SIMOTICS main motors
Overview

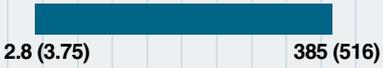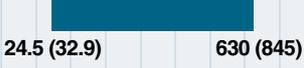| Motor type	Features	Degree of protection	Cooling method
SIMOTICS M-1PH8 asynchronous motor 	Three-phase squirrel-cage motor without housing Compact unit with high power density	IP55 IP23 IP55/IP65	Forced ventilation Forced ventilation Water cooling
SIMOTICS M-1PH8 synchronous motor 	Permanent-magnet synchronous motor Outstanding performance capabilities Compact unit with extremely high power density	IP55 IP55/IP65	Forced ventilation Water cooling
SIMOTICS M-1FE1/1FE2 synchronous built-in motors 	Synchronous built-in motors Permanent-magnet	IP00	Water cooling
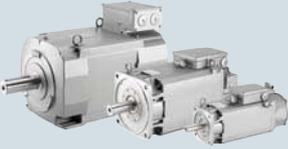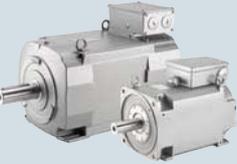
SIMOTICS M main motors

The potential applications for
SIMOTICS M-1PH8/M-1FE1/M-1FE2 motors are extremely versatile.

In machine tools, they are usually designated and used as main spindle motors.

In production machines, such as printing, packaging, and reforming machines, they are used as high-output main motors.

The selection and ordering data for the SINAMICS S120 Motor Modules are based on the booksize format by way of example. Blocksize and chassis formats are also possible. The SIZER for Siemens Drives engineering tool is available for detailed configuration

9

Shaft height	Rated power P_{rated} for duty type S1 kW (hp)	Rated torque M_{rated}	Page
SH 80/SH 100/SH 132/SH 160/ SH 180/SH 225/SH 280	2.8 (3.75) — 385 (516)	13 ... 2475 Nm (9.59 ... 1825 lb$_f$-ft)	**9/8**
SH 180/SH 225/SH 280	24.5 (32.9) — 630 (845)	317 ... 3710 Nm (234 ... 2736 lb$_f$-ft)	**9/26**
SH 80/SH 100/SH 132/SH 160/ SH 180/SH 225/SH 280	3.5 (4.69) — 460 (617)	20 ... 2610 Nm (14.8 ... 1925 lb$_f$-ft)	**9/36**
SH 132/SH 160/SH 180/SH 225	15.7 (21.1) — 196 (263)	94 ... 1091 Nm (69.3 ... 805 lb$_f$-ft)	**9/52**
SH 132/SH 160/SH 180/SH 225	15 (20.1) — 310 (416)	107 ... 1650 Nm (78.9 ... 1217 lb$_f$-ft)	**9/58**
Outer diameter (cooling jacket) High Torque series 95/115/130/190/ 205/250/310	4 (5.36) — 104 (139)	4.5 ... 820 Nm (3.32 ... 605 lb$_f$-ft)	**9/90**
High Speed series 120/155/180/205/ 230/270	6.5 (8.72) — 94 (126)	5 ... 300 Nm (3.69 ... 221 lb$_f$-ft)	**9/94**
High Torque series 180	34 (45.6) — 159 (213)	640 ... 1530 Nm (472 ... 1128 lb$_f$-ft)	**9/98**
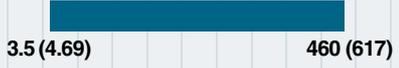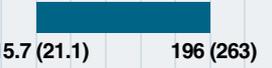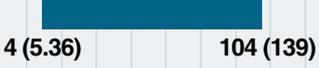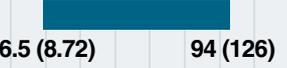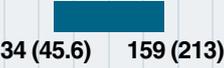
9
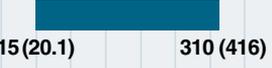
SIMOTICS main motors

SIMOTICS M asynchronous and synchronous motors for SINAMICS S120

SIMOTICS M-1PH8 main motors

■ **Overview**

SIMOTICS M-1PH8 motors, forced ventilation, shaft heights 80 to 160

SIMOTICS M-1PH8 motors, water cooling, shaft heights 80 to 160

SIMOTICS M-1PH8 motors, water cooling, shaft heights 180 to 280

The SIMOTICS M-1PH8 series is the latest motor generation for universal use with Motion Control applications. The wide power range is aimed at use as a central machine drive (as what is known as a "main motor") for various applications. The motors are available as an asynchronous variant as well as a compact synchronous variant with either forced ventilation or water cooling, based on a flexible building block principle. The flexible configuration – such as storage or electrical connection technology – allows you to adapt the motors to the requirements of almost any industrial application.

Main drive with 1PH8 = high power +
high dynamic response +
high accuracy

When developing the SIMOTICS M-1PH8 motor series, we placed special emphasis on making them perfectly compatible with the SINAMICS S120 drive system. For example, the specially harmonized power components, electronic rating plates, and the ability to integrate the motors via the DRIVE-CLiQ system interface ensure quick and easy commissioning as well as problem-free operation. What's more, thanks to the harmonization of the system, they are capable of handling extreme duty cycles, short rise times, and are exceptionally precise in terms of speed, torque, and positioning.

