

SINAMICS G120 standard inverters

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

Power Modules

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 SIMOTICS 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.

PM240-2 Power Modules standard variant

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	PM240-2 Power Module standard variant without integrated line filter	PM240-2 Power Module standard variant with integrated line filter class A
kW	hp	A	kW	hp	A		Article No.	Article No.
200 ... 240 V 1 AC/3 AC								
0.55	0.75	3.2	0.37	0.5	2.3	FSA	6SL3210-1PB13-0UL0	6SL3210-1PB13-0AL0
0.75	1	4.2	0.55	0.75	3.2	FSA	6SL3210-1PB13-8UL0	6SL3210-1PB13-8AL0
1.1	1.5	6	0.75	1	4.2	FSB	6SL3210-1PB15-5UL0	6SL3210-1PB15-5AL0
1.5	2	7.4	1.1	1.5	6	FSB	6SL3210-1PB17-4UL0	6SL3210-1PB17-4AL0
2.2	3	10.4	1.5	2	7.4	FSB	6SL3210-1PB21-0UL0	6SL3210-1PB21-0AL0
3	4	13.6	2.2	3	10.4	FSC	6SL3210-1PB21-4UL0	6SL3210-1PB21-4AL0
4	5	17.5	3	4	13.6	FSC	6SL3210-1PB21-8UL0	6SL3210-1PB21-8AL0
200 ... 240 V 3 AC								
5.5	7.5	22	4	5	17.5	FSC	6SL3210-1PC22-2UL0	6SL3210-1PC22-2AL0
7.5	10	28	5.5	7.5	22	FSC	6SL3210-1PC22-8UL0	6SL3210-1PC22-8AL0
11	15	42	7.5	10	35	FSD	6SL3210-1PC24-2UL0	—
15	20	54	11	15	42	FSD	6SL3210-1PC25-4UL0	—
18.5	25	68	15	20	54	FSD	6SL3210-1PC26-8UL0	—
22	30	80	18.5	25	68	FSE	6SL3210-1PC28-0UL0	—
30	40	104	22	30	80	FSE	6SL3210-1PC31-1UL0	—
37	50	130	30	40	104	FSF	6SL3210-1PC31-3UL0	—
45	60	154	37	50	130	FSF	6SL3210-1PC31-6UL0	—
55	75	178	45	60	154	FSF	6SL3210-1PC31-8UL0	—

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 200 V, 400 V or 690 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).

