

# Synchronous motors

## 1FT6 motors

### Overview



1FT6 motors are permanent-magnet synchronous motors with compact dimensions.

1FT6 motors with integrated encoders can be operated on the SINAMICS drive system.

The fully digital control of the SINAMICS S120 drive system and the encoder technology of the 1FT6 motors fulfill the highest demands in terms of dynamic performance, speed setting range, and rotational and positioning accuracy.

1FT6 motors are available with natural cooling, forced ventilation or also with water cooling. With the natural cooling method, heat is dissipated through the surface of the motor, whereas with the forced ventilation method, heat is forced out by means of built-on fans. Maximum power ratings, as well as a high degree of protection, can be achieved using water cooling.

### Benefits

- Optimum surface quality at the workpiece thanks to highest smooth running characteristics degree of radial eccentricity (sinusoidal current injection)
- Minimized downtime due to high dynamic performance
- Power and signal connections for use in highly contaminative environments
- High resistance to cantilever force
- High thermal reserves for continuous or overload applications
- High overload capability (250 ms)
- Extremely high efficiency
- Extremely good drive dynamic response due to low rotor moments of inertia
- Low torque ripple (mean value 1 %)
- High degree of protection

### Applications

- High-performance machine tools
- Machines with stringent requirements in terms of dynamic response, precision and flexibility, e.g. packaging machines, cross cutters, converting machines, material handling and printing machines.

## Technical specifications

<b>Type of motor</b>	Permanent-magnet synchronous motor
<b>Magnet material</b>	Rare-earth magnet material
<b>Insulation of the stator winding in accordance with EN 60034-1 (IEC 60034-1)</b>	Temperature class 155 (F) for a winding temperature rise of $\Delta T = 100$ K at an ambient temperature of +40 °C (104 °F) For water cooling max. inlet temperature 30 °C (86 °F) Avoid condensation.
<b>Cooling</b>	Natural cooling, forced ventilation and water cooling
<b>Temperature monitoring</b>	KTY84 temperature sensor in the stator winding
<b>Type in accordance with EN 60034-7 (IEC 60034-7)</b>	IM B5 (IM V1, IM V3) IM B14 (IM V18, IM V19) IM B35 for 1FT613/1FT616
<b>Degree of protection in accordance with EN 60034-5 (IEC 60034-5)</b>	IP64 standard type, IP65 core type
<b>Shaft extension on the drive end in accordance with DIN 748-3 (IEC 60072-1)</b>	Plain shaft
<b>Shaft and flange accuracy<sup>1)</sup> in accordance with DIN 42955 (IEC 60072-1)</b>	Tolerance N
<b>Vibration magnitude in accordance with EN 60034-14 (IEC 60034-14)</b>	Level A (maintained up to rated speed)
<b>Max. sound pressure level <math>L_{pA}</math> (1 m (3.28 ft)) in accordance with EN ISO 1680</b>	
<ul style="list-style-type: none"> <li>• Motors with natural/water cooling           <ul style="list-style-type: none"> <li>- 1FT602 to 1FT604</li> <li>- 1FT606 to 1FT616</li> </ul> </li> <li>• Motors with forced ventilation           <ul style="list-style-type: none"> <li>- 1FT608/1FT610</li> <li>- 1FT613/1FT616</li> </ul> </li> </ul>	55 dB 70 dB  70 dB 74 dB

**Built-in encoder systems for motors without DRIVE-CLiQ interface**

- Incremental encoder sin/cos 1  $V_{pp}$  2048 S/R
- Absolute encoder, multi-turn (traversing range 4096 revolutions) with EnDat interface:
  - 2048 S/R for 1FT603 to 1FT616
  - 512 S/R for 1FT602
- Multi-pole resolver (number of poles corresponds to number of pole pairs of the motor)
- 2-pole resolver

**Built-in encoder systems for motors with DRIVE-CLiQ interface**

- 22 bit incremental encoder (2048 S/R internal)
- Absolute encoder:
  - 22 bit single-turn (2048 S/R internal) +12 bit multi-turn (traversing range 4096 revolutions) for 1FT603 to 1FT616
  - 20 bit single-turn (512 S/R internal) +12 bit multi-turn (traversing range 4096 revolutions) for 1FT602
- 15 bit resolver
- 14 bit resolver

**Connection**

Connectors for signals and power for 1FT602 to 1FT613  
Terminal boxes for 1FT616

**Paint finish**

Anthracite RAL 7016

**2nd rating plate**

Enclosed separately

**Options**

- Shaft extension on the drive end with fitted key and keyway (half-key balancing)
- Vibration magnitude Grade R
- Built-in holding brake
- Degree of protection IP67, IP68 M5 sealing air connection present (except with forced ventilation)
- Terminal boxes for power connections for 1FT610 to 1FT613
- Planetary gearboxes, built-on (requirement: Plain shaft extension, shaft and flange accuracy tolerance N, vibration magnitude grade A, and IP65 degree of protection) for 1FT602 to 1FT613

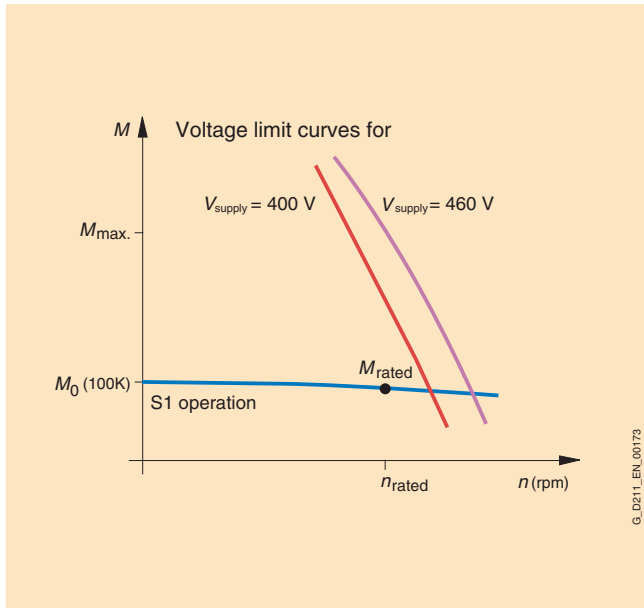
S/R = signals/revolution

<sup>1)</sup> Shaft extension run-out, concentricity of centering ring and shaft, and perpendicularity of flange to shaft.

# Synchronous motors

## 1FT6 motors

### Characteristics



Speed-torque characteristic

### More information

**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 Motor Modules are based on the Booksize format by way of example. The formats Booksize Compact, Blocksize or Chassis are also possible. Detailed engineering is performed with the SIZER engineering tool.

### Options

Order code	Option description	1FT6 Natural cooling	Forced ventilation	Water cooling
<b>K09</b>	Terminal box on right-hand side	–	■ (SH 160)	■ (SH 132 and SH 160)
<b>K10</b>	Terminal box on left-hand side	–	■ (SH 160)	■ (SH 132 and SH 160)
<b>L68</b>	Full-key balancing	–	■ (SH 132 and SH 160)	■ (SH 132 and SH 160)
<b>M03</b>	Version for Zone 2 hazardous areas (according to IEC EN 60079-15)	■ (up to SH 100)	–	■ (SH 63 to SH 100)
<b>M39</b>	Version for Zone 22 hazardous areas (according to EN 50281)	■ (up to SH 100)	–	■ (SH 63 to SH 100)
<b>N05</b>	Non-standard shaft extension (dimensions as for 1FT5 motors)	■ (SH 36 to SH 100)	–	–
<b>N40</b>	Food grade design	■ (SH 63 to SH 100)	–	■ (SH 63 to SH 100)
<b>X01</b>	Jet black finish RAL 9005	■	■	■
<b>X02</b>	Cream finish RAL 9001	■	■	■
<b>X03</b>	Reseda green finish RAL 6011	■	■	■
<b>X04</b>	Pebble gray finish RAL 7032	■	■	■
<b>X05</b>	Sky blue finish RAL 5015	■	■	■
<b>X06</b>	Light ivory finish RAL 1015	■	■	■

■ Option available  
 – Not available

**Options****M03****Version for Zone 2 hazardous areas  
(according to IEC EN 60079-15)**

Combustible or explosive gases or vapors occur only rarely or briefly in Zone 2 areas. The type of protection designation is EEx nA II ("non sparking").

The special conditions for operating 1FT6 motors in Zone 2 areas, in particular the reduction in permissible operating speeds, are described in detail in Appendix 610.40061.01 to the EC Declaration of Conformity 664.20023.21.

**M39****Version for Zone 22 hazardous areas (according to IEC EN 61241-1)**

Combustible or potentially explosive dust (non-conductive dust) occurs only rarely or briefly in Zone 22 areas. The type of protection designation is Ex 3D T 150 °C (302 °F).

The special conditions for operating 1FT6 motors in Zone 22 areas are described in detail in Appendix 610.40070.01 to the EC Declaration of Conformity 664.20030.21.

Note regarding M03 and M39 options:

When used in Zone 2 or Zone 22, 1FT6 motors are only designed for encoder connection through connectors. A version with a DRIVE-CLiQ interface on the motor is not possible. Connection to SINAMICS S120 is only possible via SMC (Sensor Module Cabinet-Mounted).

**N05****Non-standard shaft extension  
(dimensions as for 1FT5 motors)**

1FT6 motors are shipped with the following shaft dimensions that are compatible with 1FT5 motors:

- SH 36: 11 x 23 mm (0.43 x 0.91 in)
- SH 48: 14 x 30 mm (0.55 x 1.18 in)
- SH 63: 19 x 40 mm (0.75 x 1.57 in)
- SH 80: 24 x 50 mm (0.94 x 1.97 in)
- SH 100: 32 x 58 mm (1.26 x 2.28 in)

Note:

1FT6 motors with SH 63 with option N05 do not have a compatible flange with 1FT5 motors with SH 63.

**N40****Food industry design**

With this option, 1FT6 motors feature the following:

- Stainless steel shaft, fitted key and screws
- Bearing sealed with special grease (suitable for food industry) and shaft seal with stainless steel spring
- Degree of protection IP68
- Must be connected by plug (nickel plated), terminal box connection is not possible
- Paint finish: Primer plus light top coat (white aluminum RAL 9006)

# Synchronous motors

## 1FT6 motors, core type Natural cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque <sup>1)</sup>	Rated current	1FT6 synchronous motors Natural cooling	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{rated}$	SH	$P_{rated}$ at $\Delta T=100\text{ K}$	$M_0$ at $\Delta T=100\text{ K}$	$M_{rated}$ at $\Delta T=100\text{ K}$	$I_{rated}$ at $\Delta T=100\text{ K}$	Order No. <b>Core type</b>		$J$	$m$
rpm		kW (HP)	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	A			$10^{-4}\text{ kgm}^2$ ( $10^{-3}\text{ lb}_f\text{-in-s}^2$ )	kg (lb)
<b>2000</b>	100	4.8 (6.44)	27 (19.9)	23 (17)	11	<b>1FT6102-1AC71- ■■■ 1</b>	4	99 (87.6)	27.5 (60.6)
		8.0 (10.7)	50 (36.9)	38 (28)	17.6	<b>1FT6105-1AC71- ■■■ 1</b>	4	168 (148)	39.5 (87.1)
<b>3000</b>	48	1.4 (1.88)	5 (3.7)	4.3 (3.2)	2.9	<b>1FT6044-1AF71- ■■■ 1</b>	2	5.1 (4.51)	8.3 (18.3)
		1.5 (2.01)	6 (4.4)	4.7 (3.5)	3.4	<b>1FT6062-1AF71- ■■■ 1</b>	3	8.5 (7.52)	9.5 (20.9)
	63	2.2 (2.95)	9.5 (7)	7.0 (5.2)	4.9	<b>1FT6064-1AF71- ■■■ 1</b>	3	13 (11.5)	12.5 (27.6)
		3.2 (4.29)	13 (9.6)	10.3 (7.6)	8.7	<b>1FT6082-1AF71- ■■■ 1</b>	4	30 (26.5)	15 (33.1)
<b>4500</b>	63	4.6 (6.17)	20 (14.7)	14.7 (10.8)	11	<b>1FT6084-1AF71- ■■■ 1</b>	4	48 (42.4)	20.5 (45.2)
		5.8 (7.78)	27 (19.9)	18.5 (13.6)	13	<b>1FT6086-1AF71- ■■■ 1</b>	4	66.5 (58.8)	25.5 (56.2)
	80	1.7 (2.28)	6 (4.4)	3.6 (2.7)	3.9	<b>1FT6062-1AH71- ■■■ 1</b>	3	8.5 (7.52)	9.5 (20.9)
<b>6000</b>	63	2.3 (3.08)	9.5 (7)	4.8 (3.5)	5.5	<b>1FT6064-1AH71- ■■■ 1</b>	3	13 (11.5)	12.5 (27.6)
		4.9 (6.57)	20 (14.7)	10.5 (7.7)	12.5	<b>1FT6084-1AH71- ■■■ 1</b>	4	48 (42.4)	20.5 (45.2)
	80	5.7 (7.64)	27 (19.9)	12 (8.8)	12.6	<b>1FT6086-1AH71- ■■■ 1</b>	4	66.5 (58.8)	25.5 (56.2)
<b>6000</b>	36	0.88 (1.18)	2 (1.5)	1.4 (1)	2.1	<b>1FT6034-1AK71- ■■■ 1</b>	2	1.1 (0.97)	4.4 (9.7)
		80	4.1 (5.50)	20 (14.7)	6.5 (4.8)	9.2	<b>1FT6084-1AK71- ■■■ 1</b>	4	48 (42.4)

<b>Type:</b>	IM B5	<b>1</b>
<b>Connector outlet direction:</b>	Transverse right (not for 1FT603/1FT604/1FT606) Transverse left (not for 1FT603/1FT604/1FT606) Axial NDE Axial DE	<b>1</b> <b>2</b> <b>3</b> <b>4</b>
<b>Encoder systems for motors without DRIVE-CLiQ interface:</b>	Incremental encoder sin/cos 1 V <sub>pp</sub> 2048 S/R Absolute encoder EnDat 2048 S/R <sup>1)</sup>	<b>A</b> <b>E</b>
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>	22 bit incremental encoder Absolute encoder, 22 bit single-turn + 12 bit multi-turn <sup>1)</sup>	<b>D</b> <b>F</b>
<b>Shaft extension:</b> Plain shaft Plain shaft	<b>Shaft and flange accuracy:</b> Tolerance N Tolerance N	<b>G</b> <b>H</b>
	<b>Holding brake:</b> without with	

## 1FT6 motors, core type Natural cooling

### Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}$ <sup>4)</sup>  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>3)</sup>  $I_{rated}$  A	Booksize format  Order No.	Motor connection (and brake connection) via power connector		Order No. Pre-assembled cable
					Power connector  Size	Cable cross-section <sup>2)</sup>  mm <sup>2</sup>	
1FT6102-1AC7...	12.1	5.7 (7.6)	18	6SL312-TE21-8AA3	1.5	4 x 1.5	6FX002-5S21-....
1FT6105-1AC7...	21.4	10.5 (14.8)	30	6SL312-1TE23-0AA3	1.5	4 x 4	6FX002-5S41-....
1FT6044-1AF7...	3	1.6 (2.2)	3	6SL312-TE13-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6062-1AF7...	4.1	1.9 (2.6)	5	6SL312-TE15-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6064-1AF7...	6.1	3.0 (4.0)	9	6SL312-TE21-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6082-1AF7...	9.6	4.1 (5.5)	18	6SL312-TE21-8AA3	1.5	4 x 1.5	6FX002-5S21-....
1FT6084-1AF7...	13.2	6.3 (8.5)	18	6SL312-TE21-8AA3	1.5	4 x 1.5	6FX002-5S21-....
1FT6086-1AF7...	16.4	8.5 (11.4)	18	6SL312-TE21-8AA3	1.5	4 x 2.5	6FX002-5S31-....
1FT6062-1AH7...	5.7	2.8 (3.8)	9	6SL312-TE21-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6064-1AH7...	9.0	4.5 (6.0)	9	6SL312-TE21-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6084-1AH7...	19.8	9.4 (12.6)	18	6SL312-TE21-8AA3	1.5	4 x 4	6FX002-5S41-....
1FT6086-1AH7...	23.3	12.7 (17.0)	30	6SL312-1TE23-0AA3	1.5	4 x 4	6FX002-5S41-....
1FT6034-1AK7...	2.6	1.3 (1.7)	3	6SL312-TE13-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6084-1AK7...	24.1	12.6 (16.9)	30	6SL312-1TE23-0AA3	1.5	4 x 4	6FX002-5S41-....

#### Cooling:

Internal air cooling  
External air cooling

0  
1

#### Motor Module:

Single Motor Module  
Double Motor Module

1  
2

#### Type of power cable:

MOTION-CONNECT 800  
MOTION-CONNECT 500

8  
5

Without brake cores  
With brake cores

C  
D

For length code as well as power and signal cables, see MOTION-CONNECT connection system.

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1) If the absolute encoder is used,  $M_{rated}$  is reduced by 10 %.  
 2) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F)  
 3) With default setting of the pulse frequency.  
 4)  $P_{calc} [kW] = \frac{M_0 [Nm] \times n_{rated}}{9550}$        $P_{calc} [HP] = \frac{M_0 [lb\cdot in] \times n_{rated}}{63000}$

# Synchronous motors

## 1FT6 motors, standard type Natural cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque <sup>1)</sup>	Rated current	1FT6 synchronous motors Natural cooling	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{rated}$ rpm	SH	$P_{rated}$ at $\Delta T=100$ K kW (HP)	$M_0$ at $\Delta T=100$ K Nm (lb <sub>f</sub> -ft)	$M_{rated}$ at $\Delta T=100$ K Nm (lb <sub>f</sub> -ft)	$I_{rated}$ at $\Delta T=100$ K A	Order No. Standard type		$J$  $10^{-4}$ kgm <sup>2</sup> ( $10^{-3}$ lb <sub>f</sub> -in-s <sup>2</sup> )	$m$  kg (lb)
1500	100	3.8 (5.1)	27 (19.9)	24.5 (18.1)	8.4	1FT6102-8AB7 ■ - ■ ■ ■ ■ ■ ■	4	99 (87.6)	27.5 (60.6)
		6.4 (8.6)	50 (36.9)	41 (30.2)	14.5	1FT6105-8AB7 ■ - ■ ■ ■ ■ ■ ■	4	168 (148)	39.5 (87.1)
		9.6 (12.9)	70 (51.6)	61 (45)	20.5	1FT6108-8AB7 ■ - ■ ■ ■ ■ ■ ■	4	260 (230)	55.5 (122)
	132	9.7 (13.0)	75 (55.3)	62 (45.7)	19	1FT6132-6AB7 1 - ■ ■ ■ ■ ■ ■	3	430 (380)	85 (187)
		11.8 (15.8)	95 (70)	75 (55.3)	24	1FT6134-6AB7 1 - ■ ■ ■ ■ ■ ■	3	547 (484)	100 (220)
		13.8 (18.5)	115 (84.8)	88 (64.9)	27	1FT6136-6AB7 1 - ■ ■ ■ ■ ■ ■	3	664 (587)	117 (258)
<b>Type:</b>		IM B5 IM B14 <sup>2)</sup> (not for 1FT613)				1 2			
<b>Connector outlet direction:</b>		Transverse right Transverse left Axial NDE (not for 1FT613) Axial DE				1 2 3 4			
<b>Terminal box/ Cable entry:</b>		Transverse/from right Transverse/from left Axial/from NDE Axial/from DE				5 6 7 8			
<b>Encoder systems for motors without DRIVE-CLiQ interface:</b>		Incremental encoder sin/cos 1 V <sub>pp</sub> 2048 S/R Absolute encoder EnDat 2048 S/R <sup>1)</sup> Multi-pole resolver 2-pole resolver				A E S T			
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>		22 bit incremental encoder Absolute encoder, 22 bit single-turn + 12 bit multi-turn <sup>1)</sup> 15 bit resolver 14 bit resolver				D F U P			
<b>Shaft extension:</b>		<b>Shaft and flange accuracy:</b>		<b>Holding brake:</b>			A B D E G H K L		
Fitted key and keyway		Tolerance N		without					
Fitted key and keyway		Tolerance N		with					
Fitted key and keyway		Tolerance R		without					
Fitted key and keyway		Tolerance R		with					
Plain shaft		Tolerance N		without					
Plain shaft		Tolerance N		with					
Plain shaft		Tolerance R		without					
Plain shaft		Tolerance R		with					
<b>Vibration magnitude:</b>		<b>Degree of protection:</b>							
Grade A		IP64						0	
Grade A		IP65						1	
Grade A		IP67						2	
Grade A		IP68						6	
Grade R		IP64						3	
Grade R		IP65						4	
Grade R		IP67						5	
Grade R		IP68						7	

To select the degree of protection and type, see the selection guide.

# Synchronous motors

## 1FT6 motors, standard type Natural cooling

### Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}$ <sup>5)</sup>  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>4)</sup>  $I_{rated}$  A	Booksize format  Order No.	Motor connection (and brake connection) via power connector		Order No. Pre-assembled cable
					Power connector  Size	Cable cross-section <sup>3)</sup>  mm <sup>2</sup>	
1FT6102-8AB7...	8.7	4.2 (5.6)	9	<b>6SL312 - TE21 - 0AA3</b>	1.5	4 x 1.5	<b>6FX 002-5 S21-....</b>
1FT6105-8AB7...	16.0	7.9 (10.6)	18	<b>6SL312 - TE21-8AA3</b>	1.5	4 x 2.5	<b>6FX 002-5 S31-....</b>
1FT6108-8AB7...	22.3	11.0 (14.8)	30	<b>6SL312 - 1TE23-0AA3</b>	1.5	4 x 4	<b>6FX 002-5 S41-....</b>
1FT6132-6AB7...	21.6	11.8 (15.8)	30	<b>6SL312 - 1TE23-0AA3</b>	1.5	4 x 4	<b>6FX 002-5 S41-....</b>
1FT6134-6AB7...	27.0	14.9 (20.0)	30	<b>6SL312 - 1TE23-0AA3</b>	1.5	4 x 4	<b>6FX 002-5 S41-....</b>
1FT6136-6AB7...	34	18.1 (24.3)	45	<b>6SL312 - 1TE24-5AA3</b>	1.5	4 x 10	<b>6FX 002-5 S64-....</b>
<b>Cooling:</b>							
Internal air cooling					0		
External air cooling					1		
<b>Motor Module:</b>							
Single Motor Module					1		
Double Motor Module					2		
<b>Type of power cable:</b>							
MOTION-CONNECT 800						8	
MOTION-CONNECT 500						5	
Without brake cores							C
With brake cores							D
For length code as well as power and signal cables, see MOTION-CONNECT connection system.							

