

Configuration Manual 10/2005 Edition

simodrive & masterdrives

SIEMENS

SIMODRIVE 611/MASTERDRIVES MC
1FK7 Synchronous Motors



1FK7 Synchronous Motors

Configuration Manual

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Safety information/instructions

This manual contains information which you should carefully observe to ensure your own personal safety and to prevent material damage. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only, have no safety alert symbol. The warnings appear in decreasing order of risk as given below.



Danger

indicates that death or severe personal injury **will** result if proper precautions are not taken.



Warning

indicates that death or severe personal injury **may** result if proper precautions are not taken.



Caution

with a warning triangle indicates that minor personal injury can result if proper precautions are not taken.

Caution

without a warning triangle means that material damage can occur if the appropriate precautions are not taken.

Notice

indicates that an unwanted result or situation can result if the appropriate advice is not taken into account.

If several hazards of different degrees occur, the hazard with the highest degree must always be given priority. If a warning note with a warning triangle warns of personal injury, the same warning note can also contain a warning of material damage.

Qualified personnel

The associated device/system may only be set up and operated using this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Qualified persons are defined as persons who are authorized to commission, to ground, and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

Correct usage

Please note the following:



Warning

The device may be used only for the applications described in the catalog and in the technical description, and only in combination with the equipment, components and devices of other manufacturers where recommended or permitted by Siemens. Correct transport, storage, installation and assembly, as well as careful operation and maintenance, are required to ensure that the product operates safely and without faults.

Registered trademarks

All designations with the trademark symbol ® are registered trademarks of Siemens AG. Other designations in this documentation may be trademarks whose use by third parties for their own purposes can violate the rights of the owner.

Disclaimer of liability

We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. The information given in this publication is reviewed at regular intervals and any corrections that might be necessary are made in the subsequent editions.

Foreword

Information on the documentation

This document is part of the Technical Customer Documentation which has been developed for SIMODRIVE and SIMOVERT MASTERDRIVES MC (Motion Control). All of the documents are available individually. The documentation list, which includes all Advertising Brochures, Catalogs, Overviews, Short Descriptions, Operating Instructions and Technical Descriptions with Order No., ordering address and price can be obtained from your local Siemens office.

This document does not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

We would also like to point-out that the contents of this document are neither part of nor modify any prior or existing agreement, commitment or contractual relationship. The sales contract contains the entire obligations of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements contained herein neither create new warranties nor modify the existing warranty.

Structure of the documentation for 1FK and 1FT motors

Table: Configuration Manual, individual sections

Title	Order number (MLFB)	Language
Synchronous Motors, General Section for SIMODRIVE 611, SIMOVERT MASTERDRIVES MC	6SN1197-0AD07-0BP□	English
Synchronous Motors, 1FK7 Motor Section for SIMODRIVE 611 and MASTERDRIVES MC	6SN1197-0AD06-0BP□	English
Synchronous Motors, 1FK7 Motor Section for SIMODRIVE 611 and MASTERDRIVES MC	6SN1197-0AD05-0BP□	English
Synchronous Motors, 1FK7 Motor Section for SIMODRIVE 611 and MASTERDRIVES MC	6SN1197-0AD02-0BP□	English
Synchronous Motors, 1FT5 Motor Section for SIMODRIVE 611	6SN1197-0AD01-0BP□	English

Target group of the Configuration Manual

The Configuration Manual addresses planners and design engineers. It supports you when selecting motors, calculating the drive components, selecting the required accessories as well as when selecting line and motor-side power options.

Technical support

If you have any questions, please contact the following Hotline:

Tel.:	+49 (0) 180 5050–222
Fax:	+49 (0) 180 5050–223
Internet:	http://www.siemens.com/automation/support-request

Please send any questions about the documentation (e.g. suggestions for improvement, corrections) to the following fax number or email address:

Fax:	+49 (0) 9131 98–63315
Fax form:	Refer to the correction sheet at the end of the document
E-mail:	motioncontrol.docu@siemens.com

Information on the products

Up-to-date information about our products can be found on the Internet at the following address:

<http://www.siemens.com/motioncontrol>

Danger and warning information



Danger

Start-up/commissioning is absolutely prohibited until it has been completely ensured that the machine, in which the components described here are to be installed, is in full compliance with the specifications of Directive 98/37/EC.

Only appropriately qualified personnel may commission SIMODRIVE and SIMOVERT MASTERDRIVES drive units and the motors.

This personnel must carefully observe the technical customer documentation associated with this product and be knowledgeable about and carefully observe the danger and warning information.

Operational electrical equipment and motors have parts and components which are at hazardous voltage levels.

When the machine or system is operated, hazardous axis movements can occur.

All of the work carried-out on the electrical machine or system must be carried-out with it in a no-voltage condition.

SIMODRIVE and SIMOVERT MASTERDRIVES drive units have been designed to be connected to line supplies grounded through a low-ohmic connection (TN line supplies). For additional information please refer to the appropriate documentation for the drive converter systems.



Warning

The successful and safe operation of this equipment and motors is dependent on professional transport, storage, installation and mounting as well as careful operator control, service and maintenance.

For special versions of the drive units and motors, information and data in the catalogs and quotations additionally apply.

In addition to the danger and warning information/instructions in the technical customer documentation supplied, the applicable domestic, local and plant-specific regulations and requirements must be carefully taken into account.



Caution

The motors can have surface temperatures of over +100 °C.

This is the reason that temperature-sensitive components, e.g. cables or electronic components may neither be in contact nor be attached to the motor.

When connecting-up cables, please observe that they

- are not damaged
 - are not subject to tensile stress
 - cannot be touched by rotating components.
-

Caution

Motors should be connected-up according to the circuit diagram provided. They must not be connected directly to the three-phase supply because this will damage them.

SIMODRIVE and SIMOVERT MASTERDRIVES drive units with AC motors are subject, as part of the type test, to a voltage test corresponding to EN 50178. According to EN 60204-1, Section 19.4, while electrical equipment of industrial machines are being subject to a voltage test, all of the SIMODRIVE and SIMOVERT MASTERDRIVES drive unit connections must be disconnected/withdrawn in order to avoid damaging the SIMODRIVE and SIMOVERT MASTERDRIVES drive units.

Note

SIMODRIVE and SIMOVERT MASTERDRIVES drive units with motors fulfill, when operational and in dry equipment rooms, the Low-Voltage Directive 73/23/EEC.

SIMODRIVE and SIMOVERT MASTERDRIVES drive units with motors fulfill, in the configurations specified in the associated EC Declaration of Conformity, EMC Directive 89/336/EEC.

ESDS instructions



Caution

An **electrostatic-sensitive device** (ESDS) is an individual component, integrated circuit, or module that can be damaged by electrostatic fields or discharges.

ESDS regulations for handling boards and equipment:

When handling components, make sure that personnel, workplaces, and packaging are well earthed.

Personnel in ESD zones with conductive floors may only touch electronic components if they are

- grounded through an ESDS bracelet and
- wearing ESDS shoes or ESDS shoe grounding strips.

Electronic boards should only be touched if absolutely necessary.

Electronic boards must not come into contact with plastics or items of clothing containing synthetic fibers.

Electronic boards may only be placed on conductive surfaces (table with ESDS surface, conductive ESDS foam rubber, ESDS packing bag, ESDS transport containers).

Electronic boards may not be brought close to data terminals, monitors or television sets. (minimum clearance >10 cm).

Measurements may only be carried-out on electronic boards and modules if

- the measuring instrument is grounded (e.g. via a protective conductor) or
 - before making measurements with a potential-free measuring device, the measuring head is briefly discharged (e.g. by touching an unpainted blank piece of metal on the control cabinet).
-

Standards, regulations

The appropriate standards, regulations are directly assigned to the functional requirements.

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Motor Description

1.1 Overview

1FK7 motors are extremely compact, permanently excited 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.

Together with the SIMODRIVE 611, SIMOVERT MASTERDRIVES MC drive systems, the 1FK7 motors comprise 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 and the heat is dissipated through the motor surface. 1FK7 motors have a high overload capability.

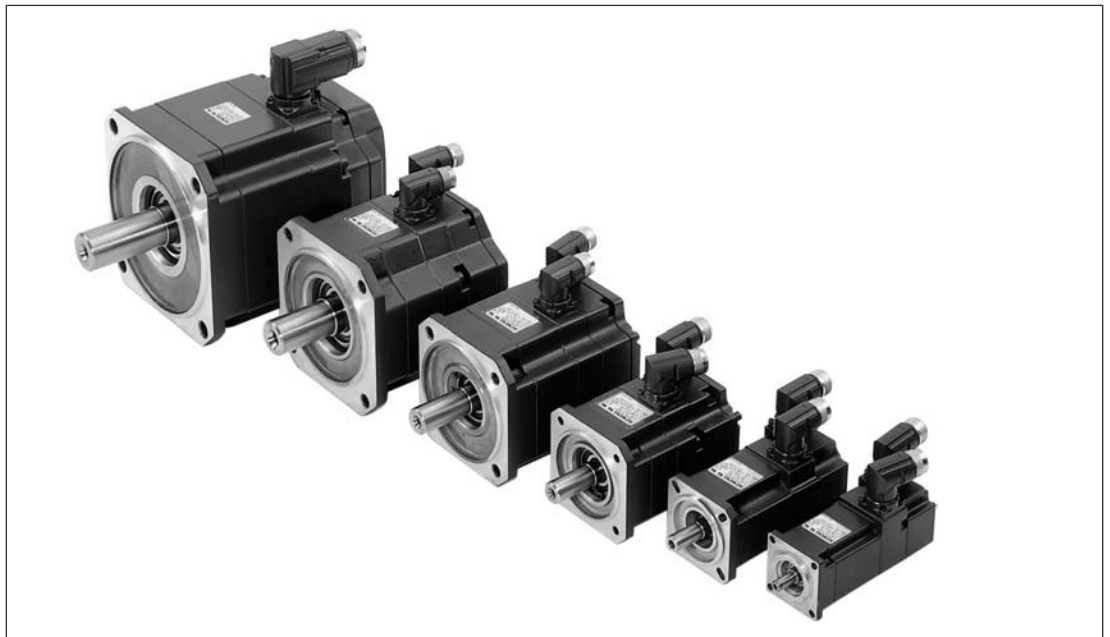


Figure 1-1 1FK7 motors

Benefits

1FK7 Compact motors offer:

- Space-saving installation thanks to extremely high power/weight ratio
- Can be universally used for many applications
- Wide range of motors

1FK7 High Dynamic motors offer:

- Extremely high dynamic response thanks 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

1.2 Technical data

Table 1-4: Technical data, 1FK7 motors

Motor type	Permanently excited synchronous motor
Magnet material	Rare-earth magnet material
Stator winding insulation according to EN 60034-1 (IEC 60034-1)	Temperature class F for a winding temperature rise of $\Delta T = 100 \text{ K}$ at an ambient temperature of $+40 \text{ °C}$
Type of construction acc. to EN 60034-7 (IEC 60034-7)	IM B5 (IM V1, IM V3)
Degree of protection to EN 60034-5 (IEC 60034-5)	IP64
Cooling	Natural cooling
Temperature monitoring	KTY 84 temperature sensor in stator winding
Paint finish	Without paint finish
2nd rating plate	Attached in the NDE cover
3rd rating plate	Supplied separately packed
Drive shaft end in accordance with DIN 748-3 (IEC 60072-1)	Plain shaft
Radial eccentricity, concentricity, and axial eccentricity in accordance with DIN 42955 (IEC 60072-1)	Tolerance N (normal)
Vibration severity acc. to EN 60034-14 (IEC 60034-14)	Grade N (normal)

Table 1-4: Technical data, 1FK7 motors

Sound pressure level, max. acc. to DIN EN ISO 1680	1FK702: 55 dB (A) 1FK703: 55 dB (A) 1FK704: 55 dB (A) 1FK706: 65 dB (A) 1FK708: 70 dB (A) 1FK710: 70 dB (A)
Built-in encoder systems	• Incremental encoder sin/cos 1 V_{pp} 2048 pulses/revolution • Absolute encoder, multiturn, 2048 pulses/revolution with 1FK704 to 1FK710. 512 pulses/revolution with 1FK702 and 1FK703 and traversing range 4096 pulses/rev. with EnDat interface • Simple absolute encoder, multiturn, 32 pulses/rev. and traversing range 4096 pulses/rev. with EnDat interface • Resolver multi-pole ¹⁾ (number of poles corresponds to number of pole pairs of the motor) • Resolver 2-pole
Wiring	Connectors for signals and power can be rotated (270°)
Options	• Drive shaft end with key and keyway (half-key balancing) • Integrated holding brake • Degree of protection IP65, additional IP67 drive end flange • Planetary gearboxes/helical/angular gearboxes • Paint finish, anthracite
Installation altitude	Up to 1.000 m without de-rating
Ambient temperature in operation	-15 °C to +40 °C
During storage	-20 °C to +60 °C

- 1) With SIMODRIVE universal HR, it is important that the maximum encoder frequency of 432 Hz is maintained (encoder frequency = speed x pole pair number / 60).

**Caution**

The motors can have surface temperatures of over +100 °C.

Note

The motors must be ordered with a special paint finish if they are to be used in sub-tropical regions and if they are to be transported by sea. This paint finish prevents the stator core from corroding.

1.3 Selection and ordering data

1.3.1 1FK7 Compact motors - core type, natural cooling

Rated speed	Shaft height SH	Rated power	Stall torque	Rated torque ¹⁾	Rated current	1FK7 Synchronous Motor Compact Natural cooling		Pole pair number	Rotor moment of inertia (without brake) J	Weight (without brake)
n _N	h	P _N with Δ T=100 K	M _O with Δ T=100 K	M _N with Δ T=100 K	I _N with Δ T=100 K	Order No. Core type				m
RPM	mm	kW	Nm	Nm	A				10 ⁻⁴ kgm ²	kg
2000	100	7.75	48	37	16	1FK7105-5AC7	1 - 1 ■ ■ ■ ■	4	156	39.1
3000	048	0.82	3	2.6	1.95	1FK7042-5AF7	1 - 1 ■ ■ ■ ■	4	3.01	4.9
	63	1.48	6	4.7	3.7	1FK7060-5AF7	1 - 1 ■ ■ ■ ■	4	7.95	7
		2.29	11	7.3	5.6	1FK7063-5AF7	1 - 1 ■ ■ ■ ■	4	15.1	11.5
	80	2.14	8	6.8	4.4	1FK7080-5AF7	1 - 1 ■ ■ ■ ■	4	15	10
		3.3	16	10.5	7.4	1FK7083-5AF7	1 - 1 ■ ■ ■ ■	4	27.3	14
	100	3.77	18	12	8	1FK7100-5AF7	1 - 1 ■ ■ ■ ■	4	55.3	19
		4.87	27	15.5	11.8	1FK7101-5AF7	1 - 1 ■ ■ ■ ■	4	79.9	21
		5.37 ⁴⁾	36	20.5 ⁴⁾	16.5 ⁴⁾	1FK7103-5AF7	1 - 1 ■ ■ ■ ■	4	105	29
8.17		48	26	18	1FK7105-5AF7	1 - 1 ■ ■ ■ ■	4	156	39.1	
4500	63	1.74	6	3.7	4.1	1FK7060-5AH7	1 - 1 ■ ■ ■ ■	4	7.95	7
		2.09 ⁵⁾	11	5 ⁵⁾	6.1 ⁵⁾	1FK7063-5AH7	1 - 1 ■ ■ ■ ■	4	15.1	11.5
	80	2.39 ⁵⁾	8	5.7 ⁵⁾	5.6 ⁵⁾	1FK7080-5AH7	1 - 1 ■ ■ ■ ■	4	15	10
		3.04 ⁶⁾	16	8.3 ⁶⁾	9 ⁶⁾	1FK7083-5AH7	1 - 1 ■ ■ ■ ■	4	27.3	14
6000	28	0.4	0.85	0.6	1.4	1FK7022-5AK7	1 - 1 ■ ■ ■ ■	3	0.28	1.8
	36	0.5	1.1	0.8	1.3	1FK7032-5AK7	1 - 1 ■ ■ ■ ■	3	0.61	2.7
		0.63	1.6	1	1.3	1FK7034-5AK7	1 - 1 ■ ■ ■ ■	3	0.9	3.7
	48	0.69	1.6	1.1	1.7	1FK7040-5AK7	1 - 1 ■ ■ ■ ■	4	1.69	3.5
		1.02 ⁷⁾	3	2 ⁷⁾	3.1 ⁷⁾	1FK7042-5AK7	1 - 1 ■ ■ ■ ■	4	3.01	4.9
• Encoder systems:			Incremental encoder sin/cos 1 Vpp 2048 pulses/revolution Absolute value encoder EnDat 2048 pulses/revolution ^{1) 2)} Absolute value encoder EnDat 512 pulses/revolution ^{1) 3)} Simple absolute encoder EnDat 32 pulses/rev ^{1) 2)} Multi-pole resolver ¹⁰⁾ 2-pole resolver				A E H G S T			
• Shaft end: With key and keyway With key and keyway Plain shaft Plain shaft			• Radial eccentricity tolerance: N N N N		• Holding brake: without with without with		A B G H			
• Degree of protection:			IP64 IP65 and additional IP67 drive end flange IP64, anthracite paint finish IP65 and additional drive end flange IP67, anthracite paint finish IP65 and additional drive end flange IP67, anthracite paint finish and metal rating plate on motor				0 2 3 5 8			

Motor type (continued)	Stall current I_0 at M_0 $\Delta T=100\text{ K}$ A	Calculated power $P_{\text{calc}} =$ $M_0 \times n_N / 9550$ P_{calc} for M_0 $\Delta T=100\text{ K}$ kW	SIMODRIVE 611 power module Required rated current		Power cable, completely screened Motor connection (and brake connection) through power connector		
			I_N at M_0 $\Delta T=100\text{ K}$ A	Order number	Power connector Size	Cable cross- section Motor ⁹⁾ mm ²	Order number Prefabricated cable
1FK7105-5AC71...	20	10	28	For ordering data, refer to Catalog	1.5	4 x 2.5	6FX ■ ■ 02 -5 ■ A31-....
1FK7042-5AF71...	2.2	0.9	3		1	4 x 1.5	-5 ■ A01-....
1FK7060-5AF71...	4.5	1.9	5		1	4 x 1.5	-5 ■ A01-....
1FK7063-5AF71...	8	3.5	9		1	4 x 1.5	-5 ■ A01-....
1FK7080-5AF71...	4.8	2.5	5		1	4 x 1.5	-5 ■ A01-....
1FK7083-5AF71...	10.4	5.0	9 ⁸⁾		1	4 x 1.5	-5 ■ A01-....
1FK7100-5AF71...	11.2	5.7	18		1	4 x 1.5	-5 ■ A01-....
1FK7101-5AF71...	19	8.5	18 ⁸⁾		1.5	4 x 2.5	-5 ■ A31-....
1FK7103-5AF71...	27.5	11.3	28		1.5	4 x 4.0	-5 ■ A41-....
1FK7105-5AF71...	31	15	28 ⁸⁾		1.5	4 x 10	-5 ■ A61-....
1FK7060-5AH71...	6.2	2.8	9		1	4 x 1.5	-5 ■ A01-....
1FK7063-5AH71...	12	5.2	18		1	4 x 1.5	-5 ■ A01-....
1FK7080-5AH71...	7.4	3.8	9		1	4 x 1.5	-5 ■ A01-....
1FK7083-5AH71...	15	7.5	18		1	4 x 1.5	-5 ■ A01-....
1FK7022-5AK71...	1.8	0.5	3		1	4 x 1.5	-5 ■ A01-....
1FK7032-5AK71...	1.7	0.7	3		1	4 x 1.5	-5 ■ A01-....
1FK7034-5AK71...	1.9	1	3		1	4 x 1.5	-5 ■ A01-....
1FK7040-5AK71...	2.25	1.0	3		1	4 x 1.5	-5 ■ A01-....
1FK7042-5AK71...	4.4	1.9	5		1	4 x 1.5	-5 ■ A01-....

Design of the power cable:

- MOTION-CONNECT 800
- MOTION-CONNECT 700 (only with brake conductors)
- MOTION-CONNECT 500
- MOTION-CONNECT 500PLUS (only up to a cross-section of 6 mm²)

8 0
7 0
5 0
5 1

- Without brake conductors
- With brake conductors

C
D

For length code as well as power and signal cables, see Catalog, Chapter "MOTION-CONNECT connecting systems".

- 1) When using an absolute encoder the following M_N is reduced by 10%.
- 2) Not possible for 1FK702 and 1FK703.
- 3) Only possible for 1FK702 and 1FK703.
- 4) Rated power/current is referred to $n = 2500$ RPM.
- 5) Rated power/current is referred to $n = 4000$ RPM.
- 6) Rated power/current is referred to $n = 3500$ RPM.
- 7) Rated power/current is referred to $n = 5000$ RPM.
- 8) With the specified power unit the motor cannot be fully utilized to $\Delta T=100\text{K}$ 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 the larger power unit.
- 9) The current load capability of the power cables corresponds to IEC 60204-1 for routing type C under continuous operating conditions
for an air ambient temperature of +40 °C, dimensioned for $I_0(100\text{K})$, PVC/PUR-insulated cables.
- 10) When using SIMODRIVEuniversal HR the max. operating frequency is 432 Hz.

1.3.2 1FK7 High Dynamic motors - core type, natural cooling

Rated speed	Shaft height SH	Rated power	Stall torque	Rated torque ¹⁾	Rated current	1FK7 Synchronous Motor High Dynamic Natural cooling		Pole pair no.	Rotor moment of inertia (without brake)	Weight (without brake)
n _N	h	P _N with Δ T=100 K	M ₀ with Δ T=100 K	M _N with Δ T=100 K	I _N with Δ T=100 K	Order number Core type			J	m
RPM	mm	kW	Nm	Nm	A				10 ⁻⁴ kgm ²	kg
3000	48	1.1	4	3.5	4	1FK7044-7AF7	1 - 1 ■ ■ ■ ■	3	1.28	7.7
	63	1.7	6.4	5.4	5.3	1FK7061-7AF7	1 - 1 ■ ■ ■ ■	3	3.4	10
		2.51	12	8	7.5	1FK7064-7AF7	1 - 1 ■ ■ ■ ■	3	6.5	15.5
	80	2.51	14	8	6.7	1FK7082-7AF7	1 - 1 ■ ■ ■ ■	4	14	17.2
		3.14 ²⁾	22	12 ²⁾	12.5 ²⁾	1FK7085-7AF7	1 - 1 ■ ■ ■ ■	4	23	23.5
		3.77 ⁷⁾	28	18 ⁷⁾	14.5 ⁷⁾	1FK7086-7AF7	1 - 1 ■ ■ ■ ■	4	23	23.5
4500	48	1.23	3.1	2.6	4	1FK7043-7AH7	1 - 1 ■ ■ ■ ■	3	1	6.3
		1.41	4	3	4.9	1FK7044-7AH7	1 - 1 ■ ■ ■ ■	3	1.28	7.7
	63	2.03	6.4	4.3	5.9	1FK7061-7AH7	1 - 1 ■ ■ ■ ■	3	3.4	10
		2.36	12	5	7	1FK7064-7AH7	1 - 1 ■ ■ ■ ■	3	6.5	15.5
6000	36	0.57	1.3	0.9	1.5	1FK7033-7AK7	1 - 1 ■ ■ ■ ■	3	0.27	3.1
	48	1.26	3.1	2	4.4	1FK7043-7AK7	1 - 1 ■ ■ ■ ■	3	1	6.3
• Encoder systems:			Incremental encoder sin/cos 1 V _{pp} 2048 pulses/rev Absolute value encoder EnDat 2048 pulses/revolution ^{1) 3)} Absolute value encoder EnDat 512 pulses/revolution ^{1) 4)} Simple absolute encoder EnDat 32 pulses/rev ^{1) 3)} Multi-pole resolver ⁶⁾ 2-pole resolver				A E H G S T			
• Shaft end: With key and keyway With key and keyway Plain shaft Plain shaft			• Radial eccentricity tolerance: N N N N			• Holding brake: without with without with		A B G H		
• Degree of protection:			IP64 IP65 and additional IP67 drive end flange IP64 and anthracite paint finish IP65 and additional drive end flange IP67, anthracite paint finish IP65 and additional drive end flange IP67, anthracite paint finish and metal rating plate on motor					0 2 3 5 8		

Motor type (continued)	Stall current I_0 at M_0 $\Delta T=100\text{ K}$ A	Calculated power $P_{\text{calc}} =$ $M_0 \times n_N/9550$ P_{calc} for M_0 $\Delta T=100\text{ K}$ kW	SIMODRIVE 611 Power Module Required rated current		Power cable, completely screened Motor connection (and brake connection) through power connector		
			I_N at M_0 $\Delta T=100\text{ K}$ A	Order number	Power connector Size	Cable cross- section Motor ⁵⁾ mm ²	Order number Prefabricated cable
1FK7044-7AF71...	4.5	1.3	5	For ordering data, refer to Catalog	1	4 x 1.5	6FX ■ ■ 02 -5 ■ A01-....
1FK7061-7AF71...	6.1	2.0	9		1	4 x 1.5	-5 ■ A01-....
1FK7064-7AF71...	11	3.8	18		1	4 x 1.5	-5 ■ A01-....
1FK7082-7AF71...	10.6	4.4	18		1	4 x 1.5	-5 ■ A01-....
1FK7085-7AF71...	22.5	6.9	28		1.5	4 x 4	-5 ■ A41-....
1FK7086-7AF71...	21	8.8	30		1.5	4 x 4	-5 ■ A41-....
1FK7043-7AH71...	4.5	1.5	5		1	4 x 1.5	-5 ■ A01-....
1FK7044-7AH71...	6.3	1.9	9		1	4 x 1.5	-5 ■ A01-....
1FK7061-7AH71...	8	3.0	9		1	4 x 1.5	-5 ■ A01-....
1FK7064-7AH71...	15	5.7	18		1	4 x 1.5	-5 ■ A01-....
1FK7033-7AK71...	2.2	0.8	3		1	4 x 1.5	-5 ■ A01-....
1FK7043-7AK71...	6.4	1.9	9		1	4 x 1.5	-5 ■ A01-....

Design of the power cable:

- MOTION-CONNECT 800
- MOTION-CONNECT 700 (only with brake conductors)
- MOTION-CONNECT 500
- MOTION-CONNECT 500PLUS (only up to a cross-section of 6 mm²)

8	0
7	0
5	0
5	1

- Without brake conductors
- With brake conductors

C
D

For length code as well as power and signal cables, see Catalog, Chapter "MOTION-CONNECT connecting systems".

1) When using an absolute encoder the following M_N is reduced by 10%.

2) Rated power/current is referred to $n=2500\text{ RPM}$.

3) Not possible for 1FK703

4) Only possible for 1FK703

5) The current load capability of the power cables corresponds to IEC 60204-1 for routing type C under continuous operating conditions for an air ambient temperature of +40 °C, dimensioned for I_0 (100K), PVC/PUR-insulated cables.

6) When using SIMODRIVEuniversal HR the max. operating frequency is 432 Hz.

7) These values refer to $n = 2000\text{ rpm}$.

1.4 Cooling, 1FK7

Cooling version

The cooling version is defined at the 9th position of the motor Order No. (MLFB).
1FK7 motors can be supplied in the natural cooling version:

Table 1-5: Cooling versions of 1FK7 motors

1FK7□□□□	A	□□□
	↓	Natural cooling

Natural cooling

Operating temperature range: -15 °C to +40 °C (without any restrictions).

The power loss is dissipated through radiation and natural convection which means that adequate heat dissipation must be ensured by suitably mounting the motor (refer to Chapter "Motor components (options)").

All of the Catalog data refer to an ambient temperature of 40 °C, mounted so that the motors are not thermally insulated and an installation altitude up to 1000 m above sea level.

If other conditions prevail (ambient temperature > 40 °C or installation altitude > 1000 m above sea level), the permissible torque/power must be defined using the factors from the following table (torque/power reduction according to EN 60034-6).

Ambient temperatures and installation altitudes are rounded-off to 5 °C or 500 m respectively.

Table 1-6: Power de-rating as a function of the installation altitude and the ambient temperature

Installation altitude above sea level [m]	Ambient temperature in °C					
	< 30	30–40	45	50	55	60
1000	1.07	1.00	0.96	0.92	0.87	0.82
1500	1.04	0.97	0.93	0.89	0.84	0.79
2000	1.00	0.94	0.90	0.86	0.82	0.77
2500	0.96	0.90	0.86	0.83	0.78	0.74
3000	0.92	0.86	0.82	0.79	0.75	0.70
3500	0.88	0.82	0.79	0.75	0.71	0.67
4000	0.82	0.77	0.74	0.71	0.67	0.63

1.5 Coupling output

1.5.1 Description of functions

After investigating various coupling outputs for servomotors in conjunction with Siemens drive converters, it was seen, that in many cases, the coupling outputs were the cause of vibration problems. In order to achieve optimum drive output characteristics, ROTEX-GS couplings from the KTR company should be used. The advantages of ROTEX-GS couplings include:

- 2 to 4x torsional stiffness of a belt-driven gearbox
- No intermeshing teeth (when compared to belt gearboxes)
- Low moment of inertia
- Good control behavior

When it comes to mounting, the clamping hub without key is considered to be adequate up to a coupling size of 38 and up to the specified torques that can be transferred (refer to the appropriate motor configuration manual). It must be carefully noted that the friction locked torque must always be adequately dimensioned according to the assignment to the particular motor frame size. The accelerating torque also has to be transferred.

From a coupling size of 42 or as an alternative to the clamping hub, we can recommend the version with clamping ring hub. This means that the maximum coupling torque can be almost reached.

The investigations extend to include the vibration characteristics and behavior. The couplings assigned to the motors permit higher speed control loop gains and therefore result in the highest possible K_V values and uniform motion.

ROTEX GS couplings are available with 4 different plastic pinion gears with various Shore hardnesses:

	98 or 95 Shore A (average)
Alternatively:	92 Shore A
Alternatively:	80 Shore A (soft)
Alternatively:	64 Shore D (hard)

The adaptation to the existing machine masses and stiffness, which becomes possible, must be determined, taking into account the mounted mechanical system.

1.5.2 Assignment of the coupling outputs to the motors

Table 1-7: Assignment of the coupling outputs to the motors

Shaft height of the 1 FK7 motor	d_w [mm] ¹⁾	Rotex GS Type	Torques that can be transmitted with 80 or 92 Sh-A-GS annular gear		T_R [Nm] ⁴⁾
			T_{KN} [Nm] ²⁾	T_{Kmax} [Nm] ³⁾	
1FK7022-...	9	9	1.8	3.6	2.6
1FK703□-...	14	14	7.5	15	102
1FK704□-...	19	19/24	10	20	-
1FK706□-...	24	24/28	35	70	-
1FK708□-...	32	28/38	95	190	-
1FK710□-...	38	38/45	190	380	-

1) d_w = Diameter, motor shaft end

2) T_{KN} = Rated coupling torque

3) T_{Kmax} = Maximum coupling torque

4) T_R : = Frictional torque (torque that can be transmitted with a clamping hub at d_w)

It may be necessary to use other annular gears (e.g. Shore hardness 80 Sh-A). They must be optimally harmonized with the mounted mechanical system.



Warning

The accelerating torque may not exceed the clamping torque of the coupling!

Notice

We cannot accept any liability for the quality and properties/features of third-party products.

1.5.3 Ordering data

Address:	KTR Kupplungstechnik GmbH Rodder Damm 170 D-48432 Rheine
Postal address:	Postfach 1763 D-48407 Rheine
Tel. engineering Dept.:	+49 (0) 5971 / 798 - 465 (337)
Fax:	+49 (0) 5971 / 798 - 450
Internet:	www.ktr.com

1.6 Armature short-circuit braking

1.6.1 Description of functions

For transistor PWM converters, when the DC link voltage values are exceeded or if the electronics fails, then electrical braking is no longer possible. If the drive which is coasting down, can represent a potential hazard, then the motor can be braked by short-circuiting the armature. Armature short-circuit braking should be initiated at the latest by the limit switch in the traversing range of the feed axis.

The friction of the mechanical system and the switching times of the contactors must be taken into account when determining the distance that the feed axis takes to come to a complete stop. In order to avoid mechanical damage, mechanical stops should be located at the end of the absolute traversing range.

For servomotors with integrated holding brake, the holding brake can be simultaneously applied to create an additional braking torque – however, with some delay.

Caution

The drive converter pulses must first be canceled and this actually implemented before an armature short-circuit contactor is closed or opened. This prevents the contactor contacts from burning and eroding and destroying the drive converter.



Warning

The drive must always be operationally braked using the setpoint input. For additional information, refer to the Drive Converter Configuration Manual.

Table 1-8: Resistance braking for 1FK7 CT and 1FK7 HD

Motor type	External braking resistor R _{opt} [Ω]	Average braking torque M _{br rms} [Nm]		Max. braking torque M _{br max} [Nm]	RMS braking current I _{br rms} [A]	
		without external braking resistor	with external braking resistor		without external braking resistor	with external braking resistor
1FK7 CT						
1FK7022-5AK71	1.0	1.8	1.9	2.3	9.0	8.7
1FK7032-5AK71	12.2	1.0	1.3	1.7	4.4	4.0
1FK7034-5AK71	11.1	1.6	2.2	2.8	6.1	5.5
1FK7040-5AK71	18.1	0.5	1.0	1.2	3.5	3.1
1FK7042-5AF71	13.1	1.7	2.5	3.1	4.2	3.8
1FK7042-5AK71	7.2	1.2	2.7	3.3	9.0	8.1
1FK7060-5AF71	7.8	2. 2	4.5	5.5	7.9	7.1
1FK7060-5AH71	5.9	1.9	4.8	6.0	11.9	10.7
1FK7063-5AF71	4.2	4.1	9.1	11.3	15.6	14.0
1FK7063-5AH71	2.7	3.5	9.6	12.0	25.0	22.3
1FK7080-5AF71	7.8	2.9	6.9	8.6	10.1	9.0
1FK7080-5AH71	5.5	2.0	6.7	8.4	14.9	13.3
1FK7083-5AF71	3.4	5.6	14.4	17.9	22.3	19.9
1FK7083-5AH71	2.6	3.8	14.2	17.6	31.8	28.5
1FK7100-5AF71	4.1	4.2	13.4	16.6	19.9	17.8
1FK7101-5AF71	1.7	7.9	24.8	30.8	41.3	37.0
1FK7103-5AF71	1.2	10.1	33.9	42.2	59.2	53.0
1FK7105-5AC71	1.7	16.8	47.5	59.1	47.3	42.3
1FK7105-5AF71	1.1	12.9	48.3	60.0	72.5	64.9
1FK7 HD						
1FK7033-7AK71	13.4	0.6	1.1	1.4	4.1	3.7
1FK7043-7AH71	9.4	0.7	1.7	2.1	5.5	4.9
1FK7043-7AK71	7.8	0.4	1.3	1.7	6.4	5.8
1FK7044-7AF71	7.9	1.0	2.0	2.5	5.2	4.7
1FK7044-7AH71	7.0	0.8	2.0	2.4	7.0	6.3
1FK7061-7AF71	8.7	0.9	3.0	3.7	6.4	5.8
1FK7061-7AH71	6.4	0.7	3.1	3.8	9.4	8.4
1FK7064-7AF71	4.7	1.6	5.6	7.0	12.0	10.8
1FK7064-7AH71	3.8	1.2	5.7	7.1	16.7	15.0
1FK7082-7AF71	5.9	2.0	7.1	8.8	12.1	10.8
1FK7085-7AF71	2.0	2.8	11.0	13.7	26.3	23.5
1FK7086-7AF71	1.8	6.0	22.2	27.5	39.0	34.9

Ordering address

Ordering address:

Fritzlen GmbH & Co.KG
Gottlieb-Daimler-Str. 61
D-71711 Murr
Germany

Tel. :

+49 (0) 7144 / 2724 - 25

Electrical Connections

2.1 Connector assignment



Warning

The motors are not designed to be connected directly to the line supply.

Connector assignment, motor connectors and temperature sensors at the motor

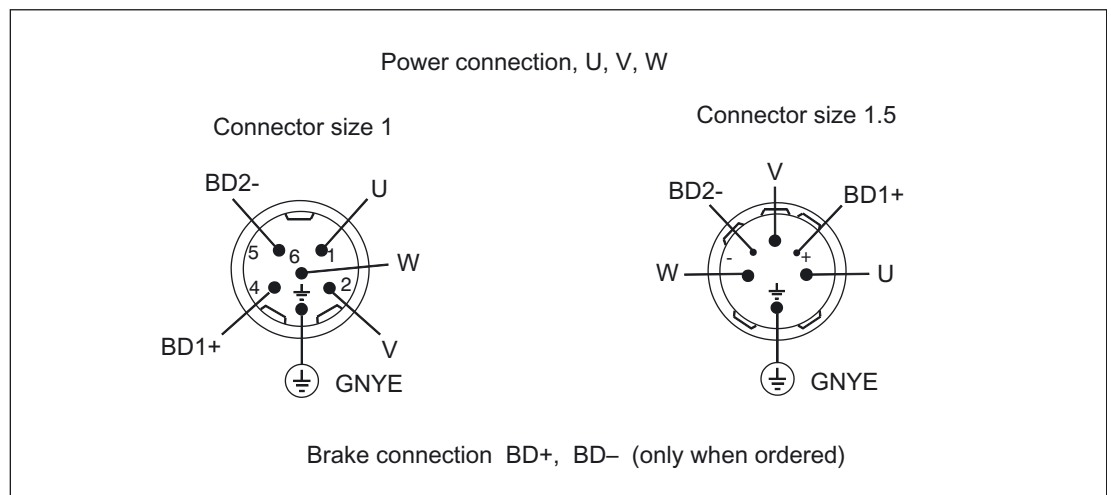


Fig. 2-1 Connection assignment: Power and temperature sensors

2.2 Rotating the connector at the motor

Power connectors and signal connectors can be rotated to a limited extent.

Notice

The permissible range of rotation may not be exceeded.
 In order to guarantee the degree of protection, a max. 10 revolutions are permissible.
 Do not exceed max. torque when rotating connectors.
 Connectors should be rotated using the mating connector that matches the connector thread.
 Connecting cables should be secured against strain and bending.
 Motor connectors should be secured so that they cannot be rotated any further.
 Connectors may not be subject to continuous force.

Direction and torque when rotating

Table 2-1: Direction and torque when rotating connectors

	Power connector Size 1	Power connector Size 1.5	Signal connector
Clockwise direction of rotation [degrees]	270°	270°	90°
Counter-clockwise direction of rotation [degrees]	Not possible	Not possible	180° for SH 28 to 80 90° for SH 100
Max. torque when rotating [Nm]	8	15	8

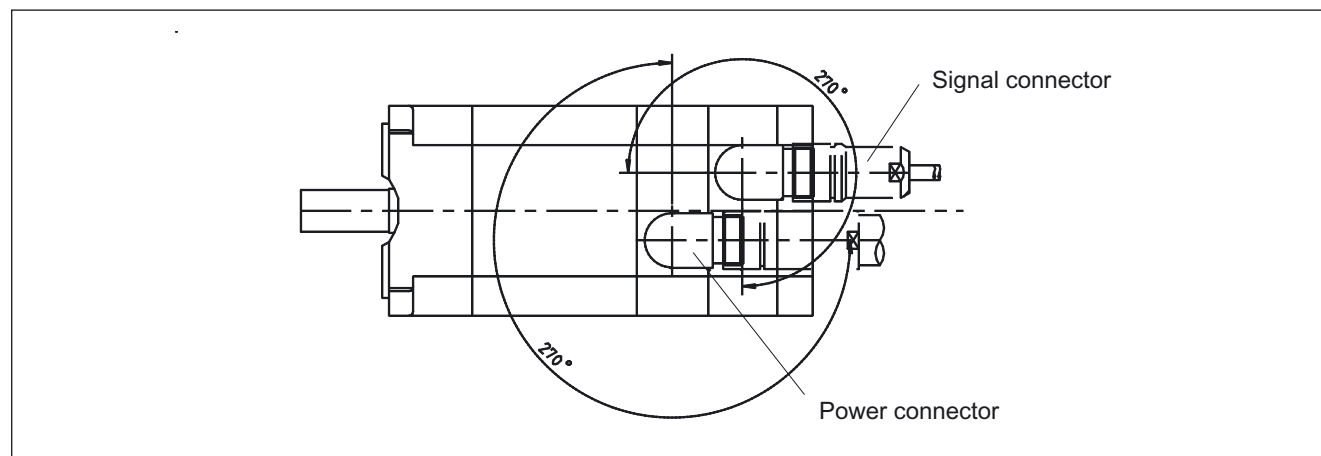


Fig. 2-2 Rotating a connector using an 1FK706 motor as an example

Technical Data and Characteristics

3.1 Introduction

Note

For converter operation on 480 V line supplies, DC link voltages greater than 600 V occur. The motors are suitable for DC link voltages up to 740 V.

For a description of the shift of the voltage limiting characteristics, refer to the documentation "General Section for synchronous motors".

