2, IP20, frame size A, 380 V … 480 V 3 AC

Article No. without filter **Article No. with filter**	**6SL3210-1PE11-8UL1** **6SL3210-1PE11-8AL1**	**6SL3210-1PE12-3UL1** **6SL3210-1PE12-3AL1**	**6SL3210-1PE13-2UL1** **6SL3210-1PE13-2AL1**
LO base load power	0.55 kW	0.75 kW	1.1 kW
LO base load input current	2.3 A	2.9 A	4.1 A
LO base load output current	1.7 A	2.2 A	3.1 A
HO base load power	0.37 kW	0.55 kW	0.75 kW
HO base load input current	2.0 A	2.6 A	3.3 A
HO base load output current	1.3 A	1.7 A	2.2 A
Fuse according to IEC Fuse according to UL, class J	3NA3805 (16 A) 10 A	3NA3805 (16 A) 10 A	3NA3805 (16 A) 15 A
Power loss	0.04 kW	0.04 kW	0.04 kW
Required cooling air flow	5 l/s	5 l/s	5 l/s
Weight without filter	1.3 kg	1.3 kg	1.3 kg
Weight with filter	1.5 kg	1.5 kg	1.5 kg

Table 6- 17 PM240-2, IP20, frame size A, 380 V … 480 V 3 AC

Article No. without filter **Article No. with filter**	**6SL3210-1PE14-3UL1** **6SL3210-1PE14-3AL1**	**6SL3210-1PE16-1UL1** **6SL3210-1PE16-1AL1**	**6SL3210-1PE18-0UL1** **6SL3210-1PE18-0AL1**
LO base load power	1.5 kW	2.2 kW	3.0 kW
LO base load input current	5.5 A	7.7 A	10.1 A
LO base load output current	4.1 A	5.9 A	7.7 A
HO base load power	1.1 kW	1.5 kW	2.2 kW
HO base load input current	4.7 A	6.1 A	8.8 A
HO base load output current	3.1 A	4.1 A	5.9 A
Fuse according to IEC Fuse according to UL, class J	3NA3805 (16 A) 20 A	3NA3805 (16 A) 30 A	3NA3805 (16 A) 30 A
Power loss	0.07 kW	0.1 kW	0.12 kW
Required cooling air flow	5 l/s	5 l/s	5 l/s
Weight without filter	1.4 kg	1.4 kg	1.4 kg
Weight with filter	1.6 kg	1.6 kg	1.6 kg