9

■ **Benefits**

■ Low space requirements thanks to high power density
■ Performance capability thanks to wide rotational speed setting ranges
■ High degree of structural flexibility due to the choice of
  - Asynchronous or synchronous design
  - Forced ventilation or water cooling
  - Mechanical designs
■ Minimized maintenance costs thanks to high bearing service lives
■ Precise motion control thanks to high rotational accuracy, even at the lowest speeds
■ Maximum thermal utilization over the complete speed range
■ Quiet operation as a result of low sound pressure level
■ Optimized for the SINAMICS S120 drive system

■ **Application**

The application spectrum reaches across all industries and comprises, for example:

• Main drives in presses and extruders
• Converting applications
• Main spindle drives in machine tools
  (See Catalog NC 62)
• Rotary axes in the paper and printing industry
• Use in crane systems

The SIMOTICS M-1PH8 motors are suitable for installation in dry indoor areas without corrosive atmospheres.

■ **Characteristic curves**

SIMOTICS M-1PH8 asynchronous motor
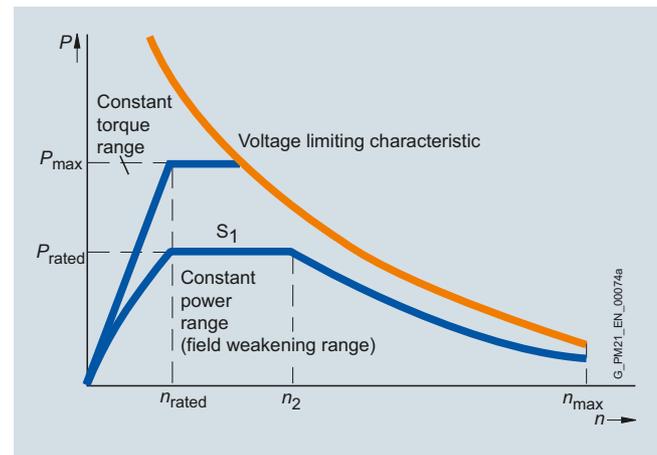
Typical speed/power characteristic curve for SIMOTICS M-1PH8 asynchronous motors

SIMOTICS M-1PH8 synchronous motor
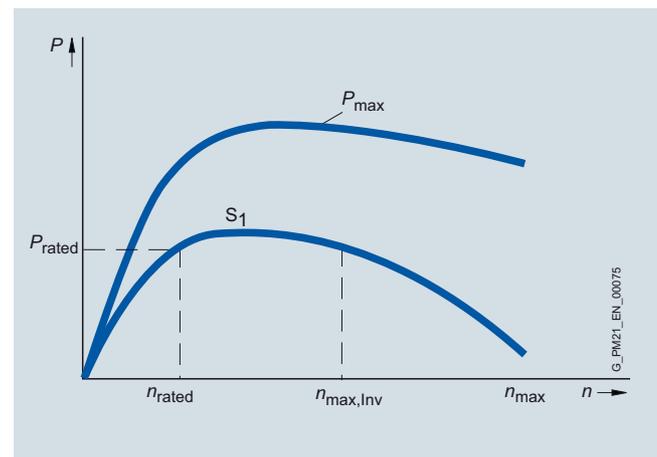
Typical speed/power characteristic curve for SIMOTICS M-1PH8 synchronous motors

The characteristic curves show the typical relationship between motor speed and drive power for SIMOTICS M-1PH8 motors for duty type S1 (continuous duty) in accordance with IEC 60034-1.

The detailed characteristic curves for the corresponding voltage and winding can be found in the SIMOTICS M-1PH8 Configuration Manual.

9

SIMOTICS main motors
SIMOTICS M asynchronous and synchronous motors for SINAMICS S120

SIMOTICS M-1PH8 asynchronous and synchronous motors, forced ventilation

■ **Technical specifications**

SIMOTICS M-1PH8 motor, forced ventilation	
Stator winding insulation **in accordance with EN 60034-1 (IEC 60034-1)**	For an ambient temperature of up to 40 °C (104 °F) Temperature class 180 (H)
Cooling **according to EN 60034-6 (IEC 60034-6)**	Forced ventilation
• 1PH808 ... 1PH822 • 1PH828	Fan mounted axially at NDE Fan mounted radially at NDE
Temperature monitoring	Pt1000 temperature sensor in the stator winding 1PH818 ... 1PH828 additional Pt1000 as reserve
Fan supply voltage	
• 1PH808 • 1PH810 ... 1PH816 • 1PH818/1PH822 • 1PH828	230 V 1 AC 50/60 Hz, 265 V 1 AC 60 Hz 400 V 3 AC 50/60 Hz, 480 V 3 AC 60 Hz 200 ... 277 V 1 AC 50/60 Hz (EC fan) 400 V 3 AC 50/60 Hz, 480 V 3 AC 60 Hz (optional) 400 V 3 AC 50/60 Hz, 480 V 3 AC 60 Hz
Type of construction **in accordance with EN 60034-7 (IEC 60034-7)**	
• 1PH808 • 1PH810 ... 1PH828	IM B3, IM B5 IM B3, IM B5, IM B35
Degree of protection **in accordance with EN 60034-5 (IEC 60034-5)**	
• 1PH808 ... 1PH828 • 1PH818 ... 1PH828	IP55 (forced ventilation) IP23 (open-circuit cooling)
Shaft extension on the drive end **in accordance with DIN 748-3 (IEC 60034-5)**	Plain shaft or feather key full-key or half-key balancing for feather key
Shaft and flange accuracy **in accordance with DIN 42955 (IEC 60072-1)** [1]	Without holding brake: Tolerance R (reduced) With holding brake: Tolerance N (normal)
Vibration severity	In accordance with Siemens/EN 60034-14 (IEC 60034-14) [1]
Sound pressure level L_{pA} (1 m) **in accordance with DIN EN ISO 1680, max.** Tolerance +3 dB Forced ventilation (IP55)	
• 1PH808 ... 1PH813 • 1PH816 • 1PH818 • 1PH822 • 1PH828	70 dB at a rated pulse frequency of 4 kHz and a speed range up to 5000 rpm 73 dB at a rated pulse frequency of 4 kHz and a speed range up to 5000 rpm 73 dB at a rated pulse frequency of 2 kHz and a speed range up to 5000 rpm 73 dB at a rated pulse frequency of 2 kHz and a speed range up to 3500 rpm 74 dB at a rated pulse frequency of 2 kHz and a speed range up to 3300 rpm
Forced ventilation (IP23)	
• 1PH818 • 1PH822 • 1PH828	73 dB at a rated pulse frequency of 2 kHz and a speed range up to 3000 rpm 73 dB at a rated pulse frequency of 2 kHz and a speed range up to 2000 rpm 74 dB at a rated pulse frequency of 2 kHz and a speed range up to 2800 rpm
Built-in encoder systems	Absolute and incremental encoder with or without DRIVE-CLiQ interface
Connection Power	Connector for signals or DRIVE-CLiQ interface (mating connector not included in the scope of supply)
• 1PH808 ... 1PH813 • 1PH816 ... 1PH828	Power connector or terminal box Terminal box
Fan	
• 1PH808 • 1PH810 ... 1PH813 • 1PH816 ... 1PH828	Power connector Power connector or terminal box Terminal box
Encoder system	Connector for signals or DRIVE-CLiQ interface (mating connector not included in the scope of supply)
Rating plate	1 attached to motor 1 supplied separately with terminal box
Paint finish	Standard paint finish in anthracite RAL 7016
Certificate of suitability, according to	cURus, CE, EAC