The specified thermal S3 limiting characteristics are referred to $\Delta T = 100 \text{ K}$ for

- 1 min cycle duration for SH 28 and 36
 - 10 min cycle duration for SH 48, 63, 80, 100
-

3.2 Speed-torque diagrams 1FK7 CT

Table 3-1: 1FK7022 CT

Technical data	Code	Units	-5AK71	
Engineering data				
Rated speed	n_N	RPM	6000	
Number of poles	2p		6	
Rated torque (100K)	$M_{N(100K)}$	Nm	0.6	
Rated current	I_N	A	1,4	
Stall torque (60K)	$M_{0(60K)}$	Nm	0.7	
Stall torque (100K)	$M_{0(100K)}$	Nm	0.85	
Stall current (60K)	$I_0(60K)$	A	1.5	
Stall current (100K)	$I_0(100K)$	A	1.8	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	0.35	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	0.28	
Optimum operating point				
Optimum speed	n_{opt}	RPM	6000	
Optimum power	P_{opt}	kW	0.38	
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	10000	
Max. torque	M_{max}	Nm	3.4	
Peak current	I_{max}	A	7.5	
Physical constants				
Torque constant	k_T	Nm/A	0.46	
Voltage constant	k_E	V/1000 RPM	29	
Winding resistance at 20 °C	R_{ph}	Ohm	4.2	
Rotating field inductance	L_D	mH	5.5	
Electrical time constant	T_{el}	ms	1.3	
Shaft torsional stiffness	c_t	Nm/rad	3000	
Mechanical time constant	T_{mech}	ms	1.7	
Thermal time constant	T_{th}	min	18	
Weight with brake	m	kg	2.0	
Weight without brake	m	kg	1.8	

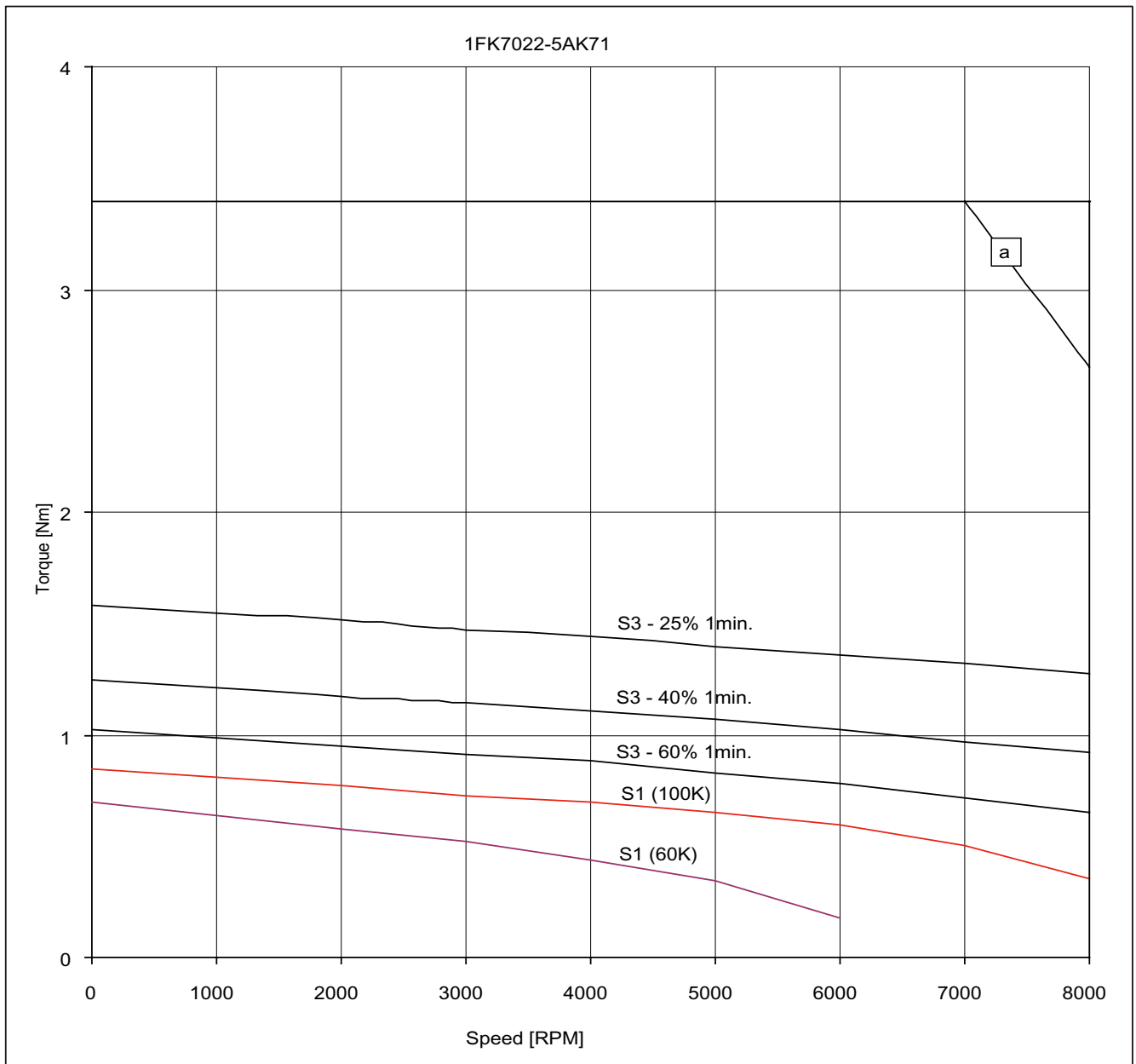


Fig. 3-1 Speed-torque diagram 1FK7022-5AK71 CT

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V$ (DC), $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V$ (DC) and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=425V_{rms}$

Table 3-2: 1FK7032 CT

Technical data	Code	Units	-5AK71	
Engineering data				
Rated speed	n_N	RPM	6000	
Number of poles	$2p$		6	
Rated torque (100K)	$M_{N(100K)}$	Nm	0.8	
Rated current	I_N	A	1.4	
Stall torque (60K)	$M_{0(60K)}$	Nm	0.85	
Stall torque (100K)	$M_{0(100K)}$	Nm	1.1	
Stall current (60K)	$I_0(60K)$	A	1.4	
Stall current (100K)	$I_0(100K)$	A	1.7	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	0.69	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	0.61	
Optimum operating point				
Optimum speed	n_{opt}	RPM	6000	
Optimum power	P_{opt}	kW	0.5	
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	10000	
Max. torque	M_{max}	Nm	4.5	
Peak current	I_{max}	A	7.5	
Physical constants				
Torque constant	k_T	Nm/A	0.66	
Voltage constant	k_E	V/1000 RPM	42	
Winding resistance at 20 °C	R_{ph}	Ohm	5.2	
Rotating field inductance	L_D	mH	18.5	
Electrical time constant	T_{el}	ms	3.6	
Shaft torsional stiffness	c_t	Nm/rad	6500	
Mechanical time constant	T_{mech}	ms	2.2	
Thermal time constant	T_{th}	min	25	
Weight with brake	m	kg	3.0	
Weight without brake	m	kg	2.7	

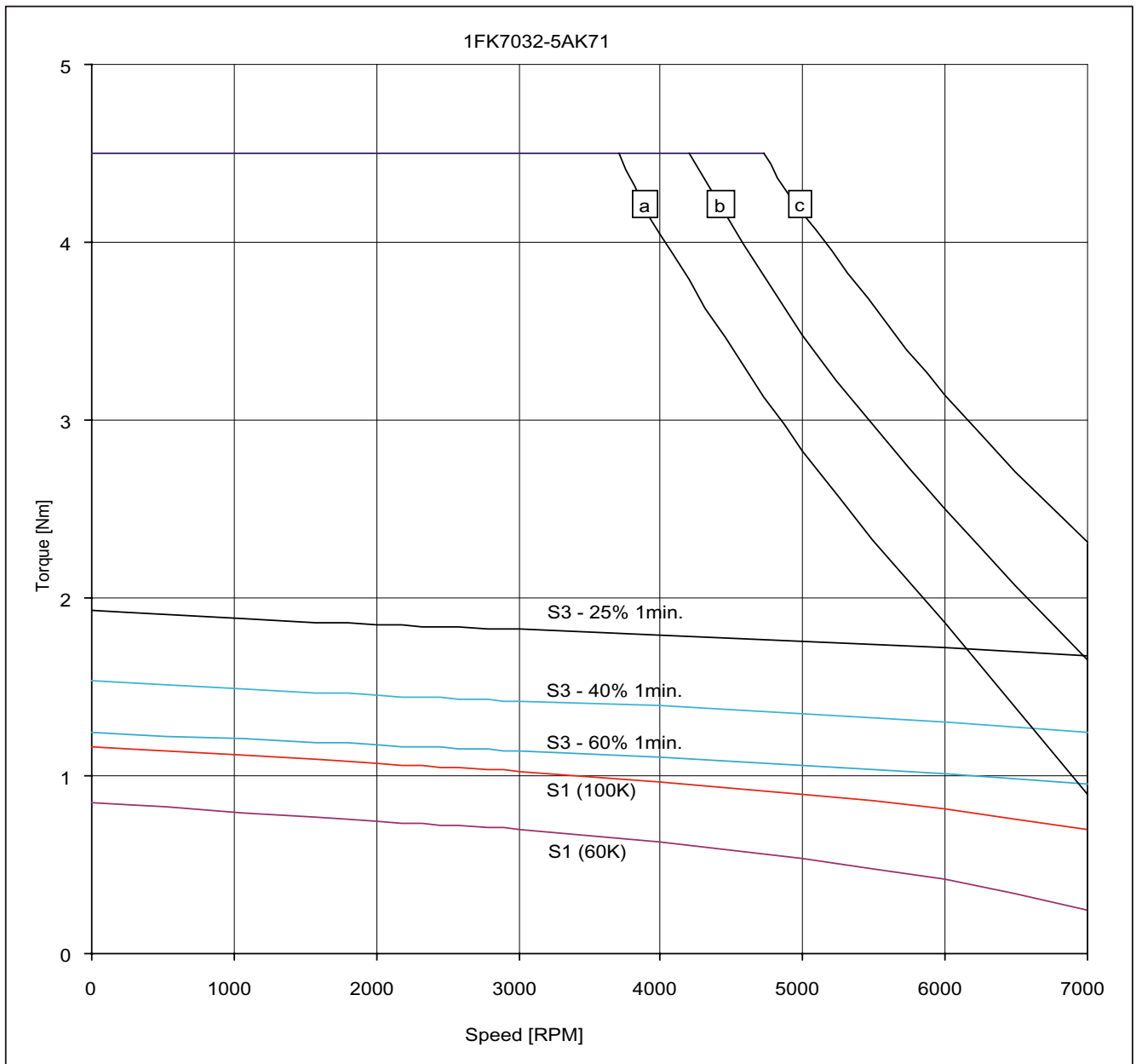


Fig. 3-2 Speed-torque diagram 1FK7032-5AK71 CT

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V$ (DC), $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V$ (DC) and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=425V_{rms}$

Table 3-3: 1FK7034 CT

Technical data	Code	Units	-5AK71	
Engineering data				
Rated speed	n_N	RPM	6000	
Number of poles	$2p$		6	
Rated torque (100K)	$M_{N(100K)}$	Nm	1	
Rated current	I_N	A	1.3	
Stall torque (60K)	$M_{0(60K)}$	Nm	1.35	
Stall torque (100K)	$M_{0(100K)}$	Nm	1.6	
Stall current (60K)	$I_0(60K)$	A	1.6	
Stall current (100K)	$I_0(100K)$	A	1.9	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	0.98	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	0.9	
Optimum operating point				
Optimum speed	n_{opt}	RPM	6000	
Optimum power	P_{opt}	kW	0.63	
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	10000	
Max. torque	M_{max}	Nm	6.5	
Peak current	I_{max}	A	8	
Physical constants				
Torque constant	k_T	Nm/A	0.86	
Voltage constant	k_E	V/1000 RPM	55	
Winding resistance at 20 °C	R_{ph}	Ohm	4.5	
Rotating field inductance	L_D	mH	16.5	
Electrical time constant	T_{el}	ms	3.7	
Shaft torsional stiffness	c_t	Nm/rad	5500	
Mechanical time constant	T_{mech}	ms	1.6	
Thermal time constant	T_{th}	min	30	
Weight with brake	m	kg	4.0	
Weight without brake	m	kg	3.7	

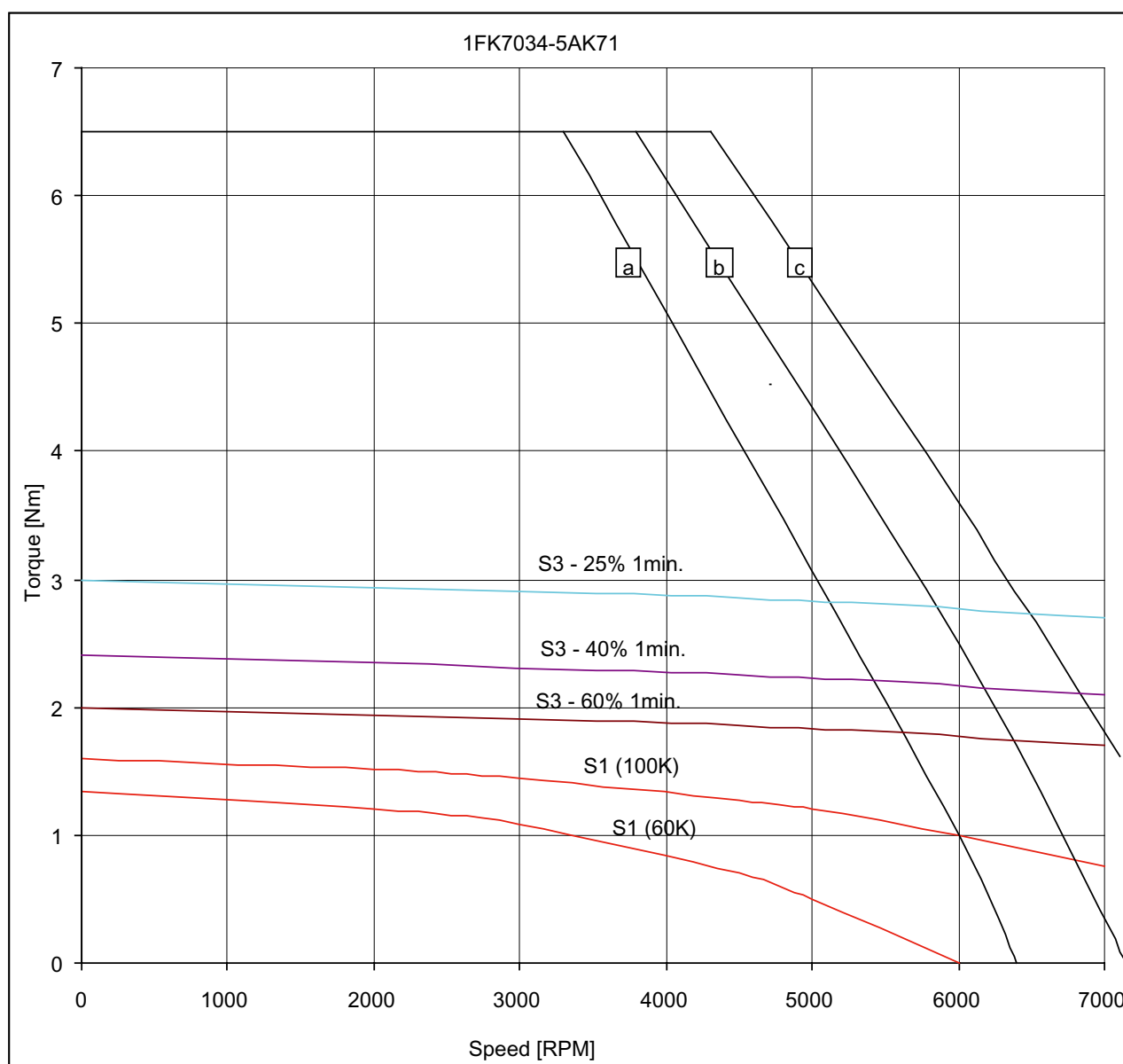


Fig. 3-3 Speed-torque diagram 1FK7034-5AK7 CT

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V$ (DC), $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V$ (DC) and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=425V_{rms}$

Table 3-4: 1FK7040 CT

Technical data	Code	Units	-5AK71	
Engineering data				
Rated speed	n_N	RPM	6000	
Number of poles	$2p$		8	
Rated torque (100K)	$M_{N(100K)}$	Nm	1.1	
Rated current	I_N	A	1.7	
Stall torque (60K)	$M_{0(60K)}$	Nm	1.3	
Stall torque (100K)	$M_{0(100K)}$	Nm	1.6	
Stall current (60K)	$I_0(60K)$	A	1.8	
Stall current (100K)	$I_0(100K)$	A	2.25	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	2.41	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	1.69	
Optimum operating point				
Optimum speed	n_{opt}	RPM	6000	
Optimum power	P_{opt}	kW	0.69	
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	9000	
Max. torque	M_{max}	Nm	5.1	
Peak current	I_{max}	A	7.7	
Physical constants				
Torque constant	k_T	Nm/A	0.68	
Voltage constant	k_E	V/1000 RPM	43	
Winding resistance at 20 °C	R_{ph}	Ohm	3.3	
Rotating field inductance	L_D	mH	17	
Electrical time constant	T_{el}	ms	5.15	
Shaft torsional stiffness	c_t	Nm/rad	19000	
Mechanical time constant	T_{mech}	ms	3.62	
Thermal time constant	T_{th}	min	25	
Weight with brake	m	kg	4.0	
Weight without brake	m	kg	3.5	

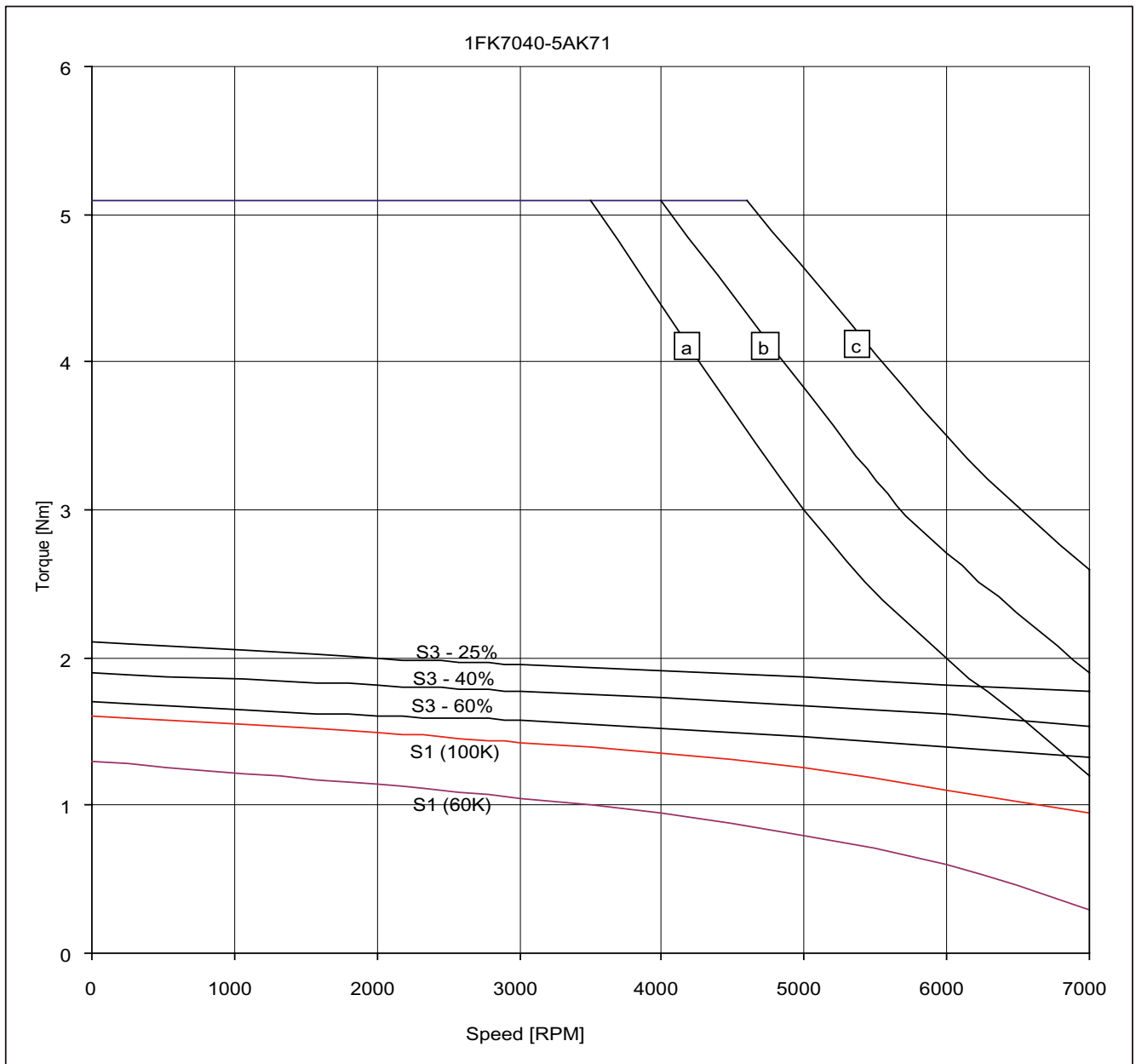


Fig. 3-4 Speed-torque diagram 1FK7040-5AK71 CT

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V$ (DC), $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V$ (DC) and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=425V_{rms}$

Table 3-5: 1FK7042 CT

Technical data	Code	Units	-5AF71	-5AK71
Engineering data				
Rated speed	n_N	RPM	3000	6000
Number of poles	$2p$		8	8
Rated torque (100K)	$M_{N(100K)}$	Nm	2.6	1.5
Rated current	I_N	A	1.95	2.45
Stall torque (60K)	$M_{0(60K)}$	Nm	2.5	2.5
Stall torque (100K)	$M_{0(100K)}$	Nm	3.0	3.0
Stall current (60K)	$I_0(60K)$	A	1.8	3.6
Stall current (100K)	$I_0(100K)$	A	2.2	4.4
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	3.73	3.73
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	3.01	3.01
Optimum operating point				
Optimum speed	n_{opt}	RPM	3000	5000
Optimum power	P_{opt}	kW	0.82	1.02
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	90000	9000
Max. torque	M_{max}	Nm	10.5	10.5
Peak current	I_{max}	A	7.35	15.3
Physical constants				
Torque constant	k_T	Nm/A	1.4	0.69
Voltage constant	k_E	V/1000 RPM	89	44
Winding resistance at 20 °C	R_{ph}	Ohm	5.15	1.2
Rotating field inductance	L_D	mH	29	6.7
Electrical time constant	T_{el}	ms	5.6	5.6
Shaft torsional stiffness	c_t	Nm/rad	16000	16000
Mechanical time constant	T_{mech}	ms	2.37	2.27
Thermal time constant	T_{th}	min	30	30
Weight with brake	m	kg	5.4	5.4
Weight without brake	m	kg	4.9	4.9

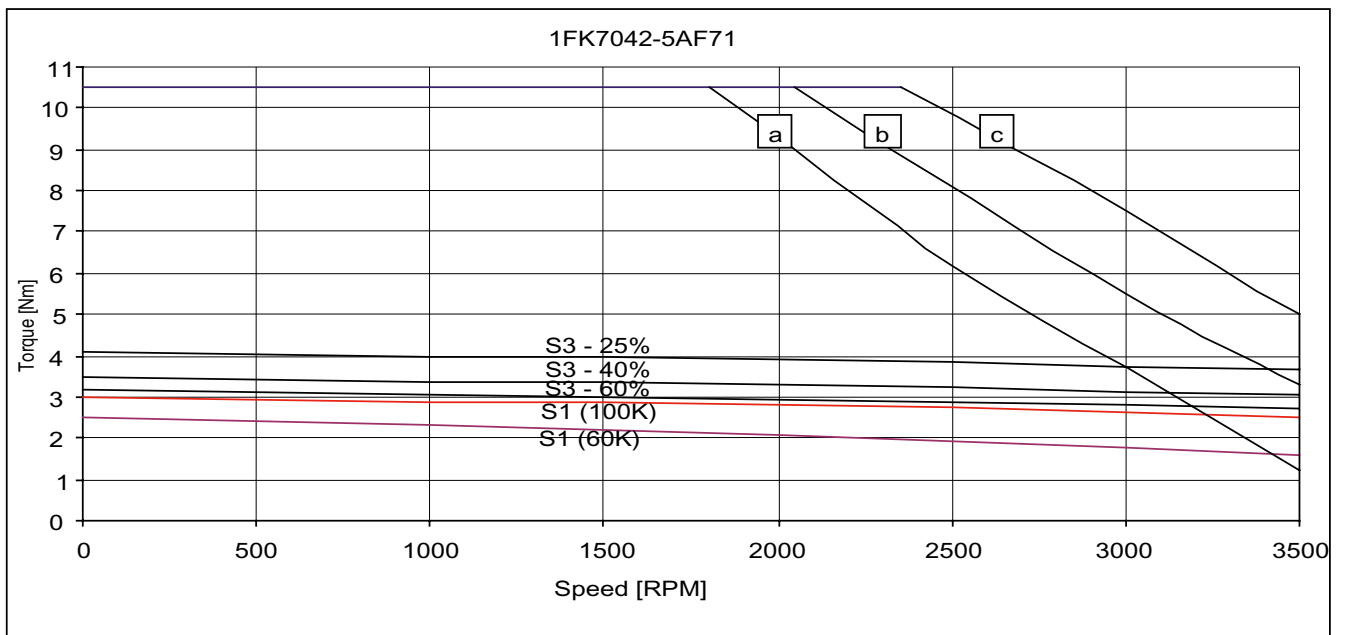


Fig. 3-5 Speed-torque diagram 1FK7042-5AF71 CT

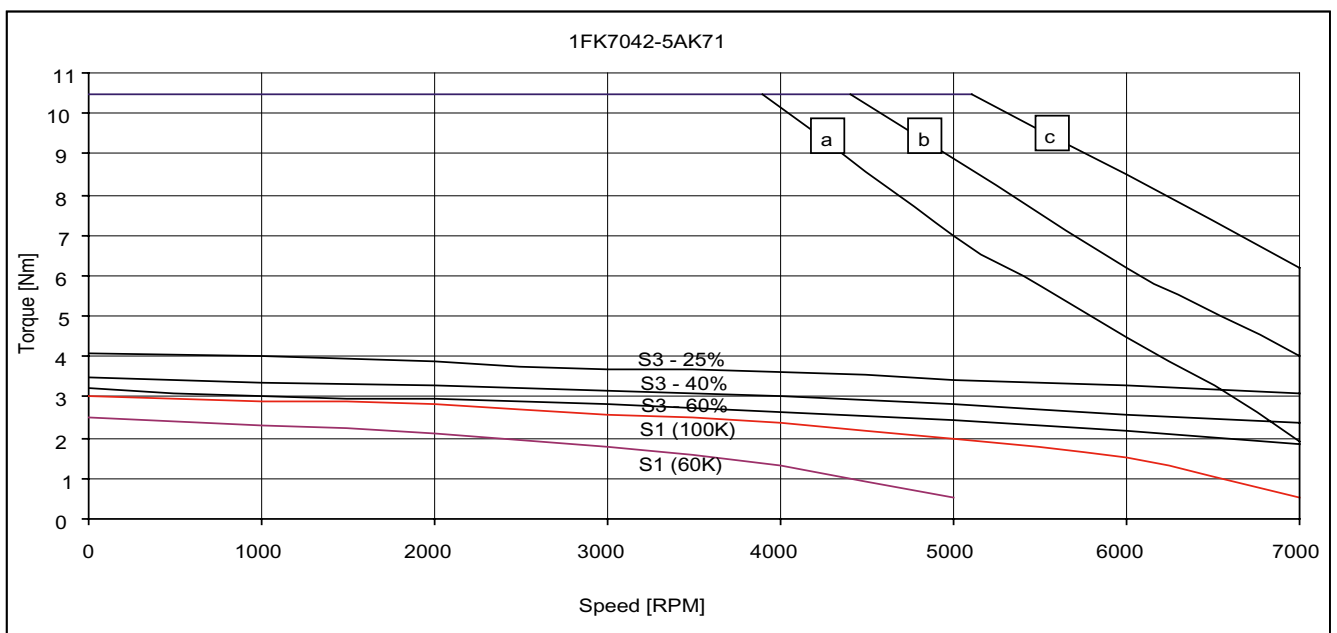


Fig. 3-6 Speed-torque diagram 1FK7042-5AK71 CT

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V \text{ (DC)}$, $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V \text{ (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=425V_{rms}$

Table 3-6: 1FK7060 CT

Technical data	Code	Units	-5AF71	-5AH71
Engineering data				
Rated speed	n_N	RPM	3000	4500
Number of poles	$2p$		8	8
Rated torque (100K)	$M_{N(100K)}$	Nm	4.7	3.7
Rated current	I_N	A	3.7	4.1
Stall torque (60K)	$M_{0(60K)}$	Nm	5.0	5.0
Stall torque (100K)	$M_{0(100K)}$	Nm	6.0	6.0
Stall current (60K)	$I_0(60K)$	A	3.7	5.1
Stall current (100K)	$I_0(100K)$	A	4.5	6.2
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	10.2	10.2
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	7.95	7.95
Optimum operating point				
Optimum speed	n_{opt}	RPM	3000	4500
Optimum power	P_{opt}	kW	1.48	1.74
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	7200	7200
Max. torque	M_{max}	Nm	18	18
Peak current	I_{max}	A	15	19.5
Physical constants				
Torque constant	k_T	Nm/A	1.33	0.95
Voltage constant	k_E	V/1000 RPM	84.5	60.5
Winding resistance at 20 °C	R_{ph}	Ohm	1.44	0.73
Rotating field inductance	L_D	mH	14.7	7.0
Electrical time constant	T_{el}	ms	10.2	9.6
Shaft torsional stiffness	c_t	Nm/rad	42000	42000
Mechanical time constant	T_{mech}	ms	1.94	1.93
Thermal time constant	T_{th}	min	30	30
Weight with brake	m	kg	8	8
Weight without brake	m	kg	7	7

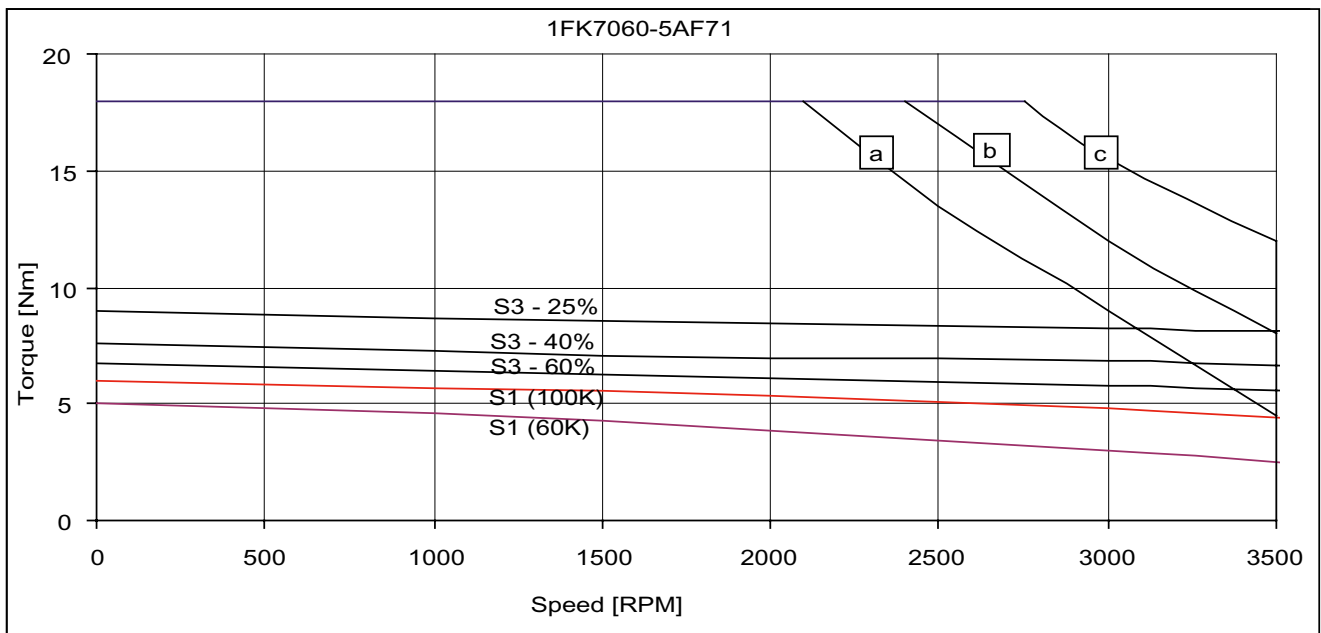


Fig. 3-7 Speed-torque diagram 1FK7060-5AF71 CT

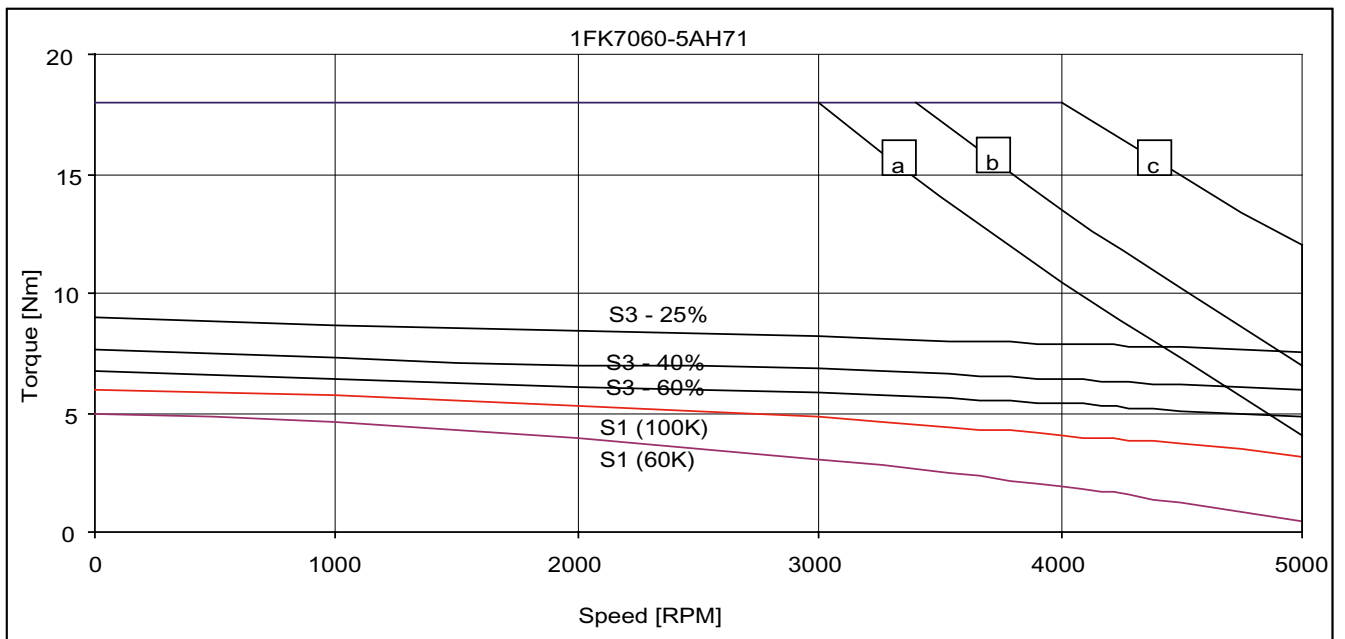


Fig. 3-8 Speed-torque diagram 1FK7060-5AH71 CT

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V \text{ (DC)}$, $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V \text{ (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=425V_{rms}$

Table 3-7: 1FK7063 CT

Technical data	Code	Units	-5AF71	-5AH71
Engineering data				
Rated speed	n_N	RPM	3000	4500
Number of poles	$2p$		8	8
Rated torque (100K)	$M_{N(100K)}$	Nm	7.3	3
Rated current	I_N	A	5.6	3.8
Stall torque (60K)	$M_{0(60K)}$	Nm	9.1	9.1
Stall torque (100K)	$M_{0(100K)}$	Nm	11	11
Stall current (60K)	$I_0(60K)$	A	6.6	9.9
Stall current (100K)	$I_0(100K)$	A	8.0	12.0
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	17.3	17.3
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	15.1	15.1
Optimum operating point				
Optimum speed	n_{opt}	RPM	3000	3300
Optimum power	P_{opt}	kW	2.29	2.32
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	7200	7200
Max. torque	M_{max}	Nm	35	35
Peak current	I_{max}	A	28	42
Physical constants				
Torque constant	k_T	Nm/A	1.37	0.91
Voltage constant	k_E	V/1000 RPM	87.5	58
Winding resistance at 20 °C	R_{ph}	Ohm	0.65	0.29
Rotating field inductance	L_D	mH	7.7	3.2
Electrical time constant	T_{el}	ms	11.8	11
Shaft torsional stiffness	c_t	Nm/rad	35000	35000
Mechanical time constant	T_{mech}	ms	1.56	1.58
Thermal time constant	T_{th}	min	40	40
Weight with brake	m	kg	12	12
Weight without brake	m	kg	11.5	11.5

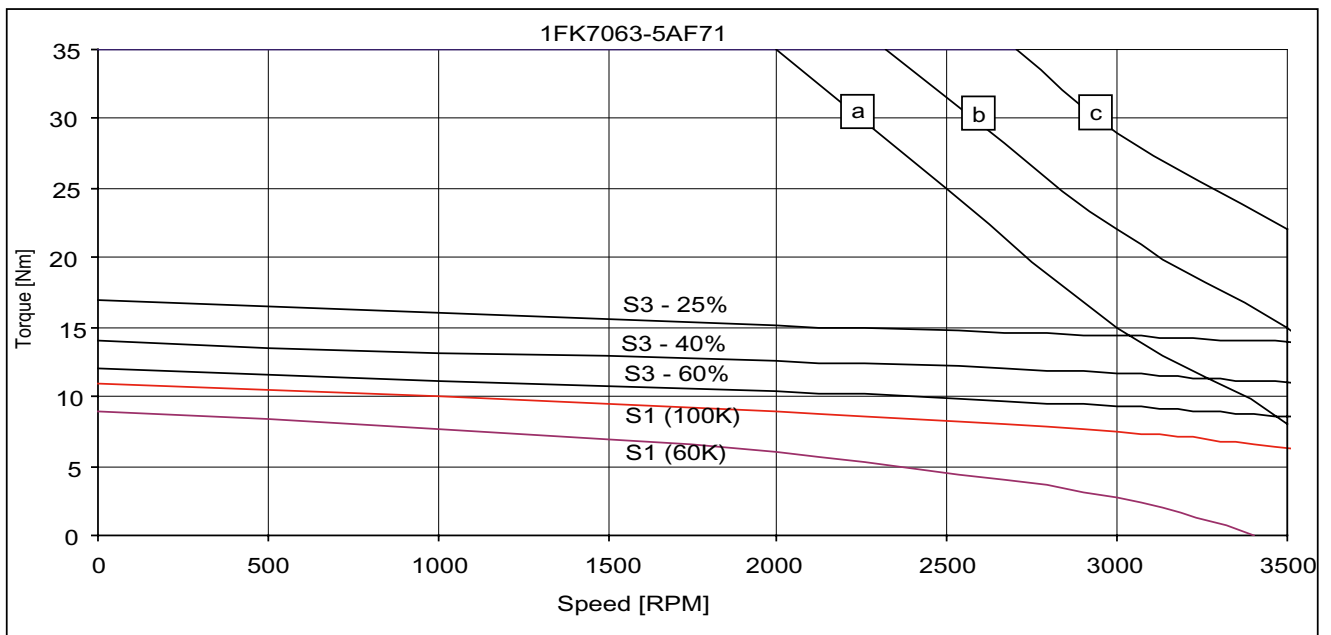


Fig. 3-9 Speed-torque diagram 1FK7063-5AF71 CT

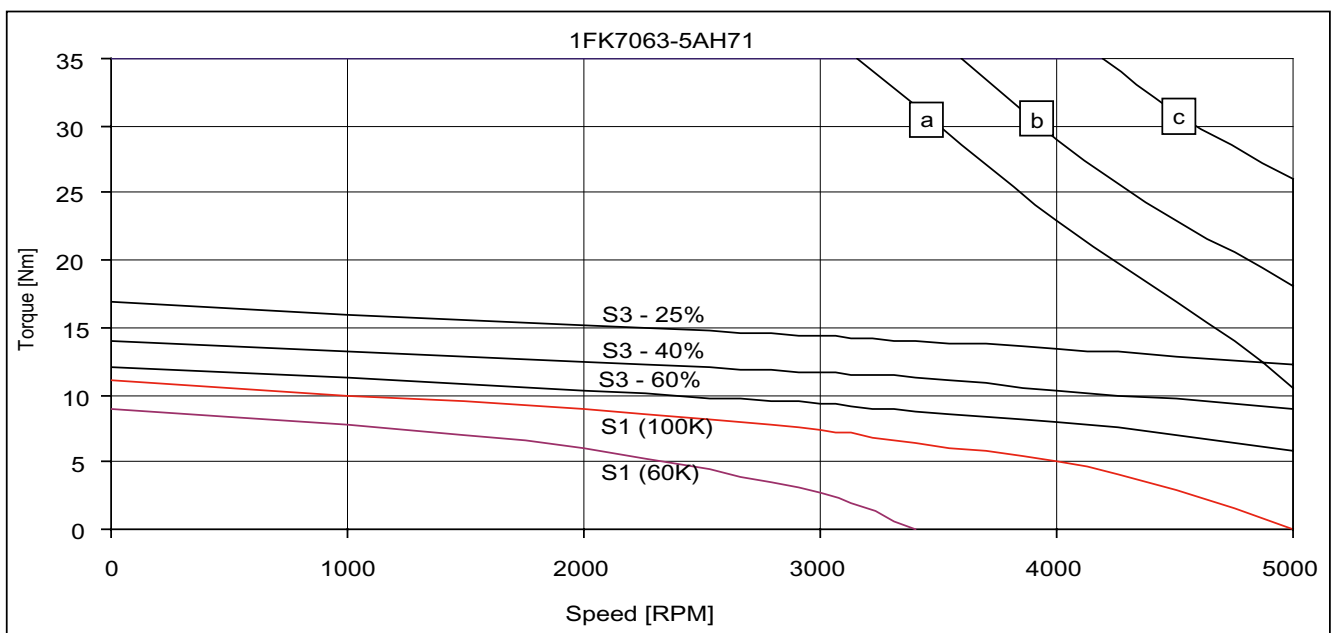


Fig. 3-10 Speed-torque diagram 1FK7063-5AH71 CT

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V \text{ (DC)}$, $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V \text{ (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=425V_{rms}$

Table 3-8: 1FK7080 CT

Technical data	Code	Units	-5AF71	-5AH71
Engineering data				
Rated speed	n_N	RPM	3000	4500
Number of poles	$2p$		8	8
Rated torque (100K)	$M_{N(100K)}$	Nm	6.8	4.5
Rated current	I_N	A	4.4	4.7
Stall torque (60K)	$M_{0(60K)}$	Nm	6.6	6.6
Stall torque (100K)	$M_{0(100K)}$	Nm	8	8
Stall current (60K)	$I_0(60K)$	A	4	6.1
Stall current (100K)	$I_0(100K)$	A	4.8	7.4
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	18.1	18.1
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	15	15
Optimum operating point				
Optimum speed	n_{opt}	RPM	3000	4000
Optimum power	P_{opt}	kW	2.14	2.39
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	6000	6000
Max. torque	M_{max}	Nm	25	25
Peak current	I_{max}	A	18	25
Physical constants				
Torque constant	k_T	Nm/A	1.61	1.06
Voltage constant	k_E	V/1000 RPM	102.5	68.0
Winding resistance at 20 °C	R_{ph}	Ohm	1.04	0.44
Rotating field inductance	L_D	mH	14.0	6.3
Electrical time constant	T_{el}	ms	13.5	14.3
Shaft torsional stiffness	c_t	Nm/rad	126000	126000
Mechanical time constant	T_{mech}	ms	1.78	1.76
Thermal time constant	T_{th}	min	40	40
Weight with brake	m	kg	12.5	12.5
Weight without brake	m	kg	10	10

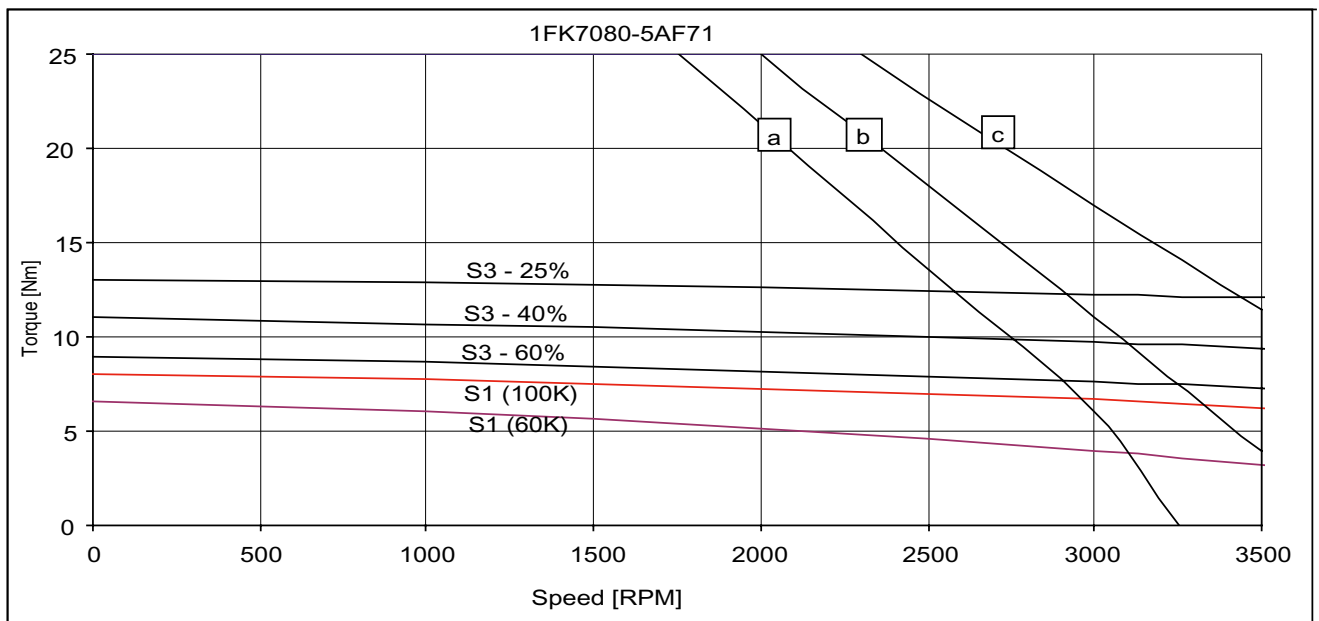


Fig. 3-11 Speed-torque diagram 1FK7080-5AF71 CT

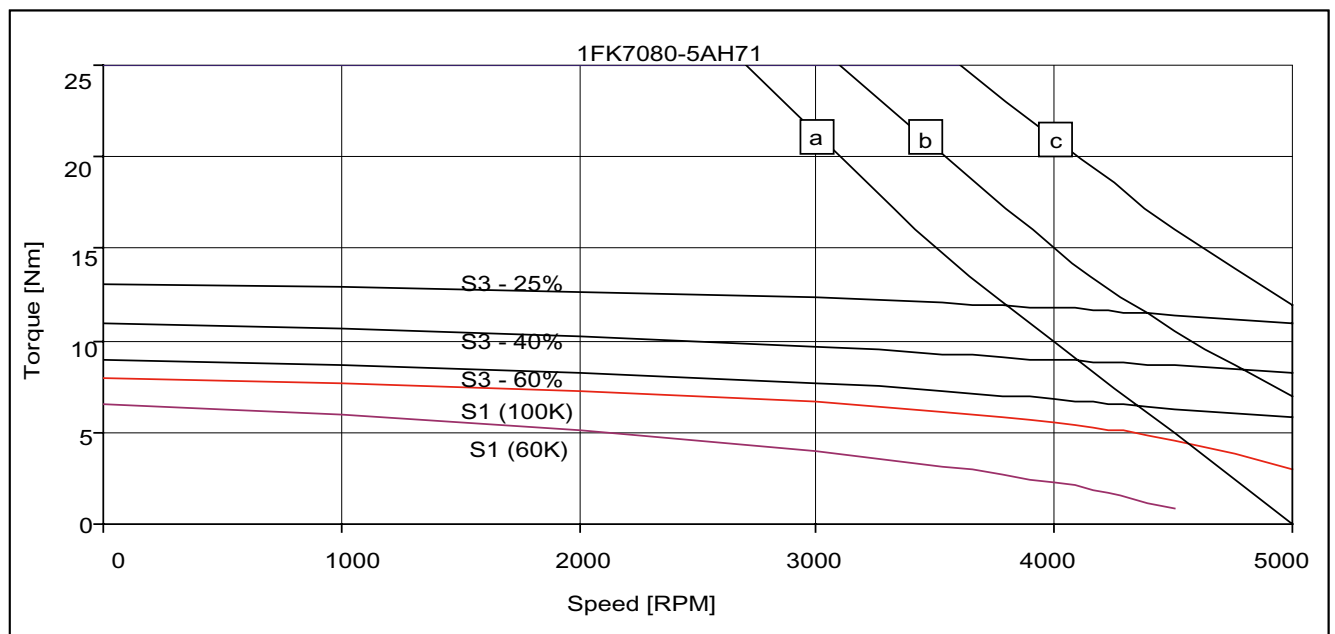


Fig. 3-12 Speed-torque diagram 1FK7080-5AH71 CT

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V \text{ (DC)}$, $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V \text{ (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=425V_{rms}$

Table 3-9: 1FK7083 CT

Technical data	Code	Units	-5AF71	-5AH71
Engineering data				
Rated speed	n_N	RPM	3000	4500
Number of poles	$2p$		8	8
Rated torque (100K)	$M_{N(100K)}$	Nm	10.5	3
Rated current	I_N	A	7.4	3.6
Stall torque (60K)	$M_{0(60K)}$	Nm	13.3	13.3
Stall torque (100K)	$M_{0(100K)}$	Nm	16	16
Stall current (60K)	$I_0(60K)$	A	8.6	12.4
Stall current (100K)	$I_0(100K)$	A	10.4	15
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	35.9	35.9
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	27.3	27.3
Optimum operating point				
Optimum speed	n_{opt}	RPM	3000	3000
Optimum power	P_{opt}	kW	3.3	3.3
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	6000	6000
Max. torque	M_{max}	Nm	50	50
Peak current	I_{max}	A	37	52
Physical constants				
Torque constant	k_T	Nm/A	1.52	1.05
Voltage constant	k_E	V/1000 RPM	97	67
Winding resistance at 20 °C	R_{ph}	Ohm	0.4	0.17
Rotating field inductance	L_D	mH	6.0	2.9
Electrical time constant	T_{el}	ms	15	17
Shaft torsional stiffness	c_t	Nm/rad	105000	105000
Mechanical time constant	T_{mech}	ms	1.41	1.26
Thermal time constant	T_{th}	min	50	50
Weight with brake	m	kg	16.5	16.5
Weight without brake	m	kg	14	14