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Power Modules

Technical specifications

General technical specifications

Power Modules	PM240-2	PM250
System operating voltage	FSA ... FSC: 200 ... 240 V 1 AC/3 AC $\pm 10\%$ 380 ... 480 V 3 AC $\pm 10\%$ FSD ... FSG: 200 ... 240 V 3 AC $\pm 10\%$ (in operation $-20\% < 1$ min) 380 ... 480 V 3 AC $\pm 10\%$ (in operation $-20\% < 1$ min) 500 ... 690 V 3 AC $\pm 10\%$ (in operation $-20\% < 1$ min)	380 ... 480 V 3 AC $\pm 10\%$
Line supply requirements Short-circuit power ratio R_{SC}	200 V: >25 With $R_{SC} > 50$ it is advisable for FSA to FSC to install a line reactor, or alternatively, to select a Power Module with the next-higher power rating. 400 V: >25 With $R_{SC} > 100$ it is advisable for FSA to FSC to install a line reactor, or alternatively, to select a Power Module with the next-higher power rating. 690 V: No restriction	>100
Input frequency	47 ... 63 Hz	
Output frequency • Control mode V/f • Control mode Vector	0 ... 550 Hz 0 ... 240 Hz	
Pulse frequency	200 V: 4 kHz 400 V: <75 kW: 4 kHz; ≥ 75 kW: 2 kHz 690 V: 2 kHz For higher pulse frequencies, see derating data	4 kHz For higher pulse frequencies, see derating data
Power factor λ	FSA ... FSC: 0.7 ... 0.85 FSD ... FSG: - 200 V: >0.95 - 400 V and 690 V: >0.9	0.9
Offset factor $\cos \varphi$	FSA ... FSC: >0.96 FSD ... FSG: 0.98 ... 0.99	0.95 capacitive
Inverter efficiency	200 V: $>96\%$ 400 V: $>97\%$ 690 V: $>98\%$	95 ... 97 %
Output voltage, max. as % of input voltage	95 %	87 %
Overload capability • Low overload (LO) <u>Note:</u> No reduction in base-load current I_L for use of overload • High overload (HO) <u>Note:</u> No reduction in base-load current I_H for use of overload	1.5 $\times$ base-load current I_L (i.e. 150 % overload) for 3 s plus 1.1 $\times$ base-load current I_L (i.e. 110 % overload) for 57 s within a cycle time of 300 s 2 $\times$ base-load current I_H (i.e. 200 % overload) for 3 s plus 1.5 $\times$ base-load current I_H (i.e. 150 % overload) for 57 s within a cycle time of 300 s	1.5 $\times$ base-load current I_L (i.e. 150 % overload) for 3 s plus 1.1 $\times$ base-load current I_L (i.e. 110 % overload) for 57 s within a cycle time of 300 s 2 $\times$ base-load current I_H (i.e. 200 % overload) for 3 s plus 1.5 $\times$ base-load current I_H (i.e. 150 % overload) for 57 s within a cycle time of 300 s

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Power Modules

Technical specifications (continued)

Power Modules	PM240-2	PM250
Possible braking methods	DC braking Compound braking Dynamic braking with integrated braking chopper	Energy recovery in generator operation (max. with rated power based on high overload (HO))
Degree of protection	IP20 (standard or push-through)	IP20
Operating temperature	Frame sizes FSA ... FSC: -10 ... +40 °C (14 ... 104 °F) without derating >40 ... 60 °C (>104 ... 140 °F) see derating characteristics Frame sizes FSD ... FSG: -20 ... +40 °C (-4 ... +104 °F) without derating >40 ... 60 °C (>104 ... 140 °F) see derating characteristics Frame sizes FSA ... FSC: -10 ... +50 °C (14 ... 122 °F) without derating >50 ... 60 °C (>122 ... 140 °F) see derating characteristics Frame sizes FSD ... FSG: -20 ... +50 °C (-4 ... +122 °F) without derating >50 ... 60 °C (>122 ... 140 °F) see derating characteristics	0 ... 40 °C (32 ... 104 °F) without derating >40 ... 60 °C (>104 ... 140 °F) see derating characteristics
Low overload (LO)		
High overload (HO)		0 ... 50 °C (32 ... 122 °F) without derating >50 ... 60 °C (>122 ... 140 °F) see derating characteristics
Relative humidity	<95 % RH, condensation not permissible	
Cooling	Internal air cooling, power units with increased air cooling by built-in fans	Internal air cooling, power units with increased air cooling by built-in fans
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, > 1000 m (3281 ft) see derating characteristics	Up to 1000 m (3281 ft) above sea level without derating, > 1000 m (3281 ft) see derating characteristics
Protection functions	- Undervoltage - Overvoltage - Overload - Ground fault - Short-circuit - Stall protection - Motor blocking protection - Motor overtemperature - Inverter overtemperature - Parameter locking	
Short-Circuit Current Rating SCCR according to UL (Short Circuit Current Rating) ¹⁾	200 V: 100 kA 400 V: 100 kA 690 V: 100 kA	FSC: 40 kA FSD ... FSF: 42 kA
Compliance with standards	CE, cULus, RCM, SEMI F47, RoHS, EAC, KC (only with internal or external line filters Category C2) For frame sizes FSD ... FSG also: WEEE (Waste Electrical & Electronic Equipment)	CE, UL, cUL, RCM, SEMI F47
CE marking	According to Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU	

¹⁾ Applies to industrial control panel installations to NEC article 409 or UL 508A.