1) If the absolute encoder is used,  $M_{rated}$  is reduced by 10 %.

2) Same flange as for IM B5 type, but with metric threaded insert in the four mounting holes.

3) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

4) With default setting of the pulse frequency.

5)  $P_{calc} [kW] = \frac{M_0 [Nm] \times n_{rated}}{9550}$        $P_{calc} [HP] = \frac{M_0 [lb-ft] \times n_{rated}}{63000}$



# Synchronous motors

## 1FT6 motors, standard type Natural cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque <sup>1)</sup>	Rated current	1FT6 synchronous motors Natural cooling	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{rated}$ rpm	SH	$P_{rated}$ at $\Delta T=100\text{ K}$ kW (HP)	$M_0$ at $\Delta T=100\text{ K}$ Nm (lb <sub>r</sub> -ft)	$M_{rated}$ at $\Delta T=100\text{ K}$ Nm (lb <sub>r</sub> -ft)	$I_{rated}$ at $\Delta T=100\text{ K}$ A	Order No. Standard type		$J$  $10^{-4}\text{ kgm}^2$ $(10^{-3}\text{ lb}_r\text{-in-s}^2)$	$m$  kg (lb)
2000	63	0.8 (1.1)	4.0 (2.9)	3.7 (2.7)	1.9	1FT6061-6AC7 ■ - ■ ■ ■ ■ ■	3	6.0 (5.31)	8.0 (7.6)
		1.1 (1.5)	6.0 (4.4)	5.2 (3.8)	2.6	1FT6062-6AC7 ■ - ■ ■ ■ ■ ■	3	8.5 (7.52)	9.5 (20.9)
		1.7 (2.3)	9.5 (7)	8.0 (5.9)	3.8	1FT6064-6AC7 ■ - ■ ■ ■ ■ ■	3	13 (11.5)	12.5 (27.6)
	80	1.6 (2.2)	8.0 (5.9)	7.5 (5.5)	4.1	1FT6081-8AC7 ■ - ■ ■ ■ ■ ■	4	21 (18.5)	12.5 (27.6)
		2.4 (3.2)	13 (9.6)	11.4 (8.4)	6.6	1FT6082-8AC7 ■ - ■ ■ ■ ■ ■	4	30 (26.5)	15.0 (33.1)
		3.5 (4.7)	20 (14.7)	16.9 (12.5)	8.3	1FT6084-8AC7 ■ - ■ ■ ■ ■ ■	4	48 (42.4)	20.5 (45.2)
		4.7 (6.3)	27 (19.9)	22.5 (16.6)	10.9	1FT6086-8AC7 ■ - ■ ■ ■ ■ ■	4	66.5 (58.8)	25.5 (56.2)
	100	4.8 (6.4)	27 (19.9)	23 (17)	11	1FT6102-8AC7 ■ - ■ ■ ■ ■ ■	4	99 (87.6)	27.5 (60.6)
		8.0 (10.7)	50 (36.9)	38 (28)	17.6	1FT6105-8AC7 ■ - ■ ■ ■ ■ ■	4	168 (148)	39.5 (87.1)
		11.5 (15.4)	70 (51.6)	55 (40.5)	24.5	1FT6108-8AC7 ■ - ■ ■ ■ ■ ■	4	260 (230)	55.5 (122)
	132	11.5 (15.4)	75 (55.3)	55 (40.5)	23	1FT6132-6AC7 1 - ■ ■ ■ ■ ■	3	430 (380)	85.0 (187)
		13.6 (18.2)	95 (70)	65 (47.9)	27	1FT6134-6AC7 1 - ■ ■ ■ ■ ■	3	547 (484)	100 (220)
15.5 (20.8)		115 (84.8)	74 (54.5)	30	1FT6136-6AC7 1 - ■ ■ ■ ■ ■	3	664 (587)	117 (258)	

<b>Type:</b>	IM B5 IM B14 <sup>2)</sup> (not for 1FT613)	1 2		
<b>Connector outlet direction:</b>	Transverse right (not for 1FT606) Transverse left (not for 1FT606) Axial NDE (not for 1FT613) Axial DE	1 2 3 4		
<b>Terminal box/ cable entry:</b> (only for 1FT61)	Transverse/from right Transverse/from left Axial/from NDE Axial/from DE	5 6 7 8		
<b>Encoder systems for motors without DRIVE-CLiQ interface:</b>	Incremental encoder sin/cos 1 V <sub>pp</sub> 2048 S/R Absolute encoder EnDat 2048 S/R <sup>1)</sup> Multi-pole resolver 2-pole resolver	A E S T		
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>	22 bit incremental encoder Absolute encoder, 22 bit single-turn + 12 bit multi-turn <sup>1)</sup> 15 bit resolver 14 bit resolver	D F U P		
<b>Shaft extension:</b>	<b>Shaft and flange accuracy:</b>	<b>Holding brake:</b>		
Fitted key and keyway	Tolerance N	without		A
Fitted key and keyway	Tolerance N	with		B
Fitted key and keyway	Tolerance R	without		D
Fitted key and keyway	Tolerance R	with		E
Plain shaft	Tolerance N	without		G
Plain shaft	Tolerance N	with		H
Plain shaft	Tolerance R	without		K
Plain shaft	Tolerance R	with		L
<b>Vibration magnitude:</b>	<b>Degree of protection:</b>			
Grade A	IP64			0
Grade A	IP65			1
Grade A	IP67			2
Grade A	IP68			6
Grade R	IP64			3
Grade R	IP65			4
Grade R	IP67			5
Grade R	IP68			7

To select the degree of protection and type, see the selection guide.

## 1FT6 motors, standard type Natural cooling

### Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}$ <sup>5)</sup>  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>4)</sup>  $I_{rated}$  A	Booksize format  Order No.	Motor connection (and brake connection) via power connector	Power connector  Size	Cable cross-section <sup>3)</sup>  mm <sup>2</sup>
1FT6061-6AC7...	1.9	0.84 (1.1)	3	6SL312 - TE13-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6062-6AC7...	2.7	1.3 (1.7)	3	6SL312 - TE13-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6064-6AC7...	4.2	2.0 (2.7)	5	6SL312 - TE15-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6081-8AC7...	3.9	1.7 (2.3)	5	6SL312 - TE15-0AA3	1.5	4 x 1.5	6FX002-5S21-....
1FT6082-8AC7...	6.6	2.7 (3.6)	9	6SL312 - TE21-0AA3	1.5	4 x 1.5	6FX002-5S21-....
1FT6084-8AC7...	8.8	4.2 (5.6)	9	6SL312 - TE21-0AA3	1.5	4 x 1.5	6FX002-5S21-....
1FT6086-8AC7...	11.3	5.7 (7.6)	18	6SL312 - TE21-8AA3	1.5	4 x 1.5	6FX002-5S21-....
1FT6102-8AC7...	12.1	5.7 (7.6)	18	6SL312 - TE21-8AA3	1.5	4 x 1.5	6FX002-5S21-....
1FT6105-8AC7...	21.4	10.5 (14.8)	30	6SL312 - 1TE23-0AA3	1.5	4 x 4	6FX002-5S41-....
1FT6108-8AC7...	29	14.7 (19.7)	30	6SL312 - 1TE23-0AA3	1.5	4 x 6	6FX002-5S51-....
1FT6132-6AC7...	29	15.7 (21.1)	30	6SL312 - 1TE23-0AA3	1.5	4 x 6	6FX002-5S51-....
1FT6134-6AC7...	36	19.9 (26.7)	45	6SL312 - 1TE24-5AA3	1.5	4 x 10	6FX002-5S64-....
1FT6136-6AC7...	42	24.1 (32.3)	45	6SL312 - 1TE24-5AA3	3	4 x 16	6FX002-5S14-....

**Cooling:**

Internal air cooling  
External air cooling

0  
1

**Motor Module:**

Single Motor Module  
Double Motor Module

1  
2

**Type of power cable:**

MOTION-CONNECT 800  
MOTION-CONNECT 500

8  
5

Without brake cores  
With brake cores

C  
D

For length code as well as power and signal cables, see MOTION-CONNECT connection system.

....

1) If the absolute encoder is used,  $M_{rated}$  is reduced by 10 %.  
 2) Same flange as for IM B5 type, but with metric threaded insert in the four mounting holes.  
 3) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F)  
 4) With default setting of the pulse frequency.  
 5)  $P_{calc}$  [kW] =  $\frac{M_0 \text{ [Nm]} \times n_{rated}}{9550}$        $P_{calc}$  [HP] =  $\frac{M_0 \text{ [lb-ft]} \times n_{rated}}{63000}$

# Synchronous motors

## 1FT6 motors, standard type Natural cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque <sup>1)</sup>	Rated current	1FT6 synchronous motors Natural cooling	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{rated}$	SH	$P_{rated}$ at $\Delta T=100$ K	$M_0$ at $\Delta T=100$ K	$M_{rated}$ at $\Delta T=100$ K	$I_{rated}$ at $\Delta T=100$ K	Order No. Standard type		$J$	$m$
rpm		kW (HP)	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	A			$10^{-4}$ kgm <sup>2</sup> ( $10^{-3}$ lb <sub>f</sub> -in-s <sup>2</sup> )	kg (lb)
3000	48	0.7 (0.9)	2.6 (1.9)	2.15 (1.6)	1.7	1FT6041-4AF71 - ■■■■	2	2.9 (2.57)	6.6 (14.6)
		1.4 (1.9)	5.0 (3.7)	4.3 (3.2)	2.9	1FT6044-4AF71 - ■■■■	2	5.1 (4.51)	8.3 (18.3)
	63	1.1 (1.5)	4.0 (2.9)	3.5 (2.6)	2.6	1FT6061-6AF7 ■■■■	3	6.0 (5.31)	8.0 (17.6)
		1.5 (2.0)	6.0 (4.4)	4.7 (3.5)	3.4	1FT6062-6AF7 ■■■■	3	8.5 (7.52)	9.5 (20.9)
		2.2 (3.0)	9.5 (7)	7.0 (5.2)	4.9	1FT6064-6AF7 ■■■■	3	13.0 (11.5)	12.5 (27.6)
	80	2.2 (3.0)	8.0 (5.9)	6.9 (5.1)	5.6	1FT6081-8AF7 ■■■■	4	21.0 (18.5)	12.5 (27.6)
		3.2 (4.3)	13 (9.6)	10.3 (7.6)	8.7	1FT6082-8AF7 ■■■■	4	30.0 (26.5)	15.0 (33.1)
		4.6 (6.2)	20 (14.7)	14.7 (10.8)	11	1FT6084-8AF7 ■■■■	4	48.0 (42.4)	20.5 (45.2)
		5.8 (7.8)	27 (19.9)	18.5 (13.6)	13	1FT6086-8AF7 ■■■■	4	66.5 (58.8)	25.5 (56.2)
	100	6.1 (8.2)	27 (19.9)	19.5 (14.4)	13.2	1FT6102-8AF7 ■■■■	4	99.0 (87.6)	27.5 (60.6)
		9.7 (13.0)	50 (36.9)	31 (22.8)	22.5	1FT6105-8AF7 ■■■■	4	168 (148)	39.5 (87.1)
		11.6 (15.6)	70 (51.6)	37 (27.3)	25	1FT6108-8AF7 ■■■■	4	260 (230)	55.5 (122.4)
	132	11.3 (15.2)	75 (55.3)	36 (26.5)	23	1FT6132-6AF71 - ■■■■	3	430 (380)	85.0 (187.4)

<b>Type:</b>	IM B5 IM B14 <sup>2)</sup> (not for 1FT604/1FT613)	1 2
<b>Connector outlet direction:</b>	Transverse right (not for 1FT604/1FT606) Transverse left (not for 1FT604/1FT606) Axial NDE (not for 1FT613 and not for 1FT6 with DRIVE-CLiQ and power connector size 3) Axial DE	1 2 3 4
<b>Terminal box/ cable entry:</b> (only for 1FT61)	Transverse/from right Transverse/from left Axial/from NDE Axial/from DE	5 6 7 8
<b>Encoder systems for motors without DRIVE-CLiQ interface:</b>	Incremental encoder sin/cos 1 V <sub>pp</sub> 2048 S/R Absolute encoder EnDat 2048 S/R <sup>1)</sup> Multi-pole resolver 2-pole resolver	A E S T
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>	22 bit incremental encoder Absolute encoder, 22 bit single-turn + 12 bit multi-turn <sup>1)</sup> 15 bit resolver 14 bit resolver	D F U P
<b>Shaft extension:</b> Fitted key and keyway Fitted key and keyway Fitted key and keyway Fitted key and keyway Plain shaft Plain shaft Plain shaft Plain shaft	<b>Shaft and flange accuracy:</b> Tolerance N Tolerance N Tolerance R Tolerance R Tolerance N Tolerance N Tolerance R Tolerance R	<b>Holding brake:</b> without with without with without with without with
<b>Vibration magnitude:</b> Grade A Grade A Grade A Grade A Grade R Grade R Grade R Grade R	<b>Degree of protection:</b> IP64 IP65 IP67 IP68 IP64 IP65 IP67 IP68	A B D E G H K L  0 1 2 6 3 4 5 7

To select the degree of protection and type, see the selection guide.

## 1FT6 motors, standard type Natural cooling

### Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}$ <sup>6)</sup>  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>5)</sup>  $I_{rated}$  A	Booksized format  Order No.	Motor connection (and brake connection) via power connector		
					Power connector	Cable cross-section <sup>4)</sup>	Order No. Pre-assembled cable
					Size	mm <sup>2</sup>	
1FT6041-4AF7 ...	1.9	0.8 (1.1)	3	<b>6SL312</b> - <b>TE13-0AA3</b>	1	4 x 1.5	<b>6FX</b> <b>002-5</b> <b>S01</b> -....
1FT6044-4AF7 ...	3.0	1.6 (2.2)	3	<b>6SL312</b> - <b>TE13-0AA3</b>	1	4 x 1.5	<b>6FX</b> <b>002-5</b> <b>S01</b> -....
1FT6061-6AF7 ...	2.7	1.3 (1.7)	3	<b>6SL312</b> - <b>TE13-0AA3</b>	1	4 x 1.5	<b>6FX</b> <b>002-5</b> <b>S01</b> -....
1FT6062-6AF7 ...	4.1	1.9 (2.6)	5	<b>6SL312</b> - <b>TE15-0AA3</b>	1	4 x 1.5	<b>6FX</b> <b>002-5</b> <b>S01</b> -....
1FT6064-6AF7 ...	6.1	3.0 (4.0)	9	<b>6SL312</b> - <b>TE21-0AA3</b>	1	4 x 1.5	<b>6FX</b> <b>002-5</b> <b>S01</b> -....
1FT6081-8AF7 ...	5.8	2.5 (3.4)	9	<b>6SL312</b> - <b>TE21-0AA3</b>	1.5	4 x 1.5	<b>6FX</b> <b>002-5</b> <b>S21</b> -....
1FT6082-8AF7 ...	9.6	4.1 (5.5)	18	<b>6SL312</b> - <b>TE21-8AA3</b>	1.5	4 x 1.5	<b>6FX</b> <b>002-5</b> <b>S21</b> -....
1FT6084-8AF7 ...	13.2	6.3 (8.5)	18	<b>6SL312</b> - <b>TE21-8AA3</b>	1.5	4 x 1.5	<b>6FX</b> <b>002-5</b> <b>S21</b> -....
1FT6086-8AF7 ...	16.4	8.5 (11.4)	18	<b>6SL312</b> - <b>TE21-8AA3</b>	1.5	4 x 2.5	<b>6FX</b> <b>002-5</b> <b>S31</b> -....
1FT6102-8AF7 ...	16.9	8.5 (11.4)	18	<b>6SL312</b> - <b>TE21-8AA3</b>	1.5	4 x 2.5	<b>6FX</b> <b>002-5</b> <b>S31</b> -....
1FT6105-8AF7 ...	32	15.7 (21.1)	30 <sup>3)</sup>	<b>6SL312</b> - <b>1 TE23-0AA3</b>	1.5	4 x 10	<b>6FX</b> <b>002-5</b> <b>S61</b> -....
1FT6108-8AF7 ...	41	22.0 (29.5)	45	<b>6SL312</b> - <b>1 TE24-5AA3</b>	3	4 x 10	<b>6FX</b> <b>002-5</b> <b>S14</b> -....
1FT6132-6AF7 ...	43	23.6 (31.7)	45	<b>6SL312</b> - <b>1 TE24-5AA3</b>	3	4 x 10	<b>6FX</b> <b>002-5</b> <b>S14</b> -....
<b>Cooling:</b>							
Internal air cooling					0		
External air cooling					1		
<b>Motor Module:</b>							
Single Motor Module					1		
Double Motor Module					2		
<b>Type of power cable:</b>							
MOTION-CONNECT 800						8	
MOTION-CONNECT 500						5	
Without brake cores							C
With brake cores							D
For length code as well as power and signal cables, see MOTION-CONNECT connection system.							....

1) If the absolute encoder is used,  $M_{rated}$  is reduced by 10 %.  
 2) Same flange as for IM B5 type, but with metric threaded insert in the four mounting holes.  
 3) With the specified Motor Module, the motor cannot be fully utilized with  $M_0$  at  $\Delta T = 100$  K winding temperature rise. If a Motor Module with a higher rating is used, you must check whether the specified power cable can be connected to it.

4) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F)  
 5) With default setting of the pulse frequency.  
 6)  $P_{calc}$  [kW] =  $\frac{M_0 \text{ [Nm]} \times n_{rated}}{9550}$        $P_{calc}$  [HP] =  $\frac{M_0 \text{ [lb}_f\text{-in]} \times n_{rated}}{63000}$

# Synchronous motors

## 1FT6 motors, standard type Natural cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque <sup>1)</sup>	Rated current	1FT6 synchronous motors Natural cooling	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)	
$n_{rated}$	SH	$P_{rated}$ at $\Delta T=100\text{ K}$	$M_0$ at $\Delta T=100\text{ K}$	$M_{rated}$ at $\Delta T=100\text{ K}$	$I_{rated}$ at $\Delta T=100\text{ K}$	Order No. Standard type		$J$	$m$	
rpm		kW (HP)	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	A			$10^{-4}\text{ kgm}^2$ ( $10^{-3}\text{ lb}_f\text{-in-s}^2$ )	kg (lb)	
4500	63	1.4 (1.9)	4.0 (2.9)	2.9 (2.1)	3.4	1FT6061-6AH7 ■■■■	3	6.0 (5.31)	8.0 (17.6)	
		1.7 (2.3)	6.0 (4.4)	3.6 (2.7)	3.9	1FT6062-6AH7 ■■■■	3	8.5 (7.52)	9.5 (20.9)	
		2.3 (3.1)	9.5 (7.0)	4.8 (3.5)	5.5	1FT6064-6AH7 ■■■■	3	13.0 (11.5)	12.5 (27.6)	
	80	2.7 (3.6)	8.0 (5.9)	5.8 (4.3)	7.3	1FT6081-8AH7 ■■■■	4	21.0 (18.5)	12.5 (27.6)	
		4.0 (5.4)	13.0 (9.6)	8.5 (6.3)	11.0	1FT6082-8AH7 ■■■■	4	30.0 (26.5)	15.0 (33.1)	
		4.9 (6.6)	20.0 (14.7)	10.5 (7.7)	12.5	1FT6084-8AH7 ■■■■	4	48.0 (42.4)	20.5 (45.2)	
		5.7 (7.6)	27.0 (19.9)	12.0 (8.8)	12.6	1FT6086-8AH7 ■■■■	4	66.5 (58.8)	25.5 (56.2)	
	100	5.7 (7.6)	27.0 (19.9)	12.0 (8.8)	12.0	1FT6102-8AH7 ■■■■	4	99.0 (87.6)	27.5 (60.6)	
	<b>Type:</b>		IM B5 IM B14 <sup>2)</sup>				1			
	<b>Connector outlet direction:</b>		Transverse right (not for 1FT606) Transverse left (not for 1FT606) Axial NDE Axial DE				2			
	<b>Terminal box/ cable entry:</b> (only for 1FT61)		Transverse/from right Transverse/from left Axial/from NDE Axial/from DE				3			
							4			
<b>Encoder systems for motors without DRIVE-CLiQ interface:</b>		Incremental encoder sin/cos 1 V <sub>pp</sub> 2048 S/R Absolute encoder EnDat 2048 S/R <sup>1)</sup> Multi-pole resolver 2-pole resolver				5				
						6				
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>		22 bit incremental encoder Absolute encoder, 22 bit single-turn + 12 bit multi-turn <sup>1)</sup> 15 bit resolver 14 bit resolver				7				
						8				
<b>Shaft extension:</b>		<b>Shaft and flange accuracy:</b>		<b>Holding brake:</b>		A				
Fitted key and keyway		Tolerance N		without		E				
Fitted key and keyway		Tolerance N		with		S				
Fitted key and keyway		Tolerance R		without		T				
Fitted key and keyway		Tolerance R		with						
Plain shaft		Tolerance N		without		B				
Plain shaft		Tolerance N		with		D				
Plain shaft		Tolerance R		without		E				
Plain shaft		Tolerance R		with		G				
						H				
						K				
						L				
<b>Vibration magnitude:</b>		<b>Degree of protection:</b>				0				
Grade A		IP64				1				
Grade A		IP65				2				
Grade A		IP67				6				
Grade A		IP68								
Grade R		IP64				3				
Grade R		IP65				4				
Grade R		IP67				5				
Grade R		IP68				7				

To select the degree of protection and type, see the selection guide.

## Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K	Calculated power $P_{\text{calc}}$ <sup>6)</sup>  $P_{\text{calc}}$ for $M_0$ $\Delta T=100$ K	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>5)</sup>  $I_{\text{rated}}$	Booksize format  Order No.	Motor connection (and brake connection) via power connector		
	A	kW (HP)	A		Power connector  Size	Cable cross-section <sup>4)</sup>  mm <sup>2</sup>	Order No. Pre-assembled cable
1FT6061-6AH7...	4	1.9 (2.6)	5	<b>6SL312 - TE15-0AA3</b>	1	4 x 1.5	<b>6FX002-5S01-....</b>
1FT6062-6AH7...	5.7	2.8 (3.8)	9	<b>6SL312 - TE21-0AA3</b>	1	4 x 1.5	<b>6FX002-5S01-....</b>
1FT6064-6AH7...	9.0	4.5 (6.0)	9	<b>6SL312 - TE21-0AA3</b>	1	4 x 1.5	<b>6FX002-5S01-....</b>
1FT6081-8AH7...	8.6	3.8 (5.1)	9	<b>6SL312 - TE21-0AA3</b>	1.5	4 x 1.5	<b>6FX002-5S21-....</b>
1FT6082-8AH7...	14.8	6.1 (8.2)	18	<b>6SL312 - TE21-8AA3</b>	1.5	4 x 1.5	<b>6FX002-5S21-....</b>
1FT6084-8AH7...	19.8	9.4 (12.6)	18 <sup>3)</sup>	<b>6SL312 - TE21-8AA3</b>	1.5	4 x 4	<b>6FX002-5S41-....</b>
1FT6086-8AH7...	23.3	12.7 (17.0)	30	<b>6SL312 - 1TE23-0AA3</b>	1.5	4 x 4	<b>6FX002-5S41-....</b>
1FT6102-8AH7...	24.1	12.7 (17.0)	30	<b>6SL312 - 1TE23-0AA3</b>	1.5	4 x 4	<b>6FX002-5S41-....</b>
<b>Cooling:</b>							
Internal air cooling				0			
External air cooling				1			
<b>Motor Module:</b>							
Single Motor Module				1			
Double Motor Module				2			
<b>Type of power cable:</b>							
MOTION-CONNECT 800						8	
MOTION-CONNECT 500						5	
Without brake cores							C
With brake cores							D
For length code as well as power and signal cables, see MOTION-CONNECT connection system.							

- 1) If the absolute encoder is used,  $M_{\text{rated}}$  is reduced by 10 %.
- 2) Same flange as for IM B5 type, but with metric threaded insert in the four mounting holes.
- 3) With the specified Motor Module, the motor cannot be fully utilized with  $M_0$  at  $\Delta T = 100$  K winding temperature rise.

- 4) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F)
- 5) With default setting of the pulse frequency.
- 6)  $P_{\text{calc}}$  [kW] =  $\frac{M_0 \text{ [Nm]} \times n_{\text{rated}}}{9550}$       $P_{\text{calc}}$  [HP] =  $\frac{M_0 \text{ [lb}_f\text{-in]} \times n_{\text{rated}}}{63000}$

# Synchronous motors

## 1FT6 motors, standard type Natural cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque <sup>1)</sup>	Rated current	1FT6 synchronous motors Natural cooling	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)	
$n_{rated}$	SH	$P_{rated}$ at $\Delta T=100\text{ K}$	$M_0$ at $\Delta T=100\text{ K}$	$M_{rated}$ at $\Delta T=100\text{ K}$	$I_{rated}$ at $\Delta T=100\text{ K}$	Order No. Standard type		$J$	$m$	
rpm		kW (HP)	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	A			$10^{-4}\text{ kgm}^2$ ( $10^{-3}\text{ lb}_f\text{-in-s}^2$ )	kg (lb)	
6000	28	0.19 (0.3)	0.4 (0.3)	0.3 (0.2)	1.1	1FT6021-6AK71 - ■■■■	3	0.21 (0.19)	1.2 (2.6)	
		0.31 (0.4)	0.8 (0.6)	0.5 (0.4)	0.9	1FT6024-6AK71 - ■■■■	3	0.34 (0.30)	2.1 (4.6)	
	36	0.47 (0.6)	1.0 (0.7)	0.75 (0.6)	1.2	1FT6031-4AK71 - ■■■■	2	0.65 (0.58)	3.1 (6.8)	
		0.88 (1.2)	2.0 (1.5)	1.4 (1.0)	2.1	1FT6034-4AK71 - ■■■■	2	1.1 (0.97)	4.4 (9.7)	
	48	1.1 (1.5)	2.6 (1.9)	1.7 (1.3)	2.4	1FT6041-4AK71 - ■■■■	2	2.9 (2.57)	6.6 (14.6)	
		1.9 (2.6)	5.0 (3.7)	3.0 (2.2)	4.1	1FT6044-4AK71 - ■■■■	2	5.1 (4.51)	8.3 (18.3)	
	63	1.3 (1.7)	1.3 (1.7)	4.0 (2.9)	2.1 (1.5)	3.1	1FT6061-6AK71 - ■■■■	3	6.0 (5.31)	8.0 (17.6)
			1.3 (1.7)	6.0 (4.4)	2.1 (1.5)	3.2	1FT6062-6AK71 - ■■■■	3	8.5 (7.52)	9.5 (20.9)
			1.3 (1.7)	9.5 (7.0)	2.1 (1.5)	3.5	1FT6064-6AK71 - ■■■■	3	13.0 (11.5)	12.5 (27.6)
	80	2.9 (4.0)	2.9 (4.0)	8.0 (5.9)	4.6 (3.4)	7.7	1FT6081-8AK71 - ■■■■	4	21.0 (18.5)	12.5 (27.6)
			3.5 (4.7)	13.0 (9.6)	5.5 (4.1)	9.1	1FT6082-8AK71 - ■■■■	4	30.0 (26.5)	15.0 (33.1)
			4.1 (5.5)	20.0 (14.7)	6.5 (4.8)	9.2	1FT6084-8AK71 - ■■■■	4	48.0 (42.4)	20.5 (45.2)

<b>Type:</b>	IM B5 IM B14 <sup>2)</sup> (not for 1FT602/1FT603/1FT604)	1 2
<b>Connector outlet direction:</b>	Transverse right (not for 1FT603/1FT604/1FT606) Transverse left (not for 1FT603/1FT604/1FT606) Axial NDE Axial DE	1 2 3 4
<b>Encoder systems for motors without DRIVE-CLiQ interface:</b>	Incremental encoder sin/cos 1 V <sub>pp</sub> 2048 S/R Absolute encoder EnDat 2048 S/R <sup>1)</sup> (not for 1FT602) Absolute encoder EnDat 512 S/R <sup>1)</sup> (only for 1FT602) Multi-pole resolver 2-pole resolver	A E H S T
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>	22 bit incremental encoder Absolute enc. 22 bit single-turn + 12 bit multi-turn <sup>1)</sup> (not for 1FT602) Absolute enc. 20 bit single-turn + 12 bit multi-turn (only for 1FT602) 15 bit resolver 14 bit resolver	D F L U P
<b>Shaft extension:</b>	<b>Shaft and flange accuracy:</b>	<b>Holding brake:</b>
Fitted key and keyway	Tolerance N	without
Fitted key and keyway	Tolerance N	with
Fitted key and keyway	Tolerance R	without
Fitted key and keyway	Tolerance R	with
Plain shaft	Tolerance N	without
Plain shaft	Tolerance N	with
Plain shaft	Tolerance R	without
Plain shaft	Tolerance R	with
		A B D E G H K L
<b>Vibration magnitude:</b>	<b>Degree of protection:</b>	0 1 2 6 3 4 5 7
Grade A	IP64	
Grade A	IP65 (not for 1FT602)	
Grade A	IP67	
Grade A	IP68 (not for 1FT602)	
Grade R	IP64	
Grade R	IP65 (not for 1FT602)	
Grade R	IP67	
Grade R	IP68 (not for 1FT602)	

To select the degree of protection and type, see the selection guide.

# Synchronous motors

## 1FT6 motors, standard type Natural cooling

4

### Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}$ <sup>5)</sup>  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>4)</sup>  $I_{rated}$  A	Booksized format  Order No.	Motor connection (and brake connection) via power connector	Power connector  Size	Cable cross-section <sup>3)</sup>  mm <sup>2</sup>
1FT6021-6AK7 ...	1.25	0.3 (0.4)	3	6SL312- ■ TE13-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6024-6AK7 ...	1.25	0.5 (0.7)	3	6SL312- ■ TE13-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6031-4AK7 ...	1.4	0.6 (0.8)	3	6SL312- ■ TE13-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6034-4AK7 ...	2.6	1.3 (1.7)	3	6SL312- ■ TE13-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6041-4AK7 ...	3.0	1.6 (2.2)	3	6SL312- ■ TE13-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6044-4AK7 ...	5.9	3.1 (4.2)	9	6SL312- ■ TE21-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6061-6AK7...	5.0	2.5 (3.4)	5	6SL312- ■ TE15-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6062-6AK7...	7.6	3.8 (5.1)	9	6SL312- ■ TE21-0AA3	1	4 x 1.5	6FX002-5S01-....
1FT6064-6AK7...	12.0	4.0 (5.4)	18	6SL312- ■ TE21-8AA3	1	4 x 1.5	6FX002-5S01-....
1FT6081-8AK7...	11.1	5.0 (6.7)	18	6SL312- ■ TE21-8AA3	1.5	4 x 1.5	6FX002-5S21-....
1FT6082-8AK7...	17.3	8.2 (11.0)	18	6SL312- ■ TE21-8AA3	1.5	4 x 2.5	6FX002-5S31-....
1FT6084-8AK7...	24.1	12.6 (16.9)	30	6SL312- ■ 1TE23-0AA3	1.5	4 x 4	6FX002-5S41-....
<b>Cooling:</b>							
Internal air cooling			0				
External air cooling			1				
<b>Motor Module:</b>							
Single Motor Module			1				
Double Motor Module			2				
<b>Type of power cable:</b>							
MOTION-CONNECT 800						8	
MOTION-CONNECT 500						5	
Without brake cores							C
With brake cores							D
For length code as well as power and signal cables, see MOTION-CONNECT connection system.							

1) If the absolute encoder is used,  $M_{rated}$  is reduced by 10 %.

2) Same flange as for IM B5 type, but with metric threaded insert in the four mounting holes.

3) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F)

4) With default setting of the pulse frequency.

5)  $P_{calc}$  [kW] =  $\frac{M_0 [Nm] \times n_{rated}}{9550}$        $P_{calc}$  [HP] =  $\frac{M_0 [lb-in] \times n_{rated}}{63000}$



# Synchronous motors

## 1FT6 motors, standard type Forced ventilation

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque <sup>1)</sup>	Rated current	1FT6 synchronous motors Forced ventilation <sup>2)</sup>	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{rated}$	SH	$P_{rated}$ at $\Delta T=100\text{ K}$	$M_0$ at $\Delta T=100\text{ K}$	$M_{rated}$ at $\Delta T=100\text{ K}$	$I_{rated}$ at $\Delta T=100\text{ K}$	Order No. Standard type		$J$	$m$
rpm		kW (HP)	Nm (lb <sub>r</sub> -ft)	Nm (lb <sub>r</sub> -ft)	A			$10^{-4}\text{ kgm}^2$ ( $10^{-3}\text{ lb}_r\text{-in-s}^2$ )	kg (lb)
1500	100	9.3 (12.5)	65.0 (47.9)	59.0 (43.5)	21.7	1FT6105-8SB7 - ■■■■	4	168 (148)	45.5 (100)
		13.0 (17.4)	90.0 (66.3)	83.0 (61.2)	31	1FT6108-8SB7 - ■■■■	4	260 (230)	61.5 (135)
	132	16.0 (21.5)	110 (81.1)	102 (75.5)	36	1FT6132-6SB71 - ■■■■	3	430 (380)	91.0 (200)
		20.4 (27.4)	140 (103)	130 (95.8)	45	1FT6134-6SB71 - ■■■■	3	547 (484)	106 (233)
2000	100	25.1 (33.7)	175 (129)	160 (117)	55	1FT6136-6SB71 - ■■■■	3	664 (587)	123 (271)
		11.7 (15.7)	65.0 (47.9)	56.0 (41.3)	28	1FT6105-8SC7 - ■■■■	4	168 (148)	45.5 (100)
	132	16.8 (22.5)	90.0 (66.3)	80.0 (59)	40	1FT6108-8SC7 - ■■■■	4	260 (230)	61.5 (135)
		20.5 (27.5)	110 (81.1)	98.0 (72.2)	46	1FT6132-6SC71 - ■■■■	3	430 (380)	91.0 (200)
	132	26.2 (35.1)	140 (103)	125 (92.1)	57	1FT6134-6SC71 - ■■■■	3	547 (484)	106 (233)
		32.5 (43.6)	175 (129)	155 (114)	72	1FT6136-6SC71 - ■■■■	3	664 (587)	123 (271)

<b>Type:</b>	IM B5 IM B14 <sup>3)</sup> (not for 1FT613.)	1 2
<b>Connector outlet direction:</b>	Transverse right Transverse left Axial NDE (not for 1FT613 and not for 1FT6 with DRIVE-CLiQ and power connector size 3) Axial DE	1 2 3 4
<b>Terminal box/ Cable entry:</b>	Transverse/from right Transverse/from left Axial/from NDE Axial/from DE	5 6 7 8
<b>Encoder systems for motors without DRIVE-CLiQ interface:</b>	Incremental encoder sin/cos 1 V <sub>pp</sub> 2048 S/R Absolute encoder EnDat 2048 S/R <sup>1)</sup> Multi-pole resolver 2-pole resolver	A E S T
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>	22 bit incremental encoder Absolute encoder, 22 bit single-turn + 12 bit multi-turn <sup>1)</sup> 15 bit resolver 14 bit resolver	D F U P
<b>Shaft extension:</b>	<b>Shaft and flange accuracy:</b>	<b>Holding brake:</b>
Fitted key and keyway	Tolerance N	without
Fitted key and keyway	Tolerance N	with
Fitted key and keyway	Tolerance R	without
Fitted key and keyway	Tolerance R	with
Plain shaft	Tolerance N	without
Plain shaft	Tolerance N	with
Plain shaft	Tolerance R	without
Plain shaft	Tolerance R	with
		A B D E G H K L
<b>Vibration magnitude:</b>	<b>Degree of protection: <sup>4)</sup></b>	
Grade A	IP64	0
Grade A	IP65	1
Grade R	IP64	3
Grade R	IP65	4

To select the degree of protection and type, see the selection guide.

## 1FT6 motors, standard type Forced ventilation

### Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}$ <sup>7)</sup>  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>6)</sup>  $I_{rated}$  A	Booksize format  Order No.	Motor connection (and brake connection) via power connector		
					Power connector	Cable cross- section <sup>5)</sup>  mm <sup>2</sup>	Order No. Pre-assembled cable
1FT6105-8SB7...	21.9	10.2 (13.7)	30	<b>6SL312 -1TE23-0AA3</b>	1.5	4 x 4	<b>6FX002-5S41-....</b>
1FT6108-8SB7...	30	14.1 (18.9)	30	<b>6SL312 -1TE23-0AA3</b>	1.5	4 x 6	<b>6FX002-5S51-....</b>
1FT6132-6SB7...	36	17.3 (23.2)	45	<b>6SL312 -1TE24-5AA3</b>	3	4 x 10	<b>6FX002-5S14-....</b>
1FT6134-6SB7...	44	22.0 (29.5)	60	<b>6SL312 -1TE26-0AA3</b>	3	4 x 10	<b>6FX002-5S14-....</b>
1FT6136-6SB7...	55	27.5 (36.9)	60	<b>6SL312 -1TE26-0AA3</b>	3	4 x 16	<b>6FX002-5S23-....</b>
1FT6105-8SC7...	30	13.6 (18.2)	30	<b>6SL312 -1TE23-0AA3</b>	1.5	4 x 6	<b>6FX002-5S51-....</b>
1FT6108-8SC7...	41	18.8 (25.2)	45	<b>6SL312 -1TE24-5AA3</b>	3	4 x 10	<b>6FX002-5S14-....</b>
1FT6132-6SC7...	47	23.0 (30.8)	60	<b>6SL312 -1TE26-0AA3</b>	3	4 x 10	<b>6FX002-5S14-....</b>
1FT6134-6SC7...	58	29.3 (39.3)	60	<b>6SL312 -1TE26-0AA3</b>	3	4 x 16	<b>6FX002-5S23-....</b>
1FT6136-6SC7...	77	36.6 (49.1)	85	<b>6SL312 -1TE28-5AA3</b>	3	4 x 25	<b>6FX002-5DS33-....</b>
<b>Cooling:</b>							
Internal air cooling					0		
External air cooling					1		
<b>Motor Module:</b>							
Single Motor Module					1		
<b>Type of power cable:</b>							
MOTION-CONNECT 800						8	
MOTION-CONNECT 500						5	
Without brake cores							C
With brake cores							D
For length code as well as power and signal cables, see MOTION-CONNECT connection system.							

### Notes on blower motor for forced ventilation:

	Shaft heights 80 and 100	Shaft height 132
<b>Direction of air flow</b>	From NDE to DE	From DE to NDE
<b>Connection system</b>	Connector size 1	Terminal box
<b>Type of connecting cable</b>	6FX.002-5CA01-....	6FX.008-1BB11-....
<b>Pin and terminal assignments</b>	Pin 1: L1, Pin 2: N	U1/L1: V2/L2: W3/L3
<b>Supply voltage</b>	1-phase 220/260 V AC, 50/60 Hz	3-phase 400/460 V AC, 50/60 Hz
<b>Max. fan current</b>	0.3 A	0.4 A
<b>Weight of the fan module, approx.</b>	4.8 kg (10.6 lb)	5.6 kg (12.3 lb)
<b>Sound pressure level <math>L_{pA}</math> (1 m)</b>	70 dB	74 dB

1) If the absolute encoder is used,  $M_{rated}$  is reduced by 10 %.

2) Not for use in environments containing electrically conductive dust. Forced ventilation cannot be used in the presence of flammable, corrosive, electrically conductive or explosive dust.

3) Same flange as for IM B5 type, but with metric threaded insert in the four mounting holes.

4) The degree of protection refers to the motor. The built-on fan meets the requirements of degree of protection IP54.

5) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F)

6) With default setting of the pulse frequency.

7)  $P_{calc}$  [kW] =  $\frac{M_0$  [Nm] x  $n_{rated}$ }{9550}       $P_{calc}$  [HP] =  $\frac{M_0$  [lb-ft] x  $n_{rated}$ }{63000}

# Synchronous motors

## 1FT6 motors, standard type Forced ventilation

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque <sup>1)</sup>	Rated current	1FT6 synchronous motors Forced ventilation <sup>2)</sup>	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{rated}$ rpm	SH	$P_{rated}$ at $\Delta T=100\text{ K}$ kW (HP)	$M_0$ at $\Delta T=100\text{ K}$ Nm (lb <sub>r</sub> -ft)	$M_{rated}$ at $\Delta T=100\text{ K}$ Nm (lb <sub>r</sub> -ft)	$I_{rated}$ at $\Delta T=100\text{ K}$ A	Order No. Standard type		$J$  $10^{-4}\text{ kgm}^2$ ( $10^{-3}\text{ lb}_r\text{-in-s}^2$ )	$m$  kg (lb)
<b>3000</b>	80	6.9 (9.3)	26.0 (19.2)	22.0 (16.2)	17	<b>1FT6084-8SF7</b> - ■■■■	4	48.0 (42.4)	25.0 (55.1)
		9.7 (13.0)	35.0 (25.8)	31.0 (22.8)	24.5	<b>1FT6086-8SF7</b> - ■■■■	4	66.5 (58.8)	30.0 (66.2)
	100	15.7 (21.1)	65.0 (47.9)	50.0 (36.9)	35	<b>1FT6105-8SF7</b> - ■■■■	4	168 (148)	45.5 (100)
		22 (29.5)	90.0 (66.3)	70.0 (51.6)	53	<b>1FT6108-8SF7</b> - ■■■■	4	260 (230)	61.5 (135)
		28.3 (38.0)	110 (81.1)	90.0 (66.3)	62	<b>1FT6132-6SF7</b> - ■■■■	3	430 (380)	91.0 (200)
			34.6 (46.4)	140 (103)	110 (81.1)	72	<b>1FT6134-6SF7</b> - ■■■■	3	547 (484)
45.5 (61.0)	175 (129)	145 (106)	104	<b>1FT6136-6SF7</b> - ■■■■	3	664 (587)	123 (271)		
	<b>4500</b>	80	9.4 (12.6)	26.0 (19.2)	20.0 (14.7)	24.5	<b>1FT6084-8SH7</b> - ■■■■	4	48.0 (42.4)
12.7 (17.0)			35.0 (25.8)	27.0 (19.9)	31.5	<b>1FT6086-8SH7</b> - ■■■■	4	66.5 (58.8)	30.0 (66.2)
100	18.8 (25.2)	65.0 (47.9)	40.0 (29.9)	41	<b>1FT6105-8SH7</b> - ■■■■	4	168 (148)	45.5 (100)	
	<b>6000</b>	80	10.7 (14.4)	26.0 (19.2)	17.0 (12.5)	25.5	<b>1FT6084-8SK7</b> - ■■■■	4	48.0 (42.4)
13.8 (18.5)			35.0 (25.8)	22.0 (16.2)	29	<b>1FT6086-8SK7</b> - ■■■■	4	66.5 (58.8)	30.0 (66.2)

<b>Type:</b>	IM B5 IM B14 <sup>3)</sup> (not for 1FT613.)	1 2
<b>Connector outlet direction</b> (not for 1FT6136-6SF71):	Transverse right Transverse left Axial NDE (not for 1FT613 and not for 1FT6 with DRIVE-CLiQ and power connector size 3) Axial DE	1 2 3 4
<b>Terminal box/ cable entry:</b> (only for 1FT61)	Transverse/from right Transverse/from left Axial/from NDE Axial/from DE	5 6 7 8
<b>Encoder systems for motors without DRIVE-CLiQ interface:</b>	Incremental encoder sin/cos 1 V <sub>pp</sub> 2048 S/R Absolute encoder EnDat 2048 S/R <sup>1)</sup> Multi-pole resolver 2-pole resolver	A E S T
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>	22 bit incremental encoder Absolute encoder, 22 bit single-turn + 12 bit multi-turn <sup>1)</sup> 15 bit resolver 14 bit resolver	D F U P
<b>Shaft extension:</b> Fitted key and keyway Fitted key and keyway Fitted key and keyway Fitted key and keyway Plain shaft Plain shaft Plain shaft Plain shaft	<b>Shaft and flange accuracy:</b> Tolerance N Tolerance N Tolerance R Tolerance R Tolerance N Tolerance N Tolerance R Tolerance R	A B D E G H K L
	<b>Holding brake:</b> without with without with without with without with	
<b>Vibration magnitude:</b> Grade A Grade A Grade R Grade R	<b>Degree of protection:</b> <sup>4)</sup> IP64 IP65 IP64 IP65	0 1 3 4

To select the degree of protection and type, see the selection guide.

## Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}$ <sup>8)</sup>  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>7)</sup>  $I_{rated}$  A	Booksized format  Order No.	Motor connection (and brake connection) via power connector	Power connector  Size	Cable cross- section <sup>6)</sup>  mm <sup>2</sup>
1FT6084-8SF7...	18.2	8.2 (11.0)	18 <sup>5)</sup>	6SL312 - TE21-8AA3	1.5	4 x 2.5	6FX002-5S31-....
1FT6086-8SF7...	25	11.0 (14.8)	30	6SL312 - 1TE23-0AA3	1.5	4 x 4	6FX002-5S41-....
1FT6105-8SF7...	42	20.4 (27.4)	45	6SL312 - 1TE24-5AA3	3	4 x 10	6FX002-5S14-....
1FT6108-8SF7...	62	28.3 (37.9)	60 <sup>5)</sup>	6SL312 - 1TE26-0AA3	3	4 x 16	6FX002-5S23-....
1FT6132-6SF7...	69	34.6 (46.4)	85	6SL312 - 1TE28-5AA3	3	4 x 25	6FX002-5DS33-....
1FT6134-6SF7...	83	44.0 (59.0)	85	6SL312 - 1TE28-5AA3	3	4 x 25	6FX002-5DS33-....
1FT6136-6SF7...	110	55.0 (73.8)	132	6SL312 - 1TE31-3AA3	Terminal box (max. 4 x 35)		
1FT6084-8SH7...	26	12.3 (16.5)	30	6SL312 - 1TE23-0AA3	1.5	4 x 4	6FX002-5S41-....
1FT6086-8SH7...	38	16.5 (22.1)	45	6SL312 - 1TE24-5AA3	3	4 x 10	6FX002-5S14-....
1FT6105-8SH7...	59	30.6 (41.0)	85	6SL312 - 1TE28-5AA3	3	4 x 16	6FX002-5S23-....
1FT6084-8SK7...	35	16.3 (21.9)	45	6SL312 - 1TE24-5AA3	1.5	4 x 10	6FX002-5S64-....
1FT6086-8SK7...	44	22.0 (29.5)	45	6SL312 - 1TE24-5AA3	3	4 x 10	6FX002-5S14-....

## Cooling:

Internal air cooling  
External air cooling0  
1

## Motor Module:

Single Motor Module  
Double Motor Module1  
2

## Type of power cable:

MOTION-CONNECT 800  
MOTION-CONNECT 5008  
5Without brake cores  
With brake coresC  
D

For length code as well as power and signal cables, see MOTION-CONNECT connection system.

## Notes on blower motor for forced ventilation:

	Shaft heights 80 and 100	Shaft height 132
<b>Direction of air flow</b>	From NDE to DE	From DE to NDE
<b>Connection system</b>	Connector size 1	Terminal box
<b>Type of connecting cable</b>	6FX.002-5CA01-....	6FX.008-1BB11-....
<b>Pin and terminal assignments</b>	Pin 1: L1, Pin 2: N	U1/L1: V2/L2: W3/L3
<b>Supply voltage</b>	1-phase 220/260 V AC, 50/60 Hz	3-phase 400/460 V AC, 50/60 Hz
<b>Max. fan current</b>	0.3 A	0.4 A
<b>Weight of the fan module, approx.</b>	4.8 kg (10.6 lb)	5.6 kg (12.3 lb)
<b>Sound pressure level <math>L_{pA}</math> (1 m)</b>	70 dB	74 dB

1) If the absolute encoder is used,  $M_{rated}$  is reduced by 10 %.

2) Not for use in environments containing electrically conductive dust. Forced ventilation cannot be used in the presence of flammable, corrosive, electrically conductive or explosive dust.

3) Same flange as for IM B5 type, but with metric threaded insert in the four mounting holes.

4) The degree of protection refers to the motor. The built-on fan meets the requirements of degree of protection IP54.

5) With the specified Motor Module, the motor cannot be fully utilized with  $M_0$  at  $\Delta T = 100$  K winding temperature rise.

6) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

7) With default setting of the pulse frequency.

8)  $P_{calc} [kW] = \frac{M_0 [Nm] \times n_{rated}}{9550}$        $P_{calc} [HP] = \frac{M_0 [lb_f-in] \times n_{rated}}{63000}$

# Synchronous motors

## 1FT6 Big Servo motors Forced ventilation

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	1FT6 synchronous motors Big Servo Forced ventilation <sup>1)</sup>	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{\text{rated}}$		$P_{\text{rated}}$ at $\Delta T=100\text{ K}$	$M_0$ at $\Delta T=100\text{ K}$	$M_{\text{rated}}$ at $\Delta T=100\text{ K}$	$I_{\text{rated}}$ at $\Delta T=100\text{ K}$	Order No.		$J$	
rpm	SH	kW (HP)	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	A			$10^{-4}\text{ kgm}^2$ ( $10^{-3}\text{ lb}_f\text{-in-s}^2$ )	kg (lb)
1500	160	60.5 (81.1)	425 (313)	385 (283)	136	1FT6163-8SB76 - ■■■■	4	2300 (2035)	170 (374)
		85 (114)	600 (442)	540 (398)	174	1FT6168-8SB76 - ■■■■	4	3100 (2743)	210 (463)
2500	160	89 (119)	425 (313)	340 (250)	185	1FT6163-8SD76 - ■■■■	4	2300 (2035)	170 (374)
<b>Type <sup>3)</sup>:</b>			IM B35			6			
<b>Terminal box at top, cable entry:</b>			Transverse right Transverse left Axial NDE Axial DE			5 6 7 8			
<b>Encoder systems for motors without DRIVE-CLiQ interface</b>			Incremental encoder sin/cos 1 $V_{\text{pp}}$ 2048 S/R Absolute encoder EnDat 2048 S/R Multi-pole resolver 2-pole resolver			A E S T			
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>			22 bit incremental encoder Absolute encoder, 22 bit single-turn + 12 bit multi-turn 15 bit resolver 14 bit resolver			D F U P			
<b>Shaft extension:</b> With fitted key and keyway With fitted key and keyway Plain shaft Plain shaft		<b>Shaft and flange accuracy:</b> Tolerance N Tolerance R Tolerance N Tolerance R		<b>Holding brake:</b> without without without without		A D G K			
<b>Vibration magnitude:</b> Grade A Grade A Grade R Grade R					<b>Degree of protection: <sup>2)</sup></b> IP64 IP65 IP64 IP65				
						0 1 3 4			

To select the degree of protection and type, see the selection guide.

## Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $\Delta T=100\text{ K}$  A	Calculated power $P_{\text{calc}}^{7)}$  $P_{\text{calc}}$ for $M_0$ $\Delta T=100\text{ K}$  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>5)</sup>  $I_{\text{rated}}^{4)}$  A	Booksized format  Order No.	Motor connection via terminal box		
					Cable entry terminal box <sup>6)</sup>	Max. con- nectable cable cross- section  mm <sup>2</sup>	Order No. Power cable/ By the meter
1FT6163-8SB76-....	151	66.8 (89.6)	200	<b>6SL312 -1TE32-0AA3</b>	2 x M50 x 1.5	2 x 4 x 50	<b>6FX 008-1BB50-....</b>
1FT6168-8SB76-....	194	94.2 (126)	200	<b>6SL312 -1TE32-0AA3</b>	2 x M50 x 1.5	2 x 4 x 50	<b>6FX 008-1BB50-....</b>
1FT6163-8SD76-....	226	111 (148)	200	<b>6SL312 -1TE32-0AA3</b>	2 x M50 x 1.5	2 x 4 x 50	<b>6FX 008-1BB50-....</b>
<b>Cooling:</b>							
Internal air cooling							
External air cooling							
<b>Motor Module:</b>							
Single Motor Module							
<b>Type of power cable:</b>							
MOTION-CONNECT 800							
MOTION-CONNECT 500							
For length code as well as power and signal cables, see MOTION-CONNECT connection system.							

Notes on blower motor for forced ventilation:

	Shaft height 160
<b>Direction of air flow</b>	From DE to NDE
<b>Connection system</b>	Terminal box
<b>Type of connecting cable</b>	6FX.008-1BB11-....
<b>Pin and terminal assignments</b>	U1/L1: V2/L2: W3/L3
<b>Supply voltage</b>	400/480 V 3 AC 50/60 Hz
<b>Max. fan current</b>	0.8 A
<b>Sound pressure level <math>L_{pA}</math> (1 m)</b>	74 dB

- Not for use in environments containing electrically conductive dust. Forced ventilation cannot be used in the presence of flammable, corrosive, electrically conductive or explosive dust.
- The degree of protection refers to the motor. The built-on fan meets the requirements of degree of protection IP54.
- 1FT616 Big Servo motors of construction type IM B35 can be mounted on the flange only.

- Motor Modules are assigned according to the motor rated current.

- With default setting of the pulse frequency.

- Terminal box type gk 630.

- $$P_{\text{calc}} [\text{kW}] = \frac{M_0 [\text{Nm}] \times n_{\text{rated}}}{9550}$$

$$P_{\text{calc}} [\text{HP}] = \frac{M_0 [\text{lb}_f\text{-in}] \times n_{\text{rated}}}{63000}$$

# Synchronous motors

## 1FT6 motors, standard type Water cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	1FT6 synchronous motors Water cooling <sup>1) 2)</sup>	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{rated}$ rpm	SH	$P_{rated}$ at $\Delta T=100$ K kW (HP)	$M_0$ at $\Delta T=100$ K Nm (lb <sub>r</sub> -ft)	$M_{rated}$ at $\Delta T=100$ K Nm (lb <sub>r</sub> -ft)	$I_{rated}$ at $\Delta T=100$ K A	Order No. Standard type		$J$  $10^{-4}$ kgm <sup>2</sup> ( $10^{-3}$ lb <sub>r</sub> -in-s <sup>2</sup> )	$m$  kg (lb)
1500	100	18.2 (24.4)	119 (87.7)	116 (85.5)	43	1FT6108-8WB7 - ■■■■	4	260 (230)	61.5 (135)
		17.2 (23.1) 24.1 (32.3)	85.0 (62.6) 119 (87.7)	82.0 (60.4) 115 (84.8)	60 57				
3000	63	3.2 (4.3) 5.1 (6.8)	10.2 (7.5) 16.2 (11.9)	10.0 (7.4) 16.0 (11.8)	6.9 10.3	1FT6062-6WF7 - ■■■■ 1FT6064-6WF7 - ■■■■	3 3	8.5 (7.52) 13.0 (11.5)	9.5 (20.9) 12.5 (27.6)
		80	11.0 (14.8) 14.5 (19.4)	35.0 (25.8) 47.0 (34.6)	35.0 (25.8) 46.0 (33.9)	27 37	1FT6084-8WF7 - ■■■■ 1FT6086-8WF7 - ■■■■	4 4	48.0 (42.4) 66.5 (58.8)
	100		24.5 (32.9) 34.2 (45.9)	85.0 (62.6) 119 (87.7)	78.0 (57.5) 109 (80.3)	82 81	1FT6105-8WF7 - ■■■■ 1FT6108-8WF7 - ■■■■	4 4	168 (148) 260 (230)
		4500	4.7 (6.3) 7.5 (10.1)	10.2 (7.5) 16.2 (11.9)	10.0 (7.4) 16.0 (11.8)	9.6 15.2	1FT6062-6WH7 - ■■■■ 1FT6064-6WH7 - ■■■■	3 3	8.5 (7.52) 13.0 (11.5)
	80		16.5 (22.1) 21.2 (28.4)	35.0 (25.8) 47.0 (34.6)	35.0 (25.8) 45.0 (33.2)	39 53	1FT6084-8WH7 - ■■■■ 1FT6086-8WH7 - ■■■■	4 4	48.0 (42.4) 66.5 (58.8)
		6000	63	6.2 (8.3) 9.9 (13.3)	10.2 (7.5) 16.2 (11.9)	9.8 (7.2) 15.8 (11.6)	12.7 20	1FT6062-6WK7 - ■■■■ 1FT6064-6WK7 - ■■■■	3 3
80	21.4 (28.7) 27.7 (37.2)			35.0 (25.8) 47.0 (34.6)	34.0 (25.1) 44.0 (32.4)	51 58	1FT6084-8WK7 - ■■■■ 1FT6086-8WK7 - ■■■■	4 4	48.0 (42.4) 66.5 (58.8)

<b>Type:</b>	IM B5 IM B14 <sup>3)</sup> (not for 1FT613)	1 2
<b>Connector outlet direction:</b>	Transverse right (not for 1FT606) Transverse left (not for 1FT606) Axial NDE (not for 1FT6 with DRIVE-CLiQ and power connec. size 3) Axial DE (1FT6062 only with water connec. on side or below) <sup>2)</sup>	1 2 3 4
<b>Terminal box/cable entry:</b> (only for 1FT61)	Transverse/from right Transverse/from left Axial/from NDE Axial/from DE	5 6 7 8
<b>Encoder systems for motors without DRIVE-CLiQ interface:</b>	Incremental encoder sin/cos 1 V <sub>pp</sub> 2048 S/R Absolute encoder EnDat 2048 S/R Multi-pole resolver 2-pole resolver	A E S T
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>	22 bit incremental encoder Absolute encoder, 22 bit single-turn + 12 bit multi-turn 15 bit resolver 14 bit resolver	D F U P
<b>Shaft extension:</b>	<b>Shaft and flange accuracy:</b>	<b>Holding brake:</b>
Fitted key and keyway	Tolerance N	without
Fitted key and keyway	Tolerance N	with
Fitted key and keyway	Tolerance R	without
Fitted key and keyway	Tolerance R	with
Plain shaft	Tolerance N	without
Plain shaft	Tolerance N	with
Plain shaft	Tolerance R	without
Plain shaft	Tolerance R	with
<b>Vibration magnitude:</b>	<b>Degree of protection:</b>	A B D E G H K L
Grade A	IP64	0
Grade A	IP65	1
Grade A	IP67	2
Grade A	IP68	6
Grade R	IP64	3
Grade R	IP65	4
Grade R	IP67	5
Grade R	IP68	7

To select the degree of protection and type, see the selection guide.

# Synchronous motors

## 1FT6 motors, standard type Water cooling

Motor type (continued)	Static current $I_0$ at $M_0$ $\Delta T=100K$ A	Calculated power $P_{calc}$ <sup>7)</sup> $P_{calc}$ for $M_0$ $\Delta T=100 K$ kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>6)</sup> $I_{rated}$ A	Booksize format Order No.	Motor connection (and brake connection) via power connector		
					Power connector	Cable cross-section <sup>5)</sup> mm <sup>2</sup>	Order No. Pre-assembled cable
					Size		
1FT6108-8WB7...	43	18.7 (25.1)	45	6SL312- 1TE24-5AA3	3	4 x 10	6FX 002-5 S14-....
1FT6105-8WC7...	58	17.8 (23.9)	60	6SL312- 1TE26-0AA3	3	4 x 16	6FX 002-5 S23-....
1FT6108-8WC7...	57	24.9 (33.4)	60	6SL312- 1TE26-0AA3	3	4 x 16	6FX 002-5 S23-....
1FT6062-6WF7...	6.9	3.2 (4.3)	9	6SL312- TE21-0AA3	1	4 x 1.5	6FX 002-5 S01-....
1FT6064-6WF7...	10.3	5.1 (6.8)	18	6SL312- TE21-8AA3	1	4 x 1.5	6FX 002-5 S01-....
1FT6084-8WF7...	24.5	11.0 (14.8)	30	6SL312- 1TE23-0AA3	1.5	4 x 4	6FX 002-5 S41-....
1FT6086-8WF7...	34	14.8 (19.9)	45	6SL312- 1TE24-5AA3	1.5	4 x 10	6FX 002-5 S64-....
1FT6105-8WF7...	83	26.7 (35.8)	85	6SL312- 1TE28-5AA3	3	4 x 25	6FX5 002-5DS33-....
1FT6108-8WF7...	86	37.4 (50.2)	85 <sup>4)</sup>	6SL312- 1TE28-5AA3	3	4 x 35	6FX5 002-5DS43-....
1FT6062-6WH7...	9.7	4.8 (6.4)	18	6SL312- TE21-8AA3	1	4 x 1.5	6FX 002-5 S01-....
1FT6064-6WH7...	15.4	7.6 (10.2)	18	6SL312- TE21-8AA3	1	4 x 2.5	6FX 002-5 S11-....
1FT6084-8WH7...	37	16.5 (22.1)	45	6SL312- 1TE24-5AA3	1.5	4 x 10	6FX 002-5 S64-....
1FT6086-8WH7...	52	22.1 (29.6)	60	6SL312- 1TE26-0AA3	3	4 x 16	6FX 002-5 S23-....
1FT6062-6WK7...	12.9	6.4 (8.6)	18	6SL312- TE21-8AA3	1	4 x 1.5	6FX 002-5 S01-....
1FT6064-6WK7...	20.5	10.2 (13.7)	30	6SL312- 1TE23-0AA3	1	4 x 2.5	6FX 002-5 S11-....
1FT6084-8WK7...	47	22.0 (29.5)	60	6SL312- 1TE26-0AA3	3	4 x 10	6FX 002-5 S14-....
1FT6086-8WK7...	59	29.5 (39.6)	60	6SL312- 1TE26-0AA3	3	4 x 16	6FX 002-5DS23-....

<b>Cooling:</b> Internal air cooling External air cooling	0 1
<b>Motor Module:</b> Single Motor Module Double Motor Module	1 2
<b>Type of power cable:</b> MOTION-CONNECT 800 MOTION-CONNECT 500	8 5
Without brake cores With brake cores	C D
For length code as well as power and signal cables, see MOTION-CONNECT connection system.	...

Notes on water cooling:

- Inlet temperature of cooling water: max. 30 °C (86 °F)
- Cooling water throughput: at least 5 l/min (1.32 US gallons)
- Pressure ahead of motor:  $p_{max} = 3$  bar (43.5 psi)
- Cooling water connection: G 3/8"
- Coolant: water with up to 25 % corrosion protection (recommendation: Tyfocor)
- Loss of pressure between inlet and outlet <0.1 bar (1.45 psi)

1) Delivered as standard with water connection "at top".  
 2) Water connection on right side: Add **-Z** + order code  
**Q20 to order number**  
 Water connection on left side: Add **-Z** + order code  
**Q21 to order number**  
 Water connection below: Add **-Z** + order code  
**Q22 to order number.**  
 3) Same flange as for IM B5 type, but with metric threaded insert in the four mounting holes.

4) With the specified Motor Module, the motor cannot be fully utilized with  $M_0$  at  $\Delta T = 100 K$  winding temperature rise. If a Motor Module with a higher rating is used, you must check whether the specified power cable can be connected to it.  
 5) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).  
 6) With default setting of the pulse frequency.  
 7)  $P_{calc} [kW] = \frac{M_0 [Nm] \times n_{rated}}{9550}$        $P_{calc} [HP] = \frac{M_0 [lb_f-in] \times n_{rated}}{63000}$



# Synchronous motors

## 1FT6 Big Servo motors Water cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	1FT6 synchronous motors Big Servo Water cooling	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)	
$n_{rated}$	SH	$P_{rated}$ at $\Delta T=100$ K	$M_0$ at $\Delta T=100$ K	$M_{rated}$ at $\Delta T=100$ K	$I_{rated}$ at $\Delta T=100$ K	Order No.		$J$	$m$	
rpm		kW (HP)	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	A			$10^{-4}$ kgm <sup>2</sup> (10 <sup>-3</sup> lb <sub>f</sub> -in-s <sup>2</sup> )	kg (lb)	
1500	132	23.6 (31.7)	155 (114)	150 (110)	58	1FT6132-6WB76 - ■■■■	3	430 (380)	90.0 (198)	
		29.1 (39.0)	200 (147)	185 (136)	67	1FT6134-6WB76 - ■■■■	3	547 (484)	103 (227)	
		36.1 (48.4)	240 (176)	230 (169)	90	1FT6136-6WB76 - ■■■■	3	665 (588)	120 (264)	
		45.5 (61.0)	300 (221)	290 (213)	112	1FT6138-6WB76 - ■■■■	3	845 (747)	137 (302)	
	160	70.7 (94.8)	450 (331)	450 (331)	160	1FT6163-8WB76 - ■■■■	4	2300 (2035)	170 (374)	
		108.4 (145.4)	700 (515)	690 (508)	221	1FT6168-8WB76 - ■■■■	4	3100 (2743)	210 (463)	
	2500	132	35.3 (47.3)	155 (114)	135 (99.5)	82	1FT6132-6WD76 - ■■■■	3	430 (380)	90.0 (198)
			48.4 (64.9)	200 (147)	185 (136)	115	1FT6134-6WD76 - ■■■■	3	547 (484)	103 (227)
57.6 (77.2)			240 (176)	220 (162)	149	1FT6136-6WD76 - ■■■■	3	665 (588)	120 (264)	
72.0 (96.6)			300 (221)	275 (202)	162	1FT6138-6WD76 - ■■■■	3	845 (747)	137 (302)	
160		117.8 (158.0)	450 (331)	450 (331)	240	1FT6163-8WD76 - ■■■■	4	2300 (2035)	170 (374)	

<b>Type</b> <sup>1)</sup> :	IM B35	6	
<b>Terminal box/ Cable entry:</b>	Transverse/from right Transverse/from left Axial/from NDE Axial/from DE	5 6 7 8	
<b>Encoder systems for motors without DRIVE-CLiQ interface:</b>	Incremental encoder sin/cos 1 $V_{op}$ 2048 S/R Absolute encoder EnDat 2048 S/R Multi-pole resolver 2-pole resolver	A E S T	
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>	22 bit incremental encoder Absolute encoder, 22 bit single-turn + 12 bit multi-turn 15 bit resolver 14 bit resolver	D F U P	
<b>Shaft extension:</b> Fitted key and keyway Fitted key and keyway Plain shaft Plain shaft	<b>Shaft and flange accuracy:</b> Tolerance N Tolerance R Tolerance N Tolerance R	<b>Holding brake:</b> without without without without	A D G K
<b>Vibration magnitude:</b> Grade A Grade A Grade R Grade R	<b>Degree of protection:</b> IP64 IP65 IP64 IP65	0 1 3 4	

To select the degree of protection, see selection guide.

## Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}^4)$  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>2)</sup>  $I_{rated}$  A	Booksize format  Order No.	Motor connection via terminal box		
					Cable cross-section terminal box type <sup>3)</sup>	Max. connectable cable cross- section  mm <sup>2</sup>	Order No. Power cable By the meter
1FT6132-6WB76-...	58	24.3 (23.6)	60	<b>6SL312 -1TE 26-0AA3</b>	2 x M32 x 1.5	2 x 4 x 16	<b>6FX008-1BB61-....</b>
1FT6134-6WB76-...	73	31.4 (42.1)	85	<b>6SL312 -1TE 28-5AA3</b>	2 x M40 x 1.5	2 x 4 x 35	<b>6FX008-1BB35-....</b>
1FT6136-6WB76-...	92	37.7 (50.6)	132	<b>6SL312 -1TE 31-3AA3</b>	2 x M50 x 1.5	2 x 4 x 50	<b>6FX008-1BB50-....</b>
1FT6138-6WB76-...	112	47.1 (63.2)	132	<b>6SL312 -1TE 31-3AA3</b>	2 x M50 x 1.5	2 x 4 x 50	<b>6FX008-1BB50-....</b>
1FT6163-8WB76-...	160	70.7 (94.8)	200	<b>6SL312 -1TE 32-0AA3</b>	2 x M50 x 1.5	2 x 4 x 50	<b>6FX008-1BB50-....</b>
1FT6168-8WB76-...	225	110 (147)	260	<b>6SL3320 -1TE 32-6AA3</b>	2 x M50 x 1.5	2 x 4 x 50	<b>6FX008-1BB50-....</b>
1FT6132-6WD76-...	92	40.6 (54.4)	85	<b>6SL312 -1TE 28-5AA3</b>	2 x M40 x 1.5	2 x 4 x 35	<b>6FX008-1BB35-....</b>
1FT6134-6WD76-...	122	52.4 (70.3)	132	<b>6SL312 -1TE 31-3AA3</b>	2 x M50 x 1.5	2 x 4 x 50	<b>6FX008-1BB50-....</b>
1FT6136-6WD76-...	158	62.8 (84.2)	200	<b>6SL312 -1TE 32-0AA3</b>	2 x M50 x 1.5	2 x 4 x 50	<b>6FX008-1BB50-....</b>
1FT6138-6WD76-...	167	78.5 (105)	200	<b>6SL312 -1TE 32-0AA3</b>	2 x M50 x 1.5	2 x 4 x 50	<b>6FX008-1BB50-....</b>
1FT6163-8WD76-...	240	118 (158)	260	<b>6SL3320 -1TE 32-6AA3</b>	2 x M50 x 1.5	2 x 4 x 50	<b>6FX008-1BB50-....</b>
<b>Cooling:</b>							
Internal air cooling					0		
External air cooling					1		
<b>Motor Module:</b>							
Single Motor Module					1		
<b>Type of power cable:</b>							
MOTION-CONNECT 800						8	
MOTION-CONNECT 500						5	
For length code as well as power and signal cables, see MOTION-CONNECT connection system.							

## Notes on water cooling:

- Inlet temperature of cooling water: max. 30 °C (86 °F)
- Cooling water throughput:  
1FT613: at least 8 l/min (2.11 US gallons)  
1FT616: at least 10 l/min (2.64 US gallons)
- Pressure ahead of motor:  $p_{max} = 6$  bar (87 psi)
- Cooling water connection:  
1FT613: G 3/8".  
1FT616: G 1/2".
- Coolant: water with up to 25 % corrosion protection  
(recommendation: Tyfocor)
- Loss of pressure between inlet and outlet <0.1 bar (1.45 psi)

1) 1FT616 Big Servo motors of construction type IM B35 can be mounted on the flange only.

2) With default setting of the pulse frequency.

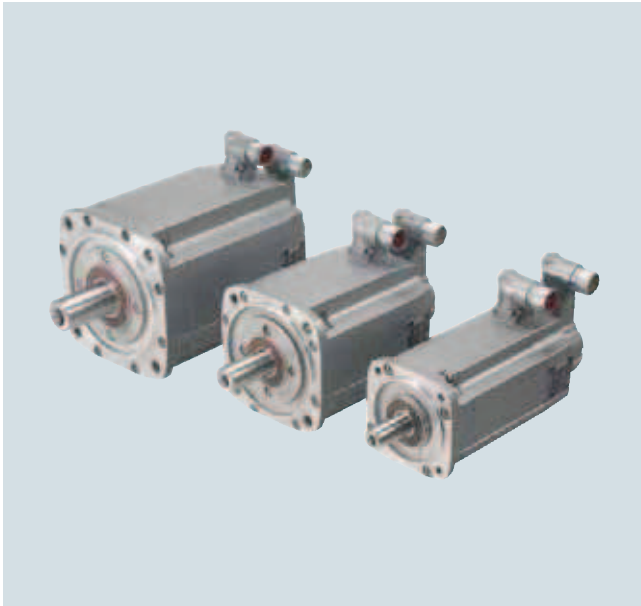
3) Terminal box type gk 630.

4)  $P_{calc} [kW] = \frac{M_0 [Nm] \times n_{rated}}{9550}$        $P_{calc} [HP] = \frac{M_0 [lb_f \cdot in] \times n_{rated}}{63000}$

# Synchronous motors

## 1FT7 Compact motors

### Overview



The new 1FT7 Compact motors are permanent-magnet synchronous motors with very compact dimensions and an optically attractive design. Quick and easy mounting of the motors is possible due to the well proven cross-profile and quick release cable connectors.

The 1FT7 Compact motors fulfill the highest demands on dynamic response, speed setting range including field weakening, shaft and flange accuracy. They are equipped with state-of-the-art encoder technology and optimized for the use with our fully digital control and drive systems.

### Benefits

- High shaft and flange accuracy
- Low torque ripple (average value <1 %)
- Highest dynamic response for minimized acceleration and deceleration times due to reduced moment of inertia (up to 30 % less than 1FT6)
- High overload capability (up to  $4 \times M_0$ )
- Compact design (up to 30 % shorter than 1FT6)
- High degree of protection
- Rugged, vibration-isolated encoder mounting
- Easy encoder replacement on site without alignment
- Quick and easy mounting due to cross-profile
- Rotatable quick release connectors
- New flange design with recessed flange surface, especially suitable for toothed-belt output and vertical assembly (IM V1). The previous flange design, compatible with the 1FT6 motors, can be ordered optionally.

### Applications

- High-performance machine tools
- Machines with stringent requirements in terms of dynamic response, precision and limited space conditions, such as packaging machines, foil stretching machines, printing machines and material handling equipment

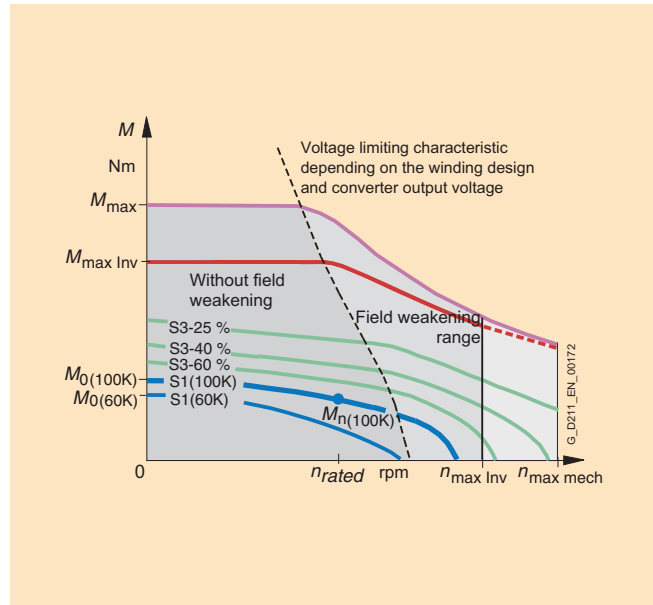
### Technical specifications

<b>Type of motor</b>	Permanent-magnet synchronous motor
<b>Magnet material</b>	Rare-earth magnet material
<b>Cooling</b>	Natural cooling (SH 36 to SH 100)
<b>Temperature monitoring</b>	KTY 84 temperature sensor in stator winding
<b>Insulation of the stator winding in accordance with EN 60034-1 (IEC 60034-1)</b>	Temperature class 155 (F) for a winding temperature rise of $\Delta T = 100 \text{ K}$ at an ambient temperature of $+40 \text{ °C}$ ( $104 \text{ °F}$ )
<b>Type in accordance with EN 60034-7 (IEC 60034-7)</b>	IM B5 (IM V1, IM V3) with flange 0
<b>Degree of protection in accordance with EN 60034-5 (IEC 60034-5)</b>	IP65
<b>Shaft extension on the drive end in accordance with DIN 748-3 (IEC 60072-1)</b>	Plain shaft
<b>Shaft and flange accuracy in accordance with DIN 42955 (IEC 60072-1) <sup>1)</sup></b>	Tolerance N
<b>Vibration magnitude in accordance with EN 60034-14 (IEC 60034-14)</b>	Grade A (maintained up to rated speed)
<b>Max. sound pressure level <math>L_{pA}</math> (1 m (3.28 ft)) in accordance with EN ISO 1680</b> Tolerance +3dB	65 dB 70 dB
<b>Built-in encoder systems for motors without DRIVE-CLiQ interface</b>	<ul style="list-style-type: none"> <li>Incremental encoder sin/cos 1 <math>V_{pp}</math> 2048 S/R</li> <li>Absolute encoder, multi-turn 2048 S/R (traversing range 4096 revolutions) with EnDat interface</li> </ul>
<b>Built-in encoder systems for motors with DRIVE-CLiQ interface</b>	<ul style="list-style-type: none"> <li>22 bit incremental encoder (2048 S/R internal)</li> <li>22 bit absolute encoder single-turn (2048 S/R internal) +12 bit multi-turn (traversing range 4096 revolutions)</li> </ul>
<b>Connection</b>	Connectors for signals and power can be rotated
<b>Paint finish</b>	Pearl dark grey RAL 9023
<b>2nd rating plate</b>	Enclosed separately
<b>Options</b>	<ul style="list-style-type: none"> <li>Type IM B5 (IM V1, IM V3) with flange 1 (compatible with 1FT6)</li> <li>Shaft extension on the drive end with fitted key and keyway (half-key balancing)</li> <li>Built-in holding brake</li> <li>Degree of protection IP64, IP67</li> <li>Vibration magnitude Grade R</li> <li>Shaft and flange accuracy Tolerance R</li> <li>Paint finish with other colors</li> <li>Planetary gearbox, built-on</li> </ul>

S/R = signals/revolution

<sup>1)</sup> Shaft extension run-out, concentricity of centering ring and shaft, and perpendicularity of flange to shaft.

### Characteristics



Torque characteristic of a synchronous motor operating on a converter with field weakening (example characteristic)

### More information

**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 are based on the Booksize format by way of example. The formats Booksize Compact, Blocksize or Chassis are also possible. Detailed engineering is performed with the SIZER engineering tool.

### Options

Order code	Option description	1FT7 Compact
<b>X01</b>	Jet black finish RAL 9005	■
<b>X02</b>	Cream finish RAL 9001	■
<b>X03</b>	Reseda green finish RAL 6011	■
<b>X04</b>	Pebble gray finish RAL 7032	■
<b>X05</b>	Sky blue finish RAL 5015	■
<b>X06</b>	Light ivory finish RAL 1015	■
<b>X09</b>	Anthracite finish RAL 7016	■

■ Option available

# Synchronous motors

## 1FT7 Compact motors, core type Natural cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	1FT7 Compact synchronous motors Natural cooling  Order No. <b>Core type</b>	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{rated}$	SH	$P_{rated}$ at $\Delta T=100$ K	$M_0$ at $\Delta T=100$ K	$M_{rated}$ at $\Delta T=100$ K	$I_{rated}$ at $\Delta T=100$ K			$J$	$m$
rpm		kW (HP)	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	A			$10^{-4}$ kgm <sup>2</sup> (10 <sup>-3</sup> lb <sub>f</sub> -in-s <sup>2</sup> )	kg (lb)
2000	100	5.03 (6.75)	30 (22.1)	24 (17.7)	10	<b>1FT7102 - 1AC7</b> - 1 ■ ■ 1	5	91.4 (80.9)	26.1 (57.5)
		7.96 (10.7)	50 (36.9)	38 (28)	15			<b>1FT7105 - 1AC7</b> - 1 ■ ■ 1	5
3000	48	1.35 (1.81)	5.0 (3.7)	4.3 (3.2)	2.6	<b>1FT7044 - 1AF7</b> - 1 ■ ■ 1	3	5.43 (4.81)	7.2 (15.9)
	63	1.7 (2.28)	6.0 (4.4)	5.4 (4.0)	3.9	<b>1FT7062 - 1AF7</b> - 1 ■ ■ 1	5	7.36 (6.51)	7.1 (15.7)
		2.39 (3.20)	9.0 (6.6)	7.6 (5.6)	5.2	<b>1FT7064 - 1AF7</b> - 1 ■ ■ 1	5	11.9 (10.5)	9.7 (21.4)
	80	3.24 (4.34)	13 (9.6)	10.5 (7.7)	6.6	<b>1FT7082 - 1AF7</b> - 1 ■ ■ 1	5	26.5 (23.4)	14 (30.9)
4500	80	4.55 (6.10)	20 (14.8)	14.5 (10.7)	8.5	<b>1FT7084 - 1AF7</b> - 1 ■ ■ 1	5	45.1 (39.9)	20.8 (45.9)
		5.65 (7.58)	28 (20.7)	18 (13.3)	11	<b>1FT7086 - 1AF7</b> - 1 ■ ■ 1	5	63.6 (56.2)	27.5 (60.6)
		4.82 (6.46) <sup>3)</sup>	20 (14.8)	11.5 (8.5) <sup>3)</sup>	10.1 <sup>3)</sup>	<b>1FT7084 - 1AH7</b> - 1 ■ ■ 1	5	45.1 (39.9)	20.8 (45.9)
6000	80	4.71 (6.32)	28 (20.7)	10 (7.4)	10	<b>1FT7086 - 1AH7</b> - 1 ■ ■ 1	5	63.6 (56.2)	27.5 (60.6)
		0.88 (1.18)	2.0 (1.5)	1.4 (1.0)	2.1	<b>1FT7034 - 1AK7</b> - 1 ■ ■ 1	3	0.85 (0.75)	3.8 (8.38)
6000	63	2.13 (2.86) <sup>1)</sup>	6.0 (4.4)	3.7 (2.7) <sup>1)</sup>	5.9 <sup>1)</sup>	<b>1FT7062 - 1AK7</b> - 1 ■ ■ 1	5	7.36 (6.51)	7.1 (15.7)
		2.59 (3.47) <sup>2)</sup>	9.0 (6.6)	5.5 (4.1) <sup>2)</sup>	6.1 <sup>2)</sup>	<b>1FT7064 - 1AK7</b> - 1 ■ ■ 1	5	11.9 (10.5)	9.7 (21.4)

<b>Type IM B5:</b>	Flange 0 Flange 1 (compatible with 1FT6)	0 1	
<b>Encoder systems for motors without DRIVE-CLiQ interface:</b>	Incremental encoder sin/cos 1 V <sub>pp</sub> 2048 S/R Absolute encoder EnDat 2048 S/R		N M
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>	22 bit incremental encoder Absolute encoder, 22 bit single-turn + 12 bit multi-turn		D F
<b>Shaft extension:</b> Plain shaft Plain shaft	<b>Shaft and flange accuracy:</b> Tolerance N Tolerance N	<b>Holding brake:</b> without with	G H
<b>Vibration magnitude:</b> Grade A	<b>Degree of protection:</b> IP65		1

To select the degree of protection and type, see selection guides.

# Synchronous motors

## 1FT7 Compact motors, core type Natural cooling

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### Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}^{6)}$  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>5)</sup>  $I_{rated}$  A	Booksize format  Order No.	Motor connection (and brake connection) via power connector		
					Power connector	Cable cross-section <sup>4)</sup>	Order No. Pre-assembled cable
					Size	mm <sup>2</sup>	
1FT7102-1AC7...	12.5	6.28 (8.42)	18	<b>6SL312 - TE21 - 8AA3</b>	1.5	4 x 1.5	<b>6FX 002 - 5 S21 - ...</b>
1FT7105-1AC7...	18	10.47 (14.0)	18	<b>6SL312 - TE21 - 8AA3</b>	1.5	4 x 2.5	<b>6FX 002 - 5 S31 - ...</b>
1FT7044-1AF7...	2.8	1.57 (2.11)	3	<b>6SL312 - TE13 - 0AA3</b>	1	4 x 1.5	<b>6FX 002 - 5 S01 - ...</b>
1FT7062-1AF7...	3.9	1.88 (2.52)	5	<b>6SL312 - TE15 - 0AA3</b>	1	4 x 1.5	<b>6FX 002 - 5 S01 - ...</b>
1FT7064-1AF7...	5.7	2.83 (3.80)	9	<b>6SL312 - TE21 - 0AA3</b>	1	4 x 1.5	<b>6FX 002 - 5 S01 - ...</b>
1FT7082-1AF7...	7.6	4.08 (5.47)	9	<b>6SL312 - TE21 - 0AA3</b>	1	4 x 1.5	<b>6FX 002 - 5 S01 - ...</b>
1FT7084-1AF7...	11	6.28 (8.42)	18	<b>6SL312 - TE21 - 8AA3</b>	1	4 x 1.5	<b>6FX 002 - 5 S01 - ...</b>
1FT7086-1AF7...	15.5	8.80 (11.8)	18	<b>6SL312 - TE21 - 8AA3</b>	1.5	4 x 2.5	<b>6FX 002 - 5 S31 - ...</b>
1FT7084-1AH7...	15.6	9.42 (12.6)	18	<b>6SL312 - TE21 - 8AA3</b>	1.5	4 x 2.5	<b>6FX 002 - 5 S31 - ...</b>
1FT7086-1AH7...	22.4	13.19 (17.7)	30	<b>6SL312 - 1 TE23 - 0AA3</b>	1.5	4 x 4	<b>6FX 002 - 5 S41 - ...</b>
1FT7034-1AK7...	2.7	1.26 (1.69)	3	<b>6SL312 - TE13 - 0AA3</b>	1	4 x 1.5	<b>6FX 002 - 5 S01 - ...</b>
1FT7062-1AK7...	8.4	3.77 (5.06)	9	<b>6SL312 - TE21 - 0AA3</b>	1	4 x 1.5	<b>6FX 002 - 5 S01 - ...</b>
1FT7064-1AK7...	9	5.65 (7.58)	9	<b>6SL312 - TE21 - 0AA3</b>	1	4 x 1.5	<b>6FX 002 - 5 S01 - ...</b>

#### Cooling:

Internal air cooling  
External air cooling

0  
1

#### Motor Module:

Single Motor Module  
Double Motor Module

1  
2

#### Type of power cable:

MOTION-CONNECT 800  
MOTION-CONNECT 500

8  
5

Without brake cores  
With brake cores

C  
D

For length code as well as power and signal cables, see MOTION-CONNECT connection system.

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1) These values refer to  $n = 5500$  rpm.

2) These values refer to  $n = 4500$  rpm.

3) These values refer to  $n = 4000$  rpm.

4) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

5) With default setting of the pulse frequency.

6)  $P_{calc} [kW] = \frac{M_0 [Nm] \times n_{rated}}{9550}$        $P_{calc} [HP] = \frac{M_0 [lb_f-in] \times n_{rated}}{63000}$

# Synchronous motors

## 1FT7 Compact motors, standard type Natural cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	1FT7 Compact synchronous motors Natural cooling	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{rated}$	SH	$P_{rated}$ at $\Delta T=100\text{ K}$	$M_0$ at $\Delta T=100\text{ K}$	$M_{rated}$ at $\Delta T=100\text{ K}$	$I_{rated}$ at $\Delta T=100\text{ K}$	Order No. Standard type		$J$	$m$
rpm		kW (HP)	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	A			$10^{-4}\text{ kgm}^2$ ( $10^{-3}\text{ lb}_f\text{-in-s}^2$ )	kg (lb)
1500	100	4.08 (5.47)	30 (22.1)	26 (19.2)	8	1FT7102 - 5AB7 - 1 ■ ■ ■ ■	5	91.4 (80.9)	26.1 (57.5)
		6.60 (8.85)	50 (36.9)	42 (31.0)	13	1FT7105 - 5AB7 - 1 ■ ■ ■ ■	5	178 (157)	44.2 (97.5)
		9.58 (12.8)	70 (51.6)	61 (45.0)	16	1FT7108 - 5AB7 - 1 ■ ■ ■ ■	5	248 (219)	59.0 (130)
<b>Type IM B5:</b>			Flange 0 Flange 1 (compatible with 1FT6)		0 1				
<b>Encoder systems for motors without DRIVE-CLiQ interface:</b>			Incremental encoder sin/cos 1 $V_{pp}$ 2048 S/R Absolute encoder EnDat 2048 S/R			N M			
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>			22 bit incremental encoder Absolute encoder, 22 bit single-turn + 12 bit multi-turn			D F			
<b>Shaft extension:</b>			<b>Shaft and flange accuracy:</b>		<b>Holding brake:</b>				
Fitted key and keyway			Tolerance N		without		A		
Fitted key and keyway			Tolerance N		with		B		
Fitted key and keyway			Tolerance R		without		D		
Fitted key and keyway			Tolerance R		with		E		
Plain shaft			Tolerance N		without		G		
Plain shaft			Tolerance N		with		H		
Plain shaft			Tolerance R		without		K		
Plain shaft			Tolerance R		with		L		
<b>Vibration magnitude:</b>			<b>Degree of protection:</b>				0 1 2 3 4 5		
Grade A			IP64						
Grade A			IP65						
Grade A			IP67						
Grade R			IP64						
Grade R			IP65						
Grade R			IP67						

To select the degree of protection and type, see selection guides.

# Synchronous motors

## 1FT7 Compact motors, standard type Natural cooling

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### Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}$ <sup>3)</sup>  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>2)</sup>  $I_{rated}$  A	Booksiz e format  Order No.	Motor connection (and brake connection) via power connector	Power connector  Size	Cable cross- section <sup>1)</sup>  mm <sup>2</sup>
1FT7102-5AB7...	9	4.71 (6.32)	9	<b>6SL312 - TE21 - 0AA3</b>	1.5	4 x 1.5	<b>6FX 002 - 5S21 - ....</b>
1FT7105-5AB7...	15	7.85 (10.5)	18	<b>6SL312 - TE21 - 8AA3</b>	1.5	4 x 1.5	<b>6FX 002 - 5S21 - ....</b>
1FT7108-5AB7...	18	10.99 (14.7)	18	<b>6SL312 - TE21 - 8AA3</b>	1.5	4 x 2.5	<b>6FX 002 - 5S31 - ....</b>

<b>Cooling:</b> Internal air cooling	0						
External air cooling	1						
<b>Motor Module:</b> Single Motor Module	1						
Double Motor Module	2						
<b>Type of power cable:</b> MOTION-CONNECT 800					8		
MOTION-CONNECT 500					5		
Without brake cores							C
With brake cores							D
For length code as well as power and signal cables, see MOTION-CONNECT connection system.							....

1) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F)

2) With default setting of the pulse frequency.