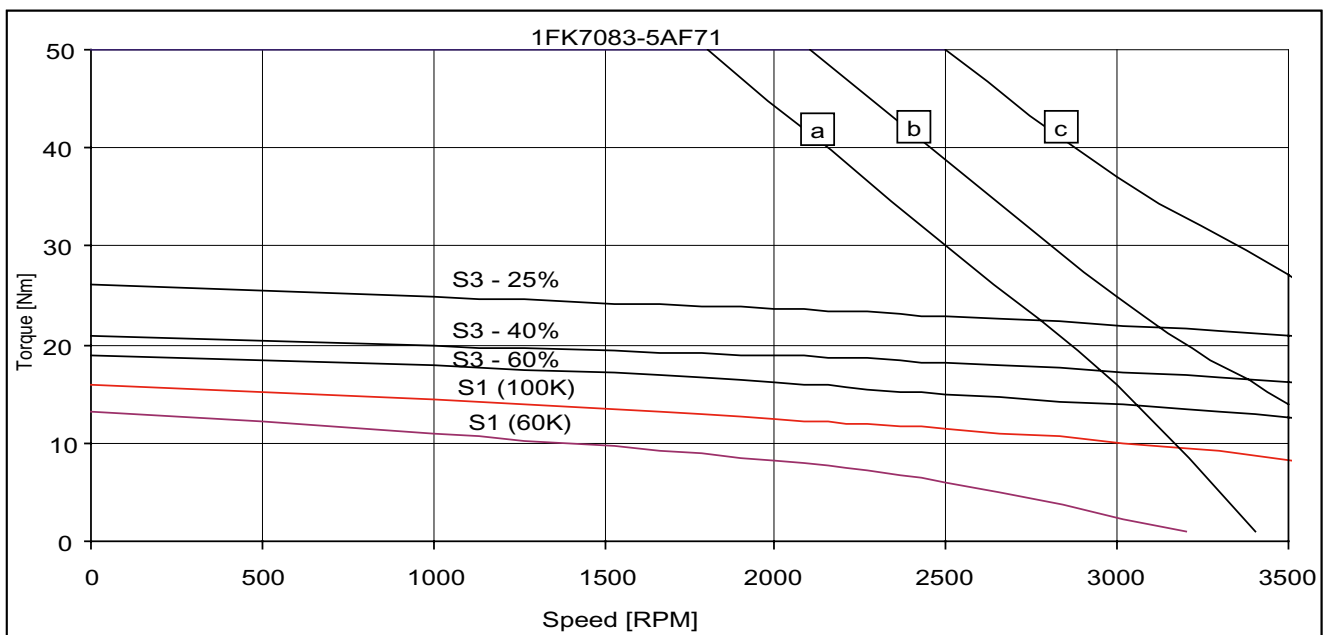


Fig. 3-13 Speed-torque diagram 1FK7083-5AF71 CT

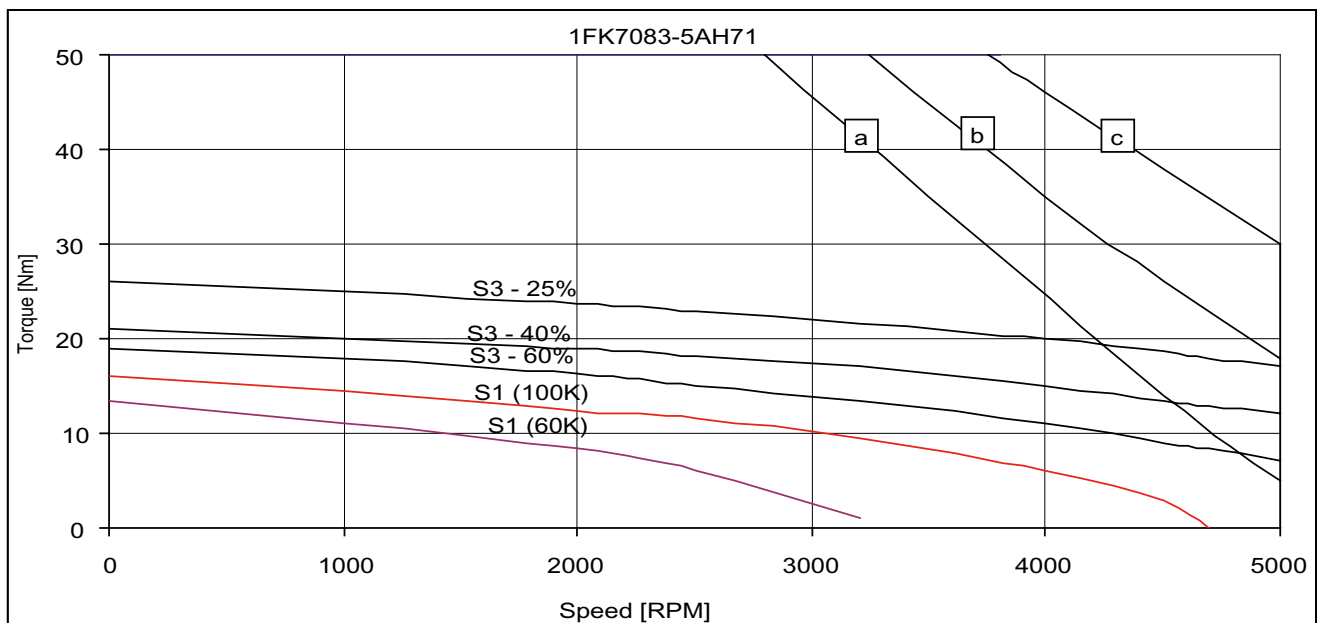


Fig. 3-14 Speed-torque diagram 1FK7083-5AH71 CT

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V \text{ (DC)}$, $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V \text{ (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=425V_{rms}$

Table 3-10: 1FK7100 CT

Technical data	Code	Units	-5AF71	
Engineering data				
Rated speed	n_N	RPM	3000	
Number of poles	$2p$		8	
Rated torque (100K)	$M_{N(100K)}$	Nm	12	
Rated current	I_N	A	8	
Stall torque (60K)	$M_{0(60K)}$	Nm	15	
Stall torque (100K)	$M_{0(100K)}$	Nm	18	
Stall current (60K)	$I_0(60K)$	A	9.2	
Stall current (100K)	$I_0(100K)$	A	11.2	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	63.9	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	55.3	
Optimum operating point				
Optimum speed	n_{opt}	RPM	3000	
Optimum power	P_{opt}	kW	3.77	
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	5000	
Max. torque	M_{max}	Nm	55	
Peak current	I_{max}	A	37	
Physical constants				
Torque constant	k_T	Nm/A	1.59	
Voltage constant	k_E	V/1000 RPM	101	
Winding resistance at 20 °C	R_{ph}	Ohm	0.34	
Rotating field inductance	L_D	mH	7.0	
Electrical time constant	T_{el}	ms	20.5	
Shaft torsional stiffness	c_t	Nm/rad	184000	
Mechanical time constant	T_{mech}	ms	2.23	
Thermal time constant	T_{th}	min	55	
Weight with brake	m	kg	21.5	
Weight without brake	m	kg	19	

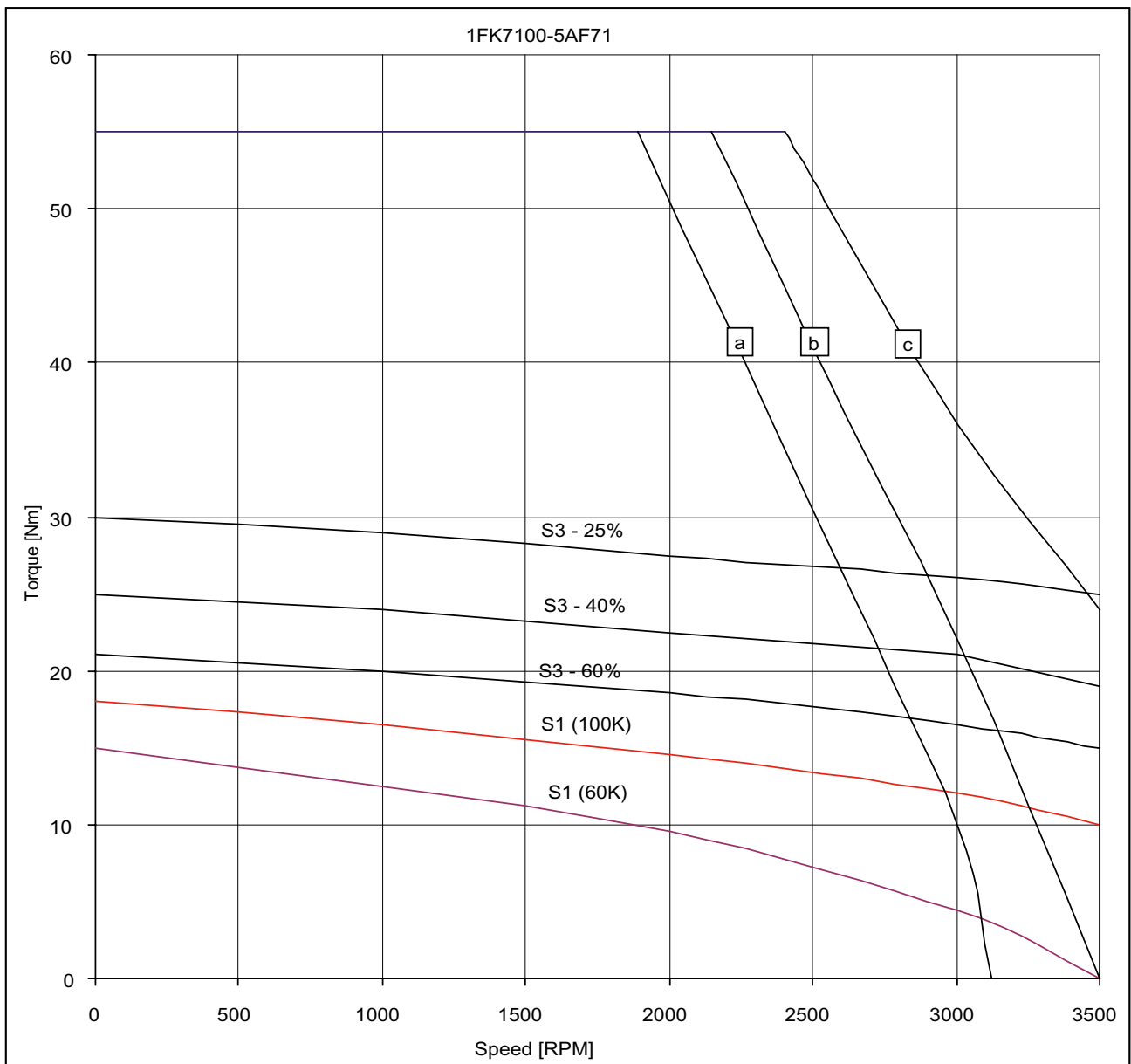


Fig. 3-15 Speed-torque diagram 1FK7100-5AF71 CT

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V$ (DC), $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V$ (DC) and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=425V_{rms}$

Table 3-11: 1FK7101 CT

Technical data	Code	Units	-5AF71	
Engineering data				
Rated speed	n_N	RPM	3000	
Number of poles	$2p$		8	
Rated torque (100K)	$M_{N(100K)}$	Nm	15.5	
Rated current	I_N	A	11.8	
Stall torque (60K)	$M_{0(60K)}$	Nm	22.4	
Stall torque (100K)	$M_{0(100K)}$	Nm	27	
Stall current (60K)	$I_0(60K)$	A	15.7	
Stall current (100K)	$I_0(100K)$	A	19	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	92.3	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	79.9	
Optimum operating point				
Optimum speed	n_{opt}	RPM	3000	
Optimum power	P_{opt}	kW	4.87	
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	5000	
Max. torque	M_{max}	Nm	80	
Peak current	I_{max}	A	63	
Physical constants				
Torque constant	k_T	Nm/A	1.41	
Voltage constant	k_E	V/1000 RPM	90	
Winding resistance at 20 °C	R_{ph}	Ohm	0.15	
Rotating field inductance	L_D	mH	3.0	
Electrical time constant	T_{el}	ms	20	
Shaft torsional stiffness	c_t	Nm/rad	165000	
Mechanical time constant	T_{mech}	ms	1.80	
Thermal time constant	T_{th}	min	60	
Weight with brake	m	kg	24	
Weight without brake	m	kg	21	

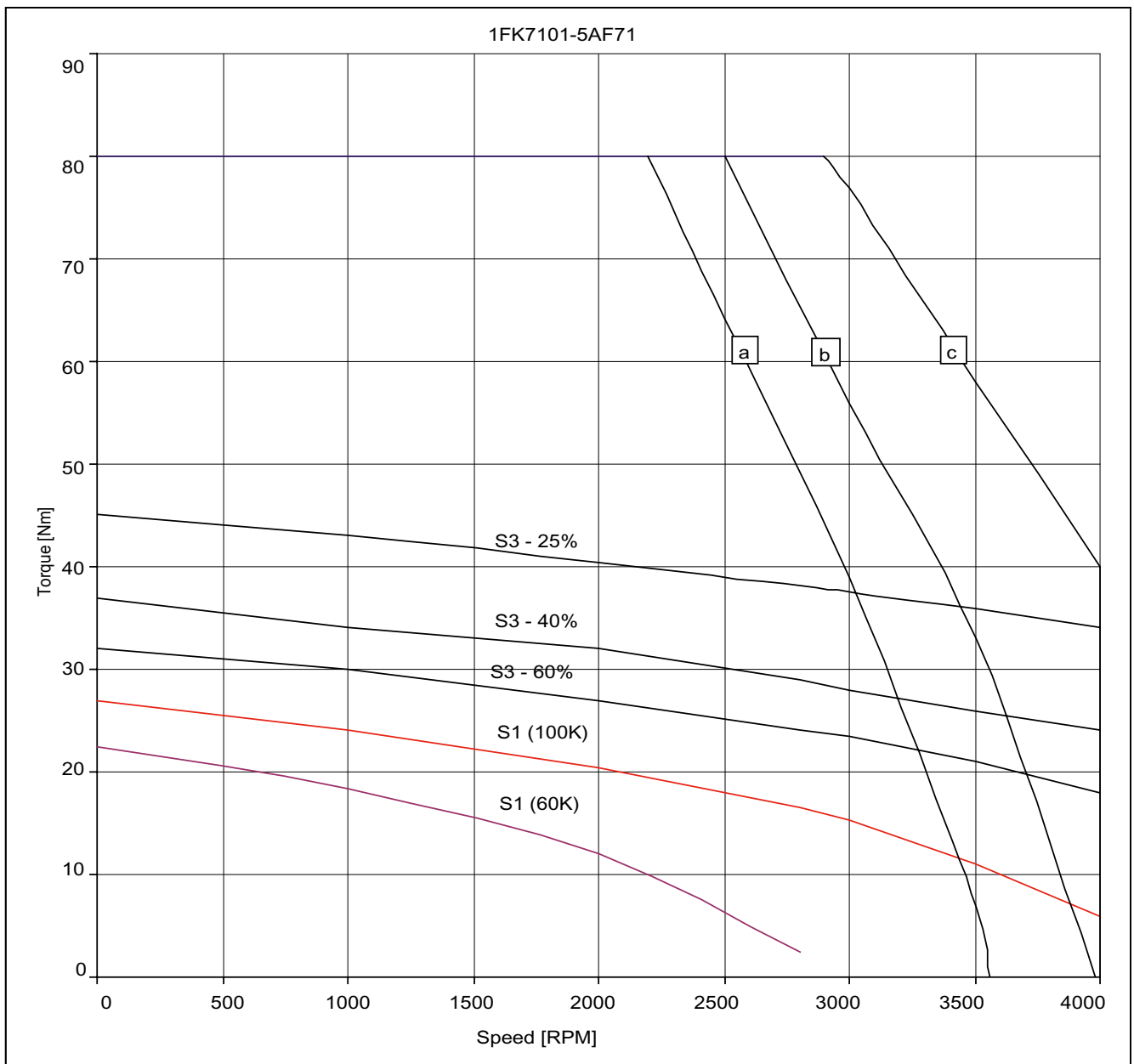


Fig. 3-16 Speed-torque diagram 1FK7101-5AF71 CT

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V$ (DC), $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V$ (DC) and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=425V_{rms}$

Table 3-12: 1FK7103 CT

Technical data	Code	Units	-5AF71	
Engineering data				
Rated speed	n_N	RPM	3000	
Number of poles	$2p$		8	
Rated torque (100K)	$M_{N(100K)}$	Nm	14	
Rated current	I_N	A	12	
Stall torque (60K)	$M_{0(60K)}$	Nm	30	
Stall torque (100K)	$M_{0(100K)}$	Nm	36	
Stall current (60K)	$I_0(60K)$	A	22.8	
Stall current (100K)	$I_0(100K)$	A	27.5	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	118	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	105	
Optimum operating point				
Optimum speed	n_{opt}	RPM	2500	
Optimum power	P_{opt}	kW	5.37	
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	5000	
Max. torque	M_{max}	Nm	108	
Peak current	I_{max}	A	84	
Physical constants				
Torque constant	k_T	Nm/A	1.35	
Voltage constant	k_E	V/1000 RPM	86	
Winding resistance at 20 °C	R_{ph}	Ohm	0.09	
Rotating field inductance	L_D	mH	2.0	
Electrical time constant	T_{el}	ms	22.2	
Shaft torsional stiffness	c_t	Nm/rad	149000	
Mechanical time constant	T_{mech}	ms	1.55	
Thermal time constant	T_{th}	min	65	
Weight with brake	m	kg	32	
Weight without brake	m	kg	29	

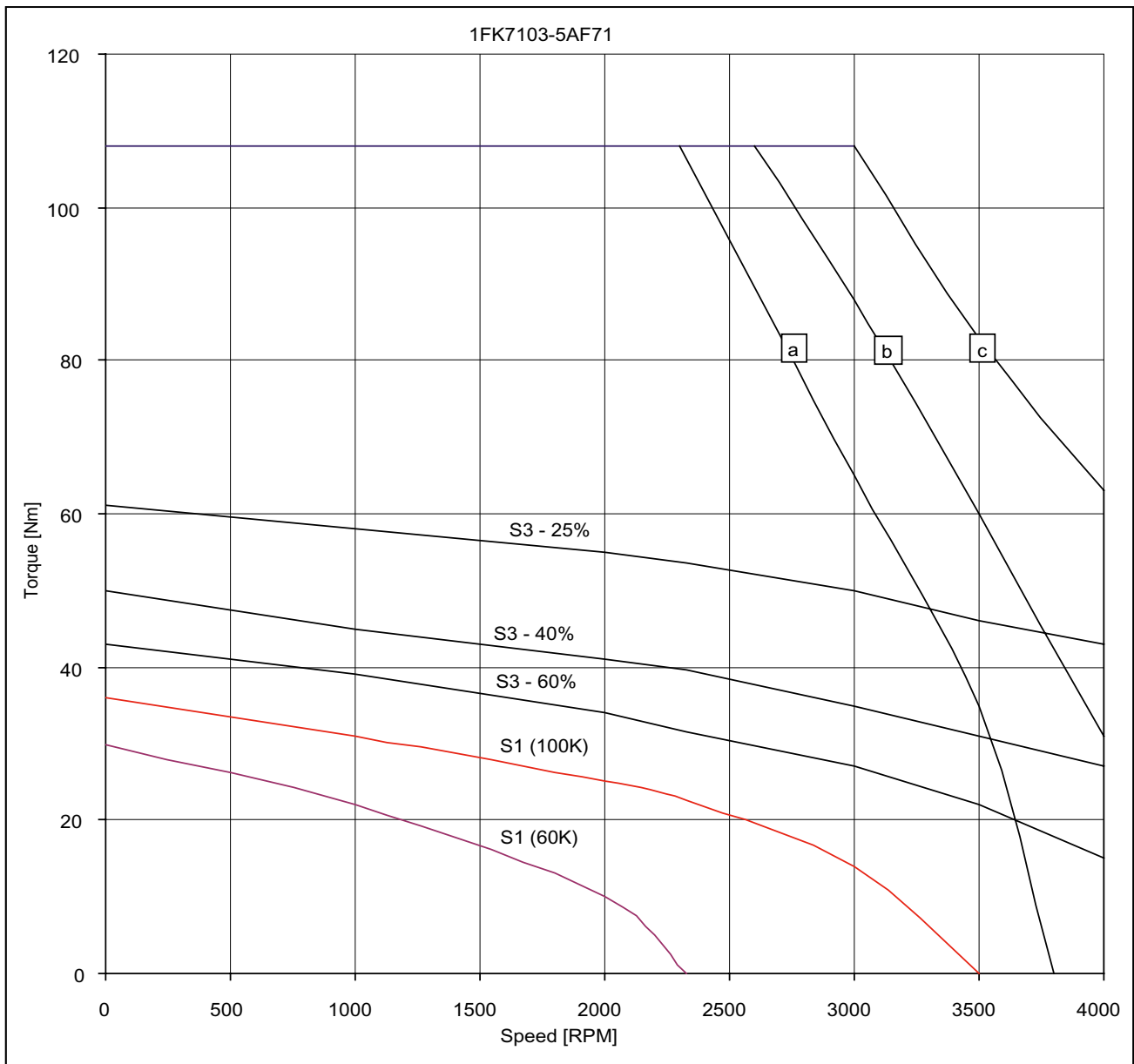


Fig. 3-17 Speed-torque diagram 1FK7103-5AF71 CT

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V$ (DC), $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V$ (DC) and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=425V_{rms}$

Table 3-13: 1FK7105 CT

Technical data	Code	Units	-5AC7	-5AF7
Engineering data				
Rated speed	n_N	RPM	2000	3000
Number of poles	$2p$		8	8
Rated torque (100K)	$M_{N(100K)}$	Nm	37	26
Rated current	I_N	A	16	18
Stall torque (60K)	$M_{0(60K)}$	Nm	40	40
Stall torque (100K)	$M_{0(100K)}$	Nm	48	48
Stall current (60K)	$I_0(60K)$	A	17	25
Stall current (100K)	$I_0(100K)$	A	20	31
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	169	169
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	156	156
Optimum operating point				
Optimum speed	n_{opt}	RPM	2000	3000
Optimum power	P_{opt}	kW	7.75	8.17
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	5000	5000
Max. torque	M_{max}	Nm	150	150
Peak current	I_{max}	A	72	109
Physical constants				
Torque constant	k_T	Nm/A	2.37	1.57
Voltage constant	k_E	V/1000 RPM	151	100
Winding resistance at 20 °C	R_{ph}	Ohm	0.17	0.074
Rotating field inductance	L_D	mH	4.4	1.9
Electrical time constant	T_{el}	ms	26	26
Shaft torsional stiffness	c_t	Nm/rad	125000	125000
Mechanical time constant	T_{mech}	ms	14.2	14.1
Thermal time constant	T_{th}	min	70	70
Weight with brake	m	kg	41.5	41.5
Weight without brake	m	kg	39.1	39.1

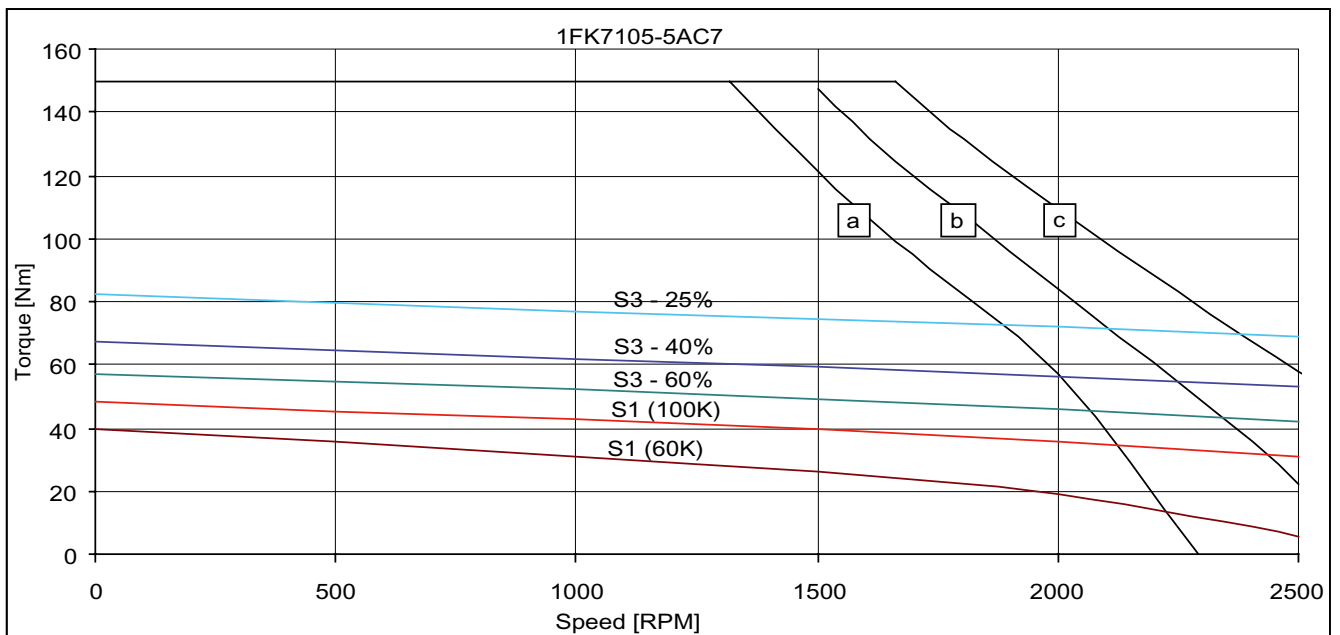


Fig. 3-18 Speed-torque diagram 1FK7105-5AC CT

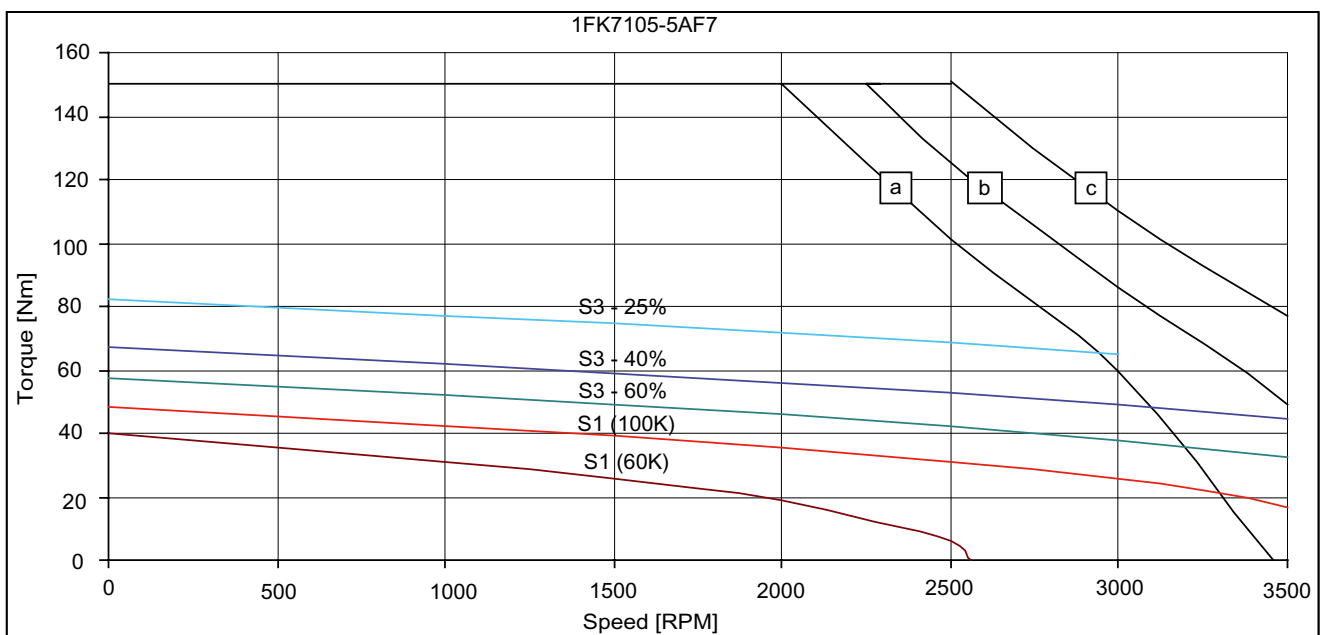


Fig. 3-19 Speed-torque diagram 1FK7105-5AF CT

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V \text{ (DC)}$, $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V \text{ (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=425V_{rms}$

3.3 Speed-torque diagrams 1FK7 HD

Table 3-14: 1FK7033 HD

Technical data	Code	Units	-7AK71	
Engineering data				
Rated speed	n_N	RPM	6000	
Number of poles	$2p$		6	
Rated torque (100K)	$M_{N(100K)}$	Nm	0.9	
Rated current	I_N	A	1.5	
Stall torque (60K)	$M_{0(60K)}$	Nm	1.0	
Stall torque (100K)	$M_{0(100K)}$	Nm	1.3	
Stall current (60K)	$I_0(60K)$	A	1.7	
Stall current (100K)	$I_0(100K)$	A	2.2	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	0.3	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	0.27	
Optimum operating point				
Optimum speed	n_{opt}	RPM	6000	
Optimum power	P_{opt}	kW	0.56	
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	10000	
Max. torque	M_{max}	Nm	4.3	
Peak current	I_{max}	A	7.2	
Physical constants				
Torque constant	k_T	Nm/A	0.6	
Voltage constant	k_E	V/1000 RPM	40	
Winding resistance at 20 °C	R_{ph}	Ohm	3.7	
Rotating field inductance	L_D	mH	18	
Electrical time constant	T_{el}	ms	4.9	
Shaft torsional stiffness	c_t	Nm/rad	8000	
Mechanical time constant	T_{mech}	ms	0.83	
Thermal time constant	T_{th}	min	25	
Weight with brake	m	kg	3.4	
Weight without brake	m	kg	3.1	

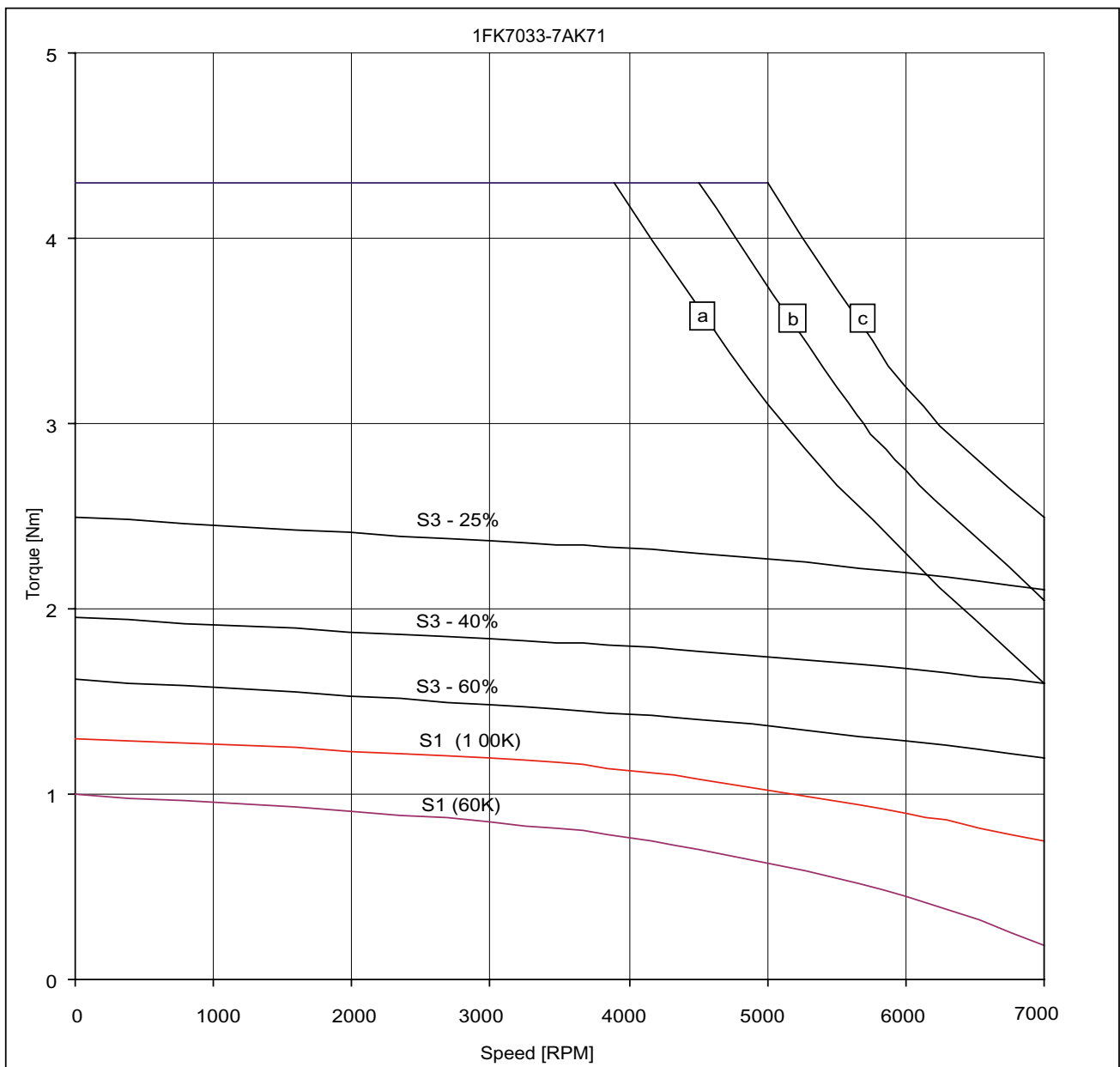


Fig. 3-20 Speed-torque diagram 1FK7033-7AK71 HD

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V$ (DC), $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V$ (DC) and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=425V_{rms}$

Table 3-15: 1FK7043 HD

Technical data	Code	Units	-7AH71	-7AK71
Engineering data				
Rated speed	n_N	RPM	4500	6000
Number of poles	$2p$		6	6
Rated torque (100K)	$M_{N(100K)}$	Nm	2.6	2
Rated current	I_N	A	4.0	4.4
Stall torque (60K)	$M_{0(60K)}$	Nm	2.5	2.5
Stall torque (100K)	$M_{0(100K)}$	Nm	3.1	3.1
Stall current (60K)	$I_0(60K)$	A	3.6	4.8
Stall current (100K)	$I_0(100K)$	A	4.5	6.4
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	1.14	1.14
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	1.01	1.01
Optimum operating point				
Optimum speed	n_{opt}	RPM	4500	6000
Optimum power	P_{opt}	kW	1.23	1.26
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	8000	8000
Max. torque	M_{max}	Nm	9.4	9.4
Peak current	I_{max}	A	14.8	20
Physical constants				
Torque constant	k_T	Nm/A	0.67	0.48
Voltage constant	k_E	V/1000 RPM	44	32
Winding resistance at 20 °C	R_{ph}	Ohm	1.2	0.65
Rotating field inductance	L_D	mH	15	9
Electrical time constant	T_{el}	ms	12.5	13.8
Shaft torsional stiffness	c_t	Nm/rad	11000	11000
Mechanical time constant	T_{mech}	ms	0.81	0.85
Thermal time constant	T_{th}	min	40	40
Weight with brake	m	kg	7.0	7.0
Weight without brake	m	kg	6.3	6.3

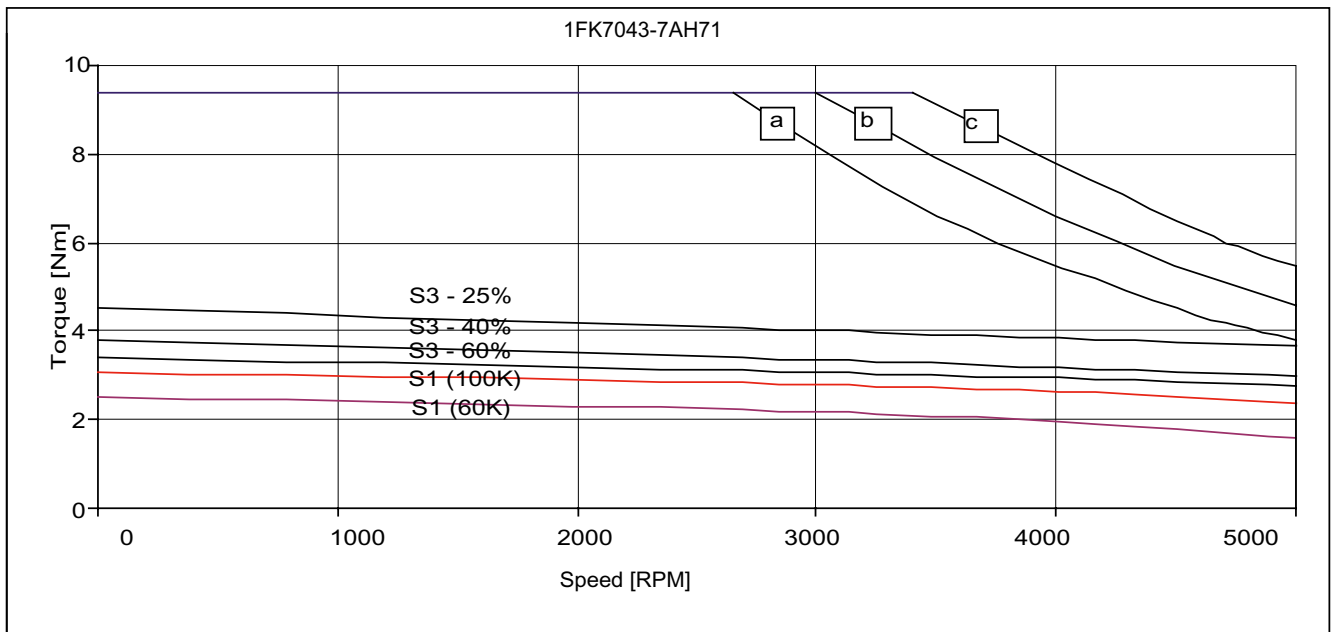


Fig. 3-21 Speed-torque diagram 1FK7043-7AH71 HD

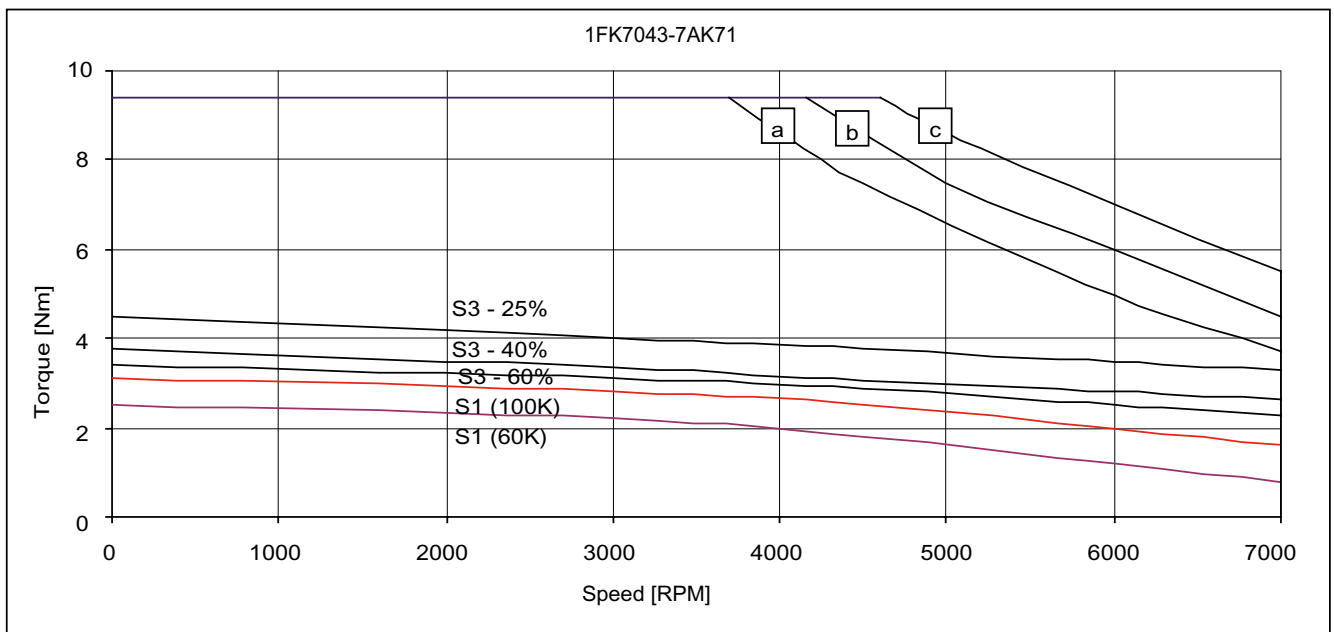


Fig. 3-22 Speed-torque diagram 1FK7043-7AK71 HD

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V \text{ (DC)}$, $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V \text{ (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=425V_{rms}$

Table 3-16: 1FK7044 HD

Technical data	Code	Units	-7AF71	-7AH71
Engineering data				
Rated speed	n_N	RPM	3000	4500
Number of poles	$2p$		6	6
Rated torque (100K)	$M_{N(100K)}$	Nm	3.5	3.0
Rated current	I_N	A	4.0	4.9
Stall torque (60K)	$M_{0(60K)}$	Nm	3.0	3.0
Stall torque (100K)	$M_{0(100K)}$	Nm	4.0	4.0
Stall current (60K)	$I_0(60K)$	A	3.4	4.6
Stall current (100K)	$I_0(100K)$	A	4.5	6.3
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	1.41	1.41
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	1.28	1.28
Optimum operating point				
Optimum speed	n_{opt}	RPM	3000	4500
Optimum power	P_{opt}	kW	1.1	1.41
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	8000	8000
Max. torque	M_{max}	Nm	12	12
Peak current	I_{max}	A	14.8	20
Physical constants				
Torque constant	k_T	Nm/A	0.86	0.63
Voltage constant	k_E	V/1000 RPM	57	42
Winding resistance at 20 °C	R_{ph}	Ohm	1.5	0.81
Rotating field inductance	L_D	mH	20	11
Electrical time constant	T_{el}	ms	13.3	13.5
Shaft torsional stiffness	c_t	Nm/rad	9500	9500
Mechanical time constant	T_{mech}	ms	0.78	0.78
Thermal time constant	T_{th}	min	45	45
Weight with brake	m	kg	8.3	8.3
Weight without brake	m	kg	7.7	7.7

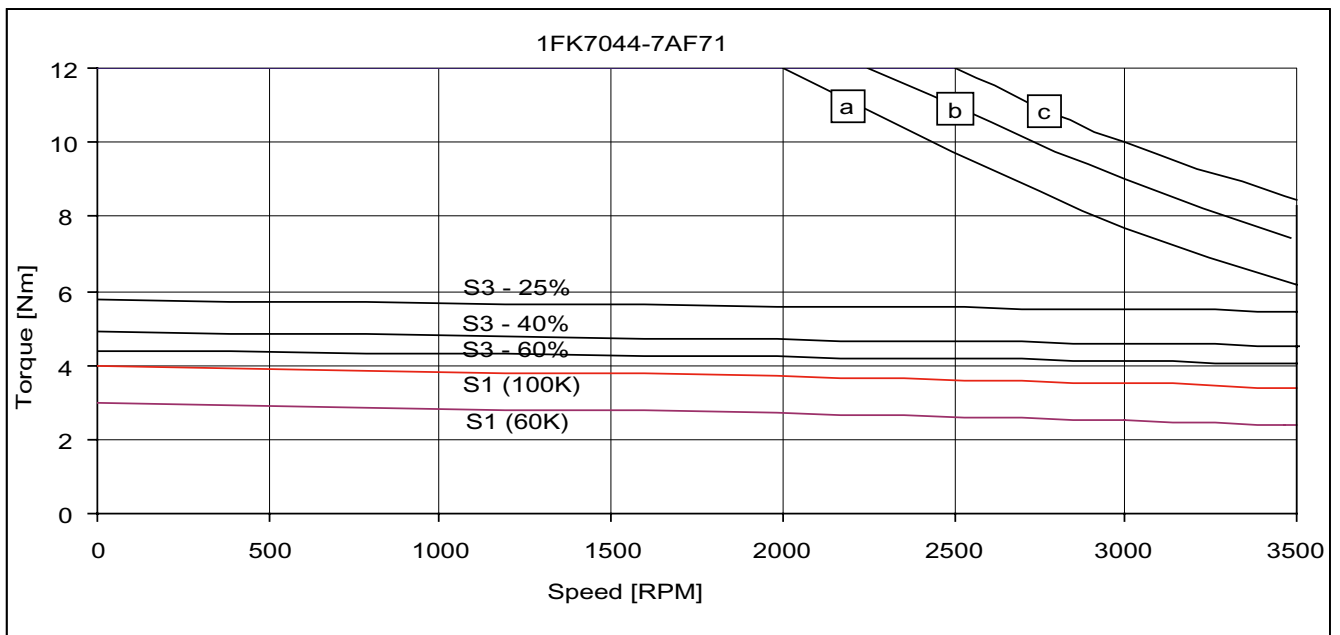


Fig. 3-23 Speed-torque diagram 1FK7044-7AF71 HD

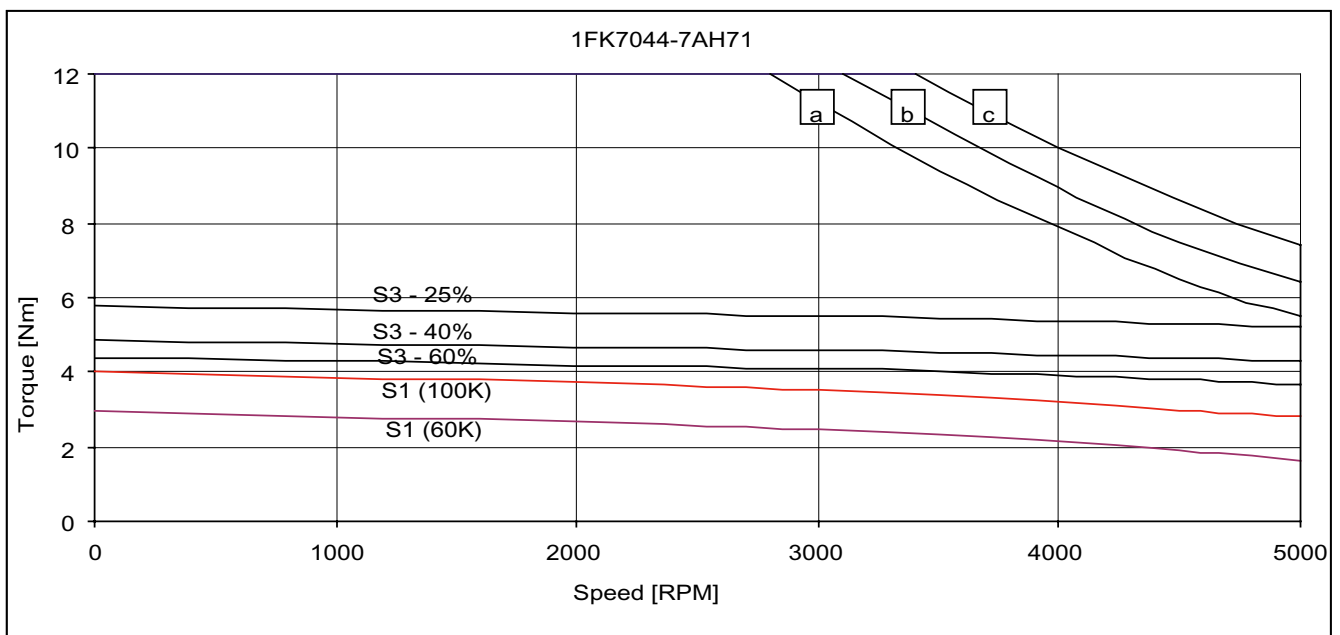


Fig. 3-24 Speed-torque diagram 1FK7044-7AH71 HD

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V \text{ (DC)}$, $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V \text{ (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V \text{ (DC)}$, $V_{mot}=425V_{rms}$