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Technical specifications (continued)

Line voltage 200 ... 240 V 3 AC		PM240-2 Power Modules standard variant				
Without integrated line filter		6SL3210-1PC22-2UL0	6SL3210-1PC22-8UL0	6SL3210-1PC24-2UL0	6SL3210-1PC25-4UL0	6SL3210-1PC26-8UL0
With integrated line filter class A		6SL3210-1PC22-2AL0	6SL3210-1PC22-8AL0	–	–	–
Output current at 50 Hz 230 V 3 AC						
• Rated current I_{rated} ¹⁾	A	22	28	42	54	68
• Base-load current I_{L} ¹⁾	A	22	28	42	54	68
• Base-load current I_{H} ²⁾	A	17.5	22	35	42	54
• Maximum current I_{max}	A	35	44	70	84	108
Rated power						
• Based on I_{L}	kW (hp)	5.5 (7.5)	7.5 (10)	11 (15)	15 (20)	18.5 (25)
• Based on I_{H}	kW (hp)	4 (5)	5.5 (7.5)	7.5 (10)	11 (15)	15 (20)
Rated pulse frequency	kHz	4	4	4	4	4
Efficiency η	%	>97	>97	>97	>97	>97
Power loss ³⁾ At rated current	kW	0.2	0.26	0.45	0.61	0.82
Cooling air requirement	m ³ /s (ft ³ /s)	0.0185 (0.65)	0.0185 (0.65)	0.055 (1.94)	0.055 (1.94)	0.055 (1.94)
Sound pressure level L_{pA} (1 m)	dB	<65	<65	45 ... 65 ⁴⁾	45 ... 65 ⁴⁾	45 ... 65 ⁴⁾
Input current ⁵⁾						
• Rated input current	A	28.6	36.4	40	51	64
• Based on I_{H}	A	22.8	28.6	36	43	56
Line supply connection U1/L1, V1/L2, W1/L3		Terminal connector	Terminal connector	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm ²	6 ... 16	6 ... 16	10 ... 35	10 ... 35	10 ... 35
Motor connection U2, V2, W2		Terminal connector	Terminal connector	Screw terminals	Screw terminals	Screw terminals
• Conductor cross-section	mm ²	6 ... 16	6 ... 16	10 ... 35	10 ... 35	10 ... 35
PE connection		Included in terminal connector	Included in terminal connector	Screw terminals	Screw terminals	Screw terminals
Motor cable length, max.						
• Shielded	m (ft)	50 (164)	50 (164)	200 (656)	200 (656)	200 (656)
• Unshielded	m (ft)	100 (328)	100 (328)	300 (984)	300 (984)	300 (984)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	140 (5.51)	140 (5.51)	200 (7.87)	200 (7.87)	200 (7.87)
• Height	mm (in)	355 (13.98)	355 (13.98)	472 (18.58)	472 (18.58)	472 (18.58)
• Depth						
- Without operator panel	mm (in)	165 (6.50)	165 (6.50)	237 (9.33)	237 (9.33)	237 (9.33)
- With operator panel, max.	mm (in)	238 (9.37)	238 (9.37)	268 (10.55)	268 (10.55)	268 (10.55)
Frame size		FSC	FSC	FSD	FSD	FSD
Weight, approx.						
• Without integrated line filter	kg (lb)	5 (11)	5 (11)	17 (37.5)	17 (37.5)	17 (37.5)
• With integrated line filter	kg (lb)	5.2 (11.5)	5.2 (11.5)	–	–	–

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⁾ Typical values. You can find more information on the Internet at:
<https://support.industry.siemens.com/cs/document/94059311>

⁴⁾ Values dependent on ambient temperature and utilization.

⁵⁾ The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_{rated}) for a line impedance corresponding to $u_{\text{K}} = 1\%$. The current values are specified on the rating plate of the Power Module.