[1] Shaft extension run-out, concentricity of centering ring and shaft, and perpendicularity of flange to shaft.

9

■ Technical specifications (continued)

SIMOTICS M-1PH8 motor, water cooling	
Stator winding insulation **in accordance with EN 60034-1 (IEC 60034-1)**	For a coolant inlet temperature up to 30 °C (86 °F) Temperature class 180 (H) [2]
Cooling **according to EN 60034-6 (IEC 60034-6)**	Water cooling Max. cooling water pressure at inlet: 6 bar Connecting thread at NDE
Temperature monitoring • 1PH808 ... 1PH816 • 1PH818 ... 1PH828	 Pt1000 temperature sensor in the stator winding 1 additional Pt1000 as reserve
Type of construction **in accordance with EN 60034-7 (IEC 60034-7)** • 1PH808 • 1PH810 ... 1PH828	 IM B3, IM B5 IM B3, IM B5, IM B35
Degree of protection **in accordance with EN 60034-5 (IEC 60034-5)** • 1PH808 ... 1PH816 • 1PH818 ... 1PH828	 IP65 IP55
Shaft extension on the drive end **in accordance with DIN 748-3 (IEC 60072-1)**	Plain shaft or feather key, full-key or half-key balancing for feather key
Shaft and flange accuracy **in accordance with DIN 42955 (IEC 60072-1)** [1]	Without holding brake: Tolerance R (reduced) With holding brake: Tolerance N (normal)
Vibration severity	in accordance with Siemens/EN 60034-14 (IEC 60034-14) [1]
Sound pressure level L_{pA} (1 m) **in accordance with DIN EN ISO 1680, max.** Tolerance +3 dB • 1PH808 ... 1PH813 • 1PH816 • 1PH818 • 1PH822 • 1PH828	 68 dB at a rated pulse frequency of 4 kHz and a speed range up to 5000 rpm 69 dB at a rated pulse frequency of 4 kHz and a speed range up to 5000 rpm 70 dB at a rated pulse frequency of 2 or 4 kHz and a speed range up to 5000 rpm 70 dB at a rated pulse frequency of 2 or 4 kHz and a speed range up to 4500 rpm 72 dB at a rated pulse frequency of 2 kHz and a speed range up to 3300 rpm
Built-in encoder systems	Absolute and incremental encoder with or without DRIVE-CLiQ interface
Connection Power • 1PH808 ... 1PH813 • 1PH816 ... 1PH828 Fan • 1PH808 • 1PH810 ... 1PH813 • 1PH816 ... 1PH828 Encoder system	Connector for signals or DRIVE-CLiQ interface (mating connector not included in the scope of supply) Power connector or terminal box Terminal box Power connector Power connector or terminal box Terminal box Connector for signals or DRIVE-CLiQ interface (mating connector not included in the scope of supply)
Rating plate	1 attached to motor 1 supplied separately with terminal box
Paint finish	Standard paint finish in anthracite RAL 7016
Certificate of suitability	cURus, CE, EAC

[1] Shaft extension run-out, concentricity of centering ring and shaft, and perpendicularity of flange to shaft.