Table 3-17: 1FK7061 HD

Technical data	Code	Units	-7AF71	-7AH71
Engineering data				
Rated speed	n_N	RPM	3000	4500
Number of poles	$2p$		6	6
Rated torque (100K)	$M_{N(100K)}$	Nm	5.4	4.3
Rated current	I_N	A	5.3	5.9
Stall torque (60K)	$M_{0(60K)}$	Nm	4.9	4.9
Stall torque (100K)	$M_{0(100K)}$	Nm	6.4	6.4
Stall current (60K)	$I_0(60K)$	A	4.8	7.0
Stall current (100K)	$I_0(100K)$	A	6.1	8.0
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	3.74	3.74
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	3.4	3.4
Optimum operating point				
Optimum speed	n_{opt}	RPM	3000	4500
Optimum power	P_{opt}	kW	1.7	2.03
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	6000	6000
Max. torque	M_{max}	Nm	17.3	17.3
Peak current	I_{max}	A	17.5	25.3
Physical constants				
Torque constant	k_T	Nm/A	1.0	0.7
Voltage constant	k_E	V/1000 RPM	66	46
Winding resistance at 20 °C	R_{ph}	Ohm	0.74	0.36
Rotating field inductance	L_D	mH	20	9.6
Electrical time constant	T_{el}	ms	27	27
Shaft torsional stiffness	c_t	Nm/rad	37000	37000
Mechanical time constant	T_{mech}	ms	0.75	0.75
Thermal time constant	T_{th}	min	45	45
Weight with brake	m	kg	11.2	11.2
Weight without brake	m	kg	10	10

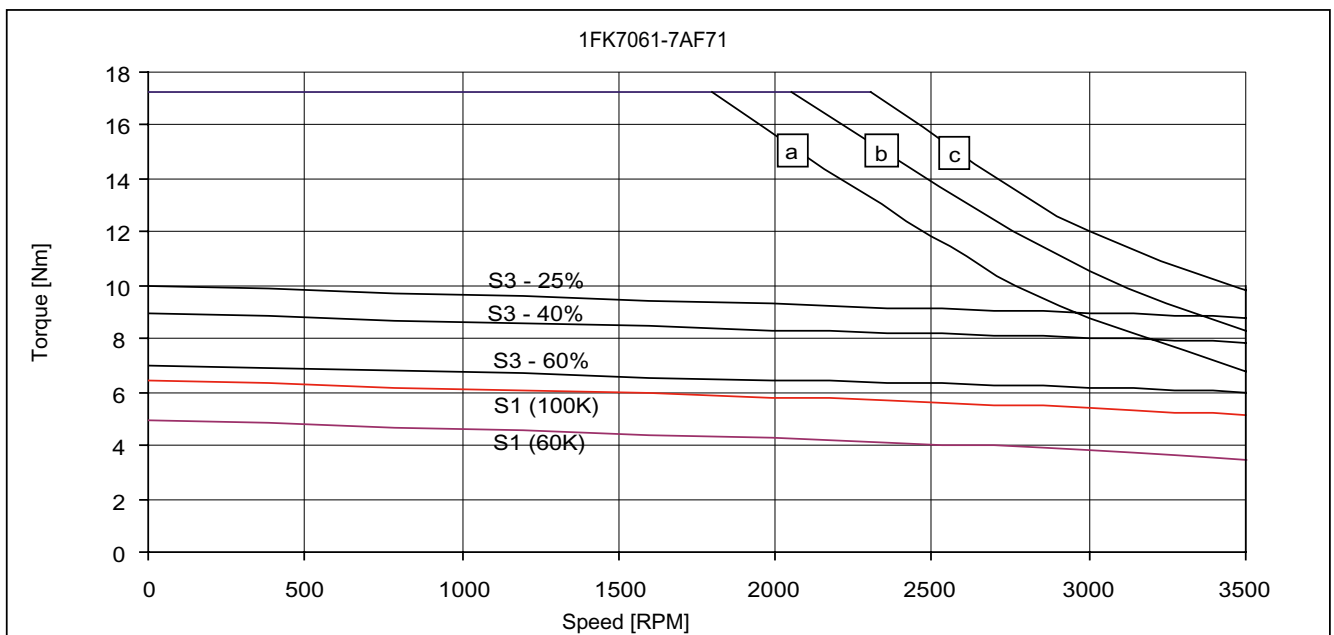


Fig. 3-25 Speed-torque diagram 1FK7061-7AF71 HD

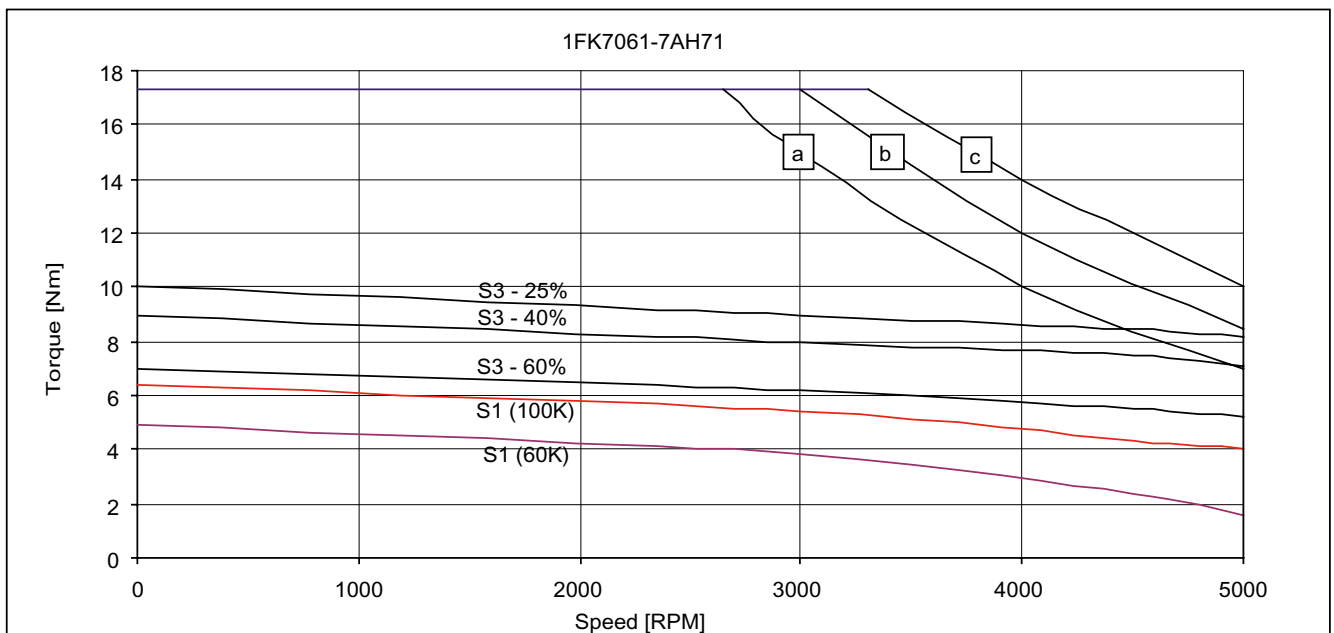


Fig. 3-26 Speed-torque diagram 1FK7061-7AH71 HD

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V$ (DC), $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V$ (DC) and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=425V_{rms}$

Table 3-18: 1FK7064 HD

Technical data	Code	Units	-7AF71	-7AH71
Engineering data				
Rated speed	n_N	RPM	3000	4500
Number of poles	$2p$		6	6
Rated torque (100K)	$M_{N(100K)}$	Nm	8.0	5.0
Rated current	I_N	A	7.5	7.0
Stall torque (60K)	$M_{0(60K)}$	Nm	9.0	9.0
Stall torque (100K)	$M_{0(100K)}$	Nm	12	12
Stall current (60K)	$I_0(60K)$	A	8.5	12
Stall current (100K)	$I_0(100K)$	A	11	15
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	6.84	6.84
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	6.5	6.5
Optimum operating point				
Optimum speed	n_{opt}	RPM	3000	3500
Optimum power	P_{opt}	kW	2.51	2.75
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	6000	6000
Max. torque	M_{max}	Nm	32	32
Peak current	I_{max}	A	31	42
Physical constants				
Torque constant	k_T	Nm/A	1.03	0.77
Voltage constant	k_E	V/1000 RPM	68	51
Winding resistance at 20 °C	R_{ph}	Ohm	0.35	0.18
Rotating field inductance	L_D	mH	10.7	5.6
Electrical time constant	T_{el}	ms	30.5	31.1
Shaft torsional stiffness	c_t	Nm/rad	30000	30000
Mechanical time constant	T_{mech}	ms	0.64	0.59
Thermal time constant	T_{th}	min	55	55
Weight with brake	m	kg	16.8	16.8
Weight without brake	m	kg	15.5	15.5

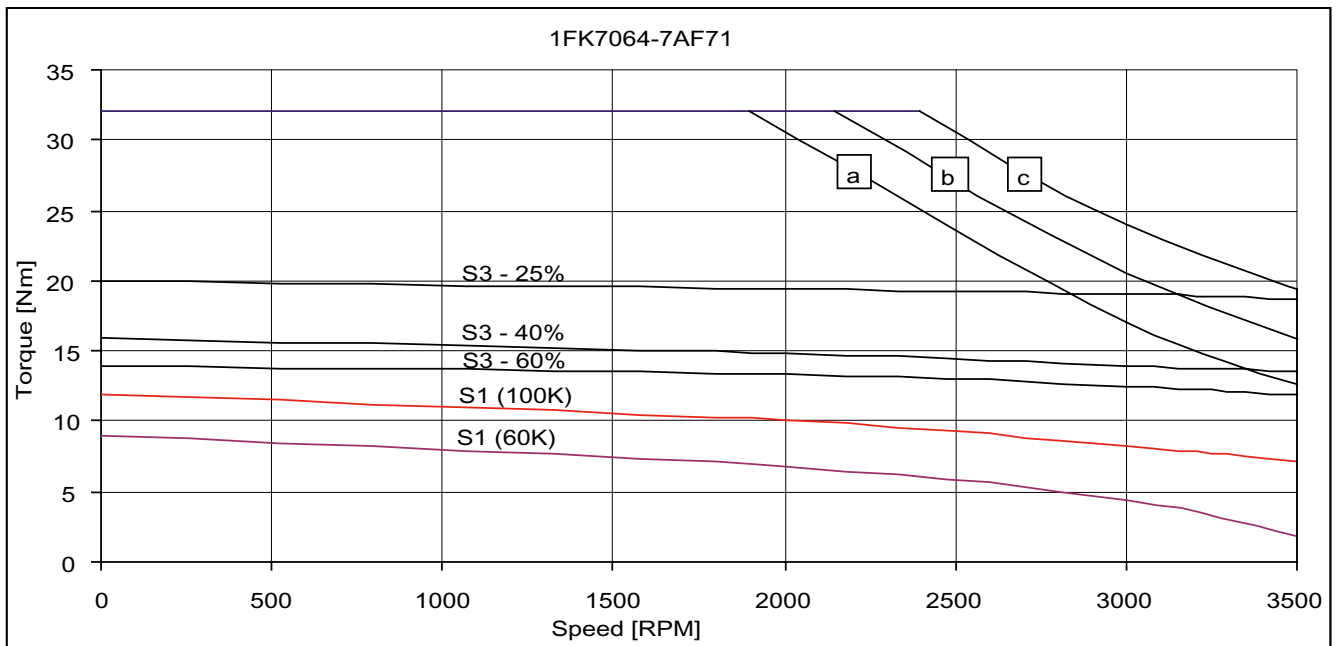


Fig. 3-27 Speed-torque diagram 1FK7064-7AF71 HD

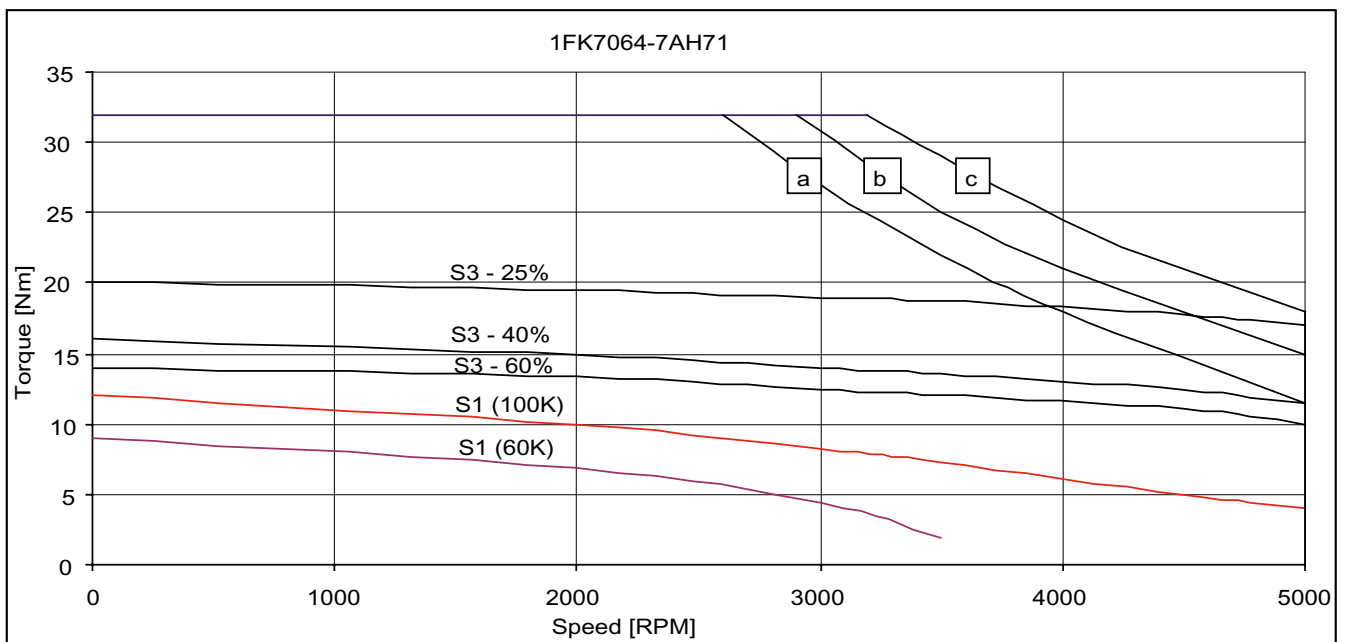


Fig. 3-28 Speed-torque diagram 1FK7064-7AH71 HD

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V$ (DC), $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V$ (DC) and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=425V_{rms}$

Table 3-19: 1FK7082 HD

Technical data	Code	Units	-7AF71	
Engineering data				
Rated speed	n_N	RPM	3000	
Number of poles	$2p$		8	
Rated torque (100K)	$M_{N(100K)}$	Nm	8.0	
Rated current	I_N	A	6.7	
Stall torque (60K)	$M_{0(60K)}$	Nm	10.5	
Stall torque (100K)	$M_{0(100K)}$	Nm	14	
Stall current (60K)	$I_0(60K)$	A	8.0	
Stall current (100K)	$I_0(100K)$	A	10.6	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	16	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	14	
Optimum operating point				
Optimum speed	n_{opt}	RPM	3000	
Optimum power	P_{opt}	kW	2.51	
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	6000	
Max. torque	M_{max}	Nm	40	
Peak current	I_{max}	A	36	
Physical constants				
Torque constant	k_T	Nm/A	1.33	
Voltage constant	k_E	V/1000 RPM	88	
Winding resistance at 20 °C	R_{ph}	Ohm	0.43	
Rotating field inductance	L_D	mH	8	
Electrical time constant	T_{el}	ms	23.2	
Shaft torsional stiffness	c_t	Nm/rad	101000	
Mechanical time constant	T_{mech}	ms	1.02	
Thermal time constant	T_{th}	min	60	
Weight with brake	m	kg	18.8	
Weight without brake	m	kg	17.2	

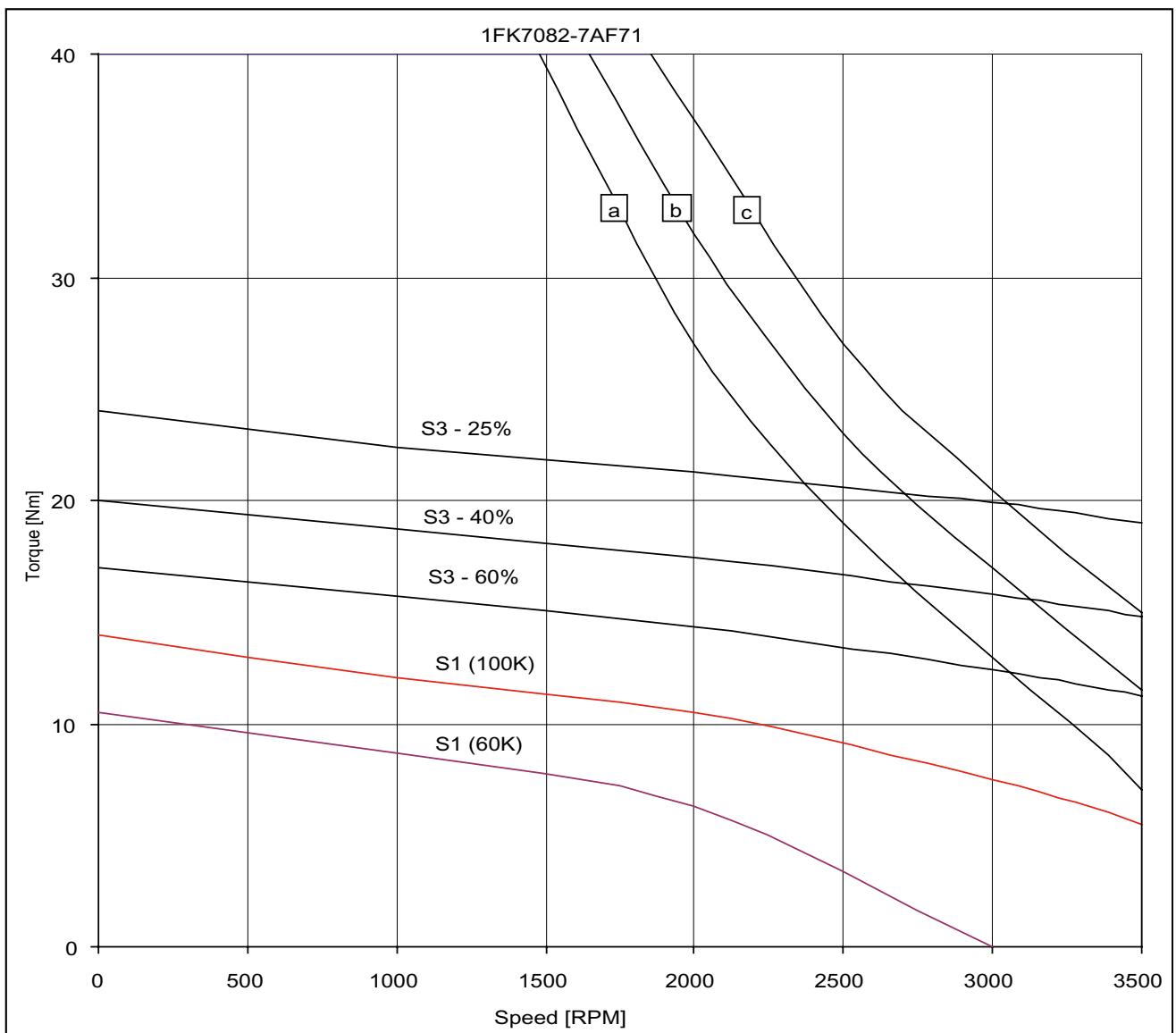


Fig. 3-29 Speed-torque diagram 1FK7082-7AF71 HD

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V$ (DC), $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V$ (DC) and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=425V_{rms}$

Table 3-20: 1FK7085 HD

Technical data	Code	Units	-7AF71	
Engineering data				
Rated speed	n_N	RPM	3000	
Number of poles	$2p$		8	
Rated torque (100K)	$M_{N(100K)}$	Nm	6.5	
Rated current	I_N	A	7.0	
Stall torque (60K)	$M_{0(60K)}$	Nm	17	
Stall torque (100K)	$M_{0(100K)}$	Nm	22	
Stall current (60K)	$I_0(60K)$	A	16.5	
Stall current (100K)	$I_0(100K)$	A	22.5	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	25	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	23	
Optimum operating point				
Optimum speed	n_{opt}	RPM	2500	
Optimum power	P_{opt}	kW	3.14	
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	6000	
Max. torque	M_{max}	Nm	35	
Peak current	I_{max}	A	80	
Physical constants				
Torque constant	k_T	Nm/A	0.96	
Voltage constant	k_E	V/1000 RPM	63	
Winding resistance at 20 °C	R_{ph}	Ohm	0.12	
Rotating field inductance	L_D	mH	3.3	
Electrical time constant	T_{el}	ms	27.5	
Shaft torsional stiffness	c_t	Nm/rad	83000	
Mechanical time constant	T_{mech}	ms	0.9	
Thermal time constant	T_{th}	min	65	
Weight with brake	m	kg	25.7	
Weight without brake	m	kg	23.5	

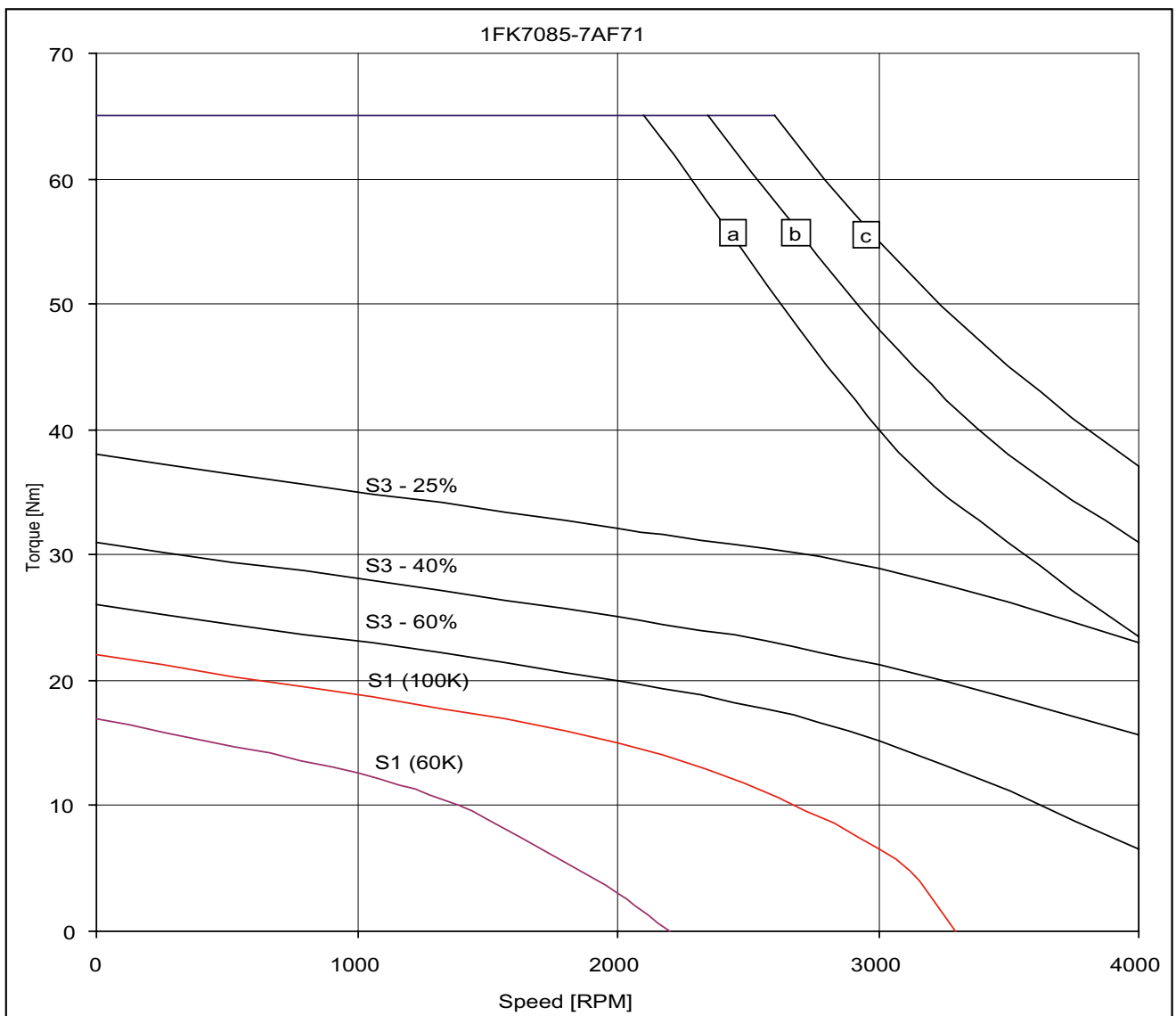


Fig. 3-30 Speed-torque diagram 1FK7085-7AF71 HD

[a] MASTERDRIVES MC, $V_{DC \text{ link}}=540V$ (DC), $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC \text{ link}}=540V$ (DC) and MASTERDRIVES MC (AFE), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC \text{ link}}=600V$ (DC), $V_{mot}=425V_{rms}$

Table 3-21: 1FK7086 HD

Technical data	Code	Units	-7AF71	
Engineering data				
Rated speed	n_N	RPM	3000	
Number of poles	$2p$		8	
Rated torque (100K)	$M_{N(100K)}$	Nm	6.5	
Rated current	I_N	A	5.5	
Stall torque (60K)	$M_{0(60K)}$	Nm	23.5	
Stall torque (100K)	$M_{0(100K)}$	Nm	28	
Stall current (60K)	$I_0(60K)$	A	17	
Stall current (100K)	$I_0(100K)$	A	21	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	25	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	23	
Optimum operating point				
Optimum speed	n_{opt}	RPM	2000	
Optimum power	P_{opt}	kW	3.77	
Limiting data				
Max. permissible speed (mech.)	n_{max}	RPM	6000	
Max. torque	M_{max}	Nm	105	
Peak current	I_{max}	A	112	
Physical constants				
Torque constant	k_T	Nm/A	1.33	
Voltage constant	k_E	V/1000 RPM	85	
Winding resistance at 20 °C	R_{ph}	Ohm	0.12	
Rotating field inductance	L_D	mH	3	
Electrical time constant	T_{el}	ms	25	
Shaft torsional stiffness	c_t	Nm/rad	83000	
Mechanical time constant	T_{mech}	ms	0.47	
Thermal time constant	T_{th}	min	65	
Weight with brake	m	kg	25.7	
Weight without brake	m	kg	23.5	

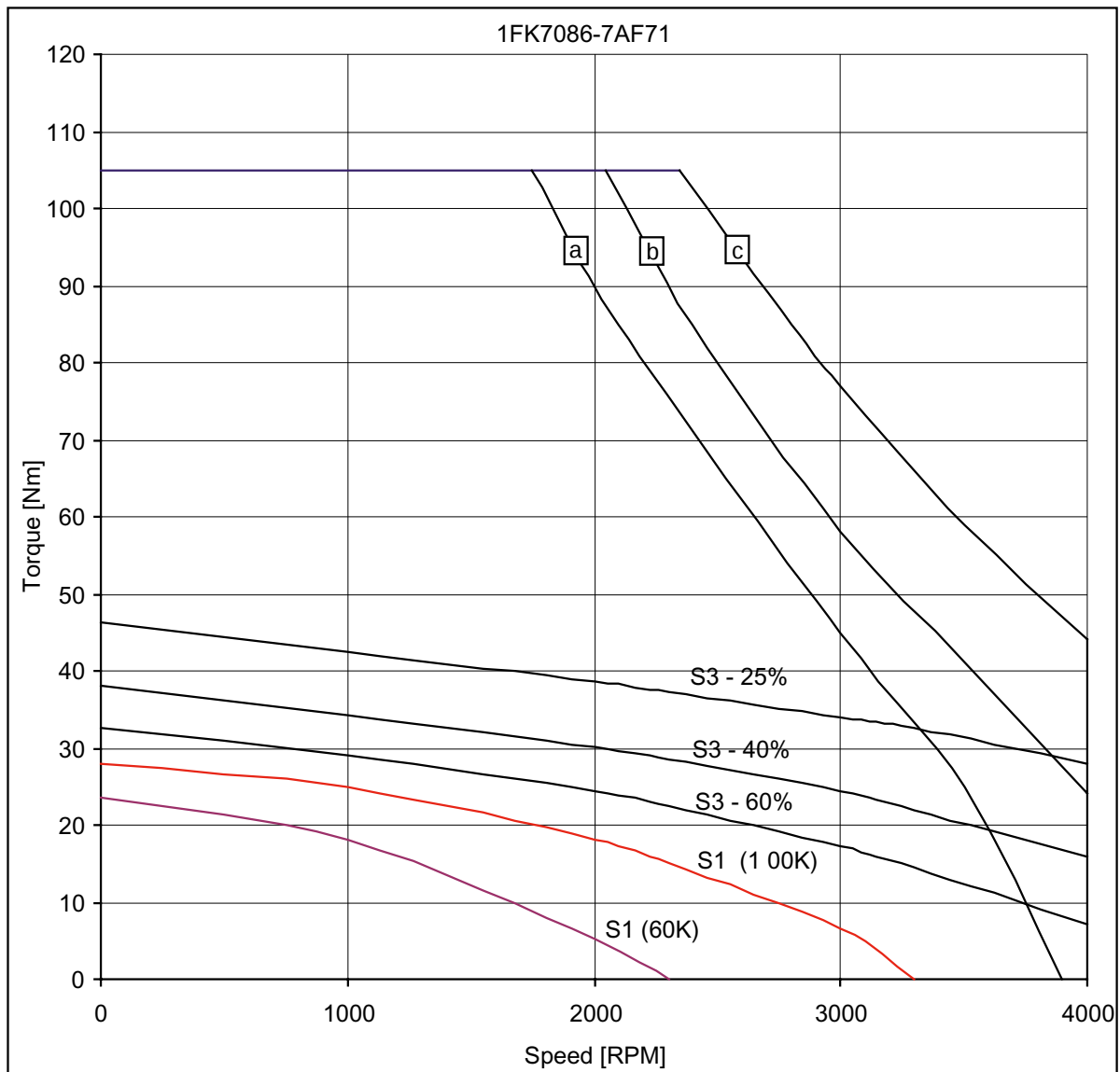


Fig. 3-31 Speed-torque diagram 1FK7086-7AF71 HD

[a] MASTERDRIVES MC, $V_{DC\ link}=540V\ (DC)$, $V_{mot}=340V_{rms}$

[b] SIMODRIVE 611 (UE), $V_{DC\ link}=540V\ (DC)$ and MASTERDRIVES MC (AFE), $V_{DC\ link}=600V\ (DC)$, $V_{mot}=380V_{rms}$

[c] SIMODRIVE 611 (ER), $V_{DC\ link}=600V\ (DC)$, $V_{mot}=425V_{rms}$

3.4 Cantilever force diagrams

Cantilever force stressing

Point of application of cantilever forces F_Q at the shaft end

- for average operating speeds
- for a nominal bearing lifetime of 20,000 h

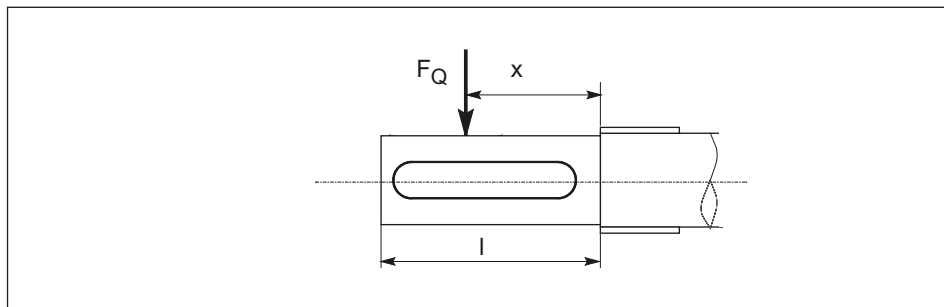


Fig. 3-32 Force application point at the drive shaft end

Dimension x : Distance between the point of application of force F_Q and the shaft shoulder in mm.

Dimension l : Length of the shaft end in mm.

Calculating the pre-tensioned belt force

$$F_R = 2 \cdot M_0 \cdot c / d_R$$

Table 3-22: Explanation of the formula abbreviations

Formula abbreviations	Units	Description
F_R	N	Belt pre-tension
M_0	Nm	Motor stall torque
d_R	m	Effective diameter of the belt pulley
c	-	Pre-tensioning factor for the accelerating torque Empirical values for toothed belts: $c = 1.5$ to 2.2 Empirical values for toothed belts: $c = 2.2$ to 3.0

When using other configurations, the actual forces that generated from the torque being transferred must be taken into account.

$$F_R \leq F_{Qper}$$

Cantilever force 1FK702

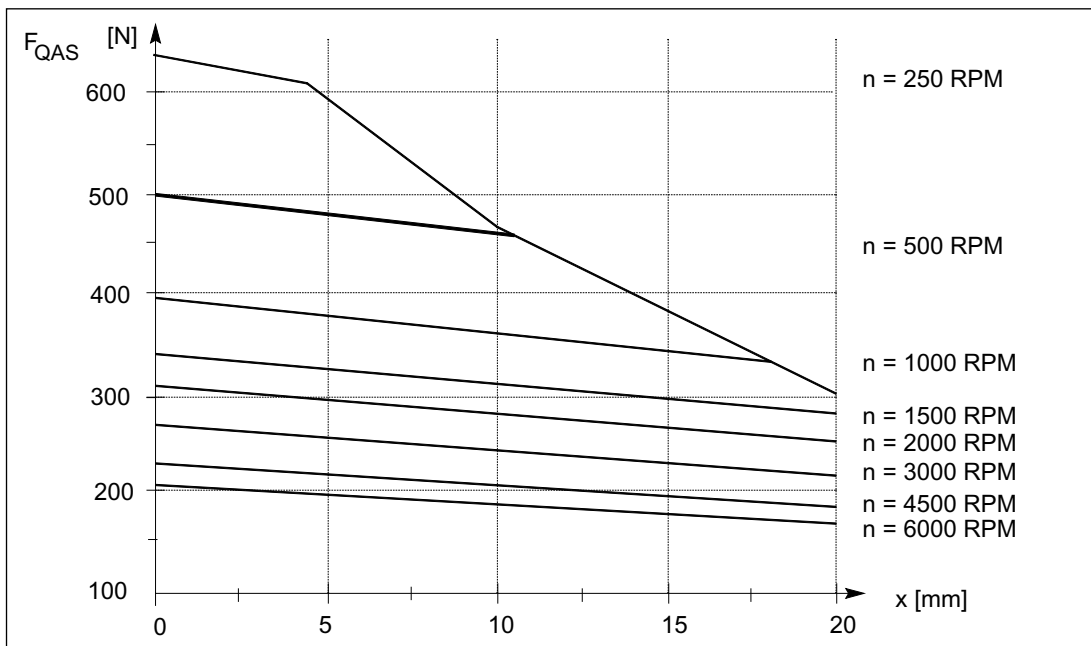


Fig. 3-33 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h

Cantilever force 1FK703

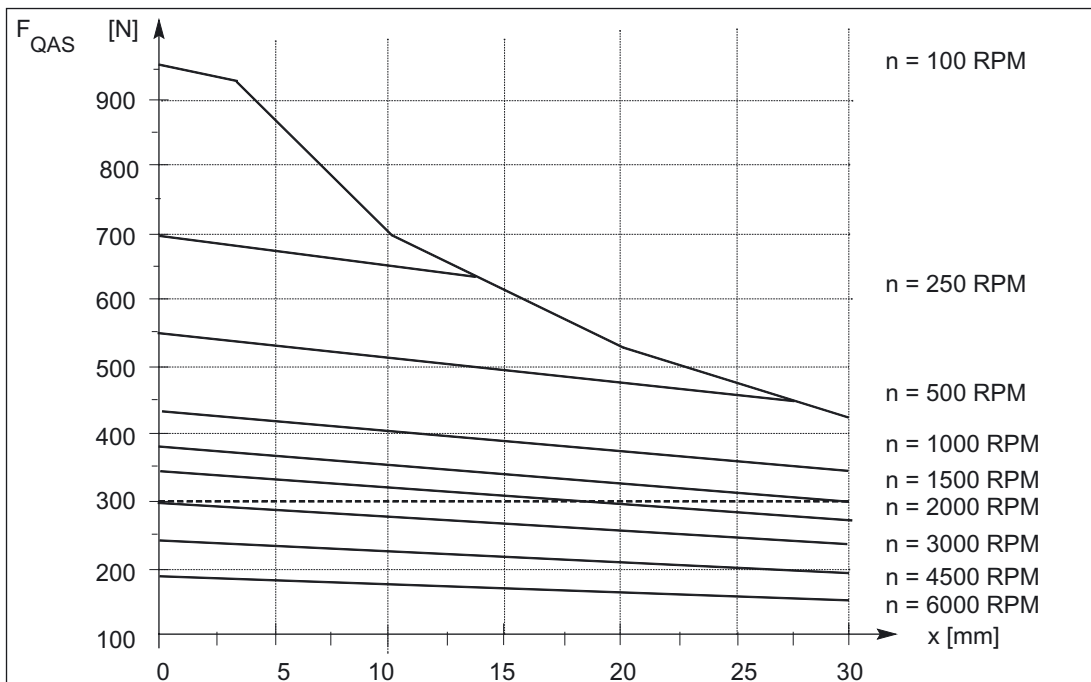


Fig. 3-34 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h

Cantilever force 1FK704

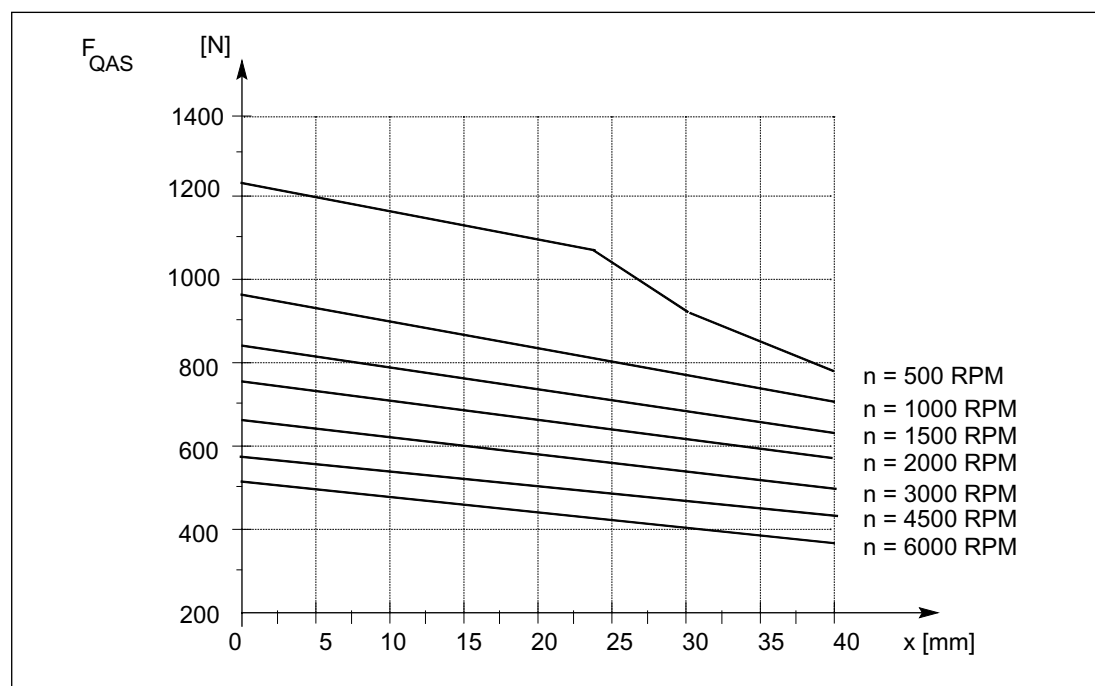


Fig. 3-35 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h

Cantilever force 1FK706

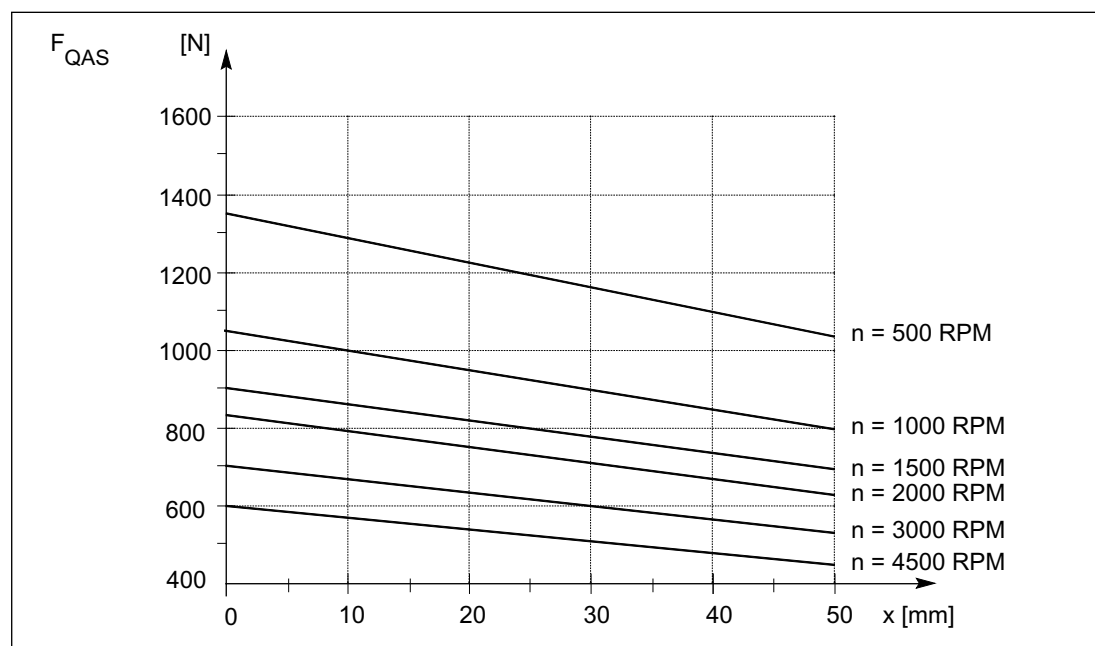


Fig. 3-36 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h

Cantilever force 1FK708

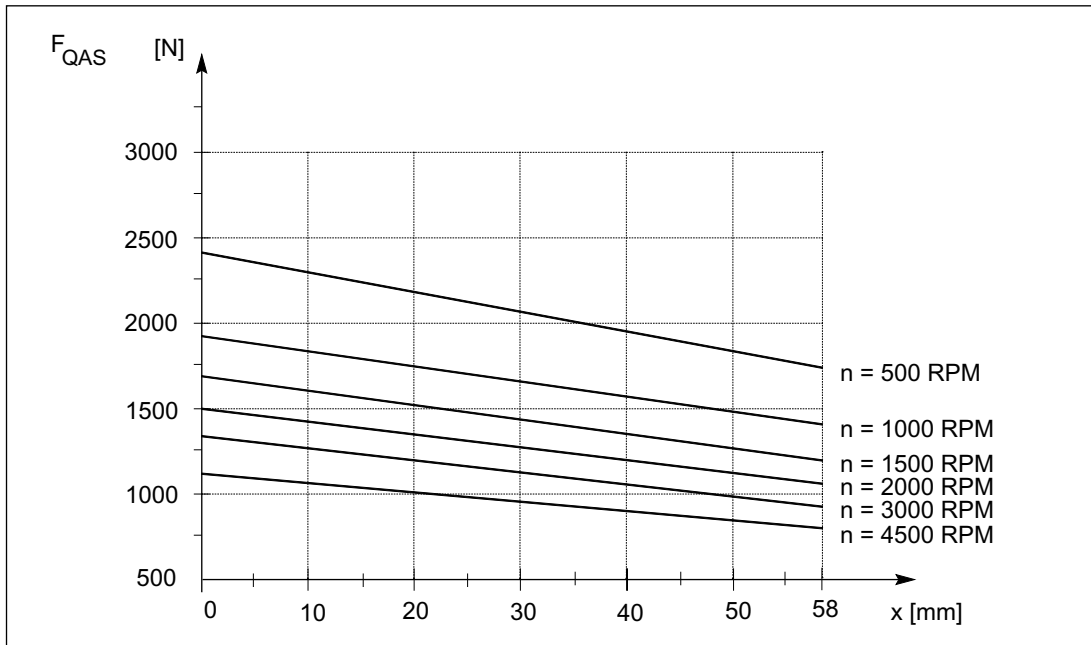


Fig. 3-37 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h

Cantilever force 1FK710

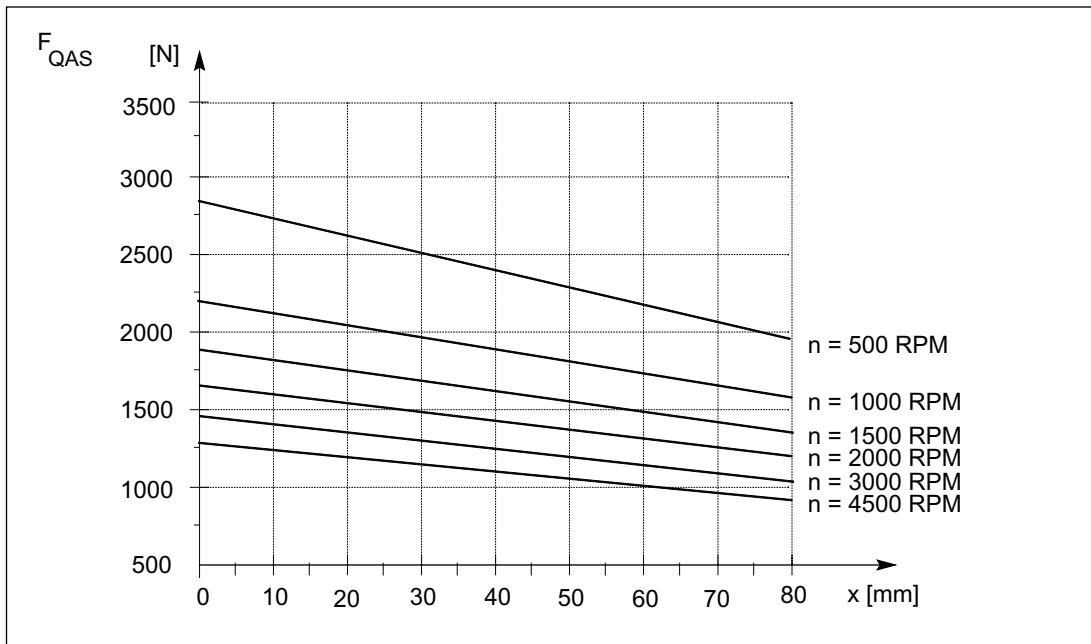


Fig. 3-38 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h

3.5 Axial forces

Axial force stressing



Warning

Motors with integrated holding brake cannot be subject to axial forces!

When using, for example, helical toothed wheels as drive element, in addition to the radial force, there is also an axial force on the motor bearings. For axial forces, the spring-loading of the bearings can be overcome so that the rotor moves corresponding to the axial bearing play present (up to 0.2 mm).

The permissible axial force can be approximately calculated using the following formula:

$$F_A = 0.35 \cdot F_Q$$

Motor Components (Options)

4.1 Thermal motor protection

A temperature-dependent resistor is integrated as temperature sensor to monitor the motor temperature.

Table 4-1: Features and technical data

Type	KTY 84
Resistance when cold (20°C)	approx. 580 Ohm
Resistance when hot (100°C)	approx. 1000 Ohm
Connection	via signal cable

The resistance of the KTY 84 thermistor changes proportionally to the winding temperature change.

