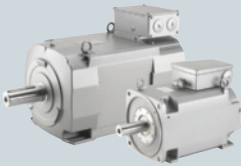
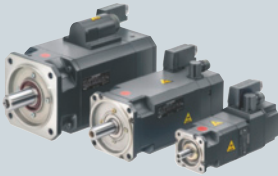
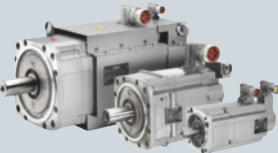







# Synchronous motors

## Introduction

### Type overview and rated data

Motor type	Designation	Degree of protection	Cooling method
 <b>1PH8</b>	Synchronous motor, permanent-magnet-excited Feed motor	IP55 <sup>1)</sup>	Forced ventilation
		IP55/IP65 <sup>2)</sup>	Water cooling
 <b>1FT6</b>	Synchronous motor, permanent-magnet-excited Feed motor – High Performance	IP64 (optional IP65, IP67, IP68)	Natural cooling
			Forced ventilation
			Water cooling
 <b>1FT7 Compact</b>	Synchronous motor, permanent-magnet-excited Feed motor – Compact Low torque ripple	IP64 <sup>3)</sup> (optional IP65, IP67)	Natural cooling
			Forced ventilation
			Water cooling
 <b>1FT7 High Dynamic</b>	Synchronous motor, permanent-magnet-excited Feed motor – High Dynamic Very low rotor moment of inertia	IP64 (optional IP65, IP67)	Forced ventilation
			Water cooling
 <b>1FK7 Compact</b>	Synchronous motor, permanent-magnet-excited Feed motor – Compact Very high power density	IP64 <sup>4)</sup> (optional IP65, IP67)	Natural cooling
 <b>1FK7 High Dynamic</b>	Synchronous motor, permanent-magnet-excited Feed motor – High Dynamic Very low rotor moment of inertia	IP64 <sup>4)</sup> (optional IP65, IP67)	Natural cooling
 <b>1FK7 High Inertia</b>	Synchronous motor, permanent-magnet-excited Feed motor – High Inertia High and variable load moment of inertia	IP64 <sup>4)</sup> (optional IP65, IP67)	Natural cooling
 <b>1FK7-DYA</b>	Synchronous motor, permanent-magnet-excited Compact geared motor 1FK7 Compact with integrated single-stage gearbox	IP64	Natural cooling

<sup>1)</sup> Fan: IP55, optional: IP66.

<sup>2)</sup> SH 180 and higher: IP55.

<sup>3)</sup> Core type: IP65.

<sup>4)</sup> DE flange: IP67.

# Synchronous motors

## Introduction

### Type overview and rated data

Shaft height	Rated power $P_{\text{rated}}$ for S1 duty kW (HP)						Rated torque $M_{\text{rated}}$	Selection and ordering data
	0.01	0.1	1	10	100	1000		
SH 132				15.7 (21.1)	57.5 (77.1)		96 ... 195 Nm (70.8 ... 144 lb <sub>f</sub> -in)	7/8 ... 7/9
SH 132/SH 180/SH 225				17.6 (23.6)	228 (306)		109 ... 1651 Nm (80.4 ... 1218 lb <sub>f</sub> -in)	7/8 ... 7/11
SH 28/SH 36/SH 48/ SH 63/SH 80/SH 100/ SH 132		0.19 (0.3)		15.5 (20.8)			0.3 ... 88 Nm (2.7 ... 779 lb <sub>f</sub> -in)	7/18 ... 7/29
SH 80/SH 100/SH 132				6.9 (9.25)	45.5 (61.0)		17 ... 160 Nm (150 ... 1416 lb <sub>f</sub> -in)	7/30 ... 7/33
SH 63/SH 80/SH 100/ SH 132				3.2 (4.29)	72 (96.6)		9.8 ... 290 Nm (86.7 ... 2567 lb <sub>f</sub> -in)	7/34 ... 7/39
SH 36/SH 48/SH 63/ SH 80/SH 100			0.85 (1.14)	10.47 (14)			1.4 ... 61 Nm (12.4 ... 540 lb <sub>f</sub> -in)	7/42 ... 7/47
SH 80/SH 100				5 (6.71)	15.1 (20.2)		21 ... 56 Nm (186 ... 496 lb <sub>f</sub> -in)	7/48 ... 7/49
SH 63/SH 80/SH 100				3.1 (4.16)	34.2 (45.9)		9.2 ... 125 Nm (81.4 ... 1106 lb <sub>f</sub> -in)	7/50 ... 7/53
SH 63/SH 80				3.8 (5.10)	10.8 (14.5)		11 ... 33 Nm (97.4 ... 292 lb <sub>f</sub> -in)	7/54 ... 7/55
SH 63/SH 80				5.7 (7.64)	21.7 (29.1)		16.5 ... 51 Nm (146 ... 451 lb <sub>f</sub> -in)	7/54 ... 7/55
SH 20/SH 28/SH 36/ SH 48/SH 63/SH 80/ SH 100		0.05 (0.07)		8.17 (11)			0.08 ... 37 Nm (0.71 ... 327 lb <sub>f</sub> -in)	7/58 ... 7/61 7/64 ... 7/65
SH 20/SH 28/SH 36/ SH 48/SH 63/SH 80		0.05 (0.07)		3.77 (5.06)			0.08 ... 18 Nm (0.71 ... 159 lb <sub>f</sub> -in)	7/62 ... 7/63 7/64 ... 7/65
SH 48/SH 63/SH 80			0.9 (1.21)	3.1 (4.16)			1.5 ... 15 Nm (13.3 ... 133 lb <sub>f</sub> -in)	7/66 ... 7/67
SH 36/SH 48/SH 63/ SH 80		0.37 (0.5)	1.88 (2.52)				6.5 ... 70 Nm (57.5 ... 620 lb <sub>f</sub> -in)	7/88 ... 7/89