[2] The following motors are designed to conform to temperature class 155 (F):
1PH8107-1.F2/1PH8107-1.M2
1PH8138-2.F2/1PH8138-2.G2
1PH8164/1PH8166/1PH8168

SIMOTICS main motors

SIMOTICS M asynchronous and synchronous motors for SINAMICS S120

■ Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed during field weakening, max. [1]	Speed, max. [2]	SIMOTICS M-1PH8 asynchronous motors Forced ventilation
n_{rated}	SH	P_{rated}	M_{rated}	I_{rated}	U_{rated}	f_{rated}	n_2	n_{max}	
rpm		kW (hp)	Nm (lb$_f$-ft)	A	V	Hz	rpm	rpm	Article No.
Line voltage 400 V 3 AC, Smart/Basic Line Module									
400	180	24.5 (32.9)	585 (431)	67	300	14.3	1900	5000	1PH8184-■■B■■-….
		31.5 (42.2)	752 (555)	88	290	14.2	2100	5000	1PH8186-■■B■■-….
	225	45 (60.3)	1074 (792)	114	300	14.1	1800	4500	1PH8224-■■B■■-….
		57 (76.4)	1361 (1004)	144	305	13.9	2100	4500	1PH8226-■■B■■-….
		72 (96.6)	1719 (1268)	176	305	14.0	2200	4500	1PH8228-■■B■■-….
700	180	40 (53.6)	546 (403)	94	320	24.5	2200	5000	1PH8184-■■C■■-….
		52 (69.7)	709 (523)	116	330	24.3	2400	5000	1PH8186-■■C■■-….
	225	80 (107)	1091 (805)	188	310	24.1	2200	4500	1PH8224-■■C■■-….
		106 (142)	1446 (1067)	240	310	24.2	2200	4500	1PH8226-■■C■■-….
		120 (161)	1637 (1207)	265	315	24.1	2300	4500	1PH8228-■■C■■-….
	280	171 (229)	2333 (1721)	355	330	23.9	1200	3300	1PH8284-1■C 4■-….
		219 (294)	2988 (2204)	455	325	23.9	1300	3300	1PH8286-1■C 4■-….
		272 (365)	3711 (2737)	570	325	23.9	1400	3300	1PH8288-1■C 4■-….
1000	180	57 (76.4)	544 (401)	120	340	34.4	2800	5000	1PH8184-■■D■■-….
		74 (99.2)	707 (521)	156	340	34.3	3000	5000	1PH8186-■■D■■-….
	225	105 (141)	1003 (740)	220	335	34.1	2700	4500	1PH8224-■■D■■-….
		135 (181)	1289 (951)	275	340	34.1	2700	4500	1PH8226-■■D■■-….
		165 (221)	1576 (1162)	330	340	34.1	2700	4500	1PH8228-■■D■■-….
	280	243 (326)	2321 (1712)	490	335	33.9	1900	3300	1PH8284-1■D 4■-….
		309 (414)	2951 (2177)	630	330	33.8	2000	3300	1PH8286-1■D 4■-….
		379 (508)	3619 (2669)	760	335	33.8	2100	3300	1PH8288-1■D 4■-….
1500	180	76 (102)	484 (357)	162	335	50.9	4300	5000	1PH8184-■■F■■-….
		108 (145)	688 (507)	225	330	50.9	4300	5000	1PH8186-■■F■■-….
	225	142 (190)	904 (667)	290	340	50.8	3000	4500	1PH8224-■■F■■-….
		175 (235)	1114 (822)	350	340	50.7	3000	4500	1PH8226-■■F■■-….
		230 (308)	1464 (1080)	465	340	50.6	3000	4500	1PH8228-■■F■■-….
	280	319 (428)	2031 (1498)	620	345	50.6	1900	3300	1PH8284-1■F 4■-….
		382 (512)	2432 (1794)	730	345	50.6	2000	3300	1PH8286-1■F 4■-….
		480 (644)	3056 (2254)	910	345	50.6	2100	3300	1PH8288-1■F 4■-….
2500	180	100 (134)	382 (282)	205	340	84.2	5000	5000	1PH8184-■■L■■-….
		130 (174)	497 (367)	270	335	84.1	5000	5000	1PH8186-■■L■■-….
	225	178 (239)	680 (502)	355	340	84.1	3500	4500	1PH8224-■■L■■-….
		235 (315)	898 (662)	475	335	84.0	3500	4500	1PH8226-■■L■■-….
		265 (355)	1012 (746)	530	340	83.9	3500	4500	1PH8228-■■L■■-….

For versions, see Article No. supplements and options.

For footnotes, see next page.

SIMOTICS main motors
SIMOTICS M asynchronous and synchronous motors for SINAMICS S120

■ Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed during field weakening, max. [1]	Speed, max. [2]	SIMOTICS M-1PH8 asynchronous motors Forced ventilation
n_{rated}	SH	P_{rated}	M_{rated}	I_{rated}	U_{rated}	f_{rated}	n_2	n_{max}	
rpm		kW (hp)	Nm (lb$_f$-ft)	A	V	Hz	rpm	rpm	Article No.
Line voltage 400 V 3 AC, Active Line Module									
500	180	30 (40.2)	573 (423)	65	370	17.6	2000	5000	1PH8184-■■ B ■■-….
		40 (53.6)	764 (563)	88	355	17.5	2200	5000	1PH8186-■■ B ■■-….
	225	55 (73.8)	1051 (775)	112	370	17.4	1800	4500	1PH8224-■■ B ■■-….
		72 (96.6)	1375 (1014)	144	375	17.3	2200	4500	1PH8226-■■ B ■■-….
		90 (121)	1719 (1268)	174	380	17.3	2200	4500	1PH8228-■■ B ■■-….
800	180	45 (60.3)	537 (396)	91	365	27.8	2300	5000	1PH8184-■■ C ■■-….
		60 (80.5)	716 (528)	120	360	27.7	2500	5000	1PH8186-■■ C ■■-….
	225	90 (121)	1074 (792)	184	350	27.4	2300	4500	1PH8224-■■ C ■■-….
		118 (158)	1409 (1039)	235	350	27.5	2300	4500	1PH8226-■■ C ■■-….
		135(181)	1612 (1189)	260	360	27.4	2400	4500	1PH8228-■■ C ■■-….
	280	195 (261)	2328 (1717)	335	400	27.2	1350	3300	1PH8284-1■ C 4■-….
		250 (335)	2984 (2201)	435	385	27.2	1500	3300	1PH8286-1■ C 4■-….
		310 (416)	3701 (2730)	560	370	27.2	1550	3300	1PH8288-1■ C 4■-….
1150	180	65 (87.2)	540 (398)	120	390	39.4	3000	5000	1PH8184-■■ D ■■-….
		85 (114)	706 (521)	154	390	39.3	3200	5000	1PH8186-■■ D ■■-….
	225	120 (161)	997 (735)	220	385	39.1	2900	4500	1PH8224-■■ D ■■-….
		155 (208)	1287 (949)	270	390	39.1	2800	4500	1PH8226-■■ D ■■-….
		190 (255)	1578 (1164)	330	390	39.1	2800	4500	1PH8228-■■ D ■■-….
	280	280 (375)	2325 (1715)	475	400	38.9	2200	3300	1PH8284-1■ D 4■-….
		355 (476)	2944 (2171)	630	380	38.8	2200	3300	1PH8286-1■ D 4■-….
		435 (583)	3607 (2660)	760	385	38.8	2200	3300	1PH8288-1■ D 4■-….
1750	180	89 (119)	486 (358)	162	390	59.3	4300	5000	1PH8184-■■ F ■■-….
		125 (168)	682 (503)	225	385	59.2	4300	5000	1PH8186-■■ F ■■-….
	225	165 (221)	900 (664)	285	395	59.2	2900	4500	1PH8224-■■ F ■■-….
		200 (268)	1091 (805)	350	390	59.0	2900	4500	1PH8226-■■ F ■■-….
		265 (355)	1446 (1067)	460	390	59.0	2900	4500	1PH8228-■■ F ■■-….
	280	370 (496)	2019 (1489)	610	400	58.9	2200	3300	1PH8284-1■ F 4■-….
		445 (597)	2429 (1792)	730	400	58.9	2200	3300	1PH8286-1■ F 4■-….
		560 (751)	3055 (2253)	910	400	58.9	2200	3300	1PH8288-1■ F 4■-….
2900	180	113 (152)	372 (274)	200	395	97.5	5000	5000	1PH8184-■■ L ■■-….
		150 (201)	494 (364)	270	385	97.4	5000	5000	1PH8186-■■ L ■■-….
	225	205 (275)	675 (498)	355	395	97.4	3500	4500	1PH8224-■■ L ■■-….
		270 (362)	889 (656)	470	390	97.3	3500	4500	1PH8226-■■ L ■■-….
		300 (402)	988 (729)	510	395	97.3	3500	4500	1PH8228-■■ L ■■-….

For versions, see Article No. supplements and options.

For footnotes, see next page.

SIMOTICS main motors

SIMOTICS M asynchronous and synchronous motors for SINAMICS S120

■ **Selection and ordering data**

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed during field weakening, max. [1]	Speed, max. [2]	SIMOTICS M-1PH8 asynchronous motors Forced ventilation
n_{rated}	SH	P_{rated}	M_{rated}	I_{rated}	U_{rated}	f_{rated}	n_2	n_{max}	
rpm		kW (hp)	Nm (lb$_f$-ft)	A	V	Hz	rpm	rpm	Article No.
Line voltage 480 V 3 AC, Smart/Basic Line Module									
600	180	36 (48.3)	573 (423)	64	440	20.9	2100	5000	**1PH8184-■■B■■-….**
		48 (64.4)	764 (563)	88	430	20.8	2300	5000	**1PH8186-■■B■■-….**
	225	67 (39.8)	1066 (786)	118	410	20.9	1800	4500	**1PH8224-■■B■■-….**
		87 (117)	1385 (1022)	152	410	20.8	2300	4500	**1PH8226-■■B■■-….**
		108 (145)	1719 (1268)	188	410	20.8	2200	4500	**1PH8228-■■B■■-….**
1000	180	57 (76.4)	544 (401)	90	460	34.4	2400	5000	**1PH8184-■■C■■-….**
		74 (99.2)	707 (521)	116	450	34.3	2600	5000	**1PH8186-■■C■■-….**
	225	105 (141)	1003 (740)	174	425	34.1	2300	4500	**1PH8224-■■C■■-….**
		146 (196)	1394 (1028)	230	440	34.1	2300	4500	**1PH8226-■■C■■-….**
		165 (221)	1576 (1162)	250	450	34.1	2400	4500	**1PH8228-■■C■■-….**
	280	235 (315)	2244 (1655)	345	455	33.9	1700	3300	**1PH8284-1■C 4■-….**
		310 (416)	2961 (2184)	450	460	33.9	2000	3300	**1PH8286-1■C 4■-….**
		385 (516)	3677 (2712)	560	460	33.9	2050	3300	**1PH8288-1■C 4■-….**
1350	180	74 (99.2)	523 (386)	118	450	46.0	3100	5000	**1PH8184-■■D■■-….**
		98 (131)	693 (511)	152	450	45.9	3300	5000	**1PH8186-■■D■■-….**
	225	137 (184)	969 (715)	215	450	45.7	3000	4500	**1PH8224-■■D■■-….**
		172 (231)	1217 (898)	255	460	45.7	2900	4500	**1PH8226-■■D■■-….**
		218 (292)	1542 (1137)	320	460	45.7	2800	4500	**1PH8228-■■D■■-….**
	280	325 (436)	2299 (1696)	475	460	45.5	2200	3300	**1PH8284-1■D 4■-….**
		410 (550)	2901 (2140)	620	445	45.5	2200	3300	**1PH8286-1■D 4■-….**
		505 (677)	3573 (2635)	750	450	45.5	2200	3300	**1PH8288-1■D 4■-….**
2000	180	98 (131)	468 (345)	156	450	67.5	4300	5000	**1PH8184-■■F■■-….**
		135 (181)	645 (476)	210	445	67.5	4300	5000	**1PH8186-■■F■■-….**
	225	178 (239)	850 (627)	265	460	67.4	2900	4500	**1PH8224-■■F■■-….**
		220 (295)	1051 (775)	335	450	67.3	2900	4500	**1PH8226-■■F■■-….**
		288 (386)	1375 (1014)	440	450	67.3	2900	4500	**1PH8228-■■F■■-….**
	280	415 (557)	1981 (1461)	600	455	67.3	2200	3300	**1PH8284-1■F 4■-….**
		500 (671)	2387 (1761)	720	455	67.2	2200	3300	**1PH8286-1■F 4■-….**
		630 (845)	3009 (2219)	900	455	67.2	2200	3300	**1PH8288-1■F 4■-….**
3400	180	113 (152)	317 (234)	176	460	114.1	4500	5000	**1PH8184-■■L■■-….**
		130 (174)	365 (269)	210	455	113.9	4500	5000	**1PH8186-■■L■■-….**
	225	205 (275)	576 (425)	310	460	114.0	3500	4500	**1PH8224-■■L■■-….**
		270 (362)	758 (559)	405	460	113.9	3500	4500	**1PH8226-■■L■■-….**
		300 (402)	843 (622)	450	460	113.8	3500	4500	**1PH8228-■■L■■-….**