The temperature signal is sensed and evaluated in the drive converter whose closed-loop control takes into account the temperature characteristic of the motor resistances.

When a fault occurs, an appropriate message is output at the drive converter. When the motor temperature increases, a message "Alarm motor overtemperature" is output; this must be externally evaluated. If this signal is not observed, the drive converter shuts down with the appropriate fault message when the motor limiting temperature or the shutdown temperature is exceeded.



Warning

If the user carries-out an additional high-voltage test, then the ends of the temperature sensor cables must be short-circuited before the test is carried-out!

If the test voltage is connected to a temperature sensor terminal, then it will be destroyed.

The polarity must be carefully observed.

The temperature sensor is designed so that the DIN/EN requirement for "protective separation" is fulfilled.



Caution

The integrated temperature sensor protects the synchronous against an overload condition

Shaft heights 28 to 48 up to $2 \cdot I_{060K}$ and speed ≤ 0 h

from shaft height 63 up to $4 \cdot I_{060K}$ and speed ≤ 0

For load applications that are critical from a thermal perspective – e.g. overload when the motor is stationary or an overload of M_{max} longer than 4 s, adequate protection is no longer available.

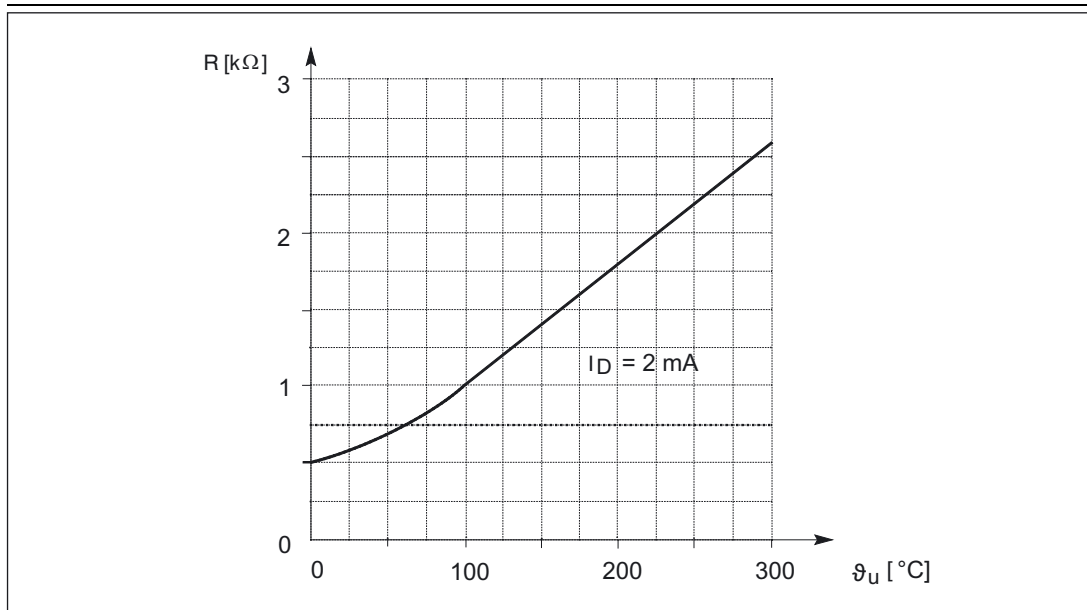


Fig. 4-1 Resistance characteristic of the KTY 84 as a function of the temperature

4.2 Encoders

4.2.1 Encoder overview

The encoder is selected with the appropriate letters in the motor Order No. (MLFB) at the 14th position.

Table 4-2: Overview of the encoders used

Motor types	Incremental encoder sin/cos 1 Vpp (for low shaft heights) (I-2048)	Incremental encoder sin/cos 1 Vpp (I-2048)	Absolute encoder EnDat (A-2048)	Simple absolute encoder (A-32)	Absolute encoder EnDat (A-512)	Resolver 2 pole or multi-pole
Order No. (MLFB) 14th position	A	A	E	G	H	S, T
1FK7 02□	X				X	X
1FK7 03□	X				X	X
1FK7 04□		X	X	X		X
1FK7 06□		X	X	X		X
1FK7 08□		X	X	X		X
1FK7 10□		X	X	X		X

Notice

When the encoder is replaced, the position of the encoder system with respect to the motor EMF must be adjusted. Only qualified personnel may replace an encoder.

4.2.2 Incremental encoder

Function:

- Angular measuring system for the commutation
- Speed actual value sensing
- Indirect incremental measuring system for the position control loop
- One zero pulse (reference mark) per revolution

Table 4-3: Technical data, sin/cos 1Vpp incremental encoder

Features	Incremental encoders sin/cos 1 Vpp (I-2048)	Incremental encoders sin/cos 1 Vpp (low SH) (I-2048)
Operating voltage	5V $\pm$ 5%	5V $\pm$ 5%
Current consumption	max. 150 mA	max. 150 mA
Resolution, incremental	2048	2048
Incremental signals	1 Vpp	1 Vpp
Angular error	$\pm$ 40"	$\pm$ 80"
C-D track (rotor position)	Available	Available

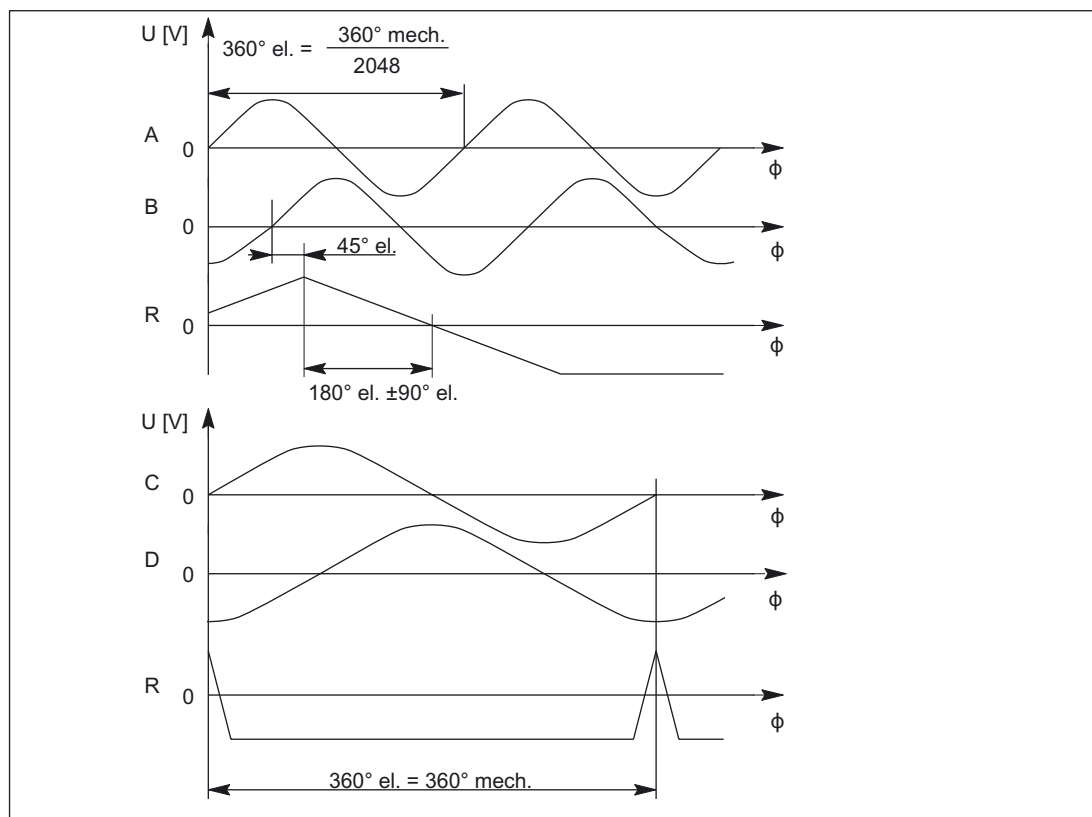
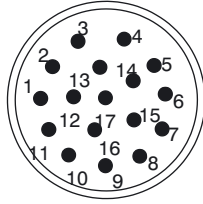


Fig. 4-2 Signal sequence and assignment for a positive direction of rotation

Connection assignment for 17-pin flange-mounted socket with pin contacts

Table 4-4: Connection assignment, 17-pin flange-mounted socket

PIN No.	Signal	
1	A+	 When viewing the plug-in side (pins)
2	A–	
3	R+	
4	D–	
5	C+	
6	C–	
7	M encoder	
8	+1R1	
9	–1R2	
10	P encoder	
11	B+	
12	B–	
13	R–	
14	D+	
15	0 V sense	
16	5 V sense	
17	not connected	

Lines

Table 4-5: Prefabricated cable

6FX	☐	002	-	2CA31	-	☐ ☐ ☐	0
	↓					↓↓↓	
	↓					Length	
	5 MOTION-CONNECT®500				Max. cable length for SIMODRIVE 611: 50 m		
	8 MOTION-CONNECT®800				max. cable length for MASTERDRIVES MC: 100 m		
					Max. cable length for SIMODRIVE 611: 50 m		
					max. cable length for MASTERDRIVES MC: 100 m		

For other technical data and length code, refer to Catalog, Chapter "MOTION-CONNECT connection system ®".

4.2.3 Absolute encoder

Function:

- Angular measuring system to impress current
- Speed actual value sensing
- Absolute measuring system for the position control loop

Table 4-6: Technical data, absolute encoder

Features	Absolute encoder EnDat (A-2048)	Absolute encoder EnDat (A-512)	Simple absolute encoder (A-32)
Operating voltage	5V $\pm$ 5%	5V $\pm$ 5%	5V $\pm$ 5%
Current consumption	max. 300 mA	max. 200 mA	max. 300 mA
Resolution, incremental (periods per revolution)	2048	512	32
Resolution, absolute (coded revolutions)	4096	4096	4096
Incremental signals	1 Vpp	1 Vpp	1 Vpp
Serial absolute position interface	EnDat	EnDat	EnDat
Angular error	$\pm$ 40"	$\pm$ 80"	$\pm$ 400"

Note

As a result of the reduced maximum operating temperature of absolute encoders with respect to incremental encoders, the thermally permissible rated motor torque is reduced by 10%.

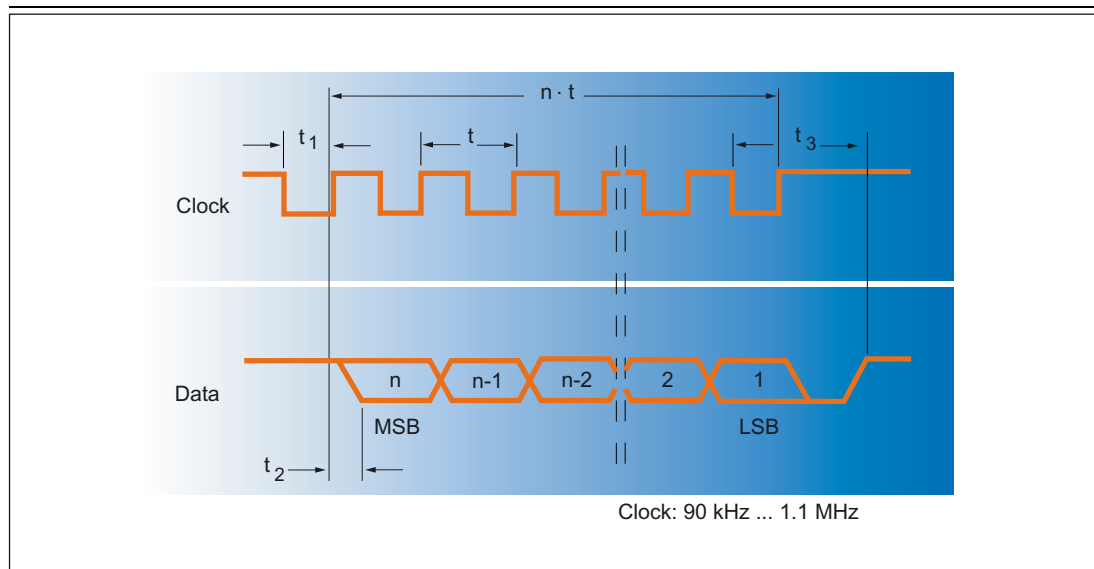
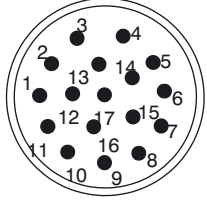


Fig. 4-3 Output signals, absolute encoders

Connection assignment for 17-pin flange-mounted socket with pin contacts

Table 4-7: Connection assignment, 17-pin flange-mounted socket

PIN No.	Signal	 When viewing the plug-in side (pins)
1	A+	
2	A–	
3	+data	
4	not connected	
5	+clock	
6	not connected	
7	M encoder	
8	+1R1	
9	–1R2	
10	P encoder	
11	B+	
12	B–	
13	–Data	
14	–clock	
15	0 V sense	
16	5 V sense	
17	not connected	

Lines

Table 4-8: Prefabricated cable

6FX	☐	002	-	2EQ10	-	☐ ☐ ☐	0
	↓					↓↓↓	
	↓					Length	
		5 MOTION-CONNECT®500				Max. cable length for SIMODRIVE 611: 50 m	
		8 MOTION-CONNECT®800				max. cable length for MASTERDRIVES MC: 150 m	
						Max. cable length for SIMODRIVE 611: 50 m	
						max. cable length for MASTERDRIVES MC: 150 m	

For other technical data and length code, refer to Catalog, Chapter "MOTION-CONNECT connection system®".

4.2.4 Resolvers

Notice

The max. operating frequency of 432 Hz must be observed with SIMODRIVE 611 universal HR.

(encoder frequency = motor speed x pole pair number of the resolver /60)

Function:

- Speed actual value sensing
- Rotor position encoder for inverter control
- Indirect incremental measuring system for the position control loop

Table 4-9: Technical data, resolvers

Features	1FK702□ - 1FK703□	1FK704□-10□
Excitation voltage	5 V (rms) up to 13 V (rms)	5 V (rms) up to 13 V (rms)
Excitation frequency	4 kHz to 10 kHz	4 kHz to 10 kHz
Current consumption	< 80 mA (rms)	< 80 mA (rms)
Angular accuracy (bandwidth) 2-pole multi-pole	< 20' < 7'	< 14' < 4'
Pole number (the pole number is the same as the motor pole number)	2, 6	2, 4, 6 or 8
Ratio	0.5	0.5

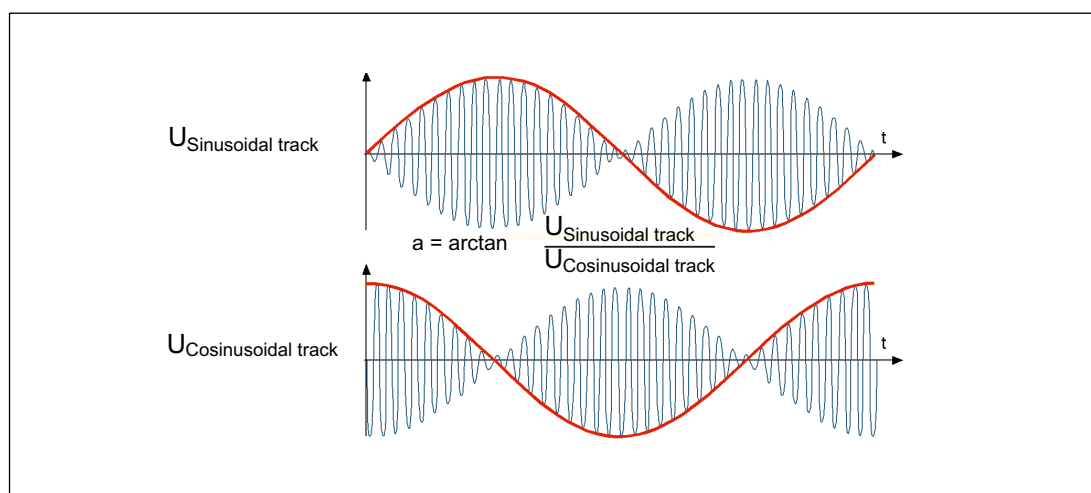
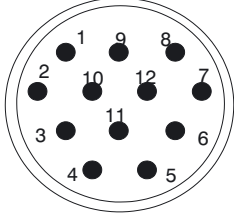


Fig. 4-4 Output signals, resolver

Connection assignment for 12-pin flange-mounted socket with pin contacts

Table 4-10: Connection assignment, 12-pin flange-mounted socket

PIN No.	Signal	
1	SIN	 When viewing the plug-in side (pins)
2	*SIN	
3	Inner shield	
4	Inner shield	
5	Inner shield	
6	not connected	
7	-Vpp	
8	+1R1	
9	-1R2	
10	+Vpp	
11	COS	
12	*COS	

Lines

Table 4-11: Prefabricated cable

6FX	□	002	-	2CF02	-	□□□	0
	↓ ↓	5 MOTION-CONNECT®500 8 MOTION-CONNECT®800			↓↓↓	Length Max. cable length for SIMODRIVE 611: 50 m max. cable length for MASTERDRIVES MC: 150 m Max. cable length for SIMODRIVE 611: 50 m max. cable length for MASTERDRIVES MC: 150 m	

For other technical data and length code, refer to Catalog, Chapter "MOTION-CONNECT connection system®".

4.3 Holding brake

4.3.1 Features

- The integrated or mounted holding brake is used to clamp the motor shaft when the motor is at a standstill. The holding brake is **not** a working brake that is used to brake a motor that is still rotating.
- Motors with or without holding brake cannot be subsequently retrofitted!
Motors with holding brake are longer by the mounted space required (refer to the dimension drawing).
- Restricted Emergency Stop operation is permissible.
Up to 2000 braking operations can be executed with 300% rotor moment of inertia as external moment of inertia from a speed of 3000 RPM without the brake being subject to an inadmissible amount of wear. The specific highest switching work for each emergency braking operation may not be exceeded.
- The rated voltage of the holding brake is 24 V DC.



Caution

The rated voltage is 24 V DC +/- 10%. Voltages outside this tolerance bandwidth can result in faults.

Inadmissible wear means that the braking function can no longer be guaranteed!
It is not permissible to exceed the above specified Emergency Stop conditions or to repeatedly briefly accelerate the motor against a holding brake that is still closed. This means that the switching times of the brakes and relays must be taken into account in the drive control and enable functions.

4.3.2 Brake types

Brakes with different principles of operation are used:

- Permanent-magnet brake
- Spring-operated brake

Both of the brake types operate according to the closed-circuit principle.

Mode of operation of a permanent-magnet brake

The magnetic field of the permanent magnets results in a pulling force on the brake armature disk. This means that in the no-current condition, the brake is closed and the motor shaft is held.

When 24 V DC rated voltage is connected to the brake, the solenoid – through which current flows – establishes an opposing field. This neutralizes the force of the permanent magnets. Permanent magnet brakes have a proportionally stiff connection to the motor rotor. This is the reason that this brake is almost without any play.

Caution

Motors with integrated permanent-magnet holding brake cannot be subject to axial forces at the shaft end! This applies when installing the system and during operation.

Mode of operation of a spring-operated brake

For a spring-operated brake, instead of the magnetic field of a permanent magnet, the force of a spring is used.

In order for a spring-operated brake to operate, the brake armature disk must be able to axially move. Therefore, torsional backlash cannot be avoided. When the brake is closed, the motor shaft can move by up to 1°.

Effect for hanging axes:

The motor brakes a hanging (suspended) axis electrically. If the brake is applied and the power is then disconnected, it is possible that the load could continue to move the motor shaft. In this case, the maximum possible motion corresponds to the above mentioned play in the gear meshing. The motion is appropriately stepped-up or stepped-down using a mounted gearbox.



Danger

Applications involving holding brakes for hanging/suspended axes must be especially carefully investigated as these represent a high potential hazard.

For motors with spring-operated brake, it must be carefully checked that the brake is suitable due to the rotational play.

For motors with spring-operated brakes, axial forces are permissible the same as for versions without brake.

4.3.3 Protective circuitry for the brake

Caution

In order to avoid overvoltages when shutting down and the possible negative impact on the plant or system environment, a protective circuit must be integrated into the brake feeder cable (refer to Fig. "Recommended circuit for the external power supply with protective circuit").

If protective circuitry is not used, voltage peaks up to 1000 V can occur in the millisecond range. Brake solenoid, switching contacts and electronic components could be destroyed.

Sensitive electronic components (e.g. logic components) can even be damaged as a result of a lower switch-off voltage. The power limits (e.g. ratings) of the components used should be carefully observed.

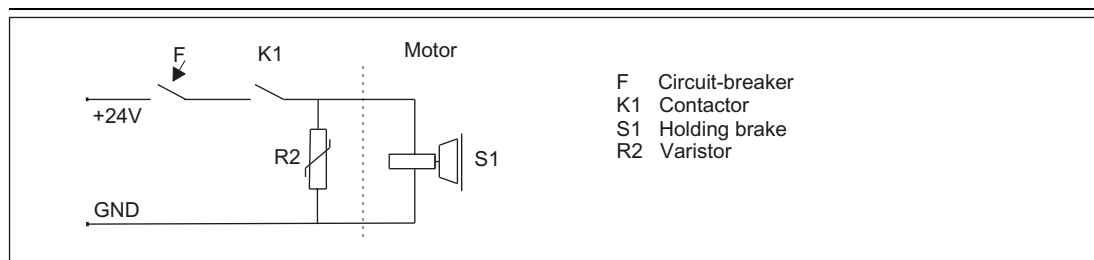


Fig. 4-5 Recommended circuit for the external power supply with protective circuit

Table 4-12: Example: Electronic components for the recommended circuit

Electr. component	Examples		
F	3RV10 circuit-breaker with current paths connected in series (if required with mounted auxiliary contact 3RV1901 to provide a feedback signal for the drive).	or	Miniature circuit-breaker 5SX21 (if required with mounted auxiliary contact to provide a feedback signal for the drive).
K1	Auxiliary contactor 3RH11	or	Contactor 3RT10
R2	Varistor SIOVS14K30 (EPCOS)		

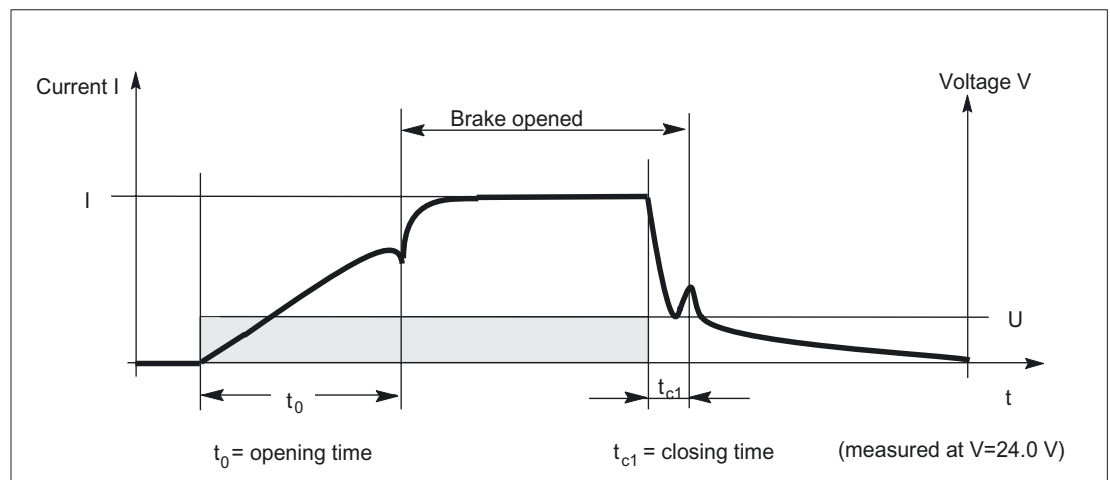


Fig. 4-6 Terminology (time) for holding operation

Important information and instructions when installing the connecting cable

The brake connecting cable is included in the power cable. The insulation between the power and brake connection is dimensioned for the basic insulation (VDE 600 V/1000V UL). The relay K1, located between the coil and contact, must also have basic insulation in order to protect the internal logic voltage (PELV=Protective Extra Low Voltage). The PELV supply may not be used to supply the holding brake (refer to Fig. "Recommended circuit for the external power supply with protective circuit").

Determining the minimum voltage

The minimum voltage of 24 V DC -10% must be available at the connector on the motor side in order to guarantee that the brake reliably opens. If the maximum voltage of 24 V DC +10 % is exceeded, then the brake could re-close. The voltage drop along the brake feeder cable must be taken into consideration.

The voltage drop for copper cables can be approximately calculated as follows:

$$dV = 0.042 \cdot (l/q) \cdot I_{\text{brake}}$$

l= cable length in m

q= brake conductor cross-section in mm²

I_{brake}= DC current of the brake in A

dV= voltage drop along the brake cable in V

4.3.4 Technical data of the holding brake

Note

Motors with or without holding brake cannot be subsequently retrofitted!

Motors with holding brake are longer by the mounted space required (refer to the dimension drawing).

Table 4-13: Technical data of the holding brakes used for 1FK7 motors

Motor type	Brake type	Holding torque M_4 ¹⁾	DC current	Opening time with varistor	Closing time with varistor	Highest switching energy
		[Nm]	[A]	[ms]	[ms]	[J]
1FK7 CT Permanent-magnet brakes						
1FK7022	EBD 0.11 BN	1	0.3	30	20	8
1FK703□	EBD 0.13 BN	1.1	0.4	50	30	17
1FK704□	EBD 0.3 BV	3.2	0.6	70	30	74
1FK706□	EBD 0.8 BK	13	0.8	100	50	400
1FK7080	EBD 1.5 BN	10	0.8	100	50	400
1FK7083 1FK7100	EBD 2 BY	22	0.9	200	60	1400
1FK7101 1FK7103 1FK7105	EBD 3.5 BV	41	1.0	300	70	3000
1FK7 HD Spring-operated brakes						
1FK7033	1EB 14–30	1.3	0.5	100	40	14
1FK704□	1EB 20–40	4	0.6	150	50	96
1FK706□	1EB 28–60	12	0.8	150	50	230
1FK708□	1EB 35–80	22	1.2	200	60	700

1) Standardized acc. to VDE 0580 with varistor circuit

Holding torque M_4

The holding torque M_4 is the minimum brake torque in steady-state operation (when the motor is at a standstill).

For motors with forced cooling or water cooling, the holding torque of the brake can be less than the motor stall torque.

Gearboxes

5.1 Selecting/dimensioning gearboxes and important parameters/quantities

5.1.1 Overview

- If the gearbox oil is in contact with the motor flange, then suitable shaft and flange seals must be selected.
- Technical data should be taken from the Catalogs of the gearbox manufacturers.
- The following influencing parameters should be taken into consideration:
 - Accelerating torque, continuous torque, number of cycles, cycle type, permissible input speed, mounting position, torsional backlash, torsional stiffness, radial and axial forces.
 - Worm gearboxes are only conditionally suitable for reversing operation with servo applications

5.1.2 Dimensioning for S3 duty for natural cooling

When engineering geared drive systems you can use the motor characteristic without reduction. Carefully observe the permissible maximum torque and the maximum permissible input speed of the gearbox.

$$M_{\text{mot}} = M_{\text{out}} / (i \cdot \eta_G)$$

The motor and gearbox are assigned as follows:

$$M_{\text{max, gear}} \geq M_{0(100K)} \cdot i \cdot f$$

$M_{\text{max, gear}}$	Max. permissible output torque
$M_{0(100K)}$	Motor stall torque
i	Gear ratio
f	Supplementary factor
$f = f_1 \cdot f_2$	
$f_1 = 2$	for motor accelerating torque
$f_2 = 1$	for ≤ 1000 gearbox switching cycles
$f_2 > 1$	for > 1000 switching cycles (refer to the Gearbox Catalog)

Notice

Switching cycles can also be superimposed vibration! The supplementary factor (f2) is then not sufficient when dimensioning the gearbox and gearboxes may fail.

The complete system should be optimized so that the higher-level vibration is minimized.

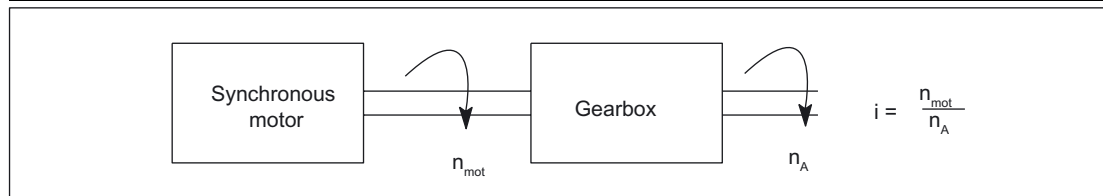


Fig. 5-1 Dimensioning the gearbox

The load torque and the required traversing velocity define the gearbox output torque, the output speed and therefore the output power.

The required drive power is calculated from this:

$$P_{out} [W] = P_{mot} \cdot \eta_G = (\pi/30) \cdot M_{mot} [Nm] \cdot n_{mot} [rpm] \cdot \eta_G$$

5.1.3 Dimensioning for S1 duty for naturally cooled systems

The gearbox itself generates heat due to friction and acts as a thermal barrier preventing heat from being dissipated through the motor flange. This is the reason that the torque must be reduced for S1 duty.

The required motor torque is calculated as follows:

$$M_{mot} = \sqrt{\left(\frac{M_{out}}{i \cdot \eta_G} + M_V \right)^2 - M_V^2} \quad \text{with} \quad M_V = a \cdot b \cdot \frac{n_{mot}}{60} (1 - \eta_G) \cdot \frac{k_T^2}{R_{ph.}}$$

M_V	Calculated "torque loss"
a	$\pi/2$ for 1FT5 motors fed with square-wave current $\pi/3$ for 1FT6/1FK□ motors supplied with sinusoidal current
b	0.5 weighting factor for gearbox losses (without dimensions)
n_{mot}	Motor speed [rpm]
k_T	Torque constant [Nm/A]
$R_{ph.}$	Motor phase resistance when warm [Ω] = 1.4 $R_{ph.}$ (Catalog)
M_{out}	Gearbox output torque [Nm]
i	Gearbox ratio ($i > 1$)
η_G	Gearbox efficiency
P_{mot}	Motor power [W]
P_{out}	Gearbox output power [W]
M_{mot}	Motor torque [Nm]

5.1.4 Change to the S1 characteristic when a gearbox is mounted

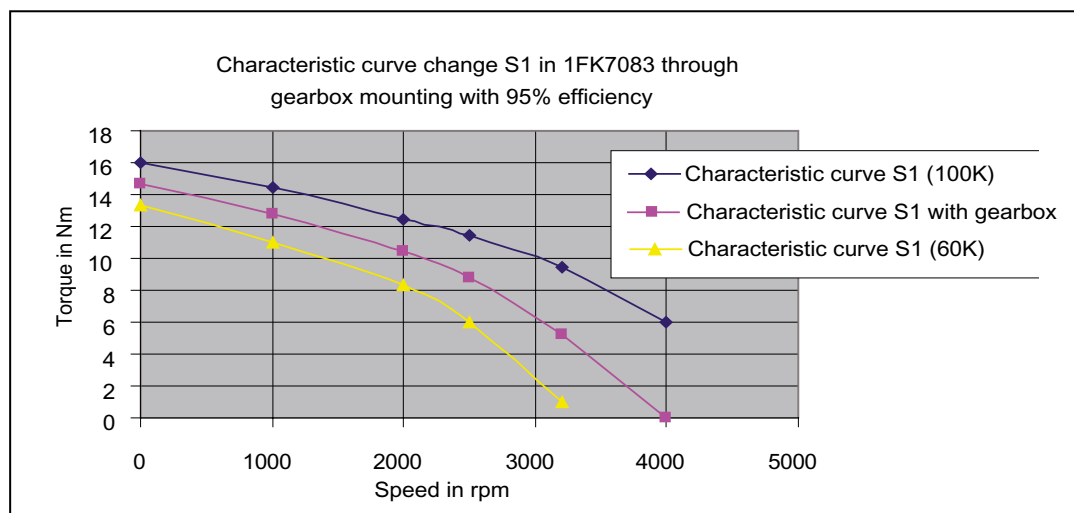


Fig. 5-2 Example: 1FK7083 with angled gearbox (characteristic)

Information for additional characteristics: $S1(\text{gearbox}) = S1(100K) - (S1(100K) - S1(60K))/2$

5.1.5 Starting characteristics

When commissioning it should be assumed that an increased current will be drawn due to the lubrication characteristics (inadequate distribution of grease and oil) and the fact that the shaft sealing ring is being run-in.

5.1.6 Rating plate data

SIEMENS									
1	●	3 ~ Motor 1FK7101-5AF1-1SU5-Z	●						28
2	●	No. YF T232 1303 01 004	Z: J05	●					27
3	●	M ₁₀ 27.0 Nm	●	I ₀ 19.0 A	●	n _{1max} 4000/min	I _{max} 51.5 A	●	26
4	●	M _{1N} 15.5 Nm	●	I _N 11.8 A	●	n _{1N} 3000/min	n ₂ 187/min	●	25
5	●	Th.Cl. (F)	U _{iN} 270 V	IP 64	M _{2N} 233 Nm (S3-60%)	●			24
6	●	Resolver p=4	BRAKE 24 V DC	17.6 W	3043501 RN 000	N01	●		23
7	●	gear unit type: SP180S-MF1	oil type: xxxx xxxx xxxx						22
8	●	ratio: i = 16.000 [16/1]	quantity of oil: x.xx l						21
9	●	mounting position: any	m: 59 kg						
10	●	C  US	Made in Germany		EN 60034				
		11 12	13	14 15	16	17	18 19	20	

Fig. 5-3 Rating plate (example)

1)	Motor type: AC Servo Motor	15)	Degree of protection
2)	Ident. No., production number	16)	Rated speed n _{1N} [rpm] of the motor Gearbox drive
3)	Continuous stall torque M ₀ [Nm]	17)	Holding brake data
4)	Rated torque M _N [Nm]	18)	Gearbox oil designation ***)
5)	Temperature Class	19)	Designation for the quantity of gearbox oil ***)
6)	Designation of the encoder type	20)	Geared motor weight m [kg]
7)	Designation of the gearbox type	21)	Barcode
8)	Designation of the gearbox ratio; [exact ratio]	22)	Geared motor version
9)	Designation of the mounting position Geared motor	23)	Encoder version
10)	Standards and regulations	24)	Rated output torque, gearbox output M _{2N} [Nm] (operating mode) *)
11)	Stall current I ₀ [A]	25)	Output speed n ₂ [rpm] gearbox output **)
12)	Rated current I _N [A]	26)	Max. current I _{max} [A]
13)	Induced voltage V _{IN} [V]	27)	Order options
14)	Max. speed n _{1max} [rpm] of the motor (gearbox drive)	28)	SIEMENS motor type/designation
*)	M _{2N} = f(M _{1N})	**)	$n_{1N} \leq n_{1max} \Rightarrow \left[n_2 = \frac{n_{1N}}{i} \right]$ $n_{1N} > n_{1max} \Rightarrow \left[n_2 = \frac{n_{1max}}{i} \right]$
***)	Only for planetary gearboxes SP 210 and SP 240 and helical / angled gearboxes		

5.2 Helical and angled gearboxes

5.2.1 Features

5.2.1.1 Overview

1FK7 geared motors are preassembled as a complete unit and supplied with a gearbox filled with oil. The range of types includes:

- Helical geared motors with 9 gearbox sizes
- Offset shaft geared motors with 5 gearbox sizes
- Bevel geared motors with 8 gearbox sizes, and
- Worm geared motors with 5 gearbox sizes

A wide range of mounting possibilities can be implemented with the numerous options.

1FK7 geared motors are designed for operation without external cooling and the heat is dissipated through the motor surface. 1FK7 geared motors can be combined with the SIMOVERT MASTERDRIVES Motion Control drive system to create a powerful system with a high degree of functionality. Integrated encoder systems for speed and position can be selected depending on the application just as for 1FK7 servomotors.

5.2.1.2 Benefits

1FK7 geared motors offer:

- Extremely compact design as a result of the direct mounting (because there is no coupling cage between the motor and gearbox)
- Maintenance-free and lubricated for life (exception, worm gearboxes)
- High efficiency
- Low torsional backlash
- Low running noise thanks to the low running noise due to the helical gearing
- High endurance gearing (exception, worm gearboxes)
- Suitable for cyclic operation with alternating load and continuous operation
- Favorably-priced solution when compared to planetary geared motors

5.2.1.3 Applications

1FK7 geared motors are admirably suited for applications in general machinery construction for basic positioning tasks and auxiliary drives with servo quality that continually operate, for example in:

- Packaging machines
- High-bay racking units
- Wood, glass, ceramic and stone working machines
- Beverage filling plants
- Conveyor belts

To engineer geared motors and as selection and ordering tool, a CD-ROM with the program "CAD CREATOR" can be used (Order No. 6SL7033-0AA00-0AG0) or online through the Internet.

www.siemens.com/cad-creator

All data, dimension drawings and 3D-CAD files for the 1FK7 geared motors are provided here.

5.2.1.4 Technical features

Helical Geared Motors	
Nominal Ratio	$i_{\text{norm } 0} = 3.8 \text{ to } 70$
Output torque	$M_2 = 46 \text{ Nm to } 1370 \text{ Nm}$
Max. permissible accelerating torque	$M_{2\text{max}} = 65 \text{ Nm to } 4140 \text{ Nm}$
Torsional backlash	10 arcmin to 20 arcmin
Efficiency	94% to 96%
Mechanical options	Solid shaft with key, flange, mounting feet, tapped hole group

Offset Shaft Geared Motor	
Nominal Ratio	$i_{\text{norm } 0} = 4.3 \text{ to } 35$
Output torque	$M_2 = 58 \text{ Nm to } 529 \text{ Nm}$
Max. permissible accelerating torque	$M_{2\text{max}} = 120 \text{ Nm to } 1100 \text{ Nm}$
Torsional backlash	10 arcmin to 11 arcmin
Efficiency	94% to 96%
Mechanical options	Solid shaft, hollow shaft with key, hollow shaft with tensioning element/shrink disk, flange, mounting feet, tapped hole group

Bevel Geared Motor	
Nominal Ratio	$i_{\text{norm } 0} = 4 \text{ to } 76$
Output torque	$M_2 = 89 \text{ Nm to } 1280 \text{ Nm}$
Max. permissible accelerating torque	$M_{2\text{max}} = 135 \text{ Nm to } 4650 \text{ Nm}$
Torsional backlash	10 arcmin to 12 arcmin
Efficiency	94% to 96%
Mechanical options	Solid shaft, hollow shaft with key, hollow shaft with tensioning element/shrink disk, flange, mounting feet, tapped hole group, torque bracket

Worm geared motor	
Nominal Ratio	$i_{\text{norm } 0} = 9.2 \text{ to } 70$
Output torque	$M_2 = 80 \text{ Nm to } 430 \text{ Nm}$
Max. permissible accelerating torque	$M_{2\text{max}} = 96 \text{ Nm to } 720 \text{ Nm}$
Torsional backlash	approx. 13 arcmin
Mechanical options	Solid shaft, hollow shaft with key, hollow shaft with tensioning element/shrink disk, flange, mounting feet, tapped hole group, torque bracket

5.2.2 Selection and ordering data

5.2.2.1 Explanation of the designations in the selection tables

P_2	kW	Mechanical power output at the gearbox shaft (in S3 duty)
n_2	rpm	Gearbox output speed referred to the input speed of the motor of $n_1 = 3000$ rpm for a horizontal gearbox shaft output
M_2	Nm	Rated gearbox output torque in S3 duty
$M_{2\max}$	Nm	Max. permissible accelerating torque of the gearbox
i_{nom}		Nominal gearbox ratio (approximate value as decimal number)
i_{exact}		Exact gearbox ratio (specified as a fraction for parameter entry in the drive converter)
F_{rpermiss}	N	Max. permissible cantilever force at the end of the gearbox shaft, referred to a motor speed of 3000 rpm
f_B		Gearbox overload factor (quotient between the max. permissible accelerating torque and stall torque of the motor and ratio)
SH		Motor frame size (1FK7 motors are available in frame sizes 36, 48, 63, 80 and 100)
Order codes		The Order codes define the gearbox type, size, ratio and mechanical implementation
Weight	kg	Total weight of the geared motor

Order No. geared motor
Order codes

[illegible]

- Bevel gearbox
- Offset gear
- Helical gear
- Worm gearbox

- Foot-mounted version ¹⁾
- Tapped hole group
- Flange (circular)
- Foot-mounted and flange (circular) ¹⁾
- Foot-mounted and tapped hole group ¹⁾

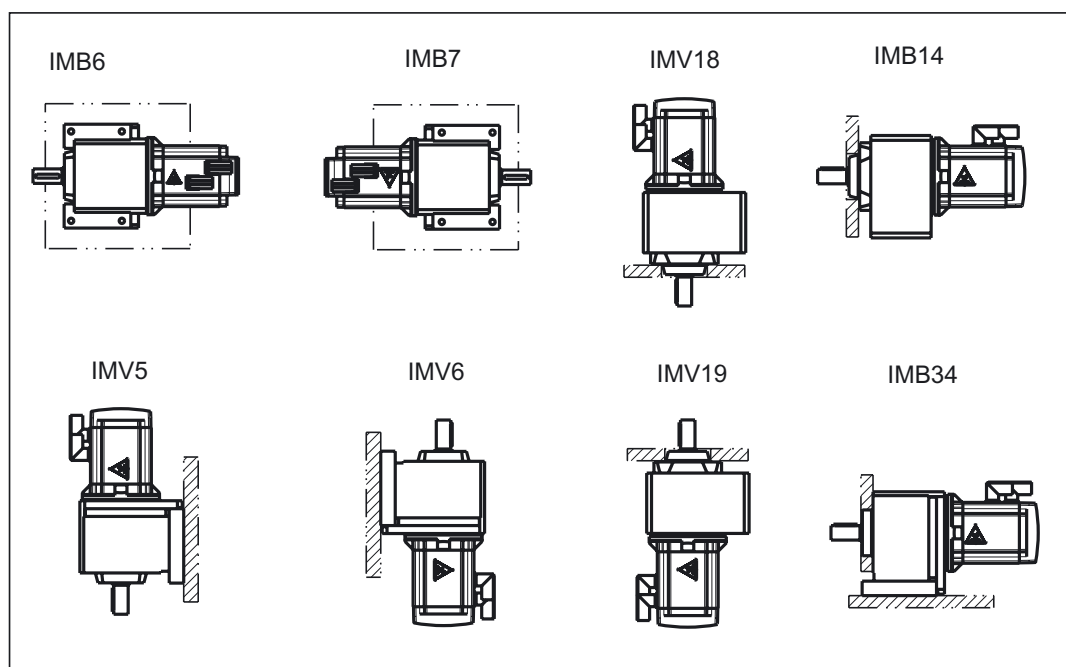
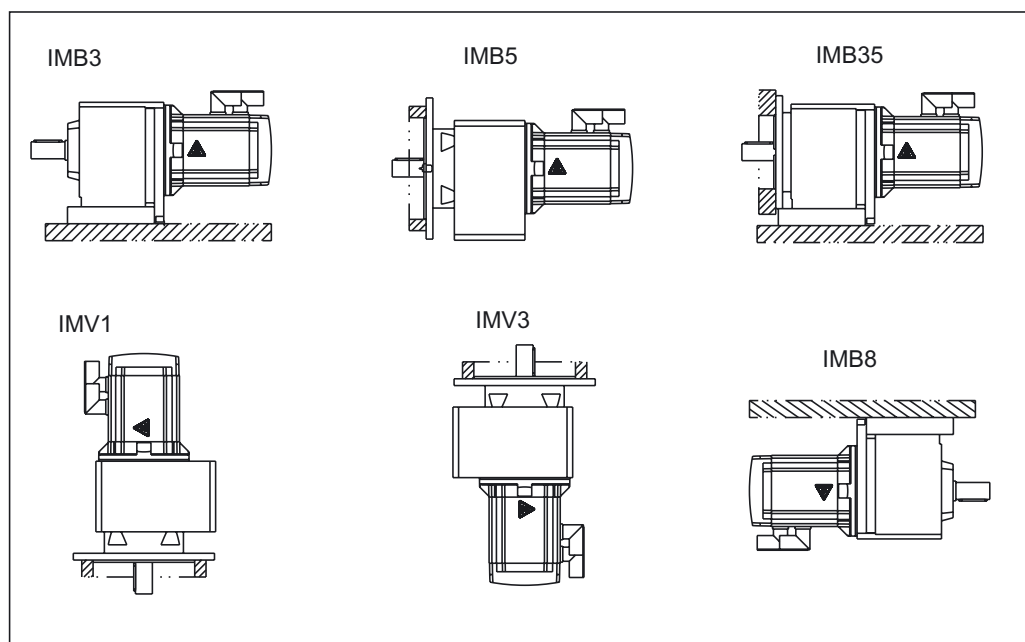
- Solid shaft with key, gearbox side 4
- Hollow shaft with keyway, insertion gearbox side 4
- Hollow shaft with tensioning element, shrink disk, side 4, insertion gearbox side 3
- Solid shaft with key, gearbox side 3
- Hollow shaft with keyway, insertion gearbox side 3
- Hollow shaft with tensioning element, shrink disk, side 3, insertion gearbox side 4

- EL 1
- EL 2
- EL 3
- EL 4
- EL 5
- EL 6

- Connector position: Gearbox side 2, on top
- Connector position: Gearbox side 4, on right
- Connector position: Gearbox side 1, bottom
- Connector position: Gearbox side 3, left

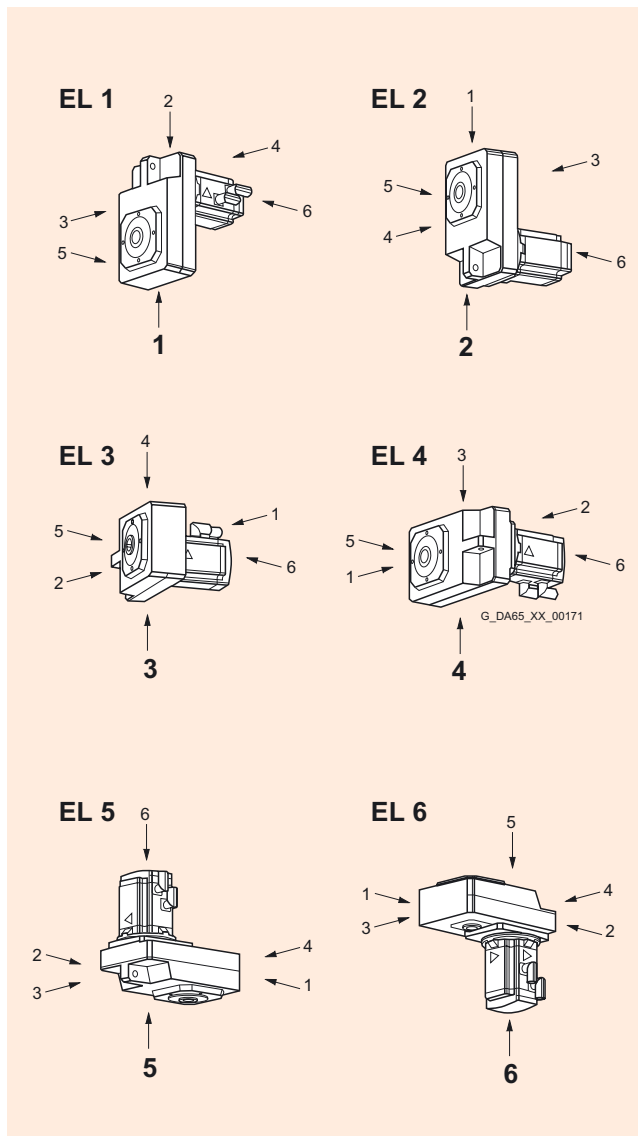
1) The mounting feet are always on gearbox side 1.