# Synchronous motors

## Introduction

### Type overview and rated data

Motor type	Designation	Degree of protection	Cooling method
 <b>1FN3</b>	Synchronous linear motor, permanent-magnet-excited Direct drive	IP65	Water cooling
 <b>1FN6</b>	Synchronous linear motor, permanent-magnet-excited Direct drive	Primary section: IP65 <sup>1)</sup>	Natural cooling  Water cooling
Motor type	Designation	Degree of protection	Cooling method
 <b>1FW6</b>	Synchronous motor with permanent-magnet rotor, multi-pole Built-in torque motor for direct drive	IP23 <sup>2)</sup>	Water cooling
Motor type	Designation	Degree of protection	Cooling method
 <b>1FE1</b>	Synchronous spindle with permanent-magnet rotor Built-in motor Main spindle motor	IP00	Water cooling
 <b>2SP1</b>	Motor spindle in synchronous and asynchronous design Main spindle motor	Working area: IP64 Behind spindle flange: IP53	Water cooling

### Application

There are many fields of application for the 1PH8/1FT6/1FT7/1FK7/1FN3/1FN6/1FW6 synchronous motors.

On machine tools, they are designated and used as feed motors.

On production machines such as printing, packaging and textile machines they are designated as synchronous servo motors.

The motors are referred to generally in this documentation as synchronous motors, due to their principle of operation.

The 1FE1 built-in motors are used as motor spindles in machine tools for turning, milling, or grinding. The 2SP1 motor spindles are a motorized spindle series used in machine tools for milling.

<sup>1)</sup> Degree of protection of the motor is determined by the construction of the motor's installation in the machine. Minimum requirement: IP23.

<sup>2)</sup> The final degree of protection (minimum degree of protection is IP54) for the installed motor is determined by the machine manufacturer.

# Synchronous motors

## Introduction

### Type overview and rated data

Primary section width mm	Feedrate force $F_{rated}$ N (lb <sub>f</sub> )							Velocity $v_{MAX}$ at $F_{rated}$	Selection and ordering data
	0.1	1	10	100	1000	10000			Page
Precision cooling without with 67/96/ 76/105/ 126/141/ 135/150/ 188/248/ 197/257/ 342 351					<b>Peak load</b> 200 (45)	<b>8100</b> (1821)		105 ... 836 m/min (345 ... 2743 ft/min)	7/92 ... 7/95
					<b>Continuous load</b> 150 (33.7)	<b>10375</b> (2332)		129 ... 435 m/min (423 ... 1427 ft/min)	7/96 ... 7/97
80/115/130/ 209/289				<b>66.3</b> (14.9)		<b>3000</b> (674)		93.9 ... 1280 m/min (308 ... 4200 ft/min)	7/104 ... 7/107
80/115				<b>119</b> (26.8)		<b>1430</b> (321)		57.5 ... 852 m/min (189 ... 2795 ft/min)	7/108 ... 7/109

Diameter mm	Rated torque $M_{rated}$ Nm (lb <sub>f</sub> -in)							Max. speed $n_{max}$ at $M_{rated}$	Selection and ordering data
	0.1	1	10	100	1000	10000			Page
Outer diameter 230/310/385/440/ 502/576/730				<b>109</b> (965)		<b>5760</b> (50982)		38 ... 650 rpm	7/112 ... 7/121

Diameter mm	Rated power $P_{rated}$ for S1 duty kW (HP)							Rated torque $M_{rated}$	Selection and ordering data
	0.01	0.1	1	10	100	1000			Page
Outer diameter (cooling jacket) High-Torque series 95/115/130/190/ 205/250/310				<b>4</b> (5.36)		<b>104</b> (139)		4.5 ... 820 Nm (39.8 ... 7258 lb <sub>f</sub> -in)	7/124 ... 7/127
High-Speed series 120/155/180/205/ 230/270				<b>6.5</b> (8.72)		<b>94</b> (126)		5 ... 300 Nm (44.3 ... 2655 lb <sub>f</sub> -in)	7/128 ... 7/131
Spindle diameter 200/250				<b>12</b> (16.1)	<b>53.4</b> (71.6)			42 ... 170 Nm (372 ... 1505 lb <sub>f</sub> -in)	7/136 ... 7/137

#### Application (continued)

**Core types** can be supplied for certain motor types. These core types can be express delivered as replacement motors in the event of plant outages and offer the advantage of a quicker spare parts supply. For this reason, core types should be used for configuration wherever possible.

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