For versions, see
Article No. supplements
and options.

9

For footnotes, see next page.

SIMOTICS main motors

SIMOTICS M asynchronous and synchronous motors for SINAMICS S120

SIMOTICS M-1PH8 asynchronous motors   > Forced ventilation, IP23 degree of protection

■ Selection and ordering data

Rated speed	Shaft height	Rated power	Rated torque	Rated current	Rated voltage	Rated frequency	Operating speed during field weakening, max. [1]	Speed, max. [2]	SIMOTICS M-1PH8 asynchronous motors Forced ventilation
n_{rated}	SH	P_{rated}	M_{rated}	I_{rated}	U_{rated}	f_{rated}	n_2	n_{max}	
rpm		kW (hp)	Nm (lb$_f$-ft)	A	V	Hz	rpm	rpm	Article No.
Line voltage 480 V 3 AC, Active Line Module									
700	180	42 (56.3)	573 (423)	65	500	24.2	2200	5000	1PH8184-■■B■■-….
		56 (75.1)	764 (1025)	88	500	24.1	2400	5000	1PH8186-■■B■■-….
	225	67 (39.8)	914 (674)	98	500	24.0	2300	4500	1PH8224-■■B■■-….
		87 (117)	1187 (875)	128	500	23.9	2400	4500	1PH8226-■■B■■-….
		108 (145)	1473 (1086)	156	500	23.9	2500	4500	1PH8228-■■B■■-….
1100	180	62 (83.1)	538 (397)	89	500	37.7	2500	5000	1PH8184-■■C■■-….
		80 (107)	695 (513)	114	500	37.6	2800	5000	1PH8186-■■C■■-….
	225	105 (141)	912 (673)	160	470	37.3	2500	4500	1PH8224-■■C■■-….
		146 (196)	1268 (935)	205	500	37.3	2500	4500	1PH8226-■■C■■-….
		165 (221)	1433 (1057)	225	500	37.3	2700	4500	1PH8228-■■C■■-….
	280	250 (335)	2170 (1601)	335	500	37.2	1700	3300	1PH8284-1■C 4■-….
		330 (443)	2865 (2113)	440	500	37.2	2000	3300	1PH8286-1■C 4■-….
		405 (543)	3516 (2593)	540	500	37.2	2050	3300	1PH8288-1■C 4■-….
1500	180	76 (102)	484 (357)	108	500	50.9	3600	5000	1PH8184-■■D■■-….
		105 (141)	669 (493)	148	500	50.9	3800	5000	1PH8186-■■D■■-….
	225	137 (184)	872 (643)	194	500	50.6	3400	4500	1PH8224-■■D■■-….
		172 (231)	1095 (808)	240	500	50.7	3100	4500	1PH8226-■■D■■-….
		218 (292)	1388 (1024)	295	500	50.7	3000	4500	1PH8228-■■D■■-….
	280	325 (436)	2069 (1526)	440	500	50.5	2200	3300	1PH8284-1■D 4■-….
		410 (550)	2610 (1925)	560	495	50.4	2200	3300	1PH8286-1■D 4■-….
		505 (677)	3215 (2371)	680	500	50.4	2200	3300	1PH8288-1■D 4■-….
2200	180	98 (131)	425 (313)	144	500	74.1	4300	5000	1PH8184-■■F■■-….
		135 (181)	586 (432)	196	490	74.1	4300	5000	1PH8186-■■F■■-….
	225	178 (239)	773 (570)	250	500	74.0	2900	4500	1PH8224-■■F■■-….
		220 (295)	955 (704)	305	500	73.9	2900	4500	1PH8226-■■F■■-….
		288 (386)	1250 (922)	405	500	73.9	2900	4500	1PH8228-■■F■■-….
	280	394 (528)	1710 (1261)	520	500	73.8	2400	3300	1PH8284-1■F 4■-….
		475 (637)	2062 (1521)	620	500	73.8	2400	3300	1PH8286-1■F 4■-….
		599 (803)	2600 (1918)	790	500	73.8	2400	3300	1PH8288-1■F 4■-….

