1FK7-DYA compact geared motors

Overview

The 1FK7-DYA compact geared motor combines electrical and mechanical components in the smallest space possible. This mechatronic unit consists of a permanent-magnet-excited synchronous motor and a directly mounted single-stage planetary gearbox.

The 1FK7-DYA compact geared motors with degree of protection IP64 are designed for operation without external cooling as the heat is dissipated over the motor surface. The integrated planetary gearboxes have high maximum torques and permit high radial and axial forces at the shaft extension.

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

Benefits

- Space-saving installation due to the high power density of the motor and integration of the planetary gearbox directly into the motor end shield. This greatly simplifies gear mounting on the machine and reduces logistics to a minimum.
- Highly dynamic due to lower motor moment of inertia; this means shorter cycle times.
- Maintenance-free
- Suitable for S1 continuous duty
- High positioning accuracy thanks to low mechanical torsional backlash of <8 arcmin
- Mechanical compatibility with regard to IM B14 flange and shaft extension for the LP+ planetary gearbox

Application

In general mechanical engineering, wherever coaxial drive units are used, such as in

- Packaging machinery
- Wood, glass and ceramic working machines
- Plastic injection molding and foil stretching machines
- Handling systems
- Machine tools
- All kinds of auxiliary axes

Technical specifications

Type of motor	Permanent-magnet-excited synchronous motor
Magnet material	Rare-earth magnet material
Insulation of the stator winding in accordance with EN 60034-1 (IEC 60034-1)	Temperature class 155 (F) for a winding temperature rise of ΔT = 100 K at an ambient temperature of 40 °C (104 °F)
Cooling	Natural cooling
Temperature monitoring	KTY 84 temperature sensor in stator winding
Type in accordance with EN 60034-7 (IEC 60034-7)	IM B5 (IM V1, IM V3) IM B14
Degree of protection in accordance with EN 60034-5 (IEC 60034-5)	IP64
Shaft extension on the drive end in accordance with DIN 748-3 (IEC 60072-1)	With fitted key
Shaft and flange accuracy[1] **in accordance with DIN 42955 (IEC 60072-1)**	Tolerance N
Vibration magnitude in accordance with EN 60034-14 (IEC 60034-14)	Grade A is observed up to rated speed
Sound pressure level in accordance with EN ISO 1680, max.	
• 1FK703	72 dB (A)
• 1FK704	75 dB (A)
• 1FK706	80 dB (A)
• 1FK708	82 dB (A)
Encoder systems, built-in 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 1FK704 ... 1FK708: 2048 S/R 1FK703: 512 S/R 1FK704 ... 1FK708: 32 S/R 1FK703: 16 S/R • Multi-pole resolver (number of poles corresponds to number of pole pairs of the motor) • 2-pole resolver
Encoder systems, built-in for motors with DRIVE-CLiQ interface	• 22 bit incremental encoder (2048 S/R internal) • Absolute encoder single-turn +12 bit multi-turn (traversing range 4096 revolutions) 1FK704 ... 1FK708: 22 bit single-turn (2048 S/R internal) 1FK703: 20 bit single-turn (512 S/R internal) 1FK704 ... 1FK708: 16 bit single-turn (32 S/R internal) 1FK703: 15 bit single-turn (16 S/R internal) • 15 bit resolver • 14 bit resolver
Connection	Connectors for signals and power can be rotated (270°)
Paint finish	Anthracite RAL 7016
2nd rating plate 3rd rating plate	Attached in the NDE cover Enclosed separately
Options	Built-in holding brake

S/R = signals/revolution

[1] Shaft extension run-out, concentricity of spigot and shaft and perpendicularity of mounting face of flange to shaft.

1FK7-DYA compact geared motors

Selection and Ordering Data

Rated speed	Rated power	Maximum speed	Maximum torque	Static torque	Rated torque	Available gear ratio	**Compact geared motor 1FK7-DYA Natural cooling**		Number of pole pairs	Rotor moment of inertia[2] (without brake)	(with brake)
$n_{2\ rated}$	P_2	n_{2max}	M_{2max}	M_{20}	$M_{2\ rated}$[1]	i	Order No.	Order code		J	J
rpm	kW (HP)	rpm	Nm (lb_f-in)	Nm (lb_f-in)	Nm (lb_f-in)					10^{-4} kgm^2 (10^{-3} x lb_f-in-s^2)	10^{-4} kgm^2 (10^{-3} x lb_f-in-s^2)
370	0.37 (0.50)	600	32 (283)	11 (97)	9.5 (84.1)	10	**1FK7032-5AK71-1 ■■ 3-Z A03**		3	0.75 (0.66)	0.83 (0.73)
740	0.5 (0.67)	1200	32 (283)	7.5 (66)	6.5 (57.5)	5	**1FK7034-5AK71-1 ■■ 3-Z A00**		3	1.04 (0.92)	1.12 (0.99)
340	0.45 (0.60)	600	49 (434)	15 (133)	12.5 (111)	10	**1FK7040-5AK71-1 ■■ 3-Z A13**		4	2.3 (2.04)	3 (2.66)
680	0.71 (0.95)	1200	51 (451)	13 (115)	10 (88.5)	5	**1FK7042-5AK71-1 ■■ 3-Z A10**		4	3.6 (3.19)	4.3 (3.81)
260	1.25 (1.68)	480	175 (1549)	57 (505)	46 (407)	10	**1FK7060-5AH71-1 ■■ 3-Z A73**		4	10.3 (9.12)	12.5 (11.1)
520	1.74 (2.33)	960	170 (1505)	51 (451)	32 (283)	5	**1FK7063-5AH71-1 ■■ 3-Z A70**		4	17.4 (15.4)	19.6 (17.3)
200	1.47 (1.97)	360	242 (2142)	76 (673)	70 (620)	10	**1FK7080-5AH71-1 ■■ 3-Z A83**		4	28.7 (25.4)	31.8 (28.1)
400	1.88 (2.52)	720	233 (2062)	68 (602)	45 (398)	5	**1FK7083-5AH71-1 ■■ 3-Z A80**		4	41 (36.3)	49.6 (43.9)