3)  $P_{calc} [kW] = \frac{M_0 [Nm] \times n_{rated}}{9550}$        $P_{calc} [HP] = \frac{M_0 [lb_f \cdot in] \times n_{rated}}{63000}$



# Synchronous motors

## 1FT7 Compact motors, standard type Natural cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	1FT7 Compact synchronous motors Natural cooling	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{rated}$	SH	$P_{rated}$ at $\Delta T=100\text{ K}$	$M_0$ at $\Delta T=100\text{ K}$	$M_{rated}$ at $\Delta T=100\text{ K}$	$I_{rated}$ at $\Delta T=100\text{ K}$	Order No. Standard type		$J$	$m$
rpm		kW (HP)	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	A			$10^{-4}\text{ kgm}^2$ ( $10^{-3}\text{ lb}_f\text{-in-s}^2$ )	kg (lb)
2000	80	2.39 (3.20)	13 (9.6)	11.4 (8.4)	4.9	1FT7082 - 5AC7 - 1 ■ ■ ■ ■	5	26.5 (23.5)	14 (30.9)
		3.54 (4.75)	20 (14.8)	16.9 (12.5)	8.4	1FT7084 - 5AC7 - 1 ■ ■ ■ ■	5	45.1 (39.9)	20.8 (45.9)
		4.71 (6.32)	28 (20.7)	22.5 (16.6)	9.2	1FT7086 - 5AC7 - 1 ■ ■ ■ ■	5	63.6 (56.3)	27.5 (60.6)
	100	5.03 (6.75)	30 (22.1)	24.0 (17.7)	10	1FT7102 - 5AC7 - 1 ■ ■ ■ ■	5	91.4 (80.9)	26.1 (57.5)
		7.96 (10.7)	50 (36.9)	38.0 (28.0)	15	1FT7105 - 5AC7 - 1 ■ ■ ■ ■	5	178 (157)	44.2 (97.5)
		10.5 (14.1)	70 (51.6)	50.0 (36.9)	18	1FT7108 - 5AC7 - 1 ■ ■ ■ ■	5	248 (219)	59 (130)

<b>Type IM B5:</b>	Flange 0 Flange 1 (compatible with 1FT6)	0 1		
<b>Encoder systems for motors without DRIVE-CLiQ interface:</b>	Incremental encoder sin/cos 1 V <sub>pp</sub> 2048 S/R Absolute encoder EnDat 2048 S/R		N M	
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>	22 bit incremental encoder Absolute encoder, 22 bit single-turn + 12 bit multi-turn		D F	
<b>Shaft extension:</b>	<b>Shaft and flange accuracy:</b>	<b>Holding brake:</b>		A B D E G H K L
Fitted key and keyway	Tolerance N	without		
Fitted key and keyway	Tolerance N	with		
Fitted key and keyway	Tolerance R	without		
Fitted key and keyway	Tolerance R	with		
Plain shaft	Tolerance N	without		
Plain shaft	Tolerance N	with		
Plain shaft	Tolerance R	without		
Plain shaft	Tolerance R	with		
<b>Vibration magnitude:</b>	<b>Degree of protection:</b>			0 1 2 3 4 5
Grade A	IP64			
Grade A	IP65			
Grade A	IP67			
Grade R	IP64			
Grade R	IP65			
Grade R	IP67			

To select the degree of protection and type, see selection guides.

# Synchronous motors

## 1FT7 Compact motors, standard type Natural cooling

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Selection and ordering data							
Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}^3)$  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>2)</sup>  $I_{rated}$  A	Booksized format  Order No.	Motor connection (and brake connection) via power connector	Cable cross- section <sup>1)</sup>  mm <sup>2</sup>	Order No. Pre-assembled cable
1FT7082-5AC7...	5	2.72 (3.65)	5	6SL312 - TE15 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7084-5AC7...	9	4.19 (5.62)	9	6SL312 - TE21 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7086-5AC7...	10.6	5.86 (7.86)	18	6SL312 - TE21 - 8AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7102-5AC7...	12.5	6.28 (8.42)	18	6SL312 - TE21 - 8AA3	1.5	4 x 1.5	6FX 002 - 5S21 - ....
1FT7105-5AC7...	18	10.47 (14.0)	18	6SL312 - TE21 - 8AA3	1.5	4 x 2.5	6FX 002 - 5S31 - ....
1FT7108-5AC7...	25	14.66 (19.7)	30	6SL312 - 1TE23 - 1AA3	1.5	4 x 4	6FX 002 - 5S41 - ....
<b>Cooling:</b>							
Internal air cooling							0
External air cooling							1
<b>Motor Module:</b>							
Single Motor Module							1
Double Motor Module							2
<b>Type of power cable:</b>							
MOTION-CONNECT 800							8
MOTION-CONNECT 500							5
Without brake cores							C
With brake cores							D
For length code as well as power and signal cables, see MOTION-CONNECT connection system.							....

1) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

2) With default setting of the pulse frequency.

3)  $P_{calc} [kW] = \frac{M_0 [Nm] \times n_{rated}}{9550}$        $P_{calc} [HP] = \frac{M_0 [lb-in] \times n_{rated}}{63000}$

# Synchronous motors

## 1FT7 Compact motors, standard type Natural cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	1FT7 Compact synchronous motors Natural cooling	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{\text{rated}}$	SH	$P_{\text{rated}}$ at $\Delta T=100$ K	$M_0$ at $\Delta T=100$ K	$M_{\text{rated}}$ at $\Delta T=100$ K	$I_{\text{rated}}$ at $\Delta T=100$ K	Order No. Standard type		$J$	$m$
rpm		kW (HP)	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	A			$10^{-4}$ kgm <sup>2</sup> (10 <sup>-3</sup> lb <sub>f</sub> -in-s <sup>2</sup> )	kg (lb)
3000	48	0.85 (1.14)	3.0 (2.2)	2.7 (2.0)	2.1	1FT7042 - 5AF7 - 1 ■ ■ ■ ■	3	2.81 (2.49)	4.6 (10.1)
		1.35 (1.81)	5.0 (3.7)	4.3 (3.2)	2.6	1FT7044 - 5AF7 - 1 ■ ■ ■ ■	3	5.43 (4.81)	7.2 (15.9)
		1.76 (2.36)	7.0 (5.2)	5.6 (4.1)	3.5	1FT7046 - 5AF7 - 1 ■ ■ ■ ■	3	7.52 (6.66)	9.3 (20.5)
	63	1.70 (2.28)	6.0 (4.4)	5.4 (4.0)	3.9	1FT7062 - 5AF7 - 1 ■ ■ ■ ■	5	7.36 (6.51)	7.1 (15.7)
		2.39 (3.20)	9.0 (6.6)	7.6 (5.6)	5.2	1FT7064 - 5AF7 - 1 ■ ■ ■ ■	5	11.9 (10.5)	9.7 (21.4)
		2.92 (3.92)	12.0 (8.9)	9.3 (6.9)	7.2	1FT7066 - 5AF7 - 1 ■ ■ ■ ■	5	16.4 (14.5)	12.3 (27.1)
		3.42 (4.59)	15.0 (11.1)	10.9 (8.0)	6.7	1FT7068 - 5AF7 - 1 ■ ■ ■ ■	5	23.2 (20.5)	16.3 (35.9)
	80	3.24 (4.34)	13.0 (9.6)	10.3 (7.6)	6.6	1FT7082 - 5AF7 - 1 ■ ■ ■ ■	5	26.5 (23.5)	14.0 (30.9)
		4.55 (6.10)	20.0 (14.8)	14.5 (10.7)	8.5	1FT7084 - 5AF7 - 1 ■ ■ ■ ■	5	45.1 (39.9)	20.8 (45.9)
		5.62 (7.54)	28.0 (20.7)	18 (13.3)	11	1FT7086 - 5AF7 - 1 ■ ■ ■ ■	5	63.6 (56.3)	27.5 (60.6)
	100	6.28 (8.42)	30.0 (22.1)	20 (14.8)	12	1FT7102 - 5AF7 - 1 ■ ■ ■ ■	5	91.4 (80.9)	26.1 (57.5)
		8.80 (11.8)	50.0 (36.9)	28 (20.7)	15	1FT7105 - 5AF7 - 1 ■ ■ ■ ■	5	178 (157)	44.2 (97.5)
8.17 (11.0)		70.0 (51.6)	20 (14.8)	12	1FT7108 - 5AF7 - 1 ■ ■ ■ ■	5	248 (220)	59.0 (130)	

#### Type IM B5:

Flange 0  
Flange 1 (compatible with 1FT6)

0  
1

#### Encoder systems for motors without DRIVE-CLiQ interface:

Incremental encoder sin/cos 1 V<sub>pp</sub> 2048 S/R  
Absolute encoder EnDat 2048 S/R

N  
M

#### Encoder systems for motors with DRIVE-CLiQ interface:

22 bit incremental encoder  
Absolute encoder, 22 bit single-turn + 12 bit multi-turn

D  
F

#### Shaft extension:

Fitted key and keyway  
Fitted key and keyway  
Fitted key and keyway  
Fitted key and keyway

#### Shaft and flange accuracy:

Tolerance N  
Tolerance N  
Tolerance R  
Tolerance R  
Tolerance N  
Tolerance N  
Tolerance R  
Tolerance R

#### Holding brake:

without  
with  
without  
with  
without  
with

A  
B  
D  
E  
G  
H  
K  
L

#### Vibration magnitude:

Grade A  
Grade A  
Grade A  
Grade R  
Grade R  
Grade R

#### Degree of protection:

IP64  
IP65  
IP67  
IP64  
IP65  
IP67

0  
1  
2  
3  
4  
5

To select the degree of protection and type, see selection guides.

# Synchronous motors

## 1FT7 Compact motors, standard type Natural cooling

4

### Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}$ <sup>3)</sup>  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>2)</sup>  $I_{rated}$  A	Booksize format  Order No.	Motor connection (and brake connection) via power connector	Power connector	Cable cross-section <sup>1)</sup>  mm <sup>2</sup>
1FT7042-5AF7...	2.1	0.94 (1.26)	3	6SL312 - TE13 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7044-5AF7...	2.8	1.57 (2.11)	3	6SL312 - TE13 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7046-5AF7...	4	2.20 (2.95)	5	6SL312 - TE15 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7062-5AF7...	3.9	1.88 (2.52)	5	6SL312 - TE15 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7064-5AF7...	5.7	2.83 (3.80)	9	6SL312 - TE21 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7066-5AF7...	8.4	3.77 (5.06)	9	6SL312 - TE21 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7068-5AF7...	8.3	4.71 (6.32)	9	6SL312 - TE21 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7082-5AF7...	7.6	4.08 (5.47)	9	6SL312 - TE21 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7084-5AF7...	11	6.28 (8.42)	18	6SL312 - TE21 - 8AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7086-5AF7...	15.5	8.80 (11.8)	18	6SL312 - TE21 - 8AA3	1.5	4 x 2.5	6FX 002 - 5S31 - ....
1FT7102-5AF7...	18	9.42 (12.6)	18	6SL312 - TE21 - 8AA3	1.5	4 x 2.5	6FX 002 - 5S31 - ....
1FT7105-5AF7...	26	15.71 (21.0)	30	6SL312 - 1TE23 - 1AA3	1.5	4 x 4	6FX 002 - 5S41 - ....
1FT7108-5AF7...	36	21.99 (29.5)	45	6SL312 - 1TE24 - 5AA3	1.5	4 x 6	6FX 002 - 5S51 - ....

#### Cooling:

Internal air cooling 0  
External air cooling 1

#### Motor Module:

Single Motor Module 1  
Double Motor Module 2

#### Type of power cable:

MOTION-CONNECT 800 8  
MOTION-CONNECT 500 5

Without brake cores C  
With brake cores D

For length code as well as power and signal cables, see MOTION-CONNECT connection system. ....

1) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

2) With default setting of the pulse frequency.

3)  $P_{calc} [kW] = \frac{M_0 [Nm] \times n_{rated}}{9550}$       $P_{calc} [HP] = \frac{M_0 [lb_f-in] \times n_{rated}}{63000}$

# Synchronous motors

## 1FT7 Compact motors, standard type Natural cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	1FT7 Compact synchronous motors Natural cooling	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{\text{rated}}$	SH	$P_{\text{rated}}$ at $\Delta T=100 \text{ K}$	$M_0$ at $\Delta T=100 \text{ K}$	$M_{\text{rated}}$ at $\Delta T=100 \text{ K}$	$I_{\text{rated}}$ at $\Delta T=100 \text{ K}$	Order No. <b>Standard type</b>		$J$	$m$
rpm		kW (HP)	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	A			$10^{-4} \text{ kgm}^2$ ( $10^{-3} \text{ lb}_f\text{-in-s}^2$ )	kg (lb)
4500	48	1.32 (1.77) <sup>1)</sup>	7.0 (5.2)	3.6 (2.7) <sup>1)</sup>	4.7 <sup>1)</sup>	1FT7046 - 5AH7 - 1 ■ ■ ■ ■	3	7.52 (6.66)	9.3 (20.5)
	63	2.55 (3.42) <sup>2)</sup>	12 (8.9)	6.1 (4.5) <sup>2)</sup>	7.5 <sup>2)</sup>	1FT7066 - 5AH7 - 1 ■ ■ ■ ■	5	16.4 (14.5)	12.3 (27.1)
	80	3.77 (5.06)	13 (9.6)	8.0 (5.9)	8.4	1FT7082 - 5AH7 - 1 ■ ■ ■ ■	5	26.5 (23.5)	14.0 (30.9)
		4.82 (6.46) <sup>2)</sup>	20 (14.8)	11.5 (8.5) <sup>2)</sup>	10.1 <sup>2)</sup>	1FT7084 - 5AH7 - 1 ■ ■ ■ ■	5	45.1 (39.9)	20.8 (45.9)
		4.71 (6.32)	28 (20.7)	10 (7.4)	10	1FT7086 - 5AH7 - 1 ■ ■ ■ ■	5	63.6 (56.3)	27.5 (60.6)

#### Type IM B5:

Flange 0  
Flange 1 (compatible with 1FT6)

0  
1

#### Encoder systems for motors without DRIVE-CLiQ interface:

Incremental encoder sin/cos 1 V<sub>pp</sub> 2048 S/R  
Absolute encoder EnDat 2048 S/R

N  
M

#### Encoder systems for motors with DRIVE-CLiQ interface:

22 bit incremental encoder  
Absolute encoder, 22 bit single-turn + 12 bit multi-turn

D  
F

#### Shaft extension:

Fitted key and keyway  
Fitted key and keyway  
Fitted key and keyway  
Fitted key and keyway  
Plain shaft  
Plain shaft  
Plain shaft  
Plain shaft

#### Shaft and flange accuracy:

Tolerance N  
Tolerance N  
Tolerance R  
Tolerance R  
Tolerance N  
Tolerance N  
Tolerance R  
Tolerance R

#### Holding brake:

without  
with  
without  
with  
without  
with  
without  
with

A  
B  
E  
G  
H  
K  
L

#### Vibration magnitude:

Grade A  
Grade A  
Grade A  
Grade R  
Grade R  
Grade R

#### Degree of protection:

IP64  
IP65  
IP67  
IP64  
IP65  
IP67

0  
1  
2  
3  
4  
5

To select the degree of protection and type, see selection guides.

# Synchronous motors

## 1FT7 Compact motors, standard type Natural cooling

4

Selection and ordering data							
Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}$ <sup>5)</sup>  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>4)</sup>  $I_{rated}$  A	Booksize format  Order No.	Motor connection (and brake connection) via power connector		
					Power connector  Size	Cable cross-section <sup>3)</sup>  mm <sup>2</sup>	Order No. Pre-assembled cable
1FT7046-5AH7...	8.1	3.30 (4.43)	9	<b>6SL312 - TE21 - 0AA3</b>	1	4 x 1.5	<b>6FX 002 - 5 S01 - ....</b>
1FT7066-5AH7...	13.6	5.65 (7.58)	18	<b>6SL312 - TE21 - 8AA3</b>	1	4 x 1.5	<b>6FX 002 - 5 S01 - ....</b>
1FT7082-5AH7...	12.3	6.13 (8.22)	18	<b>6SL312 - TE21 - 8AA3</b>	1	4 x 1.5	<b>6FX 002 - 5 S01 - ....</b>
1FT7084-5AH7...	15.6	9.42 (12.6)	18	<b>6SL312 - TE21 - 8AA3</b>	1.5	4 x 2.5	<b>6FX 002 - 5 S31 - ....</b>
1FT7086-5AH7...	22.4	13.19 (17.7)	30	<b>6SL312 - 1 TE23 - 0AA3</b>	1.5	4 x 4	<b>6FX 002 - 5 S41 - ....</b>
<b>Cooling:</b>							
Internal air cooling							
External air cooling							
<b>Motor Module:</b>							
Single Motor Module							
Double Motor Module							
<b>Type of power cable:</b>							
MOTION-CONNECT 800							
MOTION-CONNECT 500							
Without brake cores							
With brake cores							
For length code as well as power and signal cables, see MOTION-CONNECT connection system.							

1) These values refer to  $n = 3500$  rpm.  
 2) These values refer to  $n = 4000$  rpm.  
 3) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).  
 4) With default setting of the pulse frequency.  
 5)  $P_{calc} [kW] = \frac{M_0 [Nm] \times n_{rated}}{9550}$       $P_{calc} [HP] = \frac{M_0 [lb-ft] \times n_{rated}}{63000}$

# Synchronous motors

## 1FT7 Compact motors, standard type Natural cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	<b>1FT7 Compact synchronous motors</b> <b>Natural cooling</b>  Order No. <b>Standard type</b>	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{rated}$	SH	$P_{rated}$ at $\Delta T=100\text{ K}$	$M_0$ at $\Delta T=100\text{ K}$	$M_{rated}$ at $\Delta T=100\text{ K}$	$I_{rated}$ at $\Delta T=100\text{ K}$		$J$	$m$	
rpm		kW (HP)	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	A		$10^{-4}\text{ kgm}^2$ $(10^{-3}\text{ lb}_f\text{-in-s}^2)$	kg (lb)	
<b>6000</b>	36	0.88 (1.18)	2.0 (1.5)	1.4 (1.0)	2.1	<b>1FT7034 - 5AK7</b> - 1 ■ ■ ■ ■ 3	0.85 (0.75)	3.8 (8.38)	
		1.07 (1.43)	3.0 (2.2)	1.7 (1.3)	2.4	<b>1FT7036 - 5AK7</b> - 1 ■ ■ ■ ■ 3	1.33 (1.18)	5.0 (11.0)	
	48	1.26 (1.69)	3.0 (2.2)	2.0 (1.5)	3	<b>1FT7042 - 5AK7</b> - 1 ■ ■ ■ ■ 3	2.81 (2.49)	4.6 (10.1)	
		1.41 (1.89) <sup>1)</sup>	5.0 (3.7)	3.0 (2.2) <sup>1)</sup>	3.6 <sup>1)</sup>	<b>1FT7044 - 5AK7</b> - 1 ■ ■ ■ ■ 3	5.43 (4.81)	7.2 (15.9)	
	63	2.13 (2.86) <sup>2)</sup>	6.0 (4.4)	3.7 (2.7) <sup>2)</sup>	5.9 <sup>2)</sup>	<b>1FT7062 - 5AK7</b> - 1 ■ ■ ■ ■ 5	7.36 (6.51)	7.1 (15.7)	
		2.59 (3.47) <sup>1)</sup>	9.0 (6.6)	5.5 (4.1) <sup>1)</sup>	6.1 <sup>1)</sup>	<b>1FT7064 - 5AK7</b> - 1 ■ ■ ■ ■ 5	11.9 (10.5)	9.7 (21.4)	

<b>Type IM B5:</b>	Flange 0 Flange 1 (compatible with 1FT6)	<b>0</b> <b>1</b>	<b>N</b> <b>M</b> <b>D</b> <b>F</b>  <b>A</b> <b>B</b> <b>E</b> <b>D</b> <b>G</b> <b>H</b> <b>K</b> <b>L</b>
<b>Encoder systems for motors without DRIVE-CLiQ interface:</b>	Incremental encoder sin/cos 1 V <sub>pp</sub> 2048 S/R Absolute encoder EnDat 2048 S/R		
<b>Encoder systems for motors with DRIVE-CLiQ interface:</b>	22 bit incremental encoder Absolute encoder, 22 bit single-turn +12 bit multi-turn		
<b>Shaft extension:</b>	<b>Shaft and flange accuracy:</b>	<b>Holding brake:</b>	
Fitted key and keyway	Tolerance N	without	<b>0</b> <b>1</b> <b>2</b> <b>3</b> <b>4</b> <b>5</b>
Fitted key and keyway	Tolerance N	with	
Fitted key and keyway	Tolerance R	without	
Fitted key and keyway	Tolerance R	with	
Plain shaft	Tolerance N	without	
Plain shaft	Tolerance N	with	
Plain shaft	Tolerance R	without	
Plain shaft	Tolerance R	with	
<b>Vibration magnitude:</b>	<b>Degree of protection:</b>		
Grade A	IP64		
Grade A	IP65		
Grade A	IP67		
Grade R	IP64		
Grade R	IP65		
Grade R	IP67		

To select the degree of protection and type, see selection guides.

# Synchronous motors

## 1FT7 Compact motors, standard type Natural cooling

### Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}$ <sup>5)</sup>  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
			Rated output current <sup>4)</sup>  $I_{rated}$  A	Booksiz e format  Order No.	Power connector  Size	Cable cross- section <sup>3)</sup>  mm <sup>2</sup>	Order No. Pre-assembled cable
1FT7034-5AK7...	2.7	1.26 (1.69)	3	6SL312 - TE13 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7036-5AK7...	4.0	1.88 (2.52)	5	6SL312 - TE15 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7042-5AK7...	3.9	1.89 (2.53)	5	6SL312 - TE15 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7044-5AK7...	5.7	3.15 (4.22)	9	6SL312 - TE21 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7062-5AK7...	8.4	3.78 (5.07)	9	6SL312 - TE21 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....
1FT7064-5AK7...	9	5.67 (7.60)	9	6SL312 - TE21 - 0AA3	1	4 x 1.5	6FX 002 - 5S01 - ....

#### Cooling:

Internal air cooling  
External air cooling

0  
1

#### Motor Module:

Single Motor Module  
Double Motor Module

1  
2

#### Type of power cable:

MOTION-CONNECT 800  
MOTION-CONNECT 500

8  
5

Without brake cores  
With brake cores

C  
D

For length code as well as power and signal cables, see MOTION-CONNECT connection system.

....

1) These values refer to  $n = 4500$  rpm.  
 2) These values refer to  $n = 5500$  rpm.  
 3) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).  
 4) With default setting of the pulse frequency.  
 5)  $P_{calc} [kW] = \frac{M_0 [Nm] \times n_{rated}}{9550}$        $P_{calc} [HP] = \frac{M_0 [lb_f-in] \times n_{rated}}{63000}$



# Synchronous motors

## 1FK7 motors

### Overview



1FK7 motors are extremely compact, permanent-magnet synchronous motors. The available options, gearboxes and encoders, together with the expanded product range, mean that the 1FK7 motors can be optimally adapted to any application. They therefore also satisfy the permanently increasing demands of state-of-the-art machine generations.