For versions, see Article No. supplements and options.

9

For footnotes, see next page.

SIMOTICS main motors

SIMOTICS M asynchronous and synchronous motors for SINAMICS S120

Article No. supplements for SIMOTICS M-1PH8 without holding brake > SH 180 to SH 280

■ Selection and ordering data

Data position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16
Shaft height 180	1	P	H	8	1	8	.	–	■	■	■	■	■	–	■	■	■	.	–	Z
Shaft height 225	1	P	H	8	2	2	.	–	■	■	■	■	■	–	■	■	■	.	–	Z
Shaft height 280 (only asynchronous variant with water cooling)	1	P	H	8	2	8	.	–	■	■	■	■	■	–	■	■	■	.	–	Z

Overall length (cannot be selected, determined by the choice of rated power)								.										

	8	13
Asynchronous version	1	
Synchronous version	2	

Encoder systems for motors without DRIVE-CLiQ interface

	8	13
Without encoder [1]	A	2
Absolute encoder EnDat 2048 S/R (encoder AM2048S/R)	E	2
Incremental encoder HTL 1024 S/R (encoder HTL1024S/R) [1]	H	2
Incremental encoder HTL 2048 S/R (encoder HTL2048S/R) [1] [4]	J	2
Incremental encoder HTL 1024 S/R (encoder HTL1024S/R) with connection via additional terminal box [1]	W	2
Incremental encoder HTL 2048 S/R (encoder HTL2048S/R) with connection via additional terminal box [1] [4]	Y	2
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D track (encoder IC2048S/R)	M	2

Encoder systems for motors with DRIVE-CLiQ interface

	8	13
Absolute encoder 22-bit singleturn + 12-bit multiturn (encoder AM22DQ)	F	1
Incremental encoder 22-bit with commutation position (encoder IC22DQ)	D	1

Rated speeds (380 V to 480 V 3 AC) (winding design)

	9
400 rpm, 500 rpm, 600 rpm, 700 rpm	B
700 rpm, 800 rpm, 1000 rpm, 1100 rpm	C
1000 rpm, 1150 rpm, 1350 rpm, 1500 rpm	D
1500 rpm, 1750 rpm, 2000 rpm, 2200 rpm	F
2500 rpm, 2900 rpm, 3400 rpm	L

Rated speeds (690 V 3 AC) only with shaft height 280 (winding design)

	9
400 rpm, 500 rpm	H
700 rpm, 800 rpm	K
1000 rpm, 1150 rpm	U
1500 rpm, 1750 rpm	W

Cooling / **Degree of protection**

Cooling	Degree of protection	10
Forced ventilation, DE → NDE	IP55	0
Forced ventilation, NDE → DE	IP55	1
Water cooling	IP55	2
Forced ventilation, DE → NDE (only asynchronous version)	IP23	3
Forced ventilation, NDE → DE (only asynchronous version)	IP23	4

Type of construction

Shaft height 180	Shaft height 225	Shaft height 280	12
IM B3 (IM B6, IM B7, IM B8, IM V6)	IM B3 (IM B6, IM B7, IM B8, IM V6)	IM B3 (IM V6)	0
IM V5	IM V5	IM V5 [9]	1
IM B5 with A450 flange (IM V3) [5]	IM B5 with A550 flange (IM V3) [6]	IM B5 with A660 flange (IM V3) [7] [9]	2
IM B35 with A450 flange (IM V35)	IM B35 with A550 flange (IM V35)	IM B35 with A660 flange (IM V35)	3
IM V15 with A450 flange	IM V15 with A550 flange	IM V15 with flange A660 [9]	5

	13
Version status [10]	

	16
Special version (order codes required for options)	Z

For footnotes, see next page.

9

■ **Selection and ordering data** (continued)

Data position of the Article No.			1 2 3 4 5 6 7	8 9 10 11 12	13 14 15 16
			1 P H 8 . . . –	■ ■ ■ ■ ■ –	■ ■ ■ . – Z
Shaft extension (DE)	**Balancing**				13
Plain shaft	–				**0**
Feather key	Full-key				**1**
Feather key	Half-key				**2**
Bearing	**Vibration severity acc. to Siemens/EN 60034-14**	**Shaft and flange accuracy**			14
Standard	A	N			**A**
Standard	R/A	R			**B**
Increased radial forces	A	N			**E**
Increased radial forces	R/A	R			**F**
Also possible with shaft heights 180 and 225:					
Standard	S/A	R			**C**
Standard [1]	SR/A	R			**D**
Performance [8]	SR/A	R			**L**
Power connection (looking at DE)					15
Terminal box	Cable entry	Signal connection			
Top	Right	DE			**A**
Top	Left	DE			**B**
Top	NDE	Right			**C**
Top	DE	Right			**D**
Version status [10]					
Special version (order codes required for options)					**Z**

9

[1]   Only possible when 8th data position is "1" (Asynchronous version).

[4]   Limited to n_{max} = 4600 rpm.

[5]   Limited to n_{max} = 3000 rpm, not possible when 14th data position is "L" (Performance).

[6]   Limited to n_{max} = 2500 rpm, not possible when 14th data position is "L" (Performance).

[7]   Limited to n_{max} = 2000 rpm.