Encoder systems for motors without DRIVE-CLiQ interface:	Incremental encoder sin/cos 1 V_{pp}, 2048 S/R	**A**	
	Absolute encoder EnDat 2048 S/R[1] (not for 1FK703)	**E**	
	Absolute encoder EnDat 512 S/R[1] (only for 1FK703)	**H**	
	Absolute encoder EnDat 32 S/R[1] (not for 1FK703)	**G**	
	Absolute encoder EnDat 16 S/R[1] (only for 1FK703)	**J**	
	Multi-pole resolver	**S**	
	2-pole resolver	**T**	
Encoder systems for motors with DRIVE-CLiQ interface:	Incremental encoder 22 bit	**D**	
	Absolute encoder, 22 bit single-turn +12 bit multi-turn[1] (not for 1FK703)	**F**	
	Absolute encoder, 20 bit single-turn +12 bit multi-turn[1] (only for 1FK703)	**L**	
	Absolute encoder, 16 bit single-turn +12 bit multi-turn[1] (not for 1FK703)	**K**	
	Absolute encoder, 15 bit single-turn +12 bit multi-turn[1] (only for 1FK703)	**V**	
	14 bit resolver	**U**	
	15 bit resolver	**P**	
Shaft extension: / **Shaft and flange accuracy:** / **Holding brake:**			
Fitted key and keyway / Tolerance N / Without			**U**
Fitted key and keyway / Tolerance N / With			**V**
Degree of protection:	IP64, anthracite finish RAL 7016		**3**

Selection and Ordering Data

Motor type (continued)	Weight (without brake)	Weight (with brake)	Static current	Maximum current	SINAMICS S120 Motor Module Rated output current[4]	SINAMICS S120 Motor Module Booksize format	Power cable with complete shield Motor terminal (and brake terminal) via power connector		
	m	*m*	I_0 at M_0 ΔT=100 K	I_{max}	I_{rated}	Order No.	Power connector	Motor cable cross-section[3]	Order No. Pre-assembled cable
	kg (lb)	kg (lb)	A	A	A		Size	mm^2	
1FK7032-5AK71-...	4.11 (9.1)	4.47 (9.9)	1.7	5	3	**6SL312■-■TE13-0AA3**	1	4 x 1.5	**6FX■002-5■S01-....**
1FK7034-5AK71-...	5.01 (11.0)	5.37 (11.8)	1.9	7.9	3	**6SL312■-■TE13-0AA3**	1	4 x 1.5	**6FX■002-5■S01-....**
1FK7040-5AK71-...	6.6 (14.6)	7.61 (16.8)	2.3	7.4	3	**6SL312■-■TE13-0AA3**	1	4 x 1.5	**6FX■002-5■S01-....**
1FK7042-5AK71-...	7.91 (17.4)	8.62 (19.0)	4.4	14.9	5	**6SL312■-■TE15-0AA3**	1	4 x 1.5	**6FX■002-5■S01-....**
1FK7060-5AH71-...	13.9 (30.7)	15 (33.1)	6.2	19	9	**6SL312■-■TE21-0AA3**	1	4 x 1.5	**6FX■002-5■S01-....**
1FK7063-5AH71-...	17.6 (38.8)	19 (41.9)	12	41	18	**6SL312■-■TE21-8AA3**	1	4 x 1.5	**6FX■002-5■S01-....**
1FK7080-5AH71-...	23.4 (51.6)	24.6 (54.2)	7.4	24	9	**6SL312■-■TE21-0AA3**	1	4 x 1.5	**6FX■002-5■S01-....**
1FK7083-5AH71-...	28.6 (63.1)	31.2 (68.8)	15	48	18	**6SL312■-■TE21-8AA3**	1	4 x 1.5	**6FX■002-5■S01-....**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**
Type of ower 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 Connection system MOTION-CONNECT.	**....**

[1] If the absolute encoder is used, $M_{2\,rated}$ is reduced by 10%.

[2] In reference to the motor shaft.

[3] The current carrying capacity of the power cables complies with IEC 60204-1 for installation type C under continuous operating conditions at an ambient air temperature of 40 °C (104 °F), designed for I_0 (100 K), PVC/PUR-insulated cable.

[4] With default setting of the pulse frequency.