5.2.2.3 Helical geared motors, types of construction



5.2.2.4 Offset shaft geared motors, mounting positions

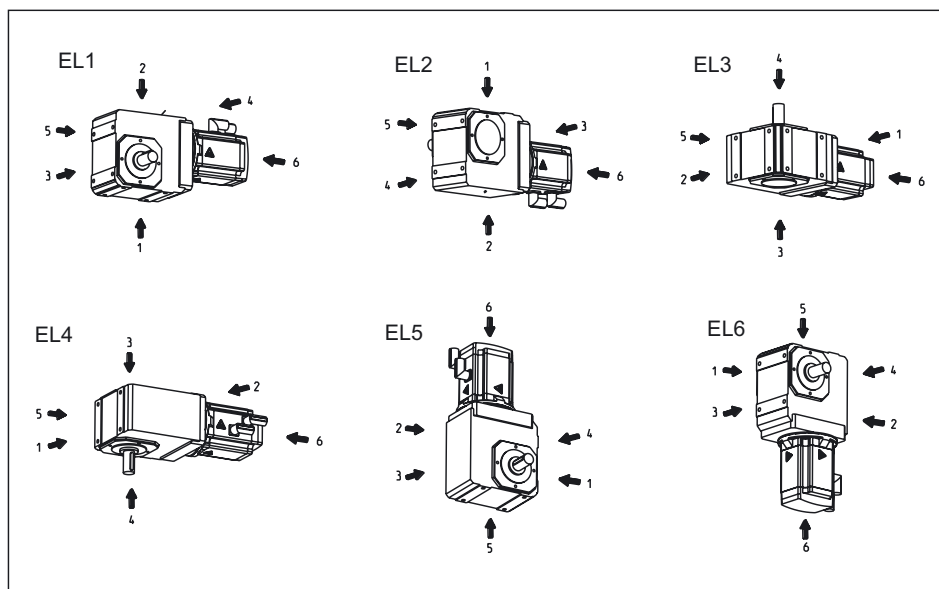
Mounting positions EL 1 to EL 6



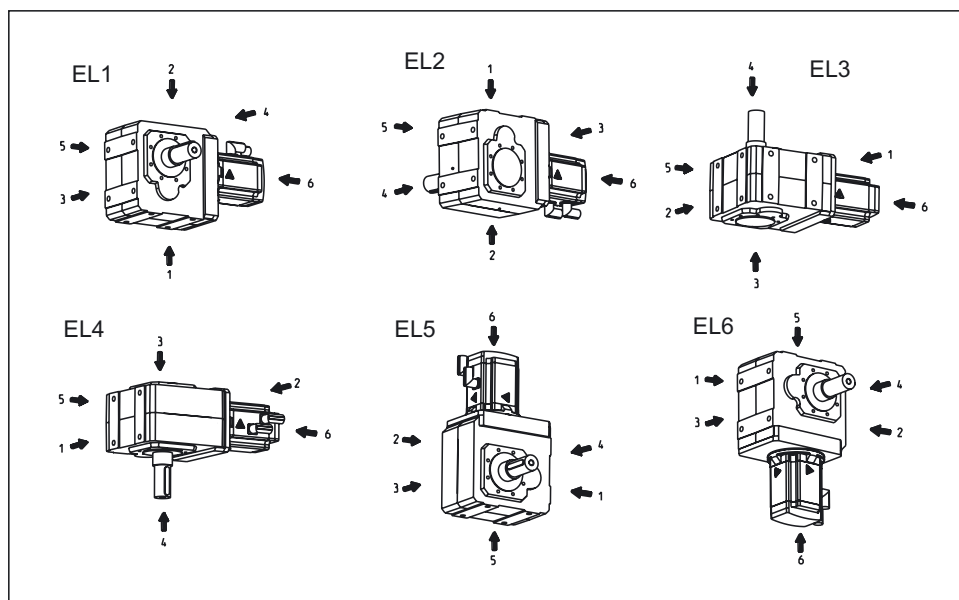
5.2.2.5 Bevel geared motors, mounting positions

The foot-mounted versions, the foot is always on gearbox side 1.

Gearbox sizes K1 to K4, mounting positions EL 1 to EL 6



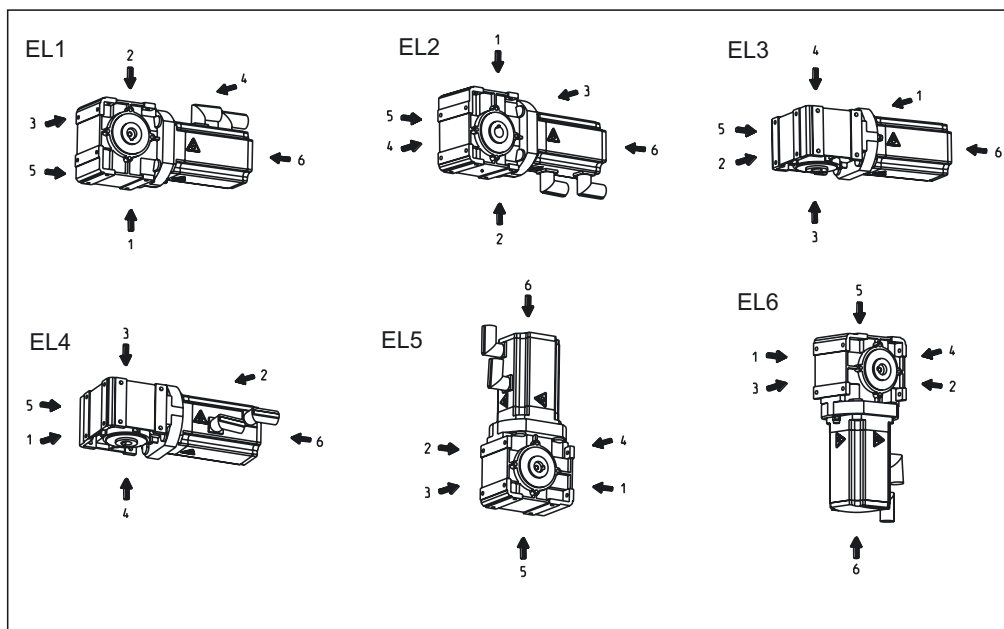
Gearbox sizes K5 to K8, mounting positions EL 1 to EL 6



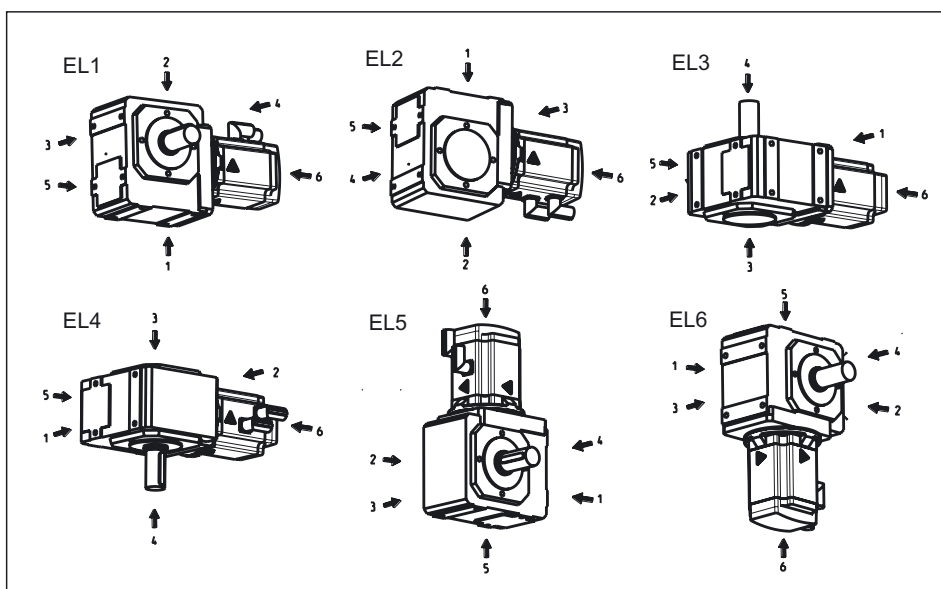
5.2.2.6 Worm geared motors, mounting positions

The foot-mounted versions, the foot is always on gearbox side 1.

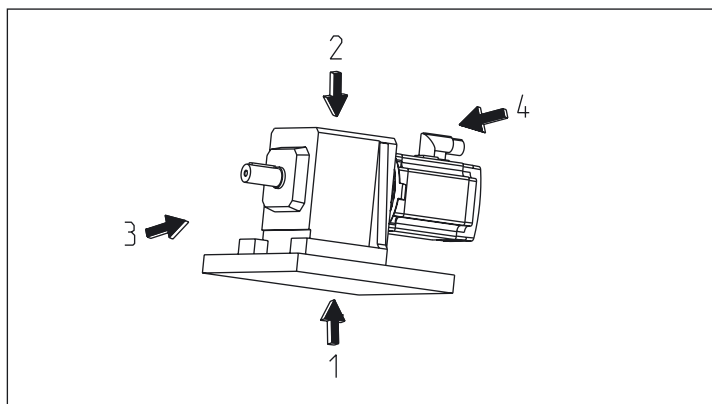
Gearbox size S0, mounting positions EL 1 to EL 6



Gearbox sizes S1 to S4, mounting positions EL 1 to EL 6



5.2.2.7 Connector connection



5.2.2.8 Helical geared motors

Output (S3 60%) P_2 kW	Output speed n_2 rpm	Rated output torque M_2 Nm	Max. permissible acceleration torque M_{2max} Nm	Nominal ratio i_{nom}	Exact ratio i_{exact}	Cantilever force gearbox shaft end F_{rperm} N	Overload factor f_B
0.30	782 476	3.63 5.96	19 29	3.8 6.3	441/115 2035/323	560 660	4.2 3.9
	291 192	9.74 14.8	51 72	10.5 15.5	1421/138 1595/102	778 894	4.2 3.9
	129 86	22 33.1	65 65	23 35	325/14 1261/36	1020 1170	2.4 1.6
	64 43	44.3 66.6	65 138	47 70	7865/168 775/11	1289 2099	1.2 1.7
0.41	782 476	5.02 8.25	36 55	3.8 6.3	441/115 2035/323	560 660	6.0 5.6
	291 192	13.5 20.5	72 72	10.5 15.5	1421/138 1595/102	778 894	4.5 3.0
	128 129	30.8 30.4	138 65	24 23	1035/44 325/14	1456 1020	3.8 1.8
	86 86	45.9 45.9	138 65	35 35	2700/77 1261/36	1663 1170	2.5 1.2
	64	61.4	138	47	516/11	1833	1.9
0.79	782 476	9.67 15.9	36 55	3.8 6.3	441/115 2035/323	560 660	3.2 3.0
	291 191	26 39.6	72 138	10.5 15.5	1421/138 377/24	778 1273	2.4 3.0
	192 128	39.4 59.3	72 138	15.5 24	1595/102 1035/44	894 1456	1.6 2.0
	86 64	88.4 118	138 138	35 47	2700/77 516/11	1663 1833	1.4 1.0
1.43	782 476	17.5 28.7	50 59	3.8 6.3	441/115 2035/323	560 660	2.2 1.6
	511 291	26.8 46.9	102 72	5.9 10.5	47/8 1421/138	917 778	3.0 1.2
	289 191	47.3 71.6	138 138	10.5 15.5	841/81 377/24	1109 1273	2.3 1.5
	196 128	69.7 107	230 138	15.5 25	703/46 1035/44	1775 1456	2.6 1.0
	128	107	350	24	845/36	3045	2.6
1.42	85	160	230	35	1372/39	2343	1.1
1.43	86 60	159 227	550 400	35 50	975/28 2736/55	5961 3911	2.7 1.4
	60 43	229 319	600 550	50 70	1305/26 559/8	6734 7519	2.1 1.4
1.44	43	319	850	70	10075/144	9229	2.1

Helical and angled gearboxes

Gearbox size	Motor frame size	Helical geared motors	Order codes			Total weight, approx. kg
		Order No.	Gearbox type	Type	Type of construction mounting position	
C002	36	1FK7032 – 5AK71 – 1 ■ ■ ■ 5 – Z	D01	G ■ ■	H ■ ■	8.6
C002	36	1FK7032 – 5AK71 – 1 ■ ■ ■ 5 – Z	D02	G ■ ■	H ■ ■	8.6
C002	36	1FK7032 – 5AK71 – 1 ■ ■ ■ 5 – Z	D03	G ■ ■	H ■ ■	8.6
C002	36	1FK7032 – 5AK71 – 1 ■ ■ ■ 5 – Z	D04	G ■ ■	H ■ ■	8.6
C002	36	1FK7032 – 5AK71 – 1 ■ ■ ■ 5 – Z	D05	G ■ ■	H ■ ■	8.6
C002	36	1FK7032 – 5AK71 – 1 ■ ■ ■ 5 – Z	D06	G ■ ■	H ■ ■	8.6
C002	36	1FK7032 – 5AK71 – 1 ■ ■ ■ 5 – Z	D07	G ■ ■	H ■ ■	8.6
C102	36	1FK7032 – 5AK71 – 1 ■ ■ ■ 5 – Z	D18	G ■ ■	H ■ ■	13.5
C002	48	1FK7040 – 5AK71 – 1 ■ ■ ■ 5 – Z	D01	G ■ ■	H ■ ■	9.4
C002	48	1FK7040 – 5AK71 – 1 ■ ■ ■ 5 – Z	D02	G ■ ■	H ■ ■	9.4
C002	48	1FK7040 – 5AK71 – 1 ■ ■ ■ 5 – Z	D03	G ■ ■	H ■ ■	9.4
C002	48	1FK7040 – 5AK71 – 1 ■ ■ ■ 5 – Z	D04	G ■ ■	H ■ ■	9.4
C102	48	1FK7040 – 5AK71 – 1 ■ ■ ■ 5 – Z	D15	G ■ ■	H ■ ■	14.3
C002	48	1FK7040 – 5AK71 – 1 ■ ■ ■ 5 – Z	D05	G ■ ■	H ■ ■	9.4
C102	48	1FK7040 – 5AK71 – 1 ■ ■ ■ 5 – Z	D16	G ■ ■	H ■ ■	14.3
C002	48	1FK7040 – 5AK71 – 1 ■ ■ ■ 5 – Z	D06	G ■ ■	H ■ ■	9.4
C102	48	1FK7040 – 5AK71 – 1 ■ ■ ■ 5 – Z	D17	G ■ ■	H ■ ■	14.3
C002	48	1FK7042 – 5AF71 – 1 ■ ■ ■ 5 – Z	D01	G ■ ■	H ■ ■	10.7
C002	48	1FK7042 – 5AF71 – 1 ■ ■ ■ 5 – Z	D02	G ■ ■	H ■ ■	10.7
C002	48	1FK7042 – 5AF71 – 1 ■ ■ ■ 5 – Z	D03	G ■ ■	H ■ ■	10.7
C102	48	1FK7042 – 5AF71 – 1 ■ ■ ■ 5 – Z	D14	G ■ ■	H ■ ■	15.6
C002	48	1FK7042 – 5AF71 – 1 ■ ■ ■ 5 – Z	D04	G ■ ■	H ■ ■	10.7
C102	48	1FK7042 – 5AF71 – 1 ■ ■ ■ 5 – Z	D15	G ■ ■	H ■ ■	15.6
C102	48	1FK7042 – 5AF71 – 1 ■ ■ ■ 5 – Z	D16	G ■ ■	H ■ ■	15.6
C102	48	1FK7042 – 5AF71 – 1 ■ ■ ■ 5 – Z	D17	G ■ ■	H ■ ■	15.6
C002	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D01	G ■ ■	H ■ ■	13.4
C002	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D02	G ■ ■	H ■ ■	13.4
C102	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D12	G ■ ■	H ■ ■	18.3
C002	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D03	G ■ ■	H ■ ■	13.4
C102	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D13	G ■ ■	H ■ ■	18.3
C102	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D14	G ■ ■	H ■ ■	18.3
C202	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D24	G ■ ■	H ■ ■	22.3
C102	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D15	G ■ ■	H ■ ■	18.3
C302	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D35	G ■ ■	H ■ ■	27.4
C202	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D26	G ■ ■	H ■ ■	22.3
C402	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D46	G ■ ■	H ■ ■	37.6
C302	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D37	G ■ ■	H ■ ■	27.4
C402	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D47	G ■ ■	H ■ ■	37.6
C402	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D48	G ■ ■	H ■ ■	37.6
C502	63	1FK7060 – 5AF71 – 1 ■ ■ ■ 5 – Z	D58	G ■ ■	H ■ ■	49.2
• Encoder system in the motor: Incremental encoder sin/cos 1 V_{pp} Absolute encoder EnDat 2,048 pulses/revolution (shaft height 48 and higher) Absolute encoder EnDat 512 pulses/revolution (only shaft height 36) Simple absolute encoder EnDat 32 pulses/revolution (shaft height 48 and higher) Resolver, multipole (pole number = pole number for motor) Resolver, 2 pole		A E H G S T				
• Holding brake: Motor without holding brake Motor with holding brake		U V				
Refer to the required Order codes and helical geared motors, types of construction						

Helical and angled gearboxes

Output (S3 60%) P_2 kW	Output speed n_2 rpm	Rated output torque M_2 Nm	Max. permissible acceleration torque M_{2max} Nm	Nominal ratio i_{nom}	Exact ratio i_{exact}	Cantilever force gearbox shaft end F_{rperm} N	Overload factor f_B
2.23	782	27.2	50	3.8	441/115	560	1.2
	511	41.6	102	5.9	47/8	917	1.6
2.22	289	73.5	138	10.5	841/81	1109	1.2
	196	108	230	15.5	703/46	1775	1.4
	128	166	350	23	845/36	3045	1.4
	86	247	550	35	975/28	5961	1.5
2.23	60	355	600	50	1305/26	6734	1.1
	43	495	850	70	10075/144	9229	1.1
2.07	773	25.6	101	3.9	1363/351	799	3.3
2.08	511	38.8	115	5.9	47/8	917	2.5
2.07	289	68.5	138	10.5	847/81	1109	1.7
	196	101	230	15.5	703/46	1775	1.9
2.08	191	104	138	15.5	377/24	1273	1.1
	128	155	350	23	845/36	3045	1.9
2.07	127	156	230	24	637/27	2051	1.3
	86	230	550	35	975/28	5961	2.0
2.08	86	231	350	35	1261/36	3479	1.3
2.07	60	329	920	50	1943/39	8241	2.4
2.09	44	454	1380	69	620/9	12344	2.6
3.20	773	39.5	101	3.9	1363/351	799	1.7
	772	39.6	154	3.9	486/125	1125	2.5
	511	59.8	115	5.9	47/8	917	1.3
	518	59	176	5.8	666/115	1284	2.0
	320	95.6	230	9.4	2450/261	1509	1.6
	322	94.8	350	9.3	3575/384	2237	2.4
3.19	193	158	400	15.5	544/35	2654	1.7
3.18	190	160	600	16	63/4	4576	2.5
3.19	128	238	550	23	1495/64	5219	1.5
	128	238	850	23	1495/64	6402	2.3
3.20	86	355	550	35	975/28	5961	1.0
	86	355	1380	35	1360/39	9838	2.6
3.19	60	507	920	50	1943/39	2265	1.2
3.20	64	477	1971	47	515/11	14923	2.7
3.23	44	702	1380	69	620/9	12344	1.3
3.19	43	708	2300	70	765/11	17027	2.1
3.66	774	45.1	251	3.9	190/49	1671	3.7
	512	68.2	288	5.9	2584/441	1917	2.8
3.64	322	108	350	9.3	3575/384	2237	2.2
3.66	193	181	400	15.5	544/35	2654	1.5
3.64	190	183	600	16	63/4	4576	2.2
3.65	128	272	850	23	1495/64	6402	2.1
	128	272	550	23	1495/64	5219	1.3
3.66	86	406	1380	35	1360/39	9838	2.3
3.65	66	528	1380	45	136/3	1852	1.7
	64	545	2300	47	515/11	14923	2.8
3.70	44	802	4140	69	6209	23146	3.4

Helical and angled gearboxes

Gearbox size	Motor frame size SH	Helical geared motors Order No.	Order codes			Total weight, approx. kg
			Gearbox type	Type	Type of construction mounting position	
C002	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	D01	G ■ ■	H ■ ■	17.1
C102	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	D12	G ■ ■	H ■ ■	22
C102	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	D13	G ■ ■	H ■ ■	22
C202	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	D24	G ■ ■	H ■ ■	26
C302	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	D35	G ■ ■	H ■ ■	31.1
C402	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	D46	G ■ ■	H ■ ■	41.3
C402	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	D47	G ■ ■	H ■ ■	41.3
C502	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	D58	G ■ ■	H ■ ■	52.9
C102	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	D11	G ■ ■	H ■ ■	21.7
C102	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	D12	G ■ ■	H ■ ■	21.7
C102	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	D13	G ■ ■	H ■ ■	21.7
C202	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	D24	G ■ ■	H ■ ■	25.7
C102	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	D14	G ■ ■	H ■ ■	21.7
C302	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	D35	G ■ ■	H ■ ■	30.8
C202	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	D25	G ■ ■	H ■ ■	25.7
C402	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	D46	G ■ ■	H ■ ■	41
C302	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	D36	G ■ ■	H ■ ■	30.8
C502	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	D57	G ■ ■	H ■ ■	52.6
C612	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	D68	G ■ ■	H ■ ■	67.9
C102	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D11	G ■ ■	H ■ ■	26.9
C202	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D21	G ■ ■	H ■ ■	30.9
C102	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D12	G ■ ■	H ■ ■	26.9
C202	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D22	G ■ ■	H ■ ■	30.9
C202	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D23	G ■ ■	H ■ ■	30.9
C302	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D33	G ■ ■	H ■ ■	36
C302	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D34	G ■ ■	H ■ ■	36
C402	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D44	G ■ ■	H ■ ■	46.2
C402	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D45	G ■ ■	H ■ ■	46.2
C502	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D55	G ■ ■	H ■ ■	57.8
C402	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D46	G ■ ■	H ■ ■	46.2
C612	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D66	G ■ ■	H ■ ■	73.1
C502	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D57	G ■ ■	H ■ ■	57.8
C712	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D77	G ■ ■	H ■ ■	108.4
C612	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D68	G ■ ■	H ■ ■	73.1
C712	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	D78	G ■ ■	H ■ ■	108.4
C302	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D31	G ■ ■	H ■ ■	38.2
C302	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D32	G ■ ■	H ■ ■	38.2
C302	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D33	G ■ ■	H ■ ■	38.2
C302	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D34	G ■ ■	H ■ ■	38.2
C402	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D44	G ■ ■	H ■ ■	48.4
C502	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D55	G ■ ■	H ■ ■	60
C402	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D45	G ■ ■	H ■ ■	48.4
C612	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D66	G ■ ■	H ■ ■	75.3
C612	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D67	G ■ ■	H ■ ■	75.3
C712	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D77	G ■ ■	H ■ ■	110.6
C812	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D88	G ■ ■	H ■ ■	170.2
- Encoder system in the motor: Incremental encoder sin/cos 1 V_{pp} Absolute encoder EnDat 2,048 pulses/revolution (shaft height 48 and higher) Simple absolute encoder EnDat 32 pulses/revolution (shaft height 48 and higher) Resolver, multipole (pole number = pole number for motor) Resolver, 2 pole - Holding brake: Motor without holding brake Motor with holding brake		A E G S T U V				
Refer to the required Order codes and helical geared motors, types of construction						

Helical and angled gearboxes

Output (S3 60%) P_2 kW	Output speed n_2 rpm	Rated output torque M_2 Nm	Max. permissible acceleration torque M_{2max} Nm	Nominal ratio i_{nom}	Exact ratio i_{exact}	Cantilever force gearbox shaft end F_{rperm} N	Overload factor f_B
4.73	774	58.3	251	3.9	190/49	1671	2.5
4.72	512	88.1	288	5.9	2584/441	1917	1.9
	324	139	550	9.3	3445/372	3834	2.3
	322	140	350	9.3	3575/384	2237	1.4
	191	236	920	15.5	377/24	5609	2.2
	190	237	600	16	63/4	4576	1.5
4.70	128	351	850	23	1495/64	6402	1.4
4.71	120	375	1650	25	5185/208	8797	2.5
4.75	86	527	2300	35	2700/77	13552	2.5
4.71	66	682	1380	45	136/3	10737	1.2
4.72	64	704	2300	47	515/11	14923	1.9
4.77	44	1036	4140	69	620/6	23146	2.3
5.19	644	77	251	3.9	190/49	1671	1.9
5.18	423	117	288	5.9	2584/441	1917	2.0
5.19	424	117	420	5.9	377/64	3297	1.4
5.18	269	184	350	9.3	3575/384	2237	2.5
5.20	241	206	920	10.5	841/81	4886	1.1
5.21	159	313	600	16	63/4	4576	1.1
5.19	154	322	1650	16	1037/64	7620	2.9
5.20	107	464	850	23	1495/64	6402	1.9
5.19	100	496	1650	25	5185/208	8797	1.1
5.23	72	694	1380	35	1360/39	9838	3.4
	71	703	4140	35	106/3	18528	1.1
5.17	53	931	2300	47	515/11	14923	2.2
5.18	46	1076	4140	54	704/13	21362	1.2
5.16	36	1370	4140	69	620/9	23146	1.1
7.92	770	98.2	366	4.7	841/216	2872	2.0
7.93	774	97.8	251	3.9	190/49	1671	1.4
7.95	513	148	650	5.9	117/20	4036	2.4
7.93	512	148	288	5.9	2584/441	1917	1.1
7.94	324	234	850	9.3	3445/372	4703	2.0
	324	234	550	9.3	3445/372	3834	1.3
7.92	191	396	920	16	377/24	5609	1.3
	185	409	1650	16	1037/64	7620	2.2
7.90	129	585	2300	23	255/11	11806	2.1
	120	629	1650	25	5185/208	8797	1.4
7.93	85	891	4140	36	106/3	18528	2.5
7.96	86	884	2300	35	2700/77	13552	1.4
7.93	66	1148	4140	46	592/13	20163	2.0
7.91	64	1181	2300	47	515/11	14923	1.1
8.00	44	1737	4140	69	620/9	23146	1.3

Helical and angled gearboxes

Gearbox size	Motor frame size SH	Helical geared motors Order No.	Order codes			Total weight, approx. kg
			Gearbox type	Type	Type of construction mounting position	
C302	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D31	G ■ ■	H ■ ■	43.8
C302	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D32	G ■ ■	H ■ ■	43.8
C402	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D43	G ■ ■	H ■ ■	43.8
C302	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D33	G ■ ■	H ■ ■	54
C502	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D54	G ■ ■	H ■ ■	65.6
C402	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D44	G ■ ■	H ■ ■	54
C502	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D55	G ■ ■	H ■ ■	65.6
C612	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D65	G ■ ■	H ■ ■	80.9
C712	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D76	G ■ ■	H ■ ■	116.2
C612	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D67	G ■ ■	H ■ ■	80.9
C712	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D77	G ■ ■	H ■ ■	116.2
C812	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	D88	G ■ ■	H ■ ■	175.8
C302	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	D31	G ■ ■	H ■ ■	50.4
C302	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	D32	G ■ ■	H ■ ■	50.4
C402	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	D42	G ■ ■	H ■ ■	60.6
C302	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	D33	G ■ ■	H ■ ■	50.4
C502	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	D53	G ■ ■	H ■ ■	72.2
C402	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	D44	G ■ ■	H ■ ■	60.6
C612	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	D64	G ■ ■	H ■ ■	87.5
C502	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	D55	G ■ ■	H ■ ■	72.2
C612	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	D65	G ■ ■	H ■ ■	87.5
C612	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	D66	G ■ ■	H ■ ■	87.5
C812	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	D86	G ■ ■	H ■ ■	182.4
C712	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	D77	G ■ ■	H ■ ■	122.8
C812	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	D87	G ■ ■	H ■ ■	182.4
C812	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	D88	G ■ ■	H ■ ■	182.4
C402	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D41	G ■ ■	H ■ ■	70.6
C302	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D31	G ■ ■	H ■ ■	60.4
C502	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D52	G ■ ■	H ■ ■	82.2
C302	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D32	G ■ ■	H ■ ■	53.3
C502	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D53	G ■ ■	H ■ ■	82.2
C402	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D43	G ■ ■	H ■ ■	70.6
C502	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D54	G ■ ■	H ■ ■	82.2
C612	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D64	G ■ ■	H ■ ■	97.5
C712	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D75	G ■ ■	H ■ ■	132.8
C612	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D65	G ■ ■	H ■ ■	97.5
C812	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D86	G ■ ■	H ■ ■	192.4
C712	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D76	G ■ ■	H ■ ■	132.8
C812	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D87	G ■ ■	H ■ ■	192.4
C712	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D77	G ■ ■	H ■ ■	132.8
C812	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	D88	G ■ ■	H ■ ■	192.4
• Encoder system in the motor:		Incremental encoder sin/cos 1 V _{pp} Absolute encoder EnDat 2,048 pulses/revolution (shaft height 48 and higher) Simple absolute encoder EnDat 32 pulses/revolution (shaft height 48 and higher) Resolver, multipole (pole number = pole number for motor) Resolver, 2 pole	A E G S T			
• Holding brake:		Motor without holding brake Motor with holding brake	U V			
Refer to the required Order codes and helical geared motors, types of construction						

5.2.2.9 Offset shaft geared motors

Output (S3 60%) P_2 kW	Output speed n_2 rpm	Rated output torque M_2 Nm	Max. permissible acceleration torque M_{2max} Nm	Nominal ratio i_{nom}	Exact ratio i_{exact}	Cantilever force gearbox shaft end F_{rperm} N	Overload factor f_B
0.30	696 464	4.07 6.11	24 33	4.3 6.5	56/13 84/13	1021 1169	4.7 4.5
	275 221	10.3 12.9	52 62	11 13.5	273/25 231/17	1392 1497	4.1 3.9
	130 86	21.8 33.1	114 120	23 35	3185/138 3575/102	1786 2053	4.2 2.9
0.41	696 464	5.64 8.46	45 64	4.3 6.5	56/13 84/13	1021 1169	6.7 6.3
	275 221	14.3 17.8	99 105	11 13.5	273/25 231/17	1392 1497	5.8 5.0
	130 86	30.2 45.9	120 120	23 35	3185/138 3575/102	1786 2053	3.4 2.2
0.79	696 464	10.9 16.3	45 64	4.3 6.5	56/13 84/13	1021 1169	3.6 3.4
	275 221	27.5 34.3	99 105	11 13.5	273/25 231/17	1392 1497	3.1 2.7
	130 128	58.2 59.1	120 233	23 23	3185/138 2320/99	1786 2308	1.8 3.4
	86 85	88.4 89.4	120 270	35 35	3575/102 390/11	2053 2650	1.2 2.6
1.43	696 464	19.6 29.5	80 91	4.3 6.5	56/13 84/13	1021 1169	3.2 2.4
	275 278	49.8 49.3	105 196	11 11	273/25 7303/676	1392 1783	1.7 3.1
	221 220	61.9 62.1	105 210	13.5 13.5	231/17 109/8	1497 1927	1.3 2.6
	128 85	107 162	270 270	23 35	2320/99 390/11	2308 2650	2.0 1.3
	86	160	450	35	7252/207	3666	2.2
2.22	696 464	30.5 45.8	80 91	4.3 6.5	56/13 84/13	1021 1169	1.7 1.3
	540 278	39.3 76.5	112 196	5.6 11	5341/962 7303/676	1428 1783	1.9 1.7
	220 128 86	96.5 166 248	210 270 450	13.5 23 35	109/8 2320/99 7252/207	1927 2308 3666	1.4 1.1 1.2

Helical and angled gearboxes

Gearbox size	Motor frame size	Offset shaft geared motors Order No.	Order codes		Type of construction mounting position	Total weight, approx. kg		
	SH		Gearbox type	Type				
F102	36	1FK7032 – 5AK71 – 1	■ ■	5 – Z	C11	G ■ ■	H ■ ■	13.8
F102	36	1FK7032 – 5AK71 – 1	■ ■	5 – Z	C12	G ■ ■	H ■ ■	13.8
F102	36	1FK7032 – 5AK71 – 1	■ ■	5 – Z	C13	G ■ ■	H ■ ■	13.8
F102	36	1FK7032 – 5AK71 – 1	■ ■	5 – Z	C14	G ■ ■	H ■ ■	13.8
F102	36	1FK7032 – 5AK71 – 1	■ ■	5 – Z	C15	G ■ ■	H ■ ■	13.8
F102	36	1FK7032 – 5AK71 – 1	■ ■	5 – Z	C16	G ■ ■	H ■ ■	13.8
F102	48	1FK7040 – 5AK71 – 1	■ ■	5 – Z	C11	G ■ ■	H ■ ■	14.6
F102	48	1FK7040 – 5AK71 – 1	■ ■	5 – Z	C12	G ■ ■	H ■ ■	14.6
F102	48	1FK7040 – 5AK71 – 1	■ ■	5 – Z	C13	G ■ ■	H ■ ■	14.6
F102	48	1FK7040 – 5AK71 – 1	■ ■	5 – Z	C14	G ■ ■	H ■ ■	14.6
F102	48	1FK7040 – 5AK71 – 1	■ ■	5 – Z	C15	G ■ ■	H ■ ■	14.6
F102	48	1FK7040 – 5AK71 – 1	■ ■	5 – Z	C16	G ■ ■	H ■ ■	14.6
F102	48	1FK7042 – 5AF71 – 1	■ ■	5 – Z	C11	G ■ ■	H ■ ■	15.9
F102	48	1FK7042 – 5AF71 – 1	■ ■	5 – Z	C12	G ■ ■	H ■ ■	15.9
F102	48	1FK7042 – 5AF71 – 1	■ ■	5 – Z	C13	G ■ ■	H ■ ■	15.9
F102	48	1FK7042 – 5AF71 – 1	■ ■	5 – Z	C14	G ■ ■	H ■ ■	15.9
F102	48	1FK7042 – 5AF71 – 1	■ ■	5 – Z	C15	G ■ ■	H ■ ■	15.9
F202	48	1FK7042 – 5AF71 – 1	■ ■	5 – Z	C25	G ■ ■	H ■ ■	24.1
F102	48	1FK7042 – 5AF71 – 1	■ ■	5 – Z	C16	G ■ ■	H ■ ■	15.9
F202	48	1FK7042 – 5AF71 – 1	■ ■	5 – Z	C26	G ■ ■	H ■ ■	24.1
F102	63	1FK7060 – 5AF71 – 1	■ ■	5 – Z	C11	G ■ ■	H ■ ■	18.6
F102	63	1FK7060 – 5AF71 – 1	■ ■	5 – Z	C12	G ■ ■	H ■ ■	18.6
F102	63	1FK7060 – 5AF71 – 1	■ ■	5 – Z	C13	G ■ ■	H ■ ■	18.6
F202	63	1FK7060 – 5AF71 – 1	■ ■	5 – Z	C23	G ■ ■	H ■ ■	26.8
F102	63	1FK7060 – 5AF71 – 1	■ ■	5 – Z	C14	G ■ ■	H ■ ■	18.6
F202	63	1FK7060 – 5AF71 – 1	■ ■	5 – Z	C24	G ■ ■	H ■ ■	26.8
F202	63	1FK7060 – 5AF71 – 1	■ ■	5 – Z	C25	G ■ ■	H ■ ■	26.8
F202	63	1FK7060 – 5AF71 – 1	■ ■	5 – Z	C26	G ■ ■	H ■ ■	26.8
F302	63	1FK7060 – 5AF71 – 1	■ ■	5 – Z	C36	G ■ ■	H ■ ■	34.4
F102	63	1FK7063 – 5AF71 – 1	■ ■	5 – Z	C11	G ■ ■	H ■ ■	22.3
F102	63	1FK7063 – 5AF71 – 1	■ ■	5 – Z	C12	G ■ ■	H ■ ■	22.3
F202	63	1FK7063 – 5AF71 – 1	■ ■	5 – Z	C22	G ■ ■	H ■ ■	30.5
F202	63	1FK7063 – 5AF71 – 1	■ ■	5 – Z	C23	G ■ ■	H ■ ■	30.5
F202	63	1FK7063 – 5AF71 – 1	■ ■	5 – Z	C24	G ■ ■	H ■ ■	30.5
F202	63	1FK7063 – 5AF71 – 1	■ ■	5 – Z	C25	G ■ ■	H ■ ■	30.5
F302	63	1FK7063 – 5AF71 – 1	■ ■	5 – Z	C36	G ■ ■	H ■ ■	38.1
• Encoder system in the motor:	Incremental encoder sin/cos 1 V _{pp}	A						
	Absolute encoder EnDat 2,048 pulses/revolution (shaft height 48 and higher)	E						
	Absolute encoder EnDat 512 pulses/revolution (only shaft height 36)	H						
	Simple absolute encoder EnDat 32 pulses/revolution (shaft height 48 and higher)	G						
	Resolver, multipole (pole number = pole number for motor)	S						
	Resolver, 2 pole	T						
• Holding brake:	Motor without holding brake	U						
	Motor with holding brake	V						
Refer to the required Order codes and helical geared motors, types of construction								

Helical and angled gearboxes

Output (S3 60%) P_2 kW	Output speed n_2 rpm	Rated output torque M_2 Nm	Max. permissible acceleration torque M_{2max} Nm	Nominal ratio i_{nom}	Exact ratio i_{exact}	Cantilever force gearbox shaft end F_{rperm} N	Overload factor f_B
0.30	696 464	4.07 6.11	24 33	4.3 6.5	56/13 84/13	1021 1169	4.7 4.5
	275 221	10.3 12.9	52 62	11 13.5	273/25 231/17	1392 1497	4.1 3.9
	130 86	21.8 33.1	114 120	23 35	3185/138 3575/102	1786 2053	4.2 2.9
0.41	696 464	5.64 8.46	45 64	4.3 6.5	56/13 84/13	1021 1169	6.7 6.3
	275 221	14.3 17.8	99 105	11 13.5	273/25 231/17	1392 1497	5.8 5.0
	130 86	30.2 45.9	120 120	23 35	3185/138 3575/102	1786 2053	3.4 2.2
0.79	696 464	10.9 16.3	45 64	4.3 6.5	56/13 84/13	1021 1169	3.6 3.4
	275 221	27.5 34.3	99 105	11 13.5	273/25 231/17	1392 1497	3.1 2.7
	130 128	58.2 59.1	120 233	23 23	3185/138 2320/99	1786 2308	1.8 3.4
	86 85	88.4 89.4	120 270	35 35	3575/102 390/11	2053 2650	1.2 2.6
1.43	696 464	19.6 29.5	80 91	4.3 6.5	56/13 84/13	1021 1169	3.2 2.4
	275 278	49.8 49.3	105 196	11 11	273/25 7303/676	1392 1783	1.7 3.1
	221 220	61.9 62.1	105 210	13.5 13.5	231/17 109/8	1497 1927	1.3 2.6
	128 85 86	107 162 160	270 270 450	23 35 35	2320/99 390/11 7252/207	2308 2650 3666	2.0 1.3 2.2
2.22	696 464	30.5 45.8	80 91	4.3 6.5	56/13 84/13	1021 1169	1.7 1.3
	540 278	39.3 76.5	112 196	5.6 11	5341/962 7303/676	1428 1783	1.9 1.7
	220 128 86	96.5 166 248	210 270 450	13.5 23 35	109/8 2320/99 7252/207	1927 2308 3666	1.4 1.1 1.2

Helical and angled gearboxes

Gearbox size	Motor frame size SH	Offset shaft geared motors Order No.	Order codes			Total weight, approx. kg
			Gearbox type	Type	Type of construction mounting position	
F202 F202	80 80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z 1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	C22 C23	G ■ ■ G ■ ■	H ■ ■ H ■ ■	30.2 30.2
F202 F202	80 80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z 1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	C24 C25	G ■ ■ G ■ ■	H ■ ■ H ■ ■	30.2 30.2
F302 F302 F402	80 80 80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z 1FK7080 – 5AF71 – 1 ■ ■ 5 – Z 1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	C35 C36 C46	G ■ ■ G ■ ■ G ■ ■	H ■ ■ H ■ ■ H ■ ■	37.8 37.8 46.1
F202 F202	80 80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z 1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	C22 C23	G ■ ■ G ■ ■	H ■ ■ H ■ ■	35.4 35.4
F302 F302	80 80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z 1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	C33 C34	G ■ ■ G ■ ■	H ■ ■ H ■ ■	43 43
F402 F302	80 80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z 1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	C44 C35	G ■ ■ G ■ ■	H ■ ■ H ■ ■	51.3 43
F402 F402 F602	80 80 80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z 1FK7083 – 5AF71 – 1 ■ ■ 5 – Z 1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	C45 C46 C66	G ■ ■ G ■ ■ G ■ ■	H ■ ■ H ■ ■ H ■ ■	51.3 51.3 78.3
F402 F402	100 100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z 1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	C42 C43	G ■ ■ G ■ ■	H ■ ■ H ■ ■	53.5 53.3
F402 F402	100 100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z 1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	C44 C45	G ■ ■ G ■ ■	H ■ ■ H ■ ■	53.5 53.3
F602 F402	100 100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z 1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	C65 C46	G ■ ■ G ■ ■	H ■ ■ H ■ ■	80.5 53.3
F402 F402	100 100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z 1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	C42 C43	G ■ ■ G ■ ■	H ■ ■ H ■ ■	59.1 59.1
F402 F602	100 100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z 1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	C44 C64	G ■ ■ G ■ ■	H ■ ■ H ■ ■	59.1 86.1
F402 F602	100 100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z 1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	C45 C66	G ■ ■ G ■ ■	H ■ ■ H ■ ■	59.1 86.1
F402 F402	100 100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z 1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	C42 C43	G ■ ■ G ■ ■	H ■ ■ H ■ ■	65.7 65.7
F602 F402	100 100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z 1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	C63 C44	G ■ ■ G ■ ■	H ■ ■ H ■ ■	92.7 65.7
F602 F602	100 100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z 1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	C64 C65	G ■ ■ G ■ ■	H ■ ■ H ■ ■	92.7 92.7
F602 F402	100 100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z 1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	C62 C42	G ■ ■ G ■ ■	H ■ ■ H ■ ■	103 75.7
F602 F402	100 100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z 1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	C63 C43	G ■ ■ G ■ ■	H ■ ■ H ■ ■	103 75.7
F602 F602	100 100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z 1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	C64 C65	G ■ ■ G ■ ■	H ■ ■ H ■ ■	103 103
Encoder system in the motor:		Incremental encoder sin/cos 1 V _{pp} Absolute encoder EnDat 2,048 pulses/revolution (shaft height 48 and higher) Simple absolute encoder EnDat 32 pulses/revolution (shaft height 48 and higher) Resolver, multipole (pole number = pole number for motor) Resolver, 2 pole	A E G S T			
Holding brake:		Motor without holding brake Motor with holding brake	U V			
Refer to the required Order codes and helical geared motors, types of construction						

5.2.2.10 Bevel geared motors

Output (S3 60%) P_2 kW	Output speed n_2 rpm	Rated output torque M_2 Nm	Max. permissible acceleration torque M_{2max} Nm	Nominal ratio i_{nom}	Exact ratio i_{exact}	Cantilever force gearbox shaft end F_{rperm} N	Overload factor f_B
0.30	750 500	3.78 5.68	22 31	4 6	4/1 6/1	1494 1710	4.7 4.5
	296 179	9.59 15.8	48 73	10 16.5	507/50 117/7	2037 2406	4.1 3.8
	129 85	22 33.2	102 135	23 35	1140/49 3686/105	2686 3081	3.8 3.3
	65 43	43.7 65.7	185 159	46 69	1849/40 6665/96	4053 4641	3.4 2.0
0.41	750 500	5.24 7.86	42 59	4 6	4/1 6/1	1494 1710	6.7 6.3
	296 179	13.3 21.9	92 122	10 16.5	507/50 117/7	2037 2406	5.8 4.7
	129 85 65	30.5 46 60.5	135 135 220	23 35 46	1140/49 3686/105 1849/40	2686 3081 4053	3.7 2.5 3.1
0.79	750 500	10.1 15.1	42 59	4 6	4/1 6/1	1494 1710	3.6 3.4
	296 179	25.6 42.2	92 122	10 16.5	507/50 117/7	2037 2406	3.1 2.5
	129 85 87	58.7 88.5 87.1	135 135 220	23 35 35	1140/49 3686/105 1935/56	2686 3081 3678	2.0 1.3 2.2
1.43	750 500	18.2 27.4	76 87	4 6	4/1 6/1	1494 1710	3.3 2.5
	296 178	46.2 76.9	103 219	10 17	507/50 2967/176	2037 2895	1.8 2.2
	129 129	106 106	220 385	23 23	2967/128 559/24	3220 3762	1.6 2.8
	87 86	158 158	220 385	35 35	1935/56 903/26	3678 4298	1.1 1.9
	65 65 46	211 211 290	385 600 1000	46 46 65	1849/40 602/13 12586/195	4728 7570 10154	1.4 2.2 2.7
2.22	750 750	28.3 28.3	76 83	4 4	4/1 4/1	1494 1793	1.8 2.0
	500 500	42.5 42.5	87 128	6 6	6/1 6/1	1710 2394	1.4 2.0
	324 178	65.6 119	186 219	9.3 17	1075/116 2967/176	2767 2895	1.9 1.2
	129 86 65	165 246 328	385 385 600	23 35 46	559/24 903/26 602/13	3762 4298 7570	1.5 1.0 1.2
2.17	46	450	1000	65	12586/195	10154	1.5