1FK7 motors can be combined with the SINAMICS S120 drive system to create a powerful system with high functionality. The integrated encoder systems for speed and position control can be selected depending on the application.

The motors are designed for operation without external cooling as the heat is dissipated through the motor surface. 1FK7 motors have a high overload capability.

### Benefits

#### 1FK7 Compact motors offer:

- Space-saving installation due to extremely high power density
- For universal applications
- Wide range of motors

#### 1FK7 High Dynamic motors offer:

- Extremely high dynamic response due to low rotor moment of inertia

### Applications

- Machine tools
- Robots and manipulators
- Wood, glass, ceramics and stone working
- Packaging, plastics and textile machines
- Auxiliary axes

<sup>1)</sup> 1FK701 only available in degree of protection IP54 and anthracite paint finish, no rating plate in NDE cover, planetary gearbox not available.

<sup>2)</sup> Shaft extension run-out, concentricity of centering ring and shaft, and perpendicularity of flange to shaft.

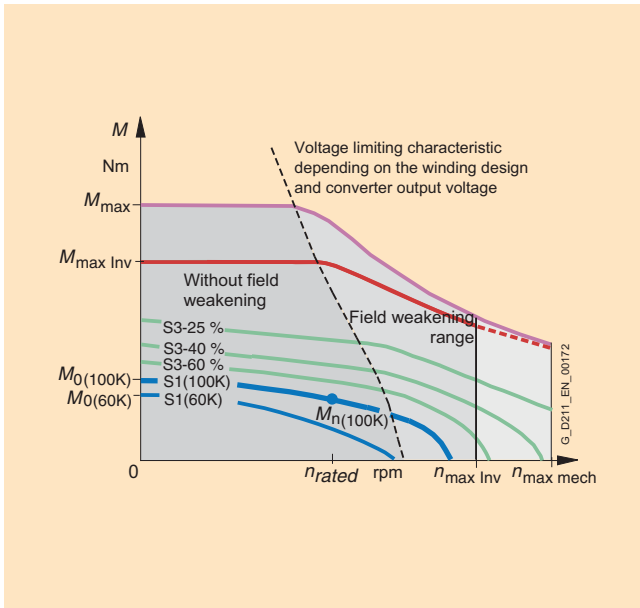
<sup>3)</sup> Traversing range 4096 revolutions

### Technical specifications

<b>Type of motor</b>	Perm.-magnet syn. motor
<b>Magnet material</b>	Rare-earth magnet material
<b>Insulation of the stator winding in accordance with EN 60034-1 (IEC 60034-1)</b>	Temperature class 155 (F) for a winding temperature rise of $\Delta T = 100$ K at an ambient temperature of 40 °C (104 °F)
<b>Cooling</b>	Natural cooling
<b>Temperature monitoring</b>	KTY84 temperature sensor in the stator winding
<b>Type in accordance with EN 60034-7 (IEC 60034-7)</b>	IM B5 (IM V1, IM V3)
<b>Degree of protection <sup>1)</sup> in accord. with EN 60034-5 (IEC 60034-5)</b>	IP64
<b>Shaft extension on the drive end in accordance with DIN 748-3 (IEC 60072-1)</b>	Plain shaft
<b>Shaft and flange accuracy <sup>2)</sup> in accordance with DIN 42955 (IEC 60072-1)</b>	Tolerance N
<b>Vibration magnitude in accord. with EN 60034-14 (IEC 60034-14)</b>	Grade A (maintained up to rated speed)
<b>Max. sound pressure level <math>L_{pA}</math> (1 m (3.28 ft)) in accord. with DIN EN ISO 1680</b>	<ul style="list-style-type: none"> <li>• 1FK701 to 1FK704 55 dB</li> <li>• 1FK706 65 dB</li> <li>• 1FK708 to 1FK710 70 dB</li> </ul>
<b>Built-in encoder systems for motors without DRIVE-CLiQ interface</b>	<ul style="list-style-type: none"> <li>• Incremental encoder sin/cos 1 <math>V_{pp}</math> 2048 S/R</li> <li>• Absolute encoder, multi-turn, <sup>3)</sup> with EnDat interface:               <ul style="list-style-type: none"> <li>- 2048 S/R for 1FK704 to 1FK710</li> <li>- 512 S/R for 1FK701 to 1FK703</li> <li>- 32 S/R for 1FK704 to 1FK710</li> <li>- 16 S/R for 1FK701 to 1FK703</li> </ul> </li> <li>• Multi-pole resolver (number of poles corresp. to number of pole pairs of the motor)</li> <li>• 2-pole resolver</li> </ul>
<b>Built-in encoder systems for motors with DRIVE-CLiQ interface</b>	<ul style="list-style-type: none"> <li>• 22 bit incremental encoder (2048 S/R internal)</li> <li>• Absolute encoder:               <ul style="list-style-type: none"> <li>- 22 bit single-turn (2048 S/R internal) + 12 bit multi-turn <sup>3)</sup> for 1FK704 to 1FK710</li> <li>- 20 bit single-turn (512 S/R internal) + 12 bit multi-turn <sup>3)</sup> for 1FK702 to 1FK703</li> <li>- 16 bit single-turn (32 S/R internal) + 12 bit multi-turn <sup>3)</sup> for 1FK704 to 1FK710</li> <li>- 15 bit single-turn (16 S/R internal) + 12 bit multi-turn <sup>3)</sup> for 1FK702 to 1FK703</li> </ul> </li> <li>• 15 bit resolver</li> <li>• 14 bit resolver</li> </ul>
<b>Connection</b>	Connectors for signals and power can be rotated (270°)
<b>Paint finish <sup>1)</sup></b>	Unpainted
<b>2nd rating plate <sup>1)</sup></b>	Attached in the NDE cover
<b>3rd rating plate</b>	Enclosed separately
<b>Options <sup>1)</sup></b>	<ul style="list-style-type: none"> <li>• Shaft ext. at the drive end with fitted key and keyway (half-key balancing)</li> <li>• Built-in holding brake</li> <li>• Degree of protection IP65, drive end flange IP67</li> <li>• Planetary gearbox, assembled (requirement: plain shaft extension, degree of protection IP64 for LP+ and IP65 for SP+)</li> <li>• Anthracite finish RAL 7016</li> </ul>

S/R = signals/revolution

## Characteristics



Torque characteristic of a synchronous motor operating on a converter with field weakening (example characteristic)

## Options

Order code	Option description	1FK7 Compact	1FK7 High Dynamic
<b>M03</b>	Version for Zone 2 hazardous areas (in accordance with EN 50021/IEC 60079-15)	■	■
<b>M39</b>	Version for Zone 22 hazardous areas (in accordance with EN 50281/IEC 61241)	■	■
<b>N05</b>	Non-standard shaft extension (dimensions as for 1FT5 motors)	■	■
<b>N25</b>	Permanent magnet brake instead of spring-operated brake	–	■
<b>K23</b>	Special finish for "Worldwide" climate comprising primer and paint finish (anthracite RAL 7016 paint finish or selectable with Option X0.)	■	■
<b>K24</b>	Primed (unpainted)	■	■
<b>X01</b>	Jet black finish RAL 9005	■	■
<b>X02</b>	Cream finish RAL 9001	■	■
<b>X03</b>	Reseda green finish RAL 6011	■	■
<b>X04</b>	Pebble gray finish RAL 7032	■	■
<b>X05</b>	Sky blue finish RAL 5015	■	■
<b>X06</b>	Light ivory finish RAL 1015	■	■
<b>X08</b>	White aluminum RAL 9006, suitable for food grade applications	■	■
<b>X27</b>	Pearl dark grey RAL 9023 paint finish	■	■

■ Option available

### M03

#### Version for Zone 2 hazardous areas (according to IEC EN 60079-15)

Combustible or explosive gases or vapors occur only rarely or briefly in Zone 2 areas. The type of protection designation is EEx nA II ("non sparking").

The special conditions for operating 1FK7 motors in Zone 2 areas, in particular the reduction in permissible operating speeds, are described in detail in Appendix 610.40063.01 to the EC Declaration of Conformity 664.20025.21.

### M39

#### Version for Zone 22 hazardous areas (according to IEC EN 61241-1)

Combustible or potentially explosive dust (non-conductive dust) occurs only rarely or briefly in Zone 22 areas. The type of protection designation is Ex 3D T 150 °C.

The special conditions for operating 1FK7 motors in Zone 22 areas are described in detail in Appendix 610.40071.01 to the EC Declaration of Conformity 664.20031.21.

Note regarding M03 and M39 options:

When used in Zone 2 or Zone 22, 1FK7 motors are only designed for encoder connection through connectors. A version with a DRIVE-CLiQ interface on the motor is not possible. Connection to SINAMICS S120 is only possible via SMC (Sensor Module Cabinet-Mounted).

### N05

#### Non-standard shaft extension (dimensions as for 1FT5 motors)

1FK7 motors are shipped with the following shaft dimensions that are compatible with 1FT5 motors:

- SH 36: 11 x 23 mm (0.43 x 0.91 in)
- SH 48: 14 x 30 mm (0.55 x 1.18 in)
- SH 63: 19 x 40 mm (0.75 x 1.57 in)
- SH 80: 24 x 50 mm (0.94 x 1.97 in)
- SH 100: 32 x 58 mm (1.26 x 2.28 in)

Note:

1FK7 motors of SH 63 with option N05 do not have a compatible flange with 1FT5 motors of SH 63.

### Q90

#### Food-grade gear oil

Only for 1FK7 Compact with helical and bevel gears

# Synchronous motors

## 1FK7 Compact motors Natural cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque <sup>1)</sup>	Rated current	1FK7 Compact synchronous motor Natural cooling	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{rated}$	SH	$P_{rated}$ at $\Delta T=100$ K	$M_0$ at $\Delta T=100$ K	$M_{rated}$ at $\Delta T=100$ K	$I_{rated}$ at $\Delta T=100$ K	Order No.		$J$	$m$
rpm		kW (HP)	Nm (lb <sub>r</sub> -ft)	Nm (lb <sub>r</sub> -ft)	A			$10^{-4}$ kgm <sup>2</sup> ( $10^{-3}$ lb <sub>r</sub> -in-s <sup>2</sup> )	kg (lb)
2000	100	4.29 (5.75)	27 (19.9)	20.5 (15.1)	9.6	1FK7101-5AC71-1 ■■■■	4	79.9 (70.7)	21 (46.3)
		5.23 (7.01)	36 (26.6)	25 (18.4)	11.5	1FK7103-5AC71-1 ■■■■	4	105 (92.9)	29 (63.9)
		7.75 (10.4)	48 (35.4)	37 (27.3)	16	1FK7105-5AC71-1 ■■■■	4	156 (138)	39 (86.2)
3000	48	0.82 (1.1)	3.0 (2.2)	2.6 (1.9)	1.95	1FK7042-5AF71-1 ■■■■	4	3.01 (2.66)	4.9 (10.8)
		1.48 (2.0)	6.0 (4.4)	4.7 (3.5)	3.7	1FK7060-5AF71-1 ■■■■	4	7.95 (7.04)	7.0 (15.4)
	63	2.29 (3.1)	11 (8.2)	7.3 (5.4)	5.6	1FK7063-5AF71-1 ■■■■	4	15.1 (13.3)	11.5 (25.4)
		2.14 (2.9)	8.0 (5.9)	6.8 (5.0)	4.4	1FK7080-5AF71-1 ■■■■	4	15.0 (13.2)	10 (22.1)
	80	3.3 (4.4)	16 (11.8)	10.5 (7.7)	7.4	1FK7083-5AF71-1 ■■■■	4	27.3 (24.1)	14 (30.9)
		3.77 (5.1)	18 (13.3)	12.0 (8.8)	8.0	1FK7100-5AF71-1 ■■■■	4	55.3 (48.9)	19 (41.9)
	100	4.87 (6.5)	27 (19.9)	15.5 (11.4)	11.8	1FK7101-5AF71-1 ■■■■	4	79.9 (70.7)	21 (46.3)
		5.37 (7.2) <sup>2)</sup>	36 (26.6)	20.5 (15.1) <sup>2)</sup>	16.5 <sup>2)</sup>	1FK7103-5AF71-1 ■■■■	4	105 (92.9)	29 (63.9)
8.17 (11.0)		48 (35.4)	26.0 (19.2)	18	1FK7105-5AF71-1 ■■■■	4	156 (138)	39 (86.2)	
4500	63	1.74 (2.3)	6.0 (4.4)	3.7 (2.7)	4.1	1FK7060-5AH71-1 ■■■■	4	7.95 (7.04)	7.0 (15.4)
		2.09 (2.8) <sup>3)</sup>	11 (8.2)	5.0 (3.7) <sup>3)</sup>	6.1 <sup>3)</sup>	1FK7063-5AH71-1 ■■■■	4	15.1 (13.3)	11.5 (25.4)
	80	2.39 (3.2) <sup>3)</sup>	8.0 (5.9)	5.7 (4.2) <sup>3)</sup>	5.6 <sup>3)</sup>	1FK7080-5AH71-1 ■■■■	4	15.0 (13.2)	10 (22.1)
		3.04 (4.1) <sup>4)</sup>	16 (11.8)	8.3 (6.1) <sup>4)</sup>	9 <sup>4)</sup>	1FK7083-5AH71-1 ■■■■	4	27.3 (24.1)	14 (30.9)
6000	20	0.05 (0.1)	0.18 (0.1)	0.08 (0.1)	0.85	1FK7011-5AK71-1 ■■■■ 3	4	0.064 (0.06)	0.9 (2.0)
		0.10 (0.1)	0.35 (0.3)	0.16 (0.1)	0.85	1FK7015-5AK71-1 ■■■■ 3	4	0.083 (0.08)	1.1 (2.4)
	28	0.43 (0.6)	0.85 (0.6)	0.6 (0.4)	1.4	1FK7022-5AK71-1 ■■■■	3	0.28 (0.25)	1.8 (4.0)
		0.50 (0.7)	1.1 (0.8)	0.8 (0.6)	1.3	1FK7032-5AK71-1 ■■■■	3	0.61 (0.54)	2.7 (6.0)
	36	0.63 (0.8)	1.6 (1.2)	1.0 (0.7)	1.3	1FK7034-5AK71-1 ■■■■	3	0.9 (0.80)	3.7 (8.2)
		0.69 (0.9)	1.6 (1.2)	1.1 (0.8)	1.7	1FK7040-5AK71-1 ■■■■	4	1.69 (1.50)	3.5 (7.7)
1.02 (1.4) <sup>5)</sup>	3.0 (2.2)	1.95 (1.4) <sup>5)</sup>	3.1 <sup>5)</sup>	1FK7042-5AK71-1 ■■■■	4	3.01 (2.66)	4.9 (10.8)		

**Encoder systems for motors without DRIVE-CLiQ interface:** Incremental encoder sin/cos 1 V<sub>pp</sub> 2048 S/R  
 Absolute encoder EnDat 2048 S/R <sup>1)</sup> (not for 1FK701 to 1FK703)  
 Absolute encoder EnDat 512 S/R <sup>1)</sup> (only for 1FK702 to 1FK703)  
 Absolute encoder EnDat 32 S/R <sup>1)</sup> (not for 1FK701 to 1FK703)  
 Absolute encoder EnDat 16 S/R <sup>1)</sup> (only for 1FK701 to 1FK703)  
 Multi-pole resolver  
 2-pole resolver

**Encoder systems for motors with DRIVE-CLiQ interface <sup>8)</sup>:** 22 bit incremental encoder (not for 1FK701)  
 22 bit absolute encoder, single-turn +12 bit multi-turn <sup>1)</sup> (not for 1FK701 to 1FK703)  
 20 bit absolute encoder, single-turn +12 bit multi-turn <sup>1)</sup> (only for 1FK702/1FK703)  
 16 bit absolute encoder, single-turn +12 bit multi-turn <sup>1)</sup> (not for 1FK701 to 1FK703)  
 15 bit absolute encoder, single-turn +12 bit multi-turn <sup>1)</sup> (only for 1FK702/1FK703)  
 15 bit resolver (not for 1FK701)  
 14 bit resolver (not for 1FK701)

**Shaft extension:** Fitted key and keyway  
 Fitted key and keyway  
 Plain shaft  
 Plain shaft

**Shaft and flange accuracy:** Tolerance N  
 Tolerance N  
 Tolerance N  
 Tolerance N

**Holding brake:** without  
 with  
 without  
 with

**Degree of protection:** IP64 (not for 1FK701)  
 IP65 and DE flange IP67 (not for 1FK701)  
 IP64 (IP54 for 1FK701) and anthracite paint finish  
 IP65 and DE flange IP67, anthracite paint finish (not for 1FK701)  
 IP65 and DE flange IP67, anthracite paint finish and metal rating plate on motor (not for 1FK701)

A  
E  
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D  
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K  
V  
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P

A  
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H

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8

To select the degree of protection and type, see selection guides.

## 1FK7 Compact motors Natural cooling

### Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}^{10)}$  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>9)</sup>  $I_{rated}$  A	Booksize format  Order No.	Motor connection (and brake connection) via power connector		
					Power connector  Size	Cable cross- section <sup>7)</sup>  mm <sup>2</sup>	Order No. Pre-assembled cable
1FK7101-5AC71...	12.3	5.7 (7.64)	18	6SL312-TE21-8AA3	1.5	4 x 1.5	6FX002-5S01-....
1FK7103-5AC71...	14.7	7.5 (10.0)	18	6SL312-TE21-8AA3	1.5	4 x 1.5	6FX002-5S01-....
1FK7105-5AC71...	20	10 (13.4)	30	6SL312-TE23-0AA3	1.5	4 x 2.5	6FX002-5S31-....
1FK7042-5AF71...	2.2	0.9 (1.2)	3	6SL312-TE13-0AA3	1	4 x 1.5	6FX002-5S01-....
1FK7060-5AF71...	4.5	1.9 (2.6)	5	6SL312-TE15-0AA3	1	4 x 1.5	6FX002-5S01-....
1FK7063-5AF71...	8	3.5 (4.7)	9	6SL312-TE21-0AA3	1	4 x 1.5	6FX002-5S01-....
1FK7080-5AF71...	4.8	2.5 (3.4)	5	6SL312-TE15-0AA3	1	4 x 1.5	6FX002-5S01-....
1FK7083-5AF71...	10.4	5.0 (6.7)	9 <sup>6)</sup>	6SL312-TE21-0AA3	1	4 x 1.5	6FX002-5S01-....
1FK7100-5AF71...	11.2	5.7 (7.6)	18	6SL312-TE21-8AA3	1	4 x 1.5	6FX002-5S01-....
1FK7101-5AF71...	19	8.5 (11.4)	18 <sup>6)</sup>	6SL312-TE21-8AA3	1.5	4 x 2.5	6FX002-5S31-....
1FK7103-5AF71...	27.5	11.3 (15.2)	30	6SL312-1TE23-0AA3	1.5	4 x 4	6FX002-5S41-....
1FK7105-5AF71...	31	15 (20.1)	30 <sup>6)</sup>	6SL312-1TE23-0AA3	1.5	4 x 10	6FX002-5S61-....
1FK7060-5AH71...	6.2	2.8 (3.8)	9	6SL312-TE21-0AA3	1	4 x 1.5	6FX002-5S01-....
1FK7063-5AH71...	12	5.2 (7.0)	18	6SL312-TE21-8AA3	1	4 x 1.5	6FX002-5S01-....
1FK7080-5AH71...	7.4	3.8 (5.1)	9	6SL312-TE21-0AA3	1	4 x 1.5	6FX002-5S01-....
1FK7083-5AH71...	15	7.5 (10.1)	18	6SL312-TE21-8AA3	1	4 x 1.5	6FX002-5S01-....
1FK7011-5AK71...	1.5	0.11 (0.2)	3	6SL312-TE13-0AA3	0.5	4 x 1.5	6FX5002-5DA20-....
1FK7015-5AK71...	1.5	0.22 (0.3)	3	6SL312-TE13-0AA3	0.5	4 x 1.5	6FX5002-5DA20-....
1FK7022-5AK71...	1.8	0.5 (0.7)	3	6SL312-TE13-0AA3	1	4 x 1.5	6FX002-5S01-....
1FK7032-5AK71...	1.7	0.7 (0.9)	3	6SL312-TE13-0AA3	1	4 x 1.5	6FX002-5S01-....
1FK7034-5AK71...	1.9	1.0 (1.3)	3	6SL312-TE13-0AA3	1	4 x 1.5	6FX002-5S01-....
1FK7040-5AK71...	2.25	1.0 (1.3)	3	6SL312-TE13-0AA3	1	4 x 1.5	6FX002-5S01-....
1FK7042-5AK71...	4.4	1.9 (2.6)	5	6SL312-TE15-0AA3	1	4 x 1.5	6FX002-5S01-....

<b>Cooling:</b> Internal air cooling External air cooling	0 1
<b>Motor Module:</b> Single Motor Module Double Motor Module	1 2
<b>Type of power cable:</b> MOTION-CONNECT 800 MOTION-CONNECT 500	8 5
Without brake cores With brake cores	C D
For length code as well as power and signal cables, see MOTION-CONNECT connection system.	

1) If the absolute encoder is used,  $M_{rated}$  is reduced by 10 %.

2) These values refer to  $n = 2500$  rpm.

3) These values refer to  $n = 4000$  rpm.

4) These values refer to  $n = 3500$  rpm.

5) These values refer to  $n = 5000$  rpm.

6) With the specified Motor Module, the motor cannot be fully utilized with  $M_0$  at  $\Delta T = 100$  K winding temperature rise. If a Motor Module with a higher rating is used, you must check whether the specified power cable can be connected to it.

7) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F)

8) Motors with shaft height 20 are not available with a DRIVE-CLiQ interface. The encoder systems are connected via the SMC (Sensor Module Cabinet-Mounted).