[8]   Only possible when 8th data position is "1" (Asynchronous version); not possible when 12th data position is "2" (IM B5) and 11th data position is "3" and "4" (Forced ventilation, IP23).
Shaft height 180: limited to n_{max} = 7500 rpm;
Shaft height 225: limited to n_{max} = 6000 rpm.

[9]   Only possible when 14th data position is "A" or "B" (Standard bearing).

[10]   Directly coupled to 9th data position.

SIMOTICS main motors
SIMOTICS M asynchronous and synchronous motors for SINAMICS S120

Article No. supplements for SIMOTICS M-1PH8 without holding brake > SH 280

■ Selection and ordering data

Data position of the Article No.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Shaft height 280 (forced ventilation)		1	P	H	8	2	8	.	– 1	■	■	■	■ –	■	■	■	. – Z
Overall length (cannot be selected, determined by the choice of rated power)								.									
Asynchronous version									1								
Encoder systems for motors without DRIVE-CLiQ interface																	
Without encoder	A																2
Absolute encoder EnDat 2048 S/R (encoder AM2048S/R)	E																2
Incremental encoder HTL 1024 S/R (encoder HTL1024S/R)	H																2
Incremental encoder HTL 2048 S/R (encoder HTL2048S/R)	J																2
Incremental encoder HTL 1024 S/R (encoder HTL1024S/R) with connection via additional terminal box [7]	W																2
Incremental encoder HTL 2048 S/R (encoder HTL2048S/R) with connection via additional terminal box [7]	Y																2
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D track (encoder IC2048S/R)	M																2
Encoder systems for motors with DRIVE-CLiQ interface																	
Absolute encoder 22-bit singleturn + 12-bit multiturn (encoder AM22DQ)	F																1
Incremental encoder 22-bit with commutation position (encoder IC22DQ)	D																1
External encoder systems																	
Incremental encoder HTL 1024 S/R WITH HOLLOW SHAFT HOG 22 (Baumer-Hübner), prepared for mounting [1]	G																2
Incremental encoder HTL 1024 S/R POG 10 (Baumer-Hübner), prepared for mounting [2]	K																2
Rated speeds (380 V to 480 V 3 AC) (winding design)																	
400 rpm, 500 rpm, 600 rpm, 700 rpm											B						
700 rpm, 800 rpm, 1000 rpm, 1100 rpm											C						
1000 rpm, 1150 rpm, 1350 rpm, 1500 rpm											D						
1500 rpm, 1750 rpm, 2000 rpm, 2200 rpm											F						
Rated speeds (690 V 3 AC) (winding design)																	
400 rpm, 500 rpm											H						
700 rpm, 800 rpm											K						
1000 rpm, 1150 rpm											U						
1500 rpm, 1750 rpm											W						

Cooling	**Degree of protection**																
Forced ventilation	IP55											1					
Forced ventilation	IP23											4					
Type of construction																	
IM B3 (IM V6)													0				
IM V5 [3] [6]													1				
IM B5 with A660 flange (IM V3) [3] [6]													2				
IM B35 with A660 flange (IM V35)													3				
IM V15 with A660 flange (IM V35) [3] [6]													5				
Version status [8]																	
Special version (order codes required for options)																	Z

For footnotes, see next page.

■ **Selection and ordering data** (continued)

Data position of the Article No.		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16		
		1 P H 8 . . . – 1 ■ ■ ■ ■ – ■ ■ ■ . – Z		

Shaft extension (DE)	**Balancing**			
Plain shaft	–		**0**	
Feather key	Full-key		**1**	
Feather key	Half-key		**2**	

Bearing	**Vibration severity acc. to Siemens/EN 60034-1**	**Shaft and flange accuracy**		
Standard	A	N	**A**	
Standard	R/A	R	**B**	
Increased radial forces	A	N	**E**	
Increased radial forces	R/A	R	**F**	

Power connection (looking at DE)					
Terminal box	Cable entry	Signal connection	External fan		
NDE right	Bottom	DE		**U**	
			NDE top, air inlet from NDE, air-flow direction NDE → DE		**–**
			NDE left, air inlet from NDE, air-flow direction NDE → DE		**G00**
NDE left	Bottom	DE		**V**	
			NDE top, air inlet from NDE, air-flow direction NDE → DE		**–**
			NDE right, air inlet from NDE, air-flow direction NDE → DE		**G02**
NDE top	Right	DE		**W**	
			NDE left, air inlet from NDE, air-flow direction NDE → DE		**G00**
			NDE right, air inlet from NDE, air-flow direction NDE → DE		**G02**
DE top [4]	Right	NDE		**X**	
			NDE top, air inlet from NDE, air-flow direction NDE → DE [4] [5]		**–**
			NDE left, air inlet from NDE, air-flow direction NDE → DE [4]		**G00**
			NDE right, air inlet from NDE, air-flow direction NDE → DE [4]		**G02**

Version status [8]					
For other versions, see options					**Z**

9

[1]   When ordering, also select option H75 (= encoder provided).

[2]   When ordering, also select options H56 (= procured by factory) or G80 (= provided).

[3] n_{max} limited to 2000 rpm.

[4]   Only possible when 12th data position is "0" (IM B3) and "1" (IM V5).

[5]   Only possible for assignments with terminal box 1XB7712-P..

[6]   Only possible when 14th data position is "A" and "B" (standard bearing).

[7]   Possible for the following combinations:
12th data position is "0" or "1" with 16th data position is "W" or "X"
12th data position is "2", "3", or "5" with 16th data position "W".

[8]   Directly coupled to 9th data position.