Helical and angled gearboxes

Gearbox size	Motor frame size SH	Bevel geared motors	Order codes			Total weight, approx. kg
		Order No.	Gearbox type	Type	Type of construction mounting position	
K102	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	B11	G ■ ■	H ■ ■	12.3
K102	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	B12	G ■ ■	H ■ ■	12.3
K102	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	B13	G ■ ■	H ■ ■	12.3
K102	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	B14	G ■ ■	H ■ ■	12.3
K102	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	B15	G ■ ■	H ■ ■	12.3
K102	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	B16	G ■ ■	H ■ ■	12.3
K202	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	B27	G ■ ■	H ■ ■	19.8
K202	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	B28	G ■ ■	H ■ ■	19.8
K102	48	1FK7040 – 5AK71 – 1 ■ ■ 5 – Z	B11	G ■ ■	H ■ ■	13.1
K102	48	1FK7040 – 5AK71 – 1 ■ ■ 5 – Z	B12	G ■ ■	H ■ ■	13.1
K102	48	1FK7040 – 5AK71 – 1 ■ ■ 5 – Z	B13	G ■ ■	H ■ ■	13.1
K102	48	1FK7040 – 5AK71 – 1 ■ ■ 5 – Z	B14	G ■ ■	H ■ ■	13.1
K102	48	1FK7040 – 5AK71 – 1 ■ ■ 5 – Z	B15	G ■ ■	H ■ ■	13.1
K102	48	1FK7040 – 5AK71 – 1 ■ ■ 5 – Z	B16	G ■ ■	H ■ ■	13.1
K202	48	1FK7040 – 5AK71 – 1 ■ ■ 5 – Z	B27	G ■ ■	H ■ ■	20.6
K102	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	B11	G ■ ■	H ■ ■	14.4
K102	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	B12	G ■ ■	H ■ ■	14.4
K102	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	B13	G ■ ■	H ■ ■	14.4
K102	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	B14	G ■ ■	H ■ ■	14.4
K102	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	B15	G ■ ■	H ■ ■	14.4
K102	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	B16	G ■ ■	H ■ ■	14.4
K202	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	B26	G ■ ■	H ■ ■	21.9
K102	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	B11	G ■ ■	H ■ ■	17.1
K102	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	B12	G ■ ■	H ■ ■	17.1
K102	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	B13	G ■ ■	H ■ ■	17.1
K202	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	B24	G ■ ■	H ■ ■	24.6
K202	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	B25	G ■ ■	H ■ ■	24.6
K302	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	B35	G ■ ■	H ■ ■	29.6
K202	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	B26	G ■ ■	H ■ ■	24.6
K302	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	B36	G ■ ■	H ■ ■	29.6
K302	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	B37	G ■ ■	H ■ ■	29.6
K402	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	B47	G ■ ■	H ■ ■	43.1
K513	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	B58	G ■ ■	H ■ ■	48.9
K102	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	B11	G ■ ■	H ■ ■	20.8
K202	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	B21	G ■ ■	H ■ ■	28.3
K102	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	B12	G ■ ■	H ■ ■	20.8
K302	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	B32	G ■ ■	H ■ ■	33.3
K302	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	B33	G ■ ■	H ■ ■	33.3
K202	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	B24	G ■ ■	H ■ ■	28.3
K302	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	B35	G ■ ■	H ■ ■	33.3
K302	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	B36	G ■ ■	H ■ ■	33.3
K402	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	B47	G ■ ■	H ■ ■	46.8
K513	63	1FK7063 – 5AF71 – 1 ■ ■ 5 – Z	B58	G ■ ■	H ■ ■	52.6
Encoder system in the motor:		Incremental encoder sin/cos 1 V _{pp} Absolute encoder EnDat 2,048 pulses/revolution (shaft height 48 and higher) Absolute encoder EnDat 512 pulses/revolution (only shaft height 36) Simple absolute encoder EnDat 32 pulses/revolution (shaft height 48 and higher) Resolver, multipole (pole number = pole number for motor) Resolver, 2 pole	A E H G S T			
Holding brake:		Motor without holding brake Motor with holding brake	U V			
Refer to the required Order codes and helical geared motors, types of construction						

Helical and angled gearboxes

Output (S3 60%) P_2 kW	Output speed n_2 rpm	Rated output torque M_2 Nm	Max. permissible acceleration torque M_{2max} Nm	Nominal ratio i_{nom}	Exact ratio i_{exact}	Cantilever force gearbox shaft end F_{rperm} N	Overload factor f_B
0.30	750 500	3.78 5.68	22 31	4 6	4/1 6/1	1494 1710	4.7 4.5
	296 179	9.59 15.8	48 73	10 16.5	507/50 117/7	2037 2406	4.1 3.8
	129 85	22 33.2	102 135	23 35	1140/49 3686/105	2686 3081	3.8 3.3
	65 43	43.7 65.7	185 159	46 69	1849/40 6665/96	4053 4641	3.4 2.0
0.41	750 500	5.24 7.86	42 59	4 6	4/1 6/1	1494 1710	6.7 6.3
	296 179	13.3 21.9	92 122	10 16.5	507/50 117/7	2037 2406	5.8 4.7
	129 85 65	30.5 46 60.5	135 135 220	23 35 46	1140/49 3686/105 1849/40	2686 3081 4053	3.7 2.5 3.1
	750 500	10.1 15.1	42 59	4 6	4/1 6/1	1494 1710	3.6 3.4
0.79	296 179	25.6 42.2	92 122	10 16.5	507/50 117/7	2037 2406	3.1 2.5
	129 85 87	58.7 88.5 87.1	135 135 220	23 35 35	1140/49 3686/105 1935/56	2686 3081 3678	2.0 1.3 2.2
	750 500	18.2 27.4	76 87	4 6	4/1 6/1	1494 1710	3.3 2.5
	296 178	46.2 76.9	103 219	10 17	507/50 2967/176	2037 2895	1.8 2.2
1.43	129 129	106 106	220 385	23 23	2967/128 559/24	3220 3762	1.6 2.8
	87 86	158 158	220 385	35 35	1935/56 903/26	3678 4298	1.1 1.9
	65 65 46	211 211 290	385 600 1000	46 46 65	1849/40 602/13 12586/195	4728 7570 10154	1.4 2.2 2.7
	750 750	28.3 28.3	76 83	4 4	4/1 4/1	1494 1793	1.8 2.0
2.22	500 500	42.5 42.5	87 128	6 6	6/1 6/1	1710 2394	1.4 2.0
	324 178	65.6 119	186 219	9.3 17	1075/116 2967/176	2767 2895	1.9 1.2
	129 86 65	165 246 328	385 385 600	23 35 46	559/24 903/26 602/13	3762 4298 7570	1.5 1.0 1.2
	46	450	1000	65	12586/195	10154	1.5

Gearbox size	Motor frame size SH	Bevel geared motors Order No.	Order codes			Total weight, approx. kg
			Gearbox type	Type	Type of construction mounting position	
K202	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	B21	G ■ ■	H ■ ■	28
K202	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	B22	G ■ ■	H ■ ■	28
K202	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	B23	G ■ ■	H ■ ■	28
K302	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	B34	G ■ ■	H ■ ■	33
K202	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	B25	G ■ ■	H ■ ■	28
K302	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	B35	G ■ ■	H ■ ■	33
K402	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	B46	G ■ ■	H ■ ■	46.5
K513	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	B57	G ■ ■	H ■ ■	52.3
K613	80	1FK7080 – 5AF71 – 1 ■ ■ 5 – Z	B68	G ■ ■	H ■ ■	73.8
K202	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B21	G ■ ■	H ■ ■	33.2
K202	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B22	G ■ ■	H ■ ■	33.2
K302	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B32	G ■ ■	H ■ ■	38.2
K202	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B23	G ■ ■	H ■ ■	33.2
K302	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B33	G ■ ■	H ■ ■	38.2
K302	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B34	G ■ ■	H ■ ■	38.2
K402	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B44	G ■ ■	H ■ ■	51.7
K302	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B35	G ■ ■	H ■ ■	38.2
K513	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B55	G ■ ■	H ■ ■	57.5
K513	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B56	G ■ ■	H ■ ■	57.5
K513	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B57	G ■ ■	H ■ ■	57.5
K613	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B67	G ■ ■	H ■ ■	79
K513	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B58	G ■ ■	H ■ ■	57.5
K713	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B78	G ■ ■	H ■ ■	107.3
K402	80	1FK7083 – 5AF71 – 1 ■ ■ 5 – Z	B46	G ■ ■	H ■ ■	51.7
K402	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B41	G ■ ■	H ■ ■	53.9
K402	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B42	G ■ ■	H ■ ■	53.9
K402	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B43	G ■ ■	H ■ ■	53.9
K402	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B44	G ■ ■	H ■ ■	53.9
K402	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B45	G ■ ■	H ■ ■	53.9
K513	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B55	G ■ ■	H ■ ■	59.7
K513	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B56	G ■ ■	H ■ ■	59.7
K613	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B66	G ■ ■	H ■ ■	81.2
K713	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B77	G ■ ■	H ■ ■	109.5
K713	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B78	G ■ ■	H ■ ■	109.5
Encoder system in the motor:		Incremental encoder sin/cos 1 V _{pp} Absolute encoder EnDat 2,048 pulses/revolution (shaft height 48 and higher) Simple absolute encoder EnDat 32 pulses/revolution (shaft height 48 and higher) Resolver, multipole (pole number = pole number for motor) Resolver, 2 pole	A			
			E			
			G			
			S			
			T			
Holding brake:		Motor without holding brake Motor with holding brake	U			
			V			
Refer to the required Order codes and helical geared motors, types of construction						

Helical and angled gearboxes

Output (S3 60%) P_2 kW	Output speed n_2 rpm	Rated output torque M_2 Nm	Max. permissible acceleration torque M_{2max} Nm	Nominal ratio i_{nom}	Exact ratio i_{exact}	Cantilever force gearbox shaft end F_{rperm} N	Overload factor f_B
4.72	750	60.1	356	4	4/1	3346	3.4
	500	90.2	407	6	6/1	3830	2.6
4.66	297	152	484	10	1333/132	4556	1.8
	177	255	575	17	559/33	5414	1.3
4.64	186	238	1000	16	26071/1620	6391	2.4
	123	361	1000	24	11687/480	7337	1.6
	125	356	1584	24	24583/1024	8687	2.6
	87	513	1600	35	35441/1024	9813	1.8
4.63	85	525	2600	35	567/16	13600	2.8
	60	739	2600	50	166005/3328	15242	2.0
4.67	46	961	2600	65	33201/512	16635	1.6
5.17	46	969	4650	65	188387/2880	21991	2.8
5.20	625	79	356	4	4/1	3346	2.5
5.19	417	119	407	6	6/1	3830	1.9
5.13	248	200	484	10	1333/132	4556	1.4
	246	199	900	10	203/20	5481	2.6
	155	315	1000	16	26071/1620	6391	1.8
	158	310	1380	16	54839/3456	7567	2.5
5.16	103	477	1000	24	11687/480	7337	1.2
	104	470	1584	24	24583/1024	8687	1.9
5.12	71	694	2600	35	35441/1024	9813	1.3
	50	978	2600	50	567/16	13600	2.1
5.13	51	960	4650	49	166005/3328	15242	1.5
5.19	39	1271	2600	65	5487/112	19971	2.8
5.09	38	1280	4650	65	33201/512	16635	1.2
7.93	750	101	356	4	188387/2880	21991	2.1
	500	151	407	6	4/1	3346	1.9
7.81	296	252	900	10	6/1	3830	1.5
7.93	297	255	484	10	203/20	5481	1.9
7.80	189	394	1380	16	1333/132	4556	1.0
	186	400	1000	16	54839/3456	7567	1.9
	125	597	1584	24	26071/1620	6391	1.4
	119	626	2600	25	24583/1024	8687	1.4
7.84	85	881	2600	35	64449/2560	12135	2.3
7.80	83	898	4255	36	567/16	3276	1.6
	61	1218	4650	49	2891/80	18045	2.6
	60	1240	2600	50	5487/112	19971	2.1
7.83	46	1626	4650	65	166005/3328	15242	1.1

Helical and angled gearboxes

Gearbox size	Motor frame size	Bevel geared motors Order No.	Order codes			Total weight, approx. kg
			Gearbox type	Type	Type of construction mounting position	
K402	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B41	G ■ ■	H ■ ■	59.5
K402	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B42	G ■ ■	H ■ ■	59.5
K402	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B43	G ■ ■	H ■ ■	59.5
K402	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B44	G ■ ■	H ■ ■	59.5
K513	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B54	G ■ ■	H ■ ■	65.3
K513	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B55	G ■ ■	H ■ ■	65.3
K613	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B65	G ■ ■	H ■ ■	86.8
K613	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B66	G ■ ■	H ■ ■	86.8
K713	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B76	G ■ ■	H ■ ■	115.1
K713	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B77	G ■ ■	H ■ ■	115.1
K713	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B78	G ■ ■	H ■ ■	115.1
K813	100	1FK7100 – 5AF71 – 1 ■ ■ 5 – Z	B88	G ■ ■	H ■ ■	168.5
K402	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	B41	G ■ ■	H ■ ■	66.1
K402	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	B42	G ■ ■	H ■ ■	66.1
K402	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	B43	G ■ ■	H ■ ■	66.1
K513	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	B53	G ■ ■	H ■ ■	71.9
K513	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	B54	G ■ ■	H ■ ■	71.9
K613	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	B64	G ■ ■	H ■ ■	93.4
K513	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	B55	G ■ ■	H ■ ■	71.9
K613	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	B65	G ■ ■	H ■ ■	93.4
K613	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	B66	G ■ ■	H ■ ■	93.4
K713	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	B76	G ■ ■	H ■ ■	121.7
K713	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	B77	G ■ ■	H ■ ■	121.7
K813	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	B87	G ■ ■	H ■ ■	175.1
K713	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	B78	G ■ ■	H ■ ■	121.7
K813	100	1FK7103 – 5AF71 – 1 ■ ■ 5 – Z	B88	G ■ ■	H ■ ■	175.1
K402	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	B41	G ■ ■	H ■ ■	76.1
K402	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	B42	G ■ ■	H ■ ■	76.1
K513	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	B53	G ■ ■	H ■ ■	82
K402	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	B43	G ■ ■	H ■ ■	76.1
K613	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	B64	G ■ ■	H ■ ■	103
K513	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	B54	G ■ ■	H ■ ■	82
K613	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	B65	G ■ ■	H ■ ■	103
K713	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	B75	G ■ ■	H ■ ■	132
K713	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	B76	G ■ ■	H ■ ■	132
K813	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	B86	G ■ ■	H ■ ■	185
K813	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	B87	G ■ ■	H ■ ■	185
K713	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	B77	G ■ ■	H ■ ■	132
K813	100	1FK7105 – 5AF71 – 1 ■ ■ 5 – Z	B88	G ■ ■	H ■ ■	183
• Encoder system in the motor:		Incremental encoder sin/cos 1 V _{pp} Absolute encoder EnDat 2,048 pulses/revolution (shaft height 48 and higher) Simple absolute encoder EnDat 32 pulses/revolution (shaft height 48 and higher) Resolver, multipole (pole number = pole number for motor) Resolver, 2 pole	A E G S T			
• Holding brake:		Motor without holding brake Motor with holding brake	U V			
Refer to the required Order codes and helical geared motors, types of construction						

5.2.2.11 Worm geared motors

Output (S3 60%) P_2 kW	Output speed n_2 rpm	Rated output torque M_2 Nm	Max. permissible acceleration torque M_{2max} Nm	Nominal ratio i_{nom}	Exact ratio i_{exact}	Cantilever force gearbox shaft end F_{rperm} N	Overload factor f_B
0.28	312 172	8.5 15.3	43 73	9.6 17.5	1107/115 297/17	1689 1938	4.1 3.9
0.27	128 86	20.2 30	82 125	23 35	117/5 873/25	2271 2441	3.3 3.4
0.24	51 52	45.6 45.8	88 172	59 58	117/2 405/7	3082 2889	1.6 3.1
	40 43	57.7 54.8	96 184	75 70	747/10 279/4	3343 3075	1.4 2.7
0.38	172 86	21.2 41.6	110 150	17.5 35	297/17 873/25	1938 2441	4.4 3.0
0.35	52 43	63.4 75.9	172 184	58 70	405/7 279/4	2889 3075	2.3 2.0
0.73	172 130	40.8 53.6	110 132	17.5 23	297/17 162/7	1938 2128	2.3 2.1
0.72	86 86	80.1 79.9	150 252	35 35	873/25 243/7	2441 3411	1.6 2.7
	52	122	172	58	405/7	2889	1.2
0.69	52	126	302	58	1863/32	4053	2.1
0.66	43	146	184	70	279/4	3075	1.1
0.68	43	151	324	70	351/5	4314	1.9
1.35	326	39.5	74	9.2	46/5	1565	1.5
1.33	172 171	73.7 74.4	110 217	17.5 17.5	297/17 351/20	1938 2717	1.2 2.3
	129 86 86	97.9 144 146	259 310 498	23 35 35	1863/80 243/7 2268/65	2986 3411 4881	2.1 1.7 2.7
1.24	52 51	227 232	302 561	58 59	1863/32 117/2	4053 5799	1.0 1.9
	43 43	275 277	609 791	70 70	2241/32 279/4	6157 7994	1.7 2.2

Helical and angled gearboxes

Gearbox size	Motor frame size	Worm geared motors	Order codes			Total weight, approx. kg
	SH	Order No.	Gearbox type	Type	Type of construction mounting position	
S002	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	E03	G ■ ■	H ■ ■	6.6
S102	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	I14	G ■ ■	H ■ ■	12.9
S002	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	E05	G ■ ■	H ■ ■	6.6
S102	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	I16	G ■ ■	H ■ ■	12.9
S002	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	E07	G ■ ■	H ■ ■	6.6
S102	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	I17	G ■ ■	H ■ ■	12.9
S002	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	E08	G ■ ■	H ■ ■	6.6
S102	36	1FK7032 – 5AK71 – 1 ■ ■ 5 – Z	I18	G ■ ■	H ■ ■	12.9
S102	48	1FK7040 – 5AK71 – 1 ■ ■ 5 – Z	I14	G ■ ■	H ■ ■	13.7
S102	48	1FK7040 – 5AK71 – 1 ■ ■ 5 – Z	I16	G ■ ■	H ■ ■	13.7
S102	48	1FK7040 – 5AK71 – 1 ■ ■ 5 – Z	I17	G ■ ■	H ■ ■	13.7
S102	48	1FK7040 – 5AK71 – 1 ■ ■ 5 – Z	I18	G ■ ■	H ■ ■	13.7
S102	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	I14	G ■ ■	H ■ ■	15
S102	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	I15	G ■ ■	H ■ ■	15
S102	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	I16	G ■ ■	H ■ ■	15
S202	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	E26	G ■ ■	H ■ ■	22.5
S102	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	I17	G ■ ■	H ■ ■	15
S202	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	E27	G ■ ■	H ■ ■	22.5
S102	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	I18	G ■ ■	H ■ ■	15
S202	48	1FK7042 – 5AF71 – 1 ■ ■ 5 – Z	I28	G ■ ■	H ■ ■	22.5
S102	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	E13	G ■ ■	H ■ ■	17.7
S102	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	I14	G ■ ■	H ■ ■	17.7
S202	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	E24	G ■ ■	H ■ ■	25.2
S202	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	I25	G ■ ■	H ■ ■	25.2
S202	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	E26	G ■ ■	H ■ ■	25.2
S302	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	I36	G ■ ■	H ■ ■	34.4
S202	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	E27	G ■ ■	H ■ ■	25.2
S302	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	E37	G ■ ■	H ■ ■	34.4
S302	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	E38	G ■ ■	H ■ ■	34.4
S402	63	1FK7060 – 5AF71 – 1 ■ ■ 5 – Z	E48	G ■ ■	H ■ ■	43.6
• Encoder system in the motor:	Incremental encoder sin/cos 1 V _{pp} Absolute encoder EnDat 2,048 pulses/revolution (shaft height 48 and higher) Absolute encoder EnDat 512 pulses/revolution (only shaft height 36) Simple absolute encoder EnDat 32 pulses/revolution (shaft height 48 and higher) Resolver, multipole (pole number = pole number for motor) Resolver, 2 pole	A E H G S T				
• Holding brake:	Motor without holding brake Motor with holding brake	U V				
Refer to the required Order codes and helical geared motors, types of construction						

Helical and angled gearboxes

Output (S3 60%) P_2 kW	Output speed n_2 rpm	Rated output torque M_2 Nm	Max. permissible acceleration torque $M_{2\max}$ Nm	Nominal ratio i_{nom}	Exact ratio i_{exact}	Cantilever force gearbox shaft end F_{rperm} N	Overload factor f_B
2.11	325	61.9	126	9.2	1431/155	2194	1.4
2.08	171	116	217	17.5	351/20	2717	1.2
2.05	129 86	152 227	259 498	23 35	1863/80 2268/65	2986 4881	1.1 1.5
1.92	51	360	561	59	117/2	5799	1.0
1.94	43	430	791	70	279/4	7994	1.2
1.93	171	108	217	17.5	351/20	2717	1.7
	173 129	107 142	373 259	17.5 23	1998/115 1863/80	3869 2986	3.0 1.6
	128 86	144 213	458 720	23 35	117/5 873/25	4273 6347	2.7 2.9
1.79	51 43	335 399	561 609	59 70	117/2 2241/32	5799 6157	1.4 1.3
3.05	322	90.5	216	9.3	270/29	3143	1.6
3.01	173	166	373	17.5	1998/115	3869	1.5
3.03	172	168	557	17.5	612/35	5040	2.2
2.98	128	222	458	23	117/5	4273	1.4
	128	222	685	23	117/5	5554	2.0
2.95	86	328	720	35	873/25	6347	1.4
3.47	259	128	371	11.5	81/7	4392	1.9
3.44	172	191	557	17.5	612/35	5040	1.9
4.50	259	166	371	11.5	81/7	4392	1.3
4.45	172	247	557	17.5	612/35	5040	1.3

5.3 Planetary gearbox

5.3.1 Motors with mounted planetary gearboxes

The gearboxes assigned to the individual motors as well as the gearbox ratios, available for these motor-gearbox combinations are listed in the selection tables of the motor-specific Sections. When making a selection, the maximum permissible input speed of the gearbox must be observed (this is the same as the maximum motor speed).

The motor-gearbox combinations, listed in the selection tables, are mainly intended for positioning duty (S3). The manufacturer must be contacted if the motors are to be used in continuous duty at high speeds.

The 1FT□ and 1FK□ synchronous motors can be supplied ex factory (Siemens) complete with a planetary gearbox mounted through a flange.

5.3.2 Series SP+

5.3.2.1 Overview

1FK7 motors can be combined with planetary gearboxes to form compact coaxial drive units. The gearboxes are flanged directly to the drive end of the motors.

When selecting gearboxes ensure that the maximum motor speed does not exceed the permissible speed of the gearbox. In the case of high operating frequencies, allowance must be made for the withstand ratio f_2 .

The frictional losses of the gearbox must always be taken into account when engineering geared drives.

The gearboxes are only available in a non-balanced design.

5.3.2.2 Benefits

- High efficiency:
 - > 97% single-stage
 - > 94% 2-stage
- Minimum torsional play:
 - ≤ 4 arcmin single-stage
 - ≤ 6 arcmin 2-stage
- Power transmission from the central sun wheel to the planetary pinions
- No shaft deflections in the planetary pinions set due to the symmetrical force distribution
- Very low moment of inertia and hence short acceleration times of the motors
- Output shaft bearings dimensioned for high cantilever and axial loads with preloaded tapered-roller bearings
- The gearboxes are connected to the motor shaft via an integrated clamping hub. A plain motor shaft end is necessary for this purpose. Radial eccentricity tolerance N to DIN 42955 and vibration severity grade N to EN 60034-14 are sufficient. The motor flange is adapted via adapter plates.
- Output shaft of the gearbox exactly coaxial with the motor
- The gearboxes are sealed (seal between gear unit and motor) and filled with grease in the factory. They are lubricated for life and sealed. Gearboxes, frame sizes SP060S to SP 180S are suitable for all mounting positions.
- The quantity of oil in gearboxes, frame sizes SP210 and SP240 depends on the mounting position. The mounting position has to be specified when ordering.
- Gearbox degree of protection IP65 (IP64 for frame sizes SP 210 and SP 240)
- Small dimensions
- Low weight

5.3.2.3 Integration

The 1FK702□ to 1FK710□ motors are supplied ex factory (SIEMENS) complete with a planetary gearbox mounted through a flange.

The gearboxes assigned to the individual motors and gear ratios i available for these motor/gearbox combinations are listed in the selection table. When making a selection, the maximum permissible input speed of the gearbox must be observed (this is the same as the maximum motor speed).

The motor/gearbox combinations listed in the selection tables are mainly intended for cyclic operation S3 - 60 % (ON time ≤ 60 % and ≤ 20 min). Reduced maximum motor speeds and output torques apply for use in S1 continuous duty (ON time > 60 % or > 20 min).

Gearbox temperatures may not exceed $+90$ °C, the maximum permissible input speed is limited from a time perspective.

It must be ensured that the geared motors have adequate cooling through convection. The gearbox must be able to dissipate sufficient heat through its flange.

Generally, planetary gearboxes can be used for ambient temperatures of between 0 ° and 40 °C. Temperatures down to -15 °C can be handled when special measures are applied (mechanical design measures, appropriate selection of lubricants etc.).

1FK7 synchronous motors to be implemented as follows for mounting to a gearbox:

- with plain shaft end
- Degree of protection IP65
- Anthracite paint finish

5.3.2.4 Selection and ordering data, single-stage planetary gearbox, series SP+

Motor Natural cooling	Planetary gearbox single-stage			Available gear ratio $i =$				Max. permis- sible motor speed S3-60%	Max. perm. output torque S3-60%	Max. perm. radial output shaft load ¹⁾	Max. perm. axial output shaft load ¹⁾
Type	Type	Rotary play arcmin	Gearbox- weight approx. kg	4	5	7	10	n_{G1} (n_1) rpm	M_{G2} (T_{2B}) Nm	F_r (F_{2Rmax}) N	F_a (F_{2Amax}) N
1FK7022	SP 060S-MF1	≤ 4	1.9	✓	✓	✓	✓	6000	40 (32 for $i = 10$)	2700	2400
1FK7032				✓	✓	✓	✓				
1FK7033				✓	✓	✓	✓				
1FK7040	SP 075S-MF1	≤ 4	3.9	✓	✓	✓	✓	6000	110 (90 for $i = 10$)	4000	3350
1FK7042				✓	✓	✓	✓				
1FK7043				✓	✓	✓	✓				
1FK7044				✓	✓	✓	✓				
1FK7060	SP 100S-MF1	≤ 3	7.7	✓	✓	✓	✓	4500	300 (225 for $i = 10$)	6300	5650
1FK7061				✓	✓	✓	✓				
1FK7063				✓	✓	✓	✓				
1FK7064				✓	✓	✓	✓				
1FK7080	SP 140S-MF1	≤ 3	17.2	✓	✓	✓	✓	4000	600 (480 for $i = 10$)	9450	9870
1FK7082				✓	✓	✓	✓				
1FK7083				✓	✓	✓	✓				
1FK7085				✓	✓	✓	✓				
1FK7100	SP 180S-MF1	≤ 3	34	✓	✓	✓	✓	3500	1100	14700	14150
1FK7101				✓	✓	✓	✓				
1FK7103				✓	✓	✓	✓				
1FK7105				✓	✓	✓	–				
1FK7105	SP 210-MF1 ²⁾	≤ 4	53	–	–	–	✓	2200	2720	18000	22500
Order codes											
• Gearbox shaft with key				J02	J03	J05	J09				
• Gearbox shaft without key				J22	J23	J25	J29				
Ordering data	1FK7...-A.71-.. 5-Z			Order No. of the motor with identifier "-Z" and							
	J ■ ■			order code for mounting the planetary gearbox assigned to the motor							
	G			Prerequisite for mounting planetary gearboxes:							
	H			Plain motor shaft end IP65 degree of protection, anthracite paint finish							

1) Referred to the center of the drive shaft.

2) For this version, the oil quantity depends on the mounting position. In the case of a vertical mounting position, the 12th position in the

Order No. should be "9" and a further order code also has to be specified: 1FT6...-A.79-.. 5-Z J.. + M1 ■

G
H

H mounting position IM V1
G mounting position IM V3

5.3.2.5 Technical data, single-stage planetary gearbox, SP+ series

Planetary gearbox with 1FK7 motor, natural cooling									
Single-stage Type	Gearratio	Motor speed	Output torque	Moment of inertia of gearboxes (referred to the drive)					
		Continuous duty S1 ¹⁾		1FK702.	1FK703.	1FK704.	1FK706.	1FK708.	1FK710.
		n_{N1} rpm	$M_{N2} (T_{2N})$ Nm	J_1 kgcm ²	J_1 kgcm ²	J_1 kgcm ²	J_1 kgcm ²	J_1 kgcm ²	J_1 kgcm ²
SP 060S-MF1	4	3300	26	0.16	0.24	—	—	—	—
	5	3300	26	0.13	0.22	—	—	—	—
	7	4000	26	0.11	0.19	—	—	—	—
	10	4000	17	0.10	0.18	—	—	—	—
SP 075S-MF1	4	2900	75	—	—	0.94	—	—	—
	5	2900	75	—	—	0.83	—	—	—
	7	3100	75	—	—	0.73	—	—	—
	10	3100	52	—	—	0.67	—	—	—
SP 100S-MF1	4	2500	180	—	—	—	3.65	—	—
	5	2500	175	—	—	—	2.99	—	—
	7	2800	170	—	—	—	2.81	—	—
	10	2800	120	—	—	—	2.58	—	—
SP 140S-MF1	4	2100	360	—	—	—	—	14.26	—
	5	2100	360	—	—	—	—	13.06	—
	7	2600	360	—	—	—	—	11.97	—
	10	2600	220	—	—	—	—	11.39	—
SP 180S-MF1	4	1500	750	—	—	—	—	—	45.08
	5	1500	750	—	—	—	—	—	36.37
	7	2300	750	—	—	—	—	—	28.57
	10	2300	750	—	—	—	—	—	24.40
SP 210-MF1	4	1200	1000	—	—	—	—	—	75.80
	5	1200	1000	—	—	—	—	—	63.50
	7	1700	1000	—	—	—	—	—	52.90
	10	1700	1000	—	—	—	—	—	47.10
SP 240-MF1	4	1000	1700	—	—	—	—	—	—
	5	1000	1700	—	—	—	—	—	—
	7	1500	1700	—	—	—	—	—	—
	10	1500	1700	—	—	—	—	—	—

1) The limit values in the table apply for S1 continuous duty (ON time > 60% or > 20 min) for a maximum gearbox temperature of +90 °C (194 °F).

5.3.2.6 Selection and ordering data, 2-stage planetary gearbox, SP+ series

Motor Natural cooling	Planetary gearbox 2-stage		Gearbox weight, approx. kg	Available gearbox ratio $i =$					Max. perm. motor speed S3-60%	Max. perm. output torque S3-60%	Max. perm. radial output shaft load ¹⁾	Max. perm. axial output shaft load ¹⁾
	Type	Tor- sional back- lash arcmin		16	20	28	40	50	n_{G1} (n_1) rpm	M_{G2} (T_{2B}) Nm	F_r (F_{2Rmax}) N	F_a (F_{2Amax}) N
1FK7022	SP 060S-MF2	≤ 6	2	✓	✓	✓	—	—	6000	40	2700	2400
1FK7032				✓	✓	—	—	—				
1FK7033				✓	✓	—	—	—				
1FK7022	SP 075S - MF2	≤ 6	3.6	—	—	—	✓	✓	6000	110	4000	33500
1FK7032				—	—	✓	✓	✓				
1FK7033				—	—	✓	✓	✓				
1FK7040				✓	✓	✓	—	—				
1FK7042				✓	—	—	—	—				
1FK7043				✓	—	—	—	—				
1FK7040	SP 100S - MF2	≤ 5	7.9	—	—	—	✓	✓	4500	300	6300	5650
1FK7042				—	—	✓	✓	✓				
1FK7043				—	—	✓	✓	✓				
1FK7044				—	—	✓	✓	—				
1FK7060				✓	✓	✓	—	—				
1FK7061				✓	✓	—	—	—				
1FK7044	SP 140S - MF2	≤ 5	17	—	—	—	—	✓	4000	600	9450	9870
1FK7060				—	—	—	✓	✓				
1FK7061				—	—	—	✓	✓				
1FK7063				✓	✓	✓	—	—				
1FK7064				✓	✓	—	—	—				
1FK7080				✓	✓	✓	—	—				
1FK7082				✓	✓	—	—	—				
1FK7083				✓	✓	—	—	—				
1FK7063	SP 180S - MF2	≤ 5	36.4	—	—	—	✓	✓	4000	1100	14700	14150
1FK7064				—	—	—	✓	✓				
1FK7080				—	—	—	✓	✓				
1FK7082				—	—	✓	✓	—				
1FK7083				—	—	—	—	—				
1FK7085				✓	✓	—	—	—				
1FK7100				✓	✓	✓	—	—				
1FK7101				✓	—	—	—	—				
1FK7103				✓	—	—	—	—				
1FK7082	SP 210-MF2 ²⁾	≤ 6	50	—	—	—	✓	✓	3500	1900	18000	22500
1FK7083				—	—	✓	✓	—				
1FK7085				—	—	—	—	—				
1FK7100				—	—	✓	✓	✓				
1FK7101				—	—	—	—	—				
1FK7103	SP 240-MF2 ²⁾	≤ 6	70	—	—	✓	✓	✓	3500	3400	27000	27800
1FK7105				—	—	✓	—	—				
1FK7105				—	—	✓	—	—				

Order codes

- Gearbox shaft with key
- Gearbox shaft without key

J12 J13 J15 J16 J17
J32 J33 J35 J36 J37

Ordering data

1FK7...-A.71-.. 5-Z
J ■ ■

G
H

Order No. of the motor with identifier "-Z" and order code for mounting the planetary gearbox assigned to the motor
Prerequisites for mounting planetary gearboxes: Plain motor shaft end and IP65 degree of protection, anthracite paint finish

1) Referred to the center of the drive shaft.

2) For this version, the oil quantity depends on the mounting position. In the case of a vertical mounting position, the 12th position in the Order No. should be "9" and a further order code also has to be specified: 1FT6...-A.79-.. 5-Z J.. + M1 ■

G
H

H mounting position IM V1
G mounting position IM V3

5.3.2.7 Technical data, 2-stage planetary gearbox, SP+ series

Planetary gearbox with 1FK7 motor, natural cooling									
2-stage Type	Gearratio	Motor speed	Output torque	Moments of inertia of the gearboxes (referred to the drive)					
		Continuous duty S1 ¹⁾		1FK702.	1FK703.	1FK704.	1FK706.	1FK708.	1FK710.
		n_{N1} rpm	$M_{N2} (T_{2N})$ Nm	J_1 kgcm ²	J_1 kgcm ²	J_1 kgcm ²	J_1 kgcm ²	J_1 kgcm ²	J_1 kgcm ²
SP 060S-MF2	16	4400	26	0.08	0.18	—	—	—	—
	20	4400	26	0.07	0.17	—	—	—	—
	28	4400	26	0.06	0.16	—	—	—	—
	40	4400	26	0.06	0.16	—	—	—	—
	50	4800	26	0.06	0.16	—	—	—	—
SP 075S-MF2	16	3500	75	0.17	0.25	0.68	—	—	—
	20	3500	75	0.14	0.22	0.65	—	—	—
	28	3500	75	0.11	0.19	0.62	—	—	—
	40	3500	75	0.10	0.18	0.61	—	—	—
	50	3800	75	0.10	0.18	0.61	—	—	—
SP 100S-MF2	16	3100	180	—	—	0.96	2.60	—	—
	20	3100	180	—	—	0.84	2.48	—	—
	28	3100	180	—	—	0.73	2.36	—	—
	40	3100	180	—	—	0.67	2.31	—	—
	50	3500	175	—	—	0.66	2.30	—	—
SP 140S-MF2	16	2900	360	—	—	2.79	3.61	9.60	—
	20	2900	360	—	—	2.26	3.08	9.07	—
	28	2900	360	—	—	1.84	2.66	8.65	—
	40	2900	360	—	—	1.58	2.39	8.39	—
	50	3200	360	—	—	1.57	2.38	8.37	—
SP 180S-MF2	16	2700	750	—	—	—	10.24	15.83	14.36
	20	2700	750	—	—	—	8.48	14.08	12.06
	28	2700	750	—	—	—	6.90	12.49	11.02
	40	2700	750	—	—	—	6.06	11.65	10.17
	50	2900	750	—	—	—	5.98	11.58	10.10
SP 210-MF2	16	2100	1000	—	—	—	—	36.30	37.40
	20	2100	1000	—	—	—	—	34.50	35.60
	28	2100	1000	—	—	—	—	32.30	33.40
	40	2300	1000	—	—	—	—	23.10	24.30
	50	2300	1000	—	—	—	—	21.90	23.00
SP 240-MF2	16	1900	1700	—	—	—	—	—	48.40
	20	1900	1700	—	—	—	—	—	44.20
	28	1900	1700	—	—	—	—	—	38.60
	40	2100	1700	—	—	—	—	—	33.60
	50	2100	1700	—	—	—	—	—	30.60

1) The limit values in the table apply for S1 continuous duty (ON time > 60% or > 20 min) for a maximum gearbox temperature of +90 °C (194 °F).

5.3.3 LP+ series

5.3.3.1 Overview

1FK7 motors can be combined with planetary gearboxes to form compact coaxial drive units. The gearboxes are flanged directly to the drive end of the motors.

When selecting the gearboxes, ensure that the permissible speed of the gearbox is not exceeded by the maximum speed of the motor. For high operating frequencies an allowance factor f_2 must be taken into account, refer to Configuration Manual "General Section for Synchronous Motors". The frictional losses of the gearbox must always be taken into account when engineering geared drives.

The gearboxes are only available in a non-balanced design and with key.

5.3.3.2 Benefits

- High efficiency, single-stage: > 97 %
- Torsional backlash, single-stage: ≤ 12 arcmin
- Power transmission from the central sun wheel to the planetary pinions
- No shaft deflections in the planetary gear set due to the symmetrical force distribution
- The gearboxes are connected to the motor shaft via an integrated clamping hub. A plain motor shaft end is required for this, while radial eccentricity tolerance N to DIN 42955 and vibration severity grade N to EN60034-14 are sufficient. The motor flange is adapted via adapter plates.
- Output shaft of gearbox exactly coaxial with the motor
- The gearboxes can be mounted in any position
- The gearboxes are sealed (seal between gearbox and motor) and filled with grease in the factory. They are lubricated and sealed for their service life.
- Gear unit degree of protection IP64
- Small dimensions
- Low weight

5.3.3.3 Integration

1FK702 to 1FK710 synchronous motors are supplied ex factor (SIEMENS) complete with planetary gearbox mounted through a flange.

The gearboxes assigned to the individual motors as well as the gearbox ratios, available for these motor-gearbox combinations are listed in the Selection and ordering data table. When making a selection, the maximum permissible input speed of the gearbox must be observed (this is the same as the maximum motor speed).

The motor/gearbox combinations listed in the selection tables are mainly intended for cycle operation S3 - 60 % (ON time $\leq$ 60 % and $\leq$ 20 min). Reduced maximum motor speeds and output torques apply for use in S1 continuous duty (ON time $>$ 60 % or $>$ 20 min).

The gearbox temperature may not exceed 90 °C and the maximum permissible input speed is limited from a time perspective.

It must be ensured that the geared motors have adequate cooling through convection. The gearbox must be able to dissipate sufficient heat through its flange.

Generally, planetary gearboxes can be used for ambient temperatures of between 0 ° and 40 °C. Temperatures down to -15 °C can be handled when special measures are applied (mechanical design measures, appropriate selection of lubricants etc.).

1FK7 synchronous motors to be implemented as follows for mounting to a gearbox:

- with plain motor shaft end
- Radial eccentricity tolerance N
- Degree of protection IP64
- Anthracite paint finish

5.3.3.4 Selection and ordering data

Motor Natural cooling	Planetary gearbox single-stage		Available gear ratios $i =$		Max. perm. input speed	Max. perm. output torque	Max. perm. output shaft	Moment of inertia	
	Torsional backlash ≤ 12 arcmin				S5 duty	S5 duty	radial force ¹⁾	Gearbox	
Type	Type	Weight of gearbox, approx. kg	5	10	n_{G1}	M_{G2} at $i = 5$	M_{G2} at $i = 10$	J_G at $i = 5/10$	
					rpm	Nm	Nm	10^{-4} kgm^2	
1FK7022	LP 050-M01	0.75	✓	–	8000	12	11	650	0.053
1FK7022	LP 070-M01	2	–	✓	6000	35	32	1450	0.28
1FK7032			✓	✓					
1FK7033			✓	✓					
1FK7034			✓	✓					
1FK7040	LP 090-M01	4	✓	✓	6000	90	80	2400	1.77
1FK7042			✓	✓					
1FK7043			✓	✓					
1FK7044			✓	✓					
1FK7060	LP 120-M01	8.6	✓	✓	4800	220	200	4600	5.42
1FK7061			✓	✓					
1FK7063			✓	✓					
1FK7064			✓	–					
1FK7080	LP 155-M01	17	✓	✓	3600	450	350	7500	25.73
1FK7082			✓	✓					
1FK7083			✓	✓					
1FK7085			✓	–					
1FK7086			✓	–					
1FK7100			✓	–					
1FK7101			✓	–					
1FK7103			✓	–					

Order code

- Gear unit shaft with key

V40

V42

Ordering data

1FK7 ...-A.71-...3-Z

V ■ ■

G
H

Order No. of the motor with identifier "-Z" and
order code for mounting the planetary gearbox assigned to the motor
Prerequisite:
Plain motor shaft end, IP64, anthracite paint finish

Continuous duty S1

At the rated speed and rated torque, continuous duty is permissible. The gearbox temperature may not exceed 90 °C (194 °F).

Planetary gearbox single-stage	Rated input speed	Rated output torque	
Torsional backlash ≤ 12 arcmin			
Type	n_{N1} rpm	M_{N2} at $i = 5$ Nm	M_{N2} at $i = 10$ Nm
LP 050-M01	4000	5.7	5.2
LP 070-M01	3700	18	16.5
LP 090-M01	3400	45	40
LP 120-M01	2600	110	100
LP 155-M01	2000	320	190

1) Referred to the center of the output shaft, at 100 rpm.

Dimension Drawings

Note

Using a configuration interface that is very easy to understand, CAD CREATOR allows you to quickly find motor-specific

- dimension drawings
- 2D/3D CAD data

and supports you when generating plant/system documentation regarding project-specific information and parts lists.

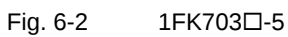
Internet: www.siemens.com/cad-creator

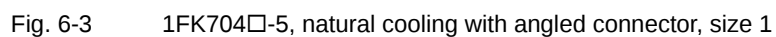
Note

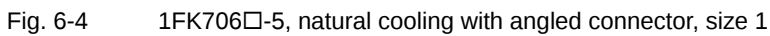
Siemens AG reserves the right to change the dimensions of the motors as part of mechanical design improvements without prior notice. This means that dimensions drawings can go out-of-date. Up-to-date dimension drawings can be requested at no charge from your local SIEMENS sales department.