9) With default setting of the pulse frequency.

$$^{10)} P_{calc} [kW] = \frac{M_0 [Nm] \times n_{rated}}{9550} \quad P_{calc} [HP] = \frac{M_0 [lb\cdot in] \times n_{rated}}{63000}$$

# Synchronous motors

## 1FK7 High Dynamic motors Natural cooling

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque <sup>1)</sup>	Rated current	1FK7 High Dynamic synchronous motor Natural cooling	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{\text{rated}}$	SH	$P_{\text{rated}}$ at $\Delta T=100\text{ K}$	$M_0$ at $\Delta T=100\text{ K}$	$M_{\text{rated}}$ at $\Delta T=100\text{ K}$	$I_{\text{rated}}$ at $\Delta T=100\text{ K}$	Order No.		$J$	$m$
rpm		kW (HP)	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	A			$10^{-4}\text{ kgm}^2$ ( $10^{-3}\text{ lb}_f\text{-in-s}^2$ )	kg (lb)
<b>3000</b>	48	1.1 (1.48)	4.0 (2.9)	3.5 (2.6)	4	<b>1FK7044-7AF71-1</b> ■■■	3	1.28 (1.13)	7.7 (17)
	63	1.7 (2.28)	6.4 (4.7)	5.4 (4.0)	5.3	<b>1FK7061-7AF71-1</b> ■■■	3	3.4 (3.01)	10 (22.1)
		2.51 (3.37)	12 (8.8)	8.0 (5.9)	7.5	<b>1FK7064-7AF71-1</b> ■■■	3	6.5 (5.75)	15.5 (34.2)
	80	3.14 (4.21) <sup>2)</sup>	22 (16.2)	12 (8.8) <sup>2)</sup>	12.5 <sup>2)</sup>	<b>1FK7085-7AF71-1</b> ■■■	4	23 (20.3)	23.5 (51.8)
3.77 (5.06) <sup>3)</sup>		28 (20.6)	18 (13.3) <sup>3)</sup>	14.5 <sup>3)</sup>	<b>1FK7086-7AF71-1</b> ■■■	4	23 (20.3)	23.5 (51.8)	
<b>4500</b>	48	1.23 (1.65)	3.1 (2.3)	2.6 (1.9)	4	<b>1FK7043-7AH71-1</b> ■■■	3	1.0 (0.89)	6.3 (13.9)
		1.41 (1.89)	4.0 (2.9)	3.0 (2.2)	4.9	<b>1FK7044-7AH71-1</b> ■■■	3	1.28 (1.13)	7.7 (17)
	63	2.03 (2.72)	6.4 (4.7)	4.3 (3.2)	5.9	<b>1FK7061-7AH71-1</b> ■■■	3	3.4 (3.01)	10 (22.1)
		2.36 (3.16)	12 (8.8)	5.0 (3.7)	7	<b>1FK7064-7AH71-1</b> ■■■	3	6.5 (5.75)	15.5 (34.2)
<b>6000</b>	36	0.57 (0.76)	1.3 (1.0)	0.9 (0.7)	1.5	<b>1FK7033-7AK71-1</b> ■■■	3	0.27 (0.24)	3.1 (6.8)
	48	1.26 (1.69)	3.1 (2.3)	2.0 (1.5)	4.4	<b>1FK7043-7AK71-1</b> ■■■	3	1.0 (0.89)	6.3 (13.9)

#### Encoder systems for motors without DRIVE-CLiQ interface:

Incremental encoder sin/cos 1 V<sub>pp</sub> 2048 S/R  
 Absolute encoder EnDat 2048 S/R <sup>1)</sup> (not for 1FK703)  
 Absolute encoder EnDat 512 S/R <sup>1)</sup> (only for 1FK703)  
 Absolute encoder EnDat 32 S/R <sup>1)</sup> (not for 1FK703)  
 Absolute encoder EnDat 16 S/R <sup>1)</sup> (only for 1FK703)  
 Multi-pole resolver  
 2-pole resolver

A  
E  
H  
G  
J  
S  
T

#### Encoder systems for motors with DRIVE-CLiQ interface:

22 bit incremental encoder  
 22 bit absolute encoder, single-turn + 12 bit multi-turn <sup>1)</sup>  
 (not for 1FK703)  
 20 bit absolute encoder, single-turn + 12 bit multi-turn <sup>1)</sup>  
 (only for 1FK703)  
 16 bit absolute encoder, single-turn + 12 bit multi-turn <sup>1)</sup>  
 (not for 1FK703)  
 15 bit absolute encoder, single-turn + 12 bit multi-turn <sup>1)</sup>  
 (only for 1FK703)  
 15 bit resolver  
 14 bit resolver

D  
F  
L  
K  
V  
U  
P

#### Shaft extension:

Fitted key and keyway  
 Fitted key and keyway  
 Plain shaft  
 Plain shaft

#### Shaft and flange accuracy:

Tolerance N  
 Tolerance N  
 Tolerance N  
 Tolerance N

#### Holding brake:

without  
 with  
 without  
 with

A  
B  
G  
H

#### Degree of protection:

IP64  
 IP65 and DE flange IP67  
 IP64 and anthracite paint finish  
 IP64 and DE flange IP67, anthracite paint finish  
 IP65 and DE flange IP67, anthracite paint finish  
 and metal rating plate on motor

0  
2  
3  
5  
8

To select the degree of protection and type, see selection guides.

## 1FK7 High Dynamic motors Natural cooling

### Selection and ordering data

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}^{6)}$  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield		
			Rated output current <sup>5)</sup>  $I_{rated}$  A	Booksized format  Order No.	Motor connection (and brake connection) via power connector		
					Power connector	Cable cross- section <sup>4)</sup>  mm <sup>2</sup>	Order No. Pre-assembled cable
					Size		
1FK7044-7AF71...	4.5	1.3 (1.7)	5	<b>6SL312</b> - <b>TE15-0AA3</b>	1	4 x 1.5	<b>6FX</b> 002-5 <b>S01</b> -....
1FK7061-7AF71...	6.1	2.0 (2.7)	9	<b>6SL312</b> - <b>TE21-0AA3</b>	1	4 x 1.5	<b>6FX</b> 002-5 <b>S01</b> -....
1FK7064-7AF71...	11	3.8 (5.1)	18	<b>6SL312</b> - <b>TE21-8AA3</b>	1	4 x 1.5	<b>6FX</b> 002-5 <b>S01</b> -....
1FK7085-7AF71...	22.5	6.9 (9.3)	30	<b>6SL312</b> - <b>1TE23-0AA3</b>	1.5	4 x 4	<b>6FX</b> 002-5 <b>S41</b> -....
1FK7086-7AF71...	21	8.8 (11.8)	30	<b>6SL312</b> - <b>1TE23-0AA3</b>	1.5	4 x 4	<b>6FX</b> 002-5 <b>S41</b> -....
1FK7043-7AH71...	4.5	1.5 (2.0)	5	<b>6SL312</b> - <b>TE15-0AA3</b>	1	4 x 1.5	<b>6FX</b> 002-5 <b>S01</b> -....
1FK7044-7AH71...	6.3	1.9 (2.6)	9	<b>6SL312</b> - <b>TE21-0AA3</b>	1	4 x 1.5	<b>6FX</b> 002-5 <b>S01</b> -....
1FK7061-7AH71...	8	3.0 (4.0)	9	<b>6SL312</b> - <b>TE21-0AA3</b>	1	4 x 1.5	<b>6FX</b> 002-5 <b>S01</b> -....
1FK7064-7AH71...	15	5.7 (7.6)	18	<b>6SL312</b> - <b>TE21-8AA3</b>	1	4 x 1.5	<b>6FX</b> 002-5 <b>S01</b> -....
1FK7033-7AK71...	2.2	0.8 (1.1)	3	<b>6SL312</b> - <b>TE13-0AA3</b>	1	4 x 1.5	<b>6FX</b> 002-5 <b>S01</b> -....
1FK7043-7AK71...	6.4	1.9 (2.6)	9	<b>6SL312</b> - <b>TE21-0AA3</b>	1	4 x 1.5	<b>6FX</b> 002-5 <b>S01</b> -....

#### Cooling:

Internal air cooling  
External air cooling

0  
1

#### Motor Module:

Single Motor Module  
Double Motor Module

1  
2

#### Type of power cable:

MOTION-CONNECT 800  
MOTION-CONNECT 500

8  
5

Without brake cores  
With brake cores

C  
D

For length code as well as power and signal cables, see MOTION-CONNECT connection system.

....

1) If the absolute encoder is used,  $M_{rated}$  is reduced by 10 %.

2) These values refer to  $n = 2500$  rpm.

3) These values refer to  $n = 2000$  rpm.

4) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient

5) With default setting of the pulse frequency.

6)  $P_{calc} [kW] = \frac{M_0 [Nm] \times n_{rated}}{9550}$        $P_{calc} [HP] = \frac{M_0 [lb_f-in] \times n_{rated}}{63000}$



# Synchronous motors

## 1FK7 Compact/1FK7 High Dynamic motors Natural cooling for Power Modules

### Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	1FK7 Compact/High Dynamic synchronous motor Natural cooling Connection to SINAMICS 230 V 1 AC  Order No.	Number of pole pairs	Rotor moment of inertia (without brake)	Weight (without brake)
$n_{rated}$	SH	$P_{rated}$ at $\Delta T=100$ K	$M_0$ at $\Delta T=100$ K	$M_{rated}$ at $\Delta T=100$ K	$I_{rated}$ at $\Delta T=100$ K			$J$	$m$
rpm		kW (HP)	Nm (lb <sub>r</sub> -ft)	Nm (lb <sub>r</sub> -ft)	A			$10^{-4}$ kgm <sup>2</sup> ( $10^{-3}$ lb <sub>r</sub> -in-s <sup>2</sup> )	kg (lb)
3000	36	0.31 (0.42)	1.15 (0.8)	1.0 (0.7)	1.6	<b>1FK7032-5AF21-1</b> ■ ■ ■	3	0.61 (0.54)	2.7 (5.9)
		0.38 (0.51)	1.3 (1.0)	1.2 (0.9)	2.0	<b>1FK7033-7AF21-1</b> ■ ■ ■	3	0.27 (0.24)	3.1 (6.8)
		0.46 (0.62)	1.6 (1.2)	1.45 (1.1)	1.8	<b>1FK7034-5AF21-1</b> ■ ■ ■	3	0.9 (0.8)	3.7 (8.2)
	48	0.82 (1.1)	3.0 (2.2)	2.6 (1.9)	3.5	<b>1FK7042-5AF21-1</b> ■ ■ ■	4	3.01 (2.66)	4.9 (10.8)
		0.79 (1.06)	2.7 (2.0)	2.5 (1.8)	3.8	<b>1FK7043-7AF21-1</b> ■ ■ ■	3	1.0 (0.89)	6.3 (13.9)
6000	20	0.05 (0.1)	0.18 (0.1)	0.08 (0.1)	0.5	<b>1FK7011-5AK21-1</b> ■ ■ ■ 3	4	0.064 (0.06)	0.9 (2.0)
		0.10 (0.1)	0.35 (0.3)	0.16 (0.1)	0.5	<b>1FK7015-5AK21-1</b> ■ ■ ■ 3	4	0.083 (0.08)	1.1 (2.4)
	28	0.38 (0.51)	0.85 (0.6)	0.6 (0.4)	1.4	<b>1FK7022-5AK21-1</b> ■ ■ ■	3	0.28 (0.25)	1.8 (4.0)

#### Encoder systems for motors without DRIVE-CLiQ interface:

Incremental encoder sin/cos 1 V<sub>pp</sub> 2048 S/R  
 Absolute encoder EnDat 2048 S/R<sup>1)</sup> (only for 1FK704)  
 Absolute encoder EnDat 512 S/R<sup>1)</sup> (not for 1FK704)  
 Absolute encoder EnDat 32 S/R<sup>1)</sup> (only for 1FK704)  
 Absolute encoder EnDat 16 S/R<sup>1)</sup> (not for 1FK704)  
 Multi-pole resolver  
 2-pole resolver

A  
E  
H  
G  
J  
S  
T

#### Encoder systems for motors with DRIVE-CLiQ interface<sup>4)</sup>:

22 bit incremental encoder (not for 1FK701)  
 22 bit absolute encoder, single-turn + 12 bit multi-turn<sup>1)</sup> (only for 1FK704)  
 20 bit absolute encoder, single-turn + 12 bit multi-turn<sup>1)</sup> (only for 1FK702/1FK703)  
 16 bit absolute encoder, single-turn + 12 bit multi-turn<sup>1)</sup> (only for 1FK704)  
 15 bit single-turn absolute encoder + 12 bit multi-turn<sup>1)</sup> (only for 1FK702/1FK703)  
 15 bit resolver (not for 1FK701)  
 14 bit resolver (not for 1FK701)

D  
F  
L  
K  
V  
U  
P

#### Shaft extension:

Fitted key and keyway  
 Fitted key and keyway  
 Plain shaft  
 Plain shaft

#### Shaft and flange accuracy:

Tolerance N  
 Tolerance N  
 Tolerance N  
 Tolerance N

#### Holding brake:

without  
 with  
 without  
 with

A  
B  
G  
H

#### Degree of protection:

IP64 (not for 1FK701)  
 IP65 and DE flange IP67 (not for 1FK701)  
 IP64 (IP54 for 1FK701) and anthracite paint finish  
 IP65 and DE flange IP67, anthracite paint finish (not for 1FK701)  
 IP65 and DE flange IP67, anthracite paint finish and metal rating plate on motor (not for 1FK701)

0  
2  
3  
5  
8

To select the degree of protection and type, see selection guides.

**1FK7 Compact/High Dynamic motors  
Natural cooling for Power Modules**
**Selection and ordering data**

Motor type (continued)	Static current  $I_0$ at $M_0$ $\Delta T=100$ K  A	Calculated power $P_{calc}$ <sup>6)</sup>  $P_{calc}$ for $M_0$ $\Delta T=100$ K  kW (HP)	SINAMICS S120 Power Module		Power cable with complete shield			
			Rated output current <sup>5)</sup>  $I_{rated}$ at $M_0$ $\Delta T=100$ K  A	Booksiz e format without line filter  Order No.	Motor connection (and brake connection) via power connector	Power connector  Size	Cable cross- section <sup>3)</sup>  mm <sup>2</sup>	Order No. Pre-assembled cable
1FK7032-5AF21...	1.7	0.36 (0.5)	2.3	<b>6SL3210 - 1SB12-3UA3</b>	1	4 x 1.5	<b>6FX 002-5 G01-....</b>	
1FK7033-7AF21...	2.2	0.41 (0.6)	2.3	<b>6SL3210 - 1SB12-3UA3</b>	1	4 x 1.5	<b>6FX 002-5 G01-....</b>	
1FK7034-5AF21...	1.9	0.50 (0.7)	2.3	<b>6SL3210 - 1SB12-3UA3</b>	1	4 x 1.5	<b>6FX 002-5 G01-....</b>	
1FK7042-5AF21...	3.9	0.94 (1.3)	3.9	<b>6SL3210 - 1SB14-0UA3</b>	1	4 x 1.5	<b>6FX 002-5 G01-....</b>	
1FK7043-7AF21...	3.9	0.85 (1.1)	3.9	<b>6SL3210 - 1SB14-0UA3</b>	1	4 x 1.5	<b>6FX 002-5 G01-....</b>	
1FK7011-5AK21...	0.85	0.11 (0.2)	0.9	<b>6SL3210 - 1SB11-0UA3</b>	0.5	4 x 1.5	<b>6FX5002-5 DA30-....<sup>2)</sup></b>	
1FK7015-5AK21...	0.85	0.22 (0.3)	0.9	<b>6SL3210 - 1SB11-0UA3</b>	0.5	4 x 1.5	<b>6FX5002-5 DA30-....<sup>2)</sup></b>	
1FK7022-5AK21...	1.8	0.53 (0.7)	2.3	<b>6SL3210 - 1SB12-3UA3</b>	1	4 x 1.5	<b>6FX 002-5 G01-....</b>	
<b>Cooling:</b> Internal air cooling								0
<b>Motor Module:</b> Single Motor Module								1
<b>Type of power cable:</b> MOTION-CONNECT 800 MOTION-CONNECT 500								8 5
Without brake cores With brake cores								C D
For length code as well as power and signal cables, see MOTION-CONNECT connection system. ....								

1) If the absolute encoder is used,  $M_{rated}$  is reduced by 10 %.

2) This power cable is fitted with a connector with M17 thread at the motor end and brake cores as standard ( $4 \times 1.5 \text{ mm}^2 + 2 \times 1.5 \text{ mm}^2$ ).

3) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

4) Motors of shaft height 20 are not available with a DRIVE-CLiQ interface. The encoder systems are connected via the SMC (Sensor Module Cabinet-Mounted).

5) With default setting of the pulse frequency.

6)  $P_{calc} [\text{kW}] = \frac{M_0 [\text{Nm}] \times n_{rated}}{9550}$        $P_{calc} [\text{HP}] = \frac{M_0 [\text{lb-in}] \times n_{rated}}{63000}$



# Synchronous motors

## Selection guides Built-in holding brakes

### Built-in holding brakes for 1FT6, 1FT7 and 1FK7 motors

Many drives need a holding brake with an emergency stop function for safety reasons or to meet process requirements.

The permanent-magnet or spring-loaded, single-face brakes used for these motor series function according to the closed-circuit current principle. The magnetic field of the permanent magnet exerts a tension on the brake anchor plate, i.e. in a condition of zero current, the brake is closed and the motor shaft thereby stopped. When the rated voltage of 24 V DC is applied to the brake, current flows through the coil and produces a counter-field that cancels the pull of the permanent magnet, causing the brake to release.

The spring-loaded, single-face brake operates by the force of pressure exerted by the spring instead of a permanent magnet.

In the event of an emergency stop or power outage, approximately 2000 braking operations can be performed with the maximum switched energy without causing excessive wear on the holding brake (condition: maximum external moment of inertia = moment of inertia of motor and  $n_{\max}$  type-specific).

The holding brake is not an operational brake.

In order to avoid switching overvoltages and any related effects on the plant environment, the brake cables must be connected

### Technical specifications for built-in holding brakes (brake supply voltage 24 V DC $\pm 10\%$ )










Frame size	Motor type	Brake type	Holding torque <sup>1)</sup>		Direct current	Opening time with varistor	Closing time with varistor	Moment of inertia	Maximum switched energy per brake operation from $n = 3000$ rpm
			Nm (lb <sub>r</sub> -ft)	A					
<b>for 1FT6 motors</b>									
28	1FT602.	EBD 0.11 B	1.0 (0.7)	0.3	0.3	20	10	0.07 (0.06)	9
36	1FT603.	EBD 0.15 B	2.0 (1.5)	0.4	0.4	30	15	0.12 (0.11)	27
48	1FT604.	EBD 0.4 BA	5.0 (3.7)	0.8	0.8	50	20	1.06 (0.94)	125
63	1FT606.	EBD 1.5 B	15.0 (11.1)	0.8	0.8	130	30	3.2 (2.83)	320
80	1FT6081/082	EBD 1.2 B	15.0 (11.1)	0.8	0.8	150	35	3.2 (2.83)	750
80	1FT6084/086	EBD 3.5 BN	28.0 (20.7)	0.9	0.9	180	35	13.5 (11.9)	1600
100	1FT610.	EBD 4 B	70.0 (51.6)	1.4	1.4	220	50	32 (28.3)	2100
132	1FT613. <sup>2)</sup>	EBD 8 B	140 (103)	1.7	1.7	300	90	76 (67.2)	9800
<b>for 1FT7 Compact motors</b>									
36	1FT703.	HT04P01	3.0 (2.2)	0.3	0.3	60	25	0.12 (0.11)	30
48	1FT704.	HT07P01	8.0 (5.9)	0.6	0.6	90	30	0.87 (0.77)	270
63	1FT706.	HT09P01	18 (13.3)	0.8	0.8	150	50	2.84 (2.51)	880
80	1FT708.	HT11P01	48 (35.4)	1.0	1.0	220	65	15.4 (13.6)	1900
100	1FT710.	HT14P01	85 (62.7)	1.6	1.6	250	70	27.6 (24.4)	5300
<b>for 1FK7 Compact motors</b>									
20	1FK701.	HT03P	0.4 (0.3)	0.3	0.3	30	20	0.019 (0.02)	2
28	1FK7022	EBD 0.11 BN	1.1 (0.8)	0.3	0.3	30	20	0.07 (0.06)	8
36	1FK7032	EBD 0.13 BN	1.3 (1.0)	0.4	0.4	50	30	0.08 (0.07)	17
48	1FK704.	EBD 0.3 BV	3.2 (2.4)	0.6	0.6	70	30	0.72 (0.64)	74
63	1FK706.	EBD 0.8 BK	13 (9.6)	0.8	0.8	100	50	2.25 (1.99)	400
80	1FK7080	EBD 1.5 BN	10 (7.4)	0.7	0.7	100	50	3.1 (2.74)	400
80	1FK7083	EBD 2 BY	22 (16.2)	0.9	0.9	200	60	8.6 (7.61)	1400
100	1FK7100	EBD 2 BY	22 (16.2)	0.9	0.9	200	60	8.6 (7.61)	1400
100	1FK7101/103/105	EBD 3.5 BV	41 (30.2)	1.0	1.0	300	70	13.5 (11.9)	3000
<b>for 1FK7 High Dynamic motors</b>									
36	1FK703.	1EB 14-30	1.3 (1.0)	0.45	0.45	100	40	0.12 (0.11)	14
48	1FK704.	1EB 20-40	4.0 (3.0)	0.6	0.6	150	50	0.13 (0.12)	96
63	1FK706.	1EB 28-60	12 (8.9)	0.8	0.8	150	50	0.34 (0.30)	230
80	1FK708.	1EB 35-80	22 (16.2)	1.2	1.2	200	60	2.0 (1.77)	700

<sup>1)</sup> Minimum torque of brake in static state (stationary motor)

<sup>2)</sup> Holding brake is not available for version with water cooling

## Selection guides Types/mounting position, degree of protection

### Types/mounting position

Type/ mounting position	Designation	Type/ mounting position	Designation	Type/ mounting position	Designation
	IM B3		IM B5 IM B14		IM B35
	IM V5		IM V1 IM V18		IM V15
	IM V6		IM V3 IM V19		IM V35

### Degree of protection

The degree of protection designation in accordance with EN 60034-5 and IEC 60034-5 consists of letters "IP" and two digits (e.g. IP64). The second digit in the degree of protection designation represents protection against water, the first digit protection against touch and protection against ingress of solid foreign objects.

Since coolants are used for machine tools and transfer lines that contain oil, are able to creep, and may also be corrosive, protection against water alone is insufficient. The IP rating should only be considered here as a guideline. Our sealing systems are based on many years of practical experience, exceed the IEC specifications by far, and are appropriate to the requirements of machine tools.

The table can serve as a decision aid for selecting the proper degree of protection for motors. With the IM V3/IM V19 types, permanent liquid on the flange is only permissible with IP67/IP68.

Liquids	General workshop environment	Water General cooling lubricant (95 % water, 5 % oil) Oil	Penetrating oil; petroleum; aggressive cooling lubricants
Dry	IP64	–	
Water-enriched environment/ increased humidity	–	IP64	IP67 <sup>1)</sup>
Mist		IP65	IP67
Spray	–	IP65	IP68
Jet	–	IP67	IP68
Splash, brief immersion; constant inundation	–	IP67	IP68

<sup>1)</sup> IP64 with dry run at shaft exit.