[illegible]

Fig. 6-1 1FK702□-5







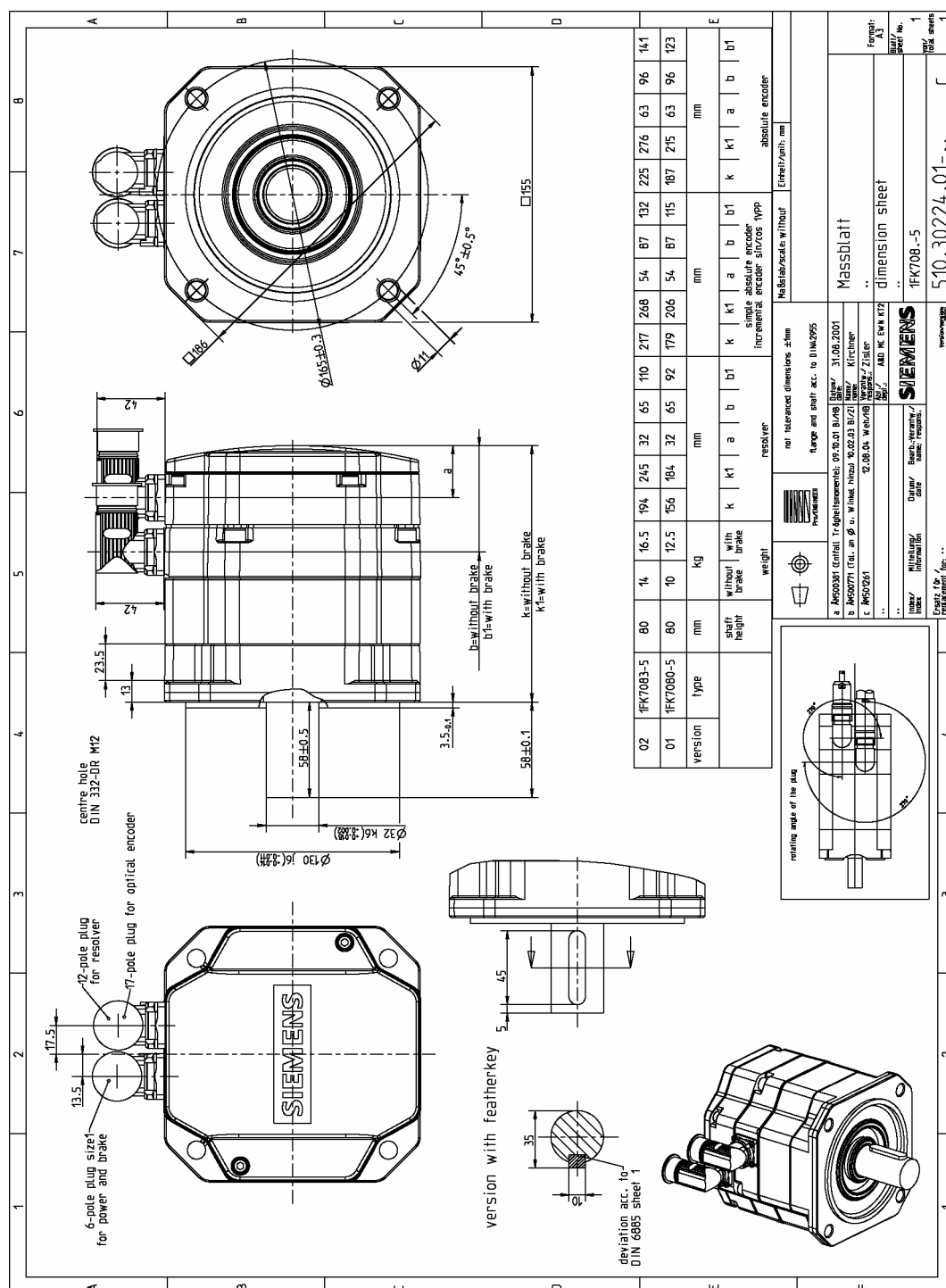
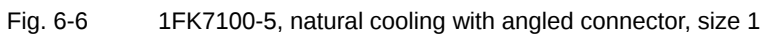
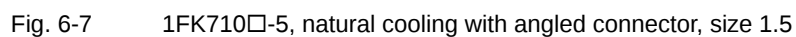


Fig. 6-5 1FK708-5, natural cooling with angled connector, size 1

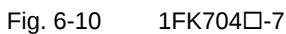






[illegible]

Fig. 6-9 1FK703□-7





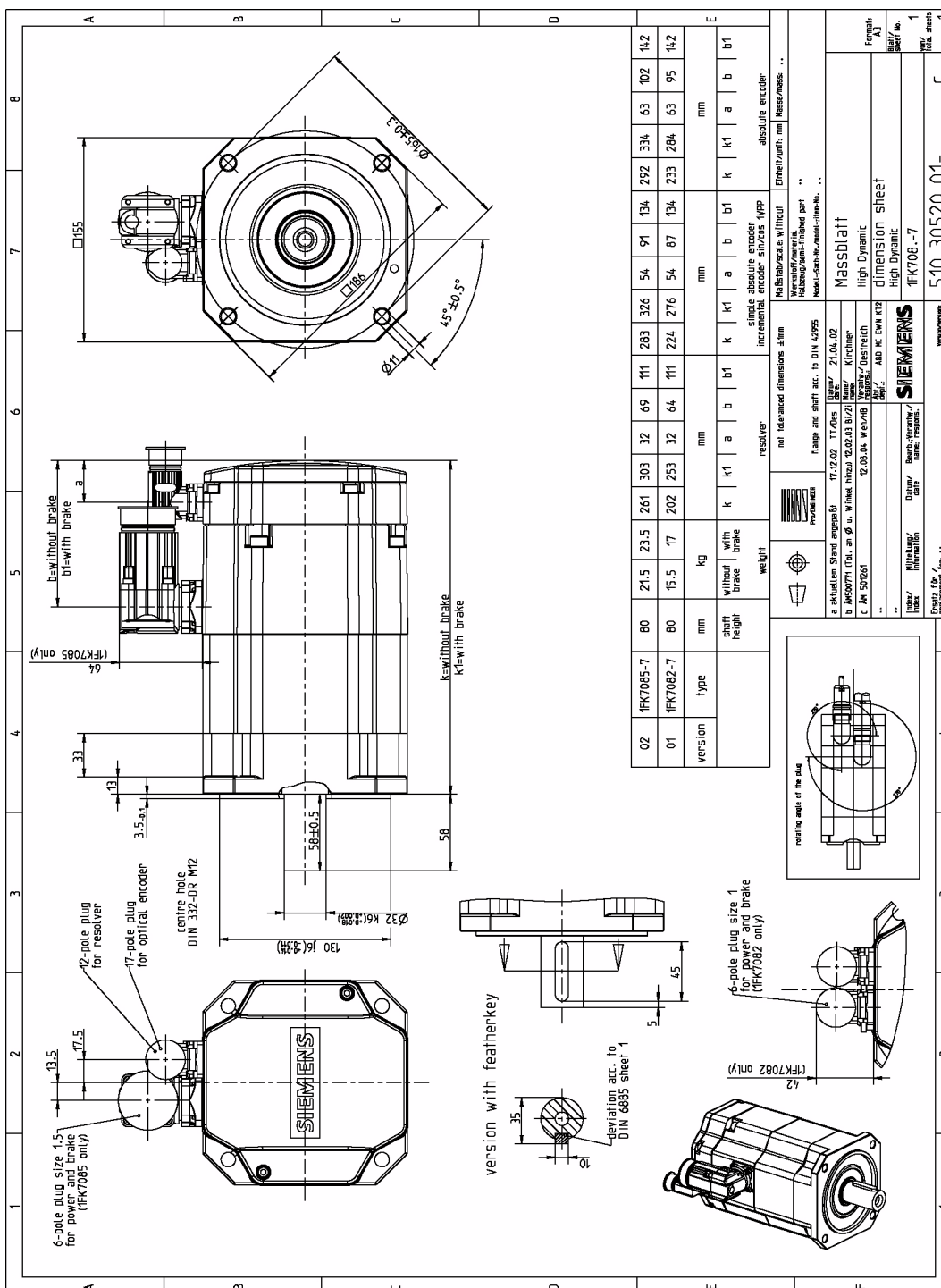


Fig. 6-12 1FK7082-7, 1FK7085-7

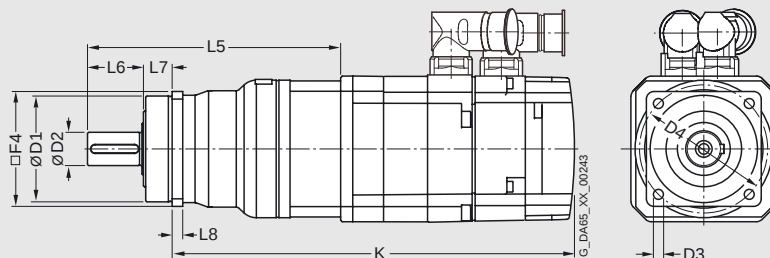


6.3 1FK7 motors with planetary gearbox

6.3.1 Dimension drawings 1FK7 Compact with single-stage planetary gearbox, SP+ series

For motor		Dimensions in mm (inches)										Resolver		Incremental encoder sin/cos 1 V _{pp} / simple absolute encoder ¹⁾		Absolute encoder	
Shaft height	Type	F4	Planetary gearbox Type	D1	D2	D3	D4	L5	L6	L7	L8	without brake K	with brake K	without brake K	with brake K	without brake K	with brake K
1FK7 Compact with SP+ planetary gearbox, single-stage, IM B5 type, natural cooling, with connector, without/with brake																	
28	1FK7022-5	62 (2.44)	SP060S-MF1	60 (2.36)	16 (0.63)	6 (0.24)	68 (2.68)	137 (5.40)	28 (1.10)	20 (0.79)	6 (0.24)	242 (9.53)	264 (10.40)	267 (10.52)	289 (11.39)	267 (10.52)	289 (11.39)
36	1FK7032-5	62 (2.44)	SP060S-MF1	60 (2.36)	16 (0.63)	6 (0.24)	68 (2.68)	142 (5.59)	28 (1.10)	20 (0.79)	6 (0.24)	244 (9.61)	269 (10.60)	269 (10.60)	294 (11.58)	269 (10.60)	294 (11.58)
48	1FK7040-5	76 (2.99)	SP075S-MF1	70 (2.76)	22 (0.87)	7 (0.28)	85 (3.35)	168 (6.62)	36 (1.42)	20 (0.79)	7 (0.28)	246 (9.69)	275 (10.84)	267 (10.52)	296 (11.66)	275 (10.84)	304 (11.98)
	1FK7042-5	76 (2.99)	SP075S-MF1	70 (2.76)	22 (0.87)	7 (0.28)	85 (3.35)	168 (6.62)	36 (1.42)	20 (0.79)	7 (0.28)	274 (10.80)	303 (11.94)	294 (11.58)	323 (12.73)	303 (11.94)	332 (13.08)
63	1FK7060-5	101 (3.98)	SP100S-MF1	90 (3.55)	32 (1.26)	9 (0.35)	120 (4.73)	217 (8.55)	58 (2.29)	30 (1.18)	10 (0.39)	286 (11.27)	329 (12.96)	309 (12.17)	352 (13.87)	317 (12.49)	360 (14.18)
	1FK7063-5	101 (3.98)	SP100S-MF1	90 (3.55)	32 (1.26)	9 (0.35)	120 (4.73)	217 (8.55)	58 (2.29)	30 (1.18)	10 (0.39)	331 (13.04)	374 (14.74)	354 (13.95)	397 (15.64)	362 (14.26)	405 (15.96)
80	1FK7080-5	141 (5.56)	SP140S-MF1	130 (5.12)	40 (1.58)	11 (0.43)	165 (6.50)	283 (11.15)	82 (3.23)	30 (1.18)	12 (0.47)	327 (12.88)	355 (13.99)	350 (13.79)	377 (14.85)	358 (14.11)	386 (15.21)
	1FK7083-5	141 (5.56)	SP140S-MF1	130 (5.12)	40 (1.58)	11 (0.43)	165 (6.50)	283 (11.15)	82 (3.23)	30 (1.18)	12 (0.47)	365 (14.38)	416 (16.39)	388 (15.29)	439 (17.30)	396 (15.60)	447 (17.61)
100	1FK7100-5	182 (7.17)	SP180S-MF1	160 (6.30)	55 (2.17)	14 (0.55)	215 (8.47)	310 (12.21)	82 (3.23)	30 (1.18)	15 (0.59)	383 (15.09)	402 (15.84)	406 (16.00)	425 (16.75)	414 (16.31)	433 (17.06)
	1FK7101-5	182 (7.17)	SP180S-MF1	160 (6.30)	55 (2.17)	14 (0.55)	215 (8.47)	310 (12.21)	82 (3.23)	30 (1.18)	15 (0.59)	409 (16.11)	438 (17.26)	432 (17.02)	461 (18.16)	440 (17.34)	469 (18.48)
	1FK7103-5	182 (7.17)	SP180S-MF1	160 (6.30)	55 (2.17)	14 (0.55)	215 (8.47)	310 (12.21)	82 (3.23)	30 (1.18)	15 (0.59)	435 (17.14)	464 (18.28)	458 (18.05)	487 (19.19)	466 (18.36)	495 (19.50)
	1FK7105-5	182 (7.17)	SP180S-MF1	160 (6.30)	55 (2.17)	14 (0.55)	215 (8.47)	310 (12.21)	82 (3.23)	30 (1.18)	15 (0.59)	487 (19.19)	516 (20.33)	510 (20.09)	539 (21.24)	518 (20.41)	547 (21.55)
	1FK7105-5	212 (8.35)	SP210-MF1	180 (7.09)	75 (2.96)	17 (0.67)	250 (9.85)	350 (13.79)	105 (4.14)	38 (1.50)	17 (0.67)	496 (19.54)	525 (20.69)	519 (20.45)	548 (21.59)	527 (20.76)	556 (21.91)

1FK702-5
1FK703-5
1FK704-5
1FK706-5
1FK708-5
1FK710-5



1) 1FK022/1FK7032 motors cannot be supplied with simple absolute encoders.

6.3.2 Dimension drawings 1FK7 High Dynamic with single-stage planetary gearbox, SP+ series

For motor			Dimensions in mm (inches)											Resolver		Incremental encoder sin/cos 1 V _{pp} / simple absolute encoder ¹⁾		Absolute encoder	
Shaft height	Type	F4	Planetary gearbox Type	D1	D2	D3	D4	L5	L6	L7	L8	K	without brake K	with brake K	without brake K	with brake K	without brake K	with brake K	
1FK7 High Dynamic with SP+ planetary gearbox, single-stage, IM B5 type, natural cooling, with connector, without/with brake																			
36	1FK7033-7	62 (2.44)	SP060S-MF1	60 (2.36)	16 (0.63)	6 (0.24)	68 (2.68)	142 (5.59)	28 (1.10)	20 (0.79)	6 (0.24)	263 (10.36)	288 (11.35)	288 (11.35)	313 (12.33)	288 (11.35)	313 (12.33)		
48	1FK7043-7	76 (2.99)	SP075S-MF1	70 (2.76)	22 (0.87)	7 (0.28)	85 (3.35)	168 (6.62)	36 (1.42)	20 (0.79)	7 (0.28)	303 (11.94)	332 (13.08)	324 (12.77)	353 (13.91)	332 (13.08)	361 (14.22)		
	1FK7044-7	76 (2.99)	SP075S-MF1	70 (2.76)	22 (0.87)	7 (0.28)	85 (3.35)	168 (6.62)	36 (1.42)	20 (0.79)	7 (0.28)	328 (12.92)	357 (14.07)	349 (13.75)	378 (14.89)	357 (14.07)	386 (15.21)		
63	1FK7061-5	101 (3.98)	SP100S-MF1	90 (3.55)	32 (1.26)	9 (0.35)	120 (4.73)	217 (8.55)	58 (2.29)	30 (1.18)	10 (0.39)	314 (12.37)	357 (14.07)	337 (13.28)	380 (14.97)	346 (13.63)	389 (15.33)		
	1FK7064-7	101 (3.98)	SP100S-MF1	90 (3.55)	32 (1.26)	9 (0.35)	120 (4.73)	217 (8.55)	58 (2.29)	30 (1.18)	10 (0.39)	378 (14.89)	421 (16.59)	401 (15.80)	444 (17.49)	410 (16.15)	453 (17.85)		
80	1FK7082-5	141 (5.56)	SP140S-MF1	130 (5.12)	40 (1.58)	11 (0.43)	165 (6.50)	283 (11.15)	82 (3.23)	30 (1.18)	12 (0.47)	373 (14.70)	424 (16.71)	395 (15.56)	447 (17.61)	404 (15.92)	455 (17.93)		
	1FK7085-7	141 (5.56)	SP140S-MF1	130 (5.12)	40 (1.58)	11 (0.43)	165 (6.50)	283 (11.15)	82 (3.23)	30 (1.18)	12 (0.47)	432 (17.02)	474 (18.68)	454 (17.89)	497 (19.58)	463 (18.24)	505 (19.90)		

1FK703.-7
1FK704.-7
1FK706.-7
1FK708.-7

G_Dat65_XX_00243

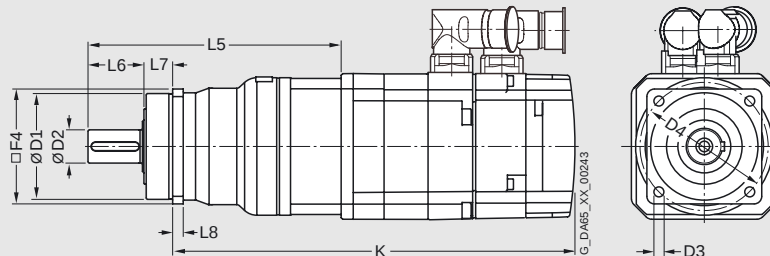
1) The 1FK7033 motor cannot be supplied with a simple absolute encoder.

1) The 1FK7033 motor cannot be supplied with a simple absolute encoder.

6.3.3 Dimension drawings 1FK7 Compact with 2-stage planetary gearbox, SP+ series

For motor		Dimensions in mm (inches)										Resolver		Incremental encoder sin/cos 1 V _{pp} / simple absolute encoder ¹⁾		Absolute encoder	
Shaft height	Type	F4	Planetary gearbox Type	D1	D2	D3	D4	L5	L6	L7	L8	without brake K	with brake K	without brake K	with brake K	without brake K	with brake K
1FK7 Compact with SP+ planetary gearbox, 2-stage, IM B5 type, natural cooling, with connector, without/with brake																	
28	1FK7022-5	62	SP060S - MF2	60	16	5.5	68	156	28	20	6	261	283	286	308	286	308
		(2.44)		(2.36)	(0.63)	(0.22)	(2.68)	(6.15)	(1.10)	(0.79)	(0.24)	(10.28)	(11.15)	(11.27)	(12.14)	(11.27)	(12.14)
	1FK7022-5	76	SP075S - MF2	70	22	6.6	85	175	36	20	7	272	294	297	319	297	319
		(2.99)		(2.76)	(0.87)	(0.26)	(3.35)	(6.90)	(1.42)	(0.79)	(0.28)	(10.72)	(11.58)	(11.70)	(12.57)	(11.70)	(12.57)
	1FK7022-5	101	SP100S - MF2	90	32	9	120	230	58	30	10	295	317	320	342	320	342
		(3.98)		(3.55)	(1.26)	(0.35)	(4.73)	(9.06)	(2.29)	(1.18)	(0.39)	(11.62)	(12.49)	(12.61)	(13.47)	(12.61)	(13.47)
36	1FK7032-5	62	SP060S - MF2	60	16	5.5	68	164	28	20	6	266	291	291	316	291	316
		(2.44)		(2.36)	(0.63)	(0.22)	(2.68)	(6.46)	(1.10)	(0.79)	(0.24)	(10.48)	(11.47)	(11.47)	(12.45)	(11.47)	(12.45)
	1FK7032-5	76	SP075S - MF2	70	22	6.6	85	179	36	20	7	273	298	298	323	298	323
		(2.99)		(2.76)	(0.87)	(0.26)	(3.35)	(7.05)	(1.42)	(0.79)	(0.28)	(10.76)	(11.74)	(11.74)	(12.73)	(11.74)	(12.73)
	1FK7032-5	101	SP100S - MF2	90	32	9	120	230	58	30	10	292	317	317	342	317	342
		(3.98)		(3.55)	(1.26)	(0.35)	(4.73)	(9.06)	(2.29)	(1.18)	(0.39)	(11.50)	(12.49)	(12.49)	(13.47)	(12.49)	(13.47)
48	1FK7040-5	76	SP075S - MF2	70	22	6.6	85	192	36	20	7	270	299	291	320	299	328
		(2.99)		(2.76)	(0.87)	(0.26)	(3.35)	(7.56)	(1.42)	(0.79)	(0.28)	(10.64)	(11.78)	(11.47)	(12.61)	(11.78)	(12.92)
	1FK7040-5	101	SP100S - MF2	90	32	9	120	234	58	30	10	280	309	301	330	309	338
		(3.98)		(3.55)	(1.26)	(0.35)	(4.73)	(9.22)	(2.29)	(1.18)	(0.39)	(11.03)	(12.17)	(11.86)	(13.00)	(12.17)	(13.32)
	1FK7040-5	141	SP140S - MF2	130	40	11	165	298	82	30	12	320	349	341	370	349	378
		(5.56)		(5.12)	(1.58)	(0.43)	(6.50)	(11.74)	(3.23)	(1.18)	(0.47)	(12.61)	(13.75)	(13.44)	(14.58)	(13.75)	(14.89)
	1FK7042-5	76	SP075S - MF2	70	22	6.6	85	192	36	20	7	298	327	298	347	327	356
		(2.99)		(2.76)	(0.87)	(0.26)	(3.35)	(7.56)	(1.42)	(0.79)	(0.28)	(11.74)	(12.88)	(11.74)	(13.67)	(12.88)	(14.03)
	1FK7042-5	101	SP100S - MF2	90	32	9	120	234	58	30	10	308	337	308	357	337	366
		(3.98)		(3.55)	(1.26)	(0.35)	(4.73)	(9.22)	(2.29)	(1.18)	(0.39)	(12.14)	(13.28)	(12.14)	(14.07)	(13.28)	(14.42)
	1FK7042-5	130	SP140S - MF2	130	40	11	165	298	82	30	12	348	377	368	397	377	406
		(5.12)		(5.12)	(1.58)	(0.43)	(6.50)	(11.74)	(3.23)	(1.18)	(0.47)	(13.71)	(14.85)	(14.50)	(15.64)	(14.85)	(16.00)
63	1FK7060-5	101	SP100S - MF2	90	32	9	120	252	58	30	10	321	364	344	387	352	395
		(3.98)		(3.55)	(1.26)	(0.35)	(4.73)	(9.93)	(2.29)	(1.18)	(0.39)	(12.65)	(14.34)	(13.55)	(15.25)	(13.87)	(15.56)
	1FK7060-5	141	SP140S - MF2	130	40	11	165	305	82	30	12	350	393	373	416	381	424
		(5.56)		(5.12)	(1.58)	(0.43)	(6.50)	(12.02)	(3.23)	(1.18)	(0.47)	(13.79)	(15.48)	(14.70)	(16.39)	(15.01)	(16.71)
	1FK7063-5	141	SP140S - MF2	130	40	11	165	305	82	30	12	395	438	418	461	426	469
		(5.56)		(5.12)	(1.58)	(0.43)	(6.50)	(12.02)	(3.23)	(1.18)	(0.47)	(15.56)	(17.26)	(16.47)	(18.16)	(16.78)	(18.48)
	1FK7063-5	182	SP180S - MF2	160	55	13.5	215	346	82	30	15	436	479	459	502	467	510
		(7.17)		(6.30)	(2.17)	(0.53)	(8.47)	(13.63)	(3.23)	(1.18)	(0.59)	(17.18)	(18.87)	(18.08)	(19.78)	(18.40)	(20.09)

1FK702.-5
1FK703.-5
1FK704.-5
1FK706.-5

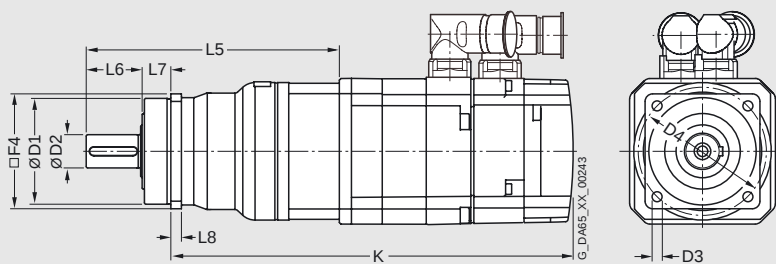


1) 1FK7022/1FK7032 motors cannot be supplied with simple absolute encoders.

1FK7 motors with planetary gearbox

For motor			Dimensions in mm (inches)											Resolver		Incremental encoder sin/cos 1 V _{pp} / simple absolute encoder		Absolute encoder	
Shaft height	Type	F4	Planetary gearbox Type	D1	D2	D3	D4	L5	L6	L7	L8	K	without brake K	with brake K	without brake K	with brake K	without brake K	with brake K	
1FK7 Compact with SP+ planetary gearbox, 2-stage, IM B5 type, natural cooling, with connector, without/with brake																			
80	1FK7080-5	141 (5.56)	SP140S - MF2	130 (5.12)	40 (1.58)	11 (0.43)	165 (6.50)	332 (13.08)	82 (3.23)	30 (1.18)	12 (0.47)	376 (14.81)	404 (15.92)	399 (15.72)	426 (16.78)	407 (16.04)	435 (17.14)		
	1FK7080-5	182 (7.17)	SP180S - MF2	160 (6.30)	55 (2.17)	13.5 (0.53)	215 (8.47)	355 (13.99)	82 (3.23)	30 (1.18)	15 (0.59)	399 (15.72)	427 (16.82)	422 (16.63)	449 (17.69)	430 (16.94)	458 (18.05)		
	1FK7080-5	212 (8.35)	SP210 - MF2	180 (7.09)	75 (2.96)	17 (0.67)	250 (9.85)	397 (15.64)	105 (4.14)	38 (1.50)	17 (0.67)	410 (16.15)	438 (17.26)	433 (17.06)	460 (18.12)	441 (17.38)	469 (18.48)		
	1FK7083-5	141 (5.56)	SP140S - MF2	130 (5.12)	40 (1.58)	11 (0.43)	165 (6.50)	332 (13.08)	82 (3.23)	30 (1.18)	12 (0.47)	414 (16.31)	465 (18.32)	437 (17.22)	488 (19.23)	445 (17.53)	496 (19.54)		
	1FK7083-5	182 (7.17)	SP180S - MF2	160 (6.30)	55 (2.17)	13.5 (0.53)	215 (8.47)	355 (13.99)	82 (3.23)	30 (1.18)	15 (0.59)	437 (17.22)	488 (19.23)	460 (18.12)	511 (20.13)	468 (18.44)	519 (20.45)		
	1FK7083-5	212 (8.35)	SP210 - MF2	180 (7.09)	75 (2.96)	17 (0.67)	250 (9.85)	397 (15.64)	105 (4.14)	38 (1.50)	17 (0.67)	448 (17.65)	499 (19.66)	471 (18.56)	522 (20.57)	479 (18.87)	530 (20.88)		
100	1FK7100-5	182 (7.17)	SP180S - MF2	160 (6.30)	55 (2.17)	13.5 (0.53)	215 (8.47)	310 (12.21)	82 (3.23)	30 (1.18)	15 (0.59)	383 (15.09)	402 (15.84)	406 (16.00)	425 (16.75)	414 (16.31)	433 (17.06)		
	1FK7100-5	212 (8.35)	SP210 - MF2	180 (7.09)	75 (2.96)	17 (0.67)	250 (9.85)	397 (15.64)	105 (4.14)	38 (1.50)	17 (0.67)	439 (17.30)	458 (18.05)	462 (18.20)	481 (18.95)	470 (18.52)	489 (19.27)		
	1FK7101-5	182 (7.17)	SP180S - MF2	160 (6.30)	55 (2.17)	13.5 (0.53)	215 (8.47)	310 (12.21)	82 (3.23)	30 (1.18)	15 (0.59)	409 (16.11)	438 (17.26)	432 (17.02)	461 (18.16)	440 (17.34)	469 (18.48)		
	1FK7101-5	212 (8.35)	SP210 - MF2	180 (7.09)	75 (2.96)	17 (0.67)	250 (9.85)	397 (15.64)	105 (4.14)	38 (1.50)	17 (0.67)	465 (18.32)	494 (19.46)	488 (19.23)	517 (20.37)	496 (19.54)	525 (20.69)		
	1FK7101-5	242 (9.53)	SP240 - MF2	200 (7.88)	85 (3.35)	17 (0.67)	290 (11.43)	454 (17.89)	130 (5.12)	40 (1.58)	20 (0.79)	495 (19.50)	524 (20.65)	518 (20.41)	547 (21.55)	526 (20.72)	555 (21.87)		
	1FK7103-5	182 (7.17)	SP180S - MF2	160 (6.30)	55 (2.17)	13.5 (0.53)	215 (8.47)	310 (12.21)	82 (3.23)	30 (1.18)	15 (0.59)	435 (17.14)	464 (18.28)	458 (18.05)	487 (19.19)	466 (18.36)	495 (19.50)		
	1FK7103-5	212 (8.35)	SP210 - MF2	180 (7.09)	75 (2.96)	17 (0.67)	250 (9.85)	397 (15.64)	105 (4.14)	38 (1.50)	17 (0.67)	491 (19.35)	520 (20.49)	514 (20.25)	543 (21.39)	522 (20.57)	551 (21.71)		
	1FK7103-5	242 (9.53)	SP240 - MF2	200 (7.88)	85 (3.35)	17 (0.67)	290 (11.43)	454 (17.89)	130 (5.12)	40 (1.58)	20 (0.79)	521 (20.53)	550 (21.67)	544 (21.43)	573 (22.58)	552 (21.75)	581 (22.89)		
	1FK7105-5	212 (8.35)	SP210 - MF2	180 (7.09)	75 (2.96)	17 (0.67)	250 (9.85)	397 (15.64)	105 (4.14)	38 (1.50)	17 (0.67)	543 (21.39)	572 (22.54)	566 (22.30)	595 (23.44)	574 (22.62)	603 (23.76)		
	1FK7105-5	242 (9.53)	SP240 - MF2	200 (7.88)	85 (3.35)	17 (0.67)	290 (11.43)	454 (17.89)	130 (5.12)	40 (1.58)	20 (0.79)	573 (22.58)	602 (23.72)	596 (23.48)	625 (24.63)	604 (23.80)	633 (24.94)		

1FK708-5
1FK710-5



6.3.4 Dimension drawings 1FK7 High Dynamic with 2-stage planetary gearbox, SP+ series

For motor			Dimensions in mm (inches)											Resolver		Incremental en- coder sin/cos 1 V _{pp} / simple absolute encoder ¹⁾		Absolute encoder	
Shaft height	Type	F4	Planetary gearbox Type	D1	D2	D3	D4	L5	L6	L7	L8	K	without brake K	with brake K	without brake K	with brake K	without brake K	with brake K	
1FK7 High Dynamic with SP+ planetary gearbox, 2-stage, IM B5 type, natural cooling, with connector, without/with brake																			
36	1FK7033-7	62	SP060S - MF2	60	16	5.5	68	164	28	20	6	285	310	310	335	310	335		
		(2.44)		(2.36)	(0.63)	(0.22)	(2.68)	(6.46)	(1.10)	(0.79)	(0.24)	(11.23)	(12.21)	(12.21)	(13.20)	(12.21)	(13.20)		
	1FK7033-7	76	SP075S - MF2	70	22	6.6	85	179	36	20	7	292	317	317	342	317	342		
		(2.99)		(2.76)	(0.87)	(0.26)	(3.35)	(7.05)	(1.42)	(0.79)	(0.28)	(11.50)	(12.49)	(12.49)	(13.47)	(12.49)	(13.47)		
	1FK7033-7	101	SP100S - MF2	90	32	9	120	230	58	30	10	311	336	336	361	336	361		
		(3.98)		(3.55)	(1.26)	(0.35)	(4.73)	(9.06)	(2.29)	(1.18)	(0.39)	(12.25)	(13.24)	(13.24)	(14.22)	(13.24)	(14.22)		
48	1FK7043-7	76	SP075S - MF2	70	22	6.6	85	192	36	20	7	327	356	348	377	356	385		
		(2.99)		(2.76)	(0.87)	(0.26)	(3.35)	(7.56)	(1.42)	(0.79)	(0.28)	(12.88)	(14.03)	(13.71)	(14.85)	(14.03)	(15.17)		
	1FK7043-7	101	SP100S - MF2	90	32	9	120	234	58	30	10	337	366	358	387	366	395		
		(3.98)		(3.55)	(1.26)	(0.35)	(4.73)	(9.22)	(2.29)	(1.18)	(0.39)	(13.28)	(14.42)	(14.11)	(15.25)	(14.42)	(15.56)		
	1FK7043-7	141	SP140S - MF2	130	40	11	165	298	82	30	12	377	406	398	427	406	435		
		(5.56)		(5.12)	(1.58)	(0.43)	(6.50)	(11.74)	(3.23)	(1.18)	(0.47)	(14.85)	(16.00)	(15.68)	(16.82)	(16.00)	(17.14)		
	1FK7044-7	101	SP100S - MF2	90	32	9	120	234	58	30	10	362	391	383	412	391	420		
		(3.98)		(3.55)	(1.26)	(0.35)	(4.73)	(9.22)	(2.29)	(1.18)	(0.39)	(14.26)	(15.41)	(15.09)	(16.23)	(15.41)	(16.55)		
	1FK7044-7	141	SP140S - MF2	130	40	11	165	298	82	30	12	402	431	432	452	431	460		
		(5.56)		(5.12)	(1.58)	(0.43)	(6.50)	(11.74)	(3.23)	(1.18)	(0.47)	(15.84)	(16.98)	(17.02)	(17.81)	(16.98)	(18.12)		
63	1FK7061-7	101	SP100S - MF2	90	32	9	120	252	58	30	10	349	392	372	415	381	424		
		(3.98)		(3.55)	(1.26)	(0.35)	(4.73)	(9.93)	(2.29)	(1.18)	(0.39)	(13.75)	(15.44)	(14.66)	(16.35)	(15.01)	(16.71)		
	1FK7061-7	141	SP140S - MF2	130	40	11	165	305	82	30	12	378	421	401	444	410	453		
		(5.56)		(5.12)	(1.58)	(0.43)	(6.50)	(12.02)	(3.23)	(1.18)	(0.47)	(14.89)	(16.59)	(15.80)	(17.49)	(16.15)	(17.85)		
	1FK7064-7	141	SP140S - MF2	130	40	11	165	305	82	30	12	442	485	465	508	474	517		
		(5.56)		(5.12)	(1.58)	(0.43)	(6.50)	(12.02)	(3.23)	(1.18)	(0.47)	(17.41)	(19.11)	(18.32)	(20.02)	(18.68)	(20.37)		
80	1FK7082-7	141	SP140S - MF2	130	40	11	165	332	82	30	12	422	473	444	496	453	504		
		(5.56)		(5.12)	(1.58)	(0.43)	(6.50)	(13.08)	(3.23)	(1.18)	(0.47)	(16.63)	(18.64)	(17.49)	(19.54)	(17.85)	(19.86)		
	1FK7082-7	182	SP180S - MF2	160	55	13.5	215	355	82	30	15	445	496	467	519	476	527		
		(7.17)		(6.30)	(2.17)	(0.53)	(8.47)	(13.99)	(3.23)	(1.18)	(0.59)	(17.53)	(19.54)	(18.40)	(20.45)	(18.75)	(20.76)		
	1FK7082-7	212	SP210 - MF2	180	75	17	250	397	105	38	17	456	507	478	530	487	538		
		(8.35)		(7.09)	(2.96)	(0.67)	(9.85)	(15.64)	(4.14)	(1.50)	(0.67)	(17.97)	(19.98)	(18.83)	(20.88)	(19.19)	(21.20)		
	1FK7085-7	141	SP140S - MF2	130	40	11	165	332	82	30	12	481	523	503	546	512	554		
		(5.56)		(5.12)	(1.58)	(0.43)	(6.50)	(13.08)	(3.23)	(1.18)	(0.47)	(18.95)	(20.61)	(19.82)	(21.51)	(20.17)	(21.83)		
	1FK7085-7	212	SP210 - MF2	180	75	17	250	397	105	38	17	515	557	537	580	546	588		
		(8.35)		(7.09)	(2.96)	(0.67)	(9.85)	(15.64)	(4.14)	(1.50)	(0.67)	(20.29)	(21.95)	(21.16)	(22.85)	(21.51)	(23.17)		

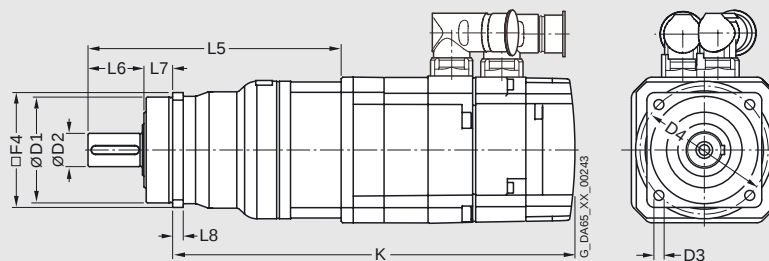
1FK 703-7
1FK 704-7
1FK 706-7
1FK 708-7

Technical drawing of a 1FK7 motor showing dimensions: L5, L6, L7, L8, K, D1, D2, D3, D4, and DF4.

Technical drawing of a 1FK7 motor showing dimensions: D3 and D4.

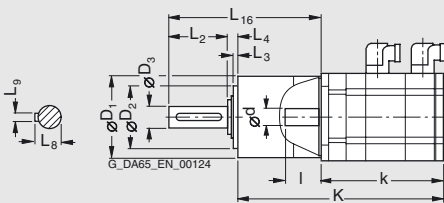
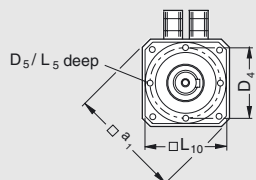
1) The 1FK7033 motor cannot be supplied with a simple absolute encoder.

1FK 703.-7
1FK 704.-7
1FK 706.-7
1FK 708.-7

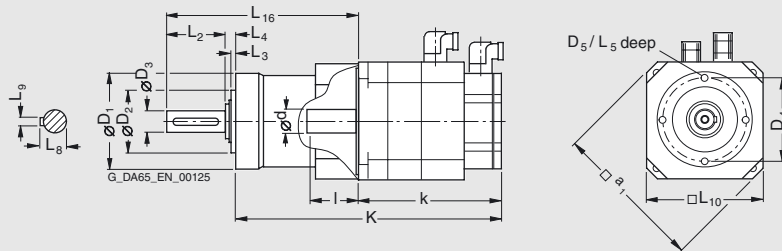


1) The 1FK7033 motor cannot be supplied with a simple absolute encoder.

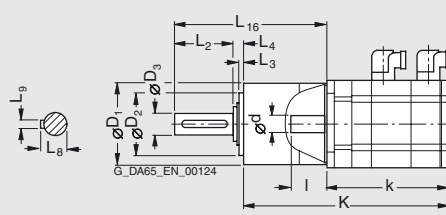
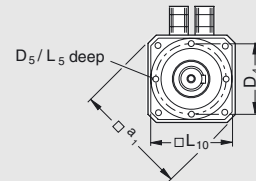
6.3.5 Dimension drawings 1FK7 Compact with single-stage planetary gearbox, LP+ series

For motor		Dimensions in mm (inches)																
Shaft height	Type	DIN IEC	Resolver				Simple absolute encoder (EnDat)				Incremental encoder sin/cos 1 V _{pp}				Absolute encoder (EnDat)			
			without brake		with brake		without brake		with brake		without brake		with brake		l E	d D	a ₁ P	
			k LB	K –	k LB	K –	k LB	K –	k LB	K –	k LB	K –	k LB	K –				
1FK7 Compact with LP planetary gearbox, single-stage, IM B5 type, natural cooling, with connector, without/with brake																		
28	1FK7022-5		153 (6.02)	216 (8..50)	175 (6.89)	238 (9.37)	178 (7.01)	241 (9.49)	200 (7.87)	263 (10.35)	178 (7.01)	241 (9.49)	200 (7.87)	263 (10.35)	20 (0.79)	9 (0.35)	-	
	1FK7022-5		153 (6.02)	236 (9.29)	175 (6.89)	258 (10.16)	178 (7.01)	261 (10.28)	200 (7.87)	283 (11.14)	178 (7.01)	261 (10.28)	200 (7.87)	283 (11.14)				
36	1FK7032-5		150 (5.91)	240 (9.45)	175 (6.89)	265 (10.43)	175 (6.89)	265 (10.43)	200 (7.87)	290 (11.42)	175 (6.89)	265 (10.43)	200 (7.87)	290 (11.42)	30 (1.18)	14 (0.55)	92 (3.62)	
	1FK7034-5		175 (6.89)	265 (10.43)	200 (7.87)	290 (11.42)	200 (7.87)	290 (11.42)	225 (8.86)	315 (12.40)	200 (7.87)	290 (11.42)	225 (8.86)	315 (12.40)	30 (1.18)	14 (0.55)	92 (3.62)	
48	1FK7040-5		135 (5.31)	247 (9.72)	164 (6.46)	276 (10.87)	155 (6.10)	267 (10.51)	184 (7.24)	296 (11.65)	164 (6.46)	276 (10.87)	193 (7.60)	305 (12.01)	40 (1.57)	19 (0.75)	120 (4.72)	
	1FK7042-5		162 (6.38)	274 (10.79)	191 (7.52)	303 (11.93)	183 (7.20)	295 (11.61)	212 (8.35)	324 (12.76)	191 (7.52)	303 (11.93)	220 (8.66)	332 (13.07)				
63	1FK7060-5		157 (6.18)	297 (11.69)	200 (7.87)	340 (13.39)	180 (7.09)	320 (12.60)	223 (8.78)	363 (14.29)	188 (7.40)	328 (12.91)	231 (9.09)	371 (14.61)	50 (1.97)	24 (0.94)	155 (6.10)	
	1FK7063-5		202 (7.95)	342 (13.46)	245 (9.65)	385 (15.16)	225 (8.86)	365 (14.37)	268 (10.55)	408 (16.06)	233 (9.17)	373 (14.69)	276 (10.87)	416 (16.38)				
80	1FK7080-5		156 (6.14)	325 (12.80)	184 (7.24)	353 (13.90)	179 (7.05)	347 (13.66)	206 (8.11)	375 (14.76)	187 (7.36)	355 (13.98)	215 (8.46)	384 (15.12)	58 (2.28)	32 (1.26)	186 (7.32)	
	1FK7083-5		194 (7.64)	363 (14.29)	245 (9.65)	414 (16.30)	217 (8.54)	385 (15.16)	268 (10.55)	436 (17.17)	225 (8.86)	393 (15.47)	276 (10.87)	444 (17.48)				
Shaft height	Type	Planetary gearbox Type	D ₁ –	D ₂ –	D ₃ –	D ₄ –	D ₅ –	L ₂ –	L ₃ –	L ₄ –	L ₅ –	L ₈ –	L ₉ –	L ₁₀ –	L ₁₆ –			
28	1FK7022-5	LP050-M01	50 (1.97)	35 (1.38)	12 (0.47)	44 (1.73)	M 4	18 (0.71)	4 (0.16)	7 (0.28)	8 (0.31)	14 (0.55)	4 (0.16)	50 (1.97)	88 (3.46)			
	1FK7022-5	LP070-M01	70 (2.76)	52 (2.05)	16 (0.63)	62 (2.44)	M 5	28 (1.10)	5 (0.20)	8 (0.31)	10 (0.39)	18 (0.71)	5 (0.20)	70 (2.76)	119 (4.69)			
36	1FK7032-5	LP070-M01	70 (2.76)	52 (2.05)	16 (0.63)	62 (2.44)	M 5	28 (1.10)	5 (0.20)	8 (0.31)	10 (0.39)	18 (0.71)	5 (0.20)	70 (2.76)	126 (4.96)			
	1FK7034-5																	
48	1FK7040-5	LP090-M01	90 (3.54)	68 (2.68)	22 (0.87)	80 (3.15)	M 6	36 (1.42)	5 (0.20)	10 (0.39)	12 (0.47)	25 (0.98)	6 (0.24)	90 (3.54)	158 (6.22)			
	1FK7042-5																	
63	1FK7060-5	LP120-M01	120 (4.72)	90 (3.54)	32 (1.26)	108 (4.25)	M 8	58 (2.28)	6 (0.24)	12 (0.47)	16 (0.63)	35 (1.38)	10 (0.39)	120 (4.72)	210 (8.27)			
	1FK7063-5																	
80	1FK7080-5	LP155-M01	155 (6.10)	120 (4.72)	40 (1.57)	140 (5.51)	M 10	82 (3.23)	8 (0.31)	15 (0.59)	20 (0.79)	43 (1.69)	12 (0.47)	150 (5.91)	266 (10.47)			
	1FK7083-5																	
1FK702 -5 1FK703 -5 1FK704 -5 1FK706 -5 1FK708 -5																		
																		

1FK7 motors with planetary gearbox

For motor		Dimensions in mm (inches)																
Shaft height	Type	DIN IEC	Resolver				Simple absolute encoder (EnDat) Incremental encoder sin/cos 1 V _{pp}				Absolute encoder (EnDat)				l	d	a ₁ P	
			without brake		with brake		without brake		with brake		without brake		with brake					
			k LB	K —	k LB	K —	k LB	K —	k LB	K —	k LB	K —	k LB	K —				
1FK7 Compact with LP planetary gearbox, single-stage, IM B5 type, natural cooling, with connector, without/with brake																		
100	1FK7100-5		185 (7.28)	374 (14.72)	204 (8.03)	393 (15.47)	208 (8.19)	396 (15.59)	227 (8.94)	415 (16.34)	216 (8.50)	404 (15.91)	235 (9.25)	423 (16.65)	80 (3.15)	38 (1.50)	240 (9.45)	
	1FK7101-5		211 (8.31)	400 (15.75)	240 (9.45)	429 (16.89)	234 (9.21)	422 (16.61)	263 (10.35)	452 (17.80)	242 (9.53)	430 (16.93)	271 (10.67)	460 (18.11)				
	1FK7103-5		237 (9.33)	426 (16.77)	266 (10.47)	455 (17.91)	260 (10.24)	448 (17.64)	289 (11.38)	478 (18.82)	268 (10.55)	456 (17.95)	297 (11.69)	486 (19.13)				
	1FK7105-5		289 (11.38)	478 (18.82)	318 (12.52)	507 (19.96)	312 (12.28)	500 (19.69)	341 (13.43)	530 (20.87)	320 (12.60)	508 (20.00)	349 (13.74)	538 (21.18)				
Shaft height	Type	Planetary gearbox Type																
			D ₁ —	D ₂ —	D ₃ —	D ₄ —	D ₅ —	L ₂ —	L ₃ —	L ₄ —	L ₅ —	L ₈ —	L ₉ —	L ₁₀ —	L ₁₆ —			
100	1FK710.-5	LP155-M01	155 (6.10)	120 (4.72)	40 (1.57)	140 (5.51)	M 10	82 (3.23)	8 (0.31)	15 (0.59)	20 (0.79)	43 (1.69)	12 (0.47)	150 (5.91)	286 (11.26)			
1FK710.-5																		

6.3.6 Dimension drawings 1FK7 High Dynamic with single-stage planetary gearbox, LP+ series

For motor		Dimensions in mm (inches)																
Shaft height	Type	DIN IEC	Resolver				Simple absolute encoder (EnDat) Incremental encoder sin/cos 1 V _{pp}				Absolute encoder (EnDat)				l E	d D	a ₁ P	
			without brake		with brake		without brake		with brake		without brake		with brake					
			k LB	K —	k LB	K —	k LB	K —	k LB	K —	k LB	K —	k LB	K —				
1FK7 High Dynamic with LP planetary gearbox, single-stage, IM B5 type, natural cooling, with connector, without/with brake																		
36	1FK7033-7		170 (6.69)	260 (10.24)	195 (7.68)	285 (11.22)	195 (7.68)	285 (11.22)	220 (8.66)	310 (12.20)	195 (7.68)	285 (11.22)	220 (8.66)	310 (12.20)	30 (1.18)	14 (0.55)	92 (3.62)	
48	1FK7043-7		191 (7.52)	303 (11.93)	220 (8.66)	332 (13.07)	212 (8.35)	324 (12.76)	240 (9.45)	352 (13.86)	220 (8.66)	332 (13.07)	249 (9.80)	361 (14.21)	40 (1.57)	19 (0.75)	120 (4.72)	
	1FK7044-7		216 (8.50)	328 (12.91)	245 (9.65)	357 (14.06)	237 (9.33)	349 (13.74)	265 (10.43)	377 (14.84)	245 (9.65)	357 (14.06)	274 (10.79)	386 (15.20)				
63	1FK7061-7		185 (7.28)	325 (12.80)	228 (8.98)	368 (14.49)	208 (8.19)	348 (13.70)	251 (9.88)	391 (15.39)	217 (8.54)	357 (14.06)	260 (10.24)	400 (15.75)	50 (1.97)	24 (0.94)	155 (6.10)	
	1FK7064-7		249 (9.80)	389 (15.31)	292 (11.50)	432 (17.01)	272 (10.71)	412 (16.22)	315 (12.40)	455 (17.91)	281 (11.06)	421 (16.57)	324 (12.76)	464 (18.27)				
80	1FK7082-7		201 (7.91)	370 (14.57)	254 (10.00)	423 (16.65)	224 (8.82)	393 (15.47)	276 (10.87)	445 (17.52)	232 (9.13)	401 (15.79)	285 (11.22)	454 (17.87)	58 (2.28)	32 (1.26)	186 (7.32)	
	1FK7085-7		261 (10.28)	430 (16.93)	304 (11.97)	473 (18.62)	284 (11.18)	453 (17.83)	326 (12.83)	495 (19.49)	292 (11.50)	461 (18.15)	335 (13.19)	504 (19.84)				
	1FK7086-7																	
Shaft height	Type	Planetary gearbox Type																
			D ₁ —	D ₂ —	D ₃ —	D ₄ —	D ₅ —	L ₂ —	L ₃ —	L ₄ —	L ₅ —	L ₈ —	L ₉ —	L ₁₀ —	L ₁₆ —			
36	1FK7033-7	LP070-M01	70 (2.76)	52 (2.05)	16 (0.63)	62 (2.44)	M 5	28 (1.10)	5 (0.20)	8 (0.31)	10 (0.39)	18 (0.71)	5 (0.20)	70 (2.76)	126 (4.96)			
48	1FK7043-7	LP090-M01	90 (3.54)	68 (2.68)	22 (0.87)	80 (3.15)	M 6	36 (1.42)	5 (0.20)	10 (0.39)	12 (0.47)	25 (0.98)	6 (0.24)	90 (3.54)	158 (6.22)			
	1FK7044-7																	
63	1FK7061-7	LP120-M01	120 (4.72)	90 (3.54)	32 (1.26)	108 (4.25)	M 8	58 (2.28)	6 (0.24)	12 (0.47)	16 (0.63)	35 (1.38)	10 (0.39)	120 (4.72)	210 (8.27)			
	1FK7064-7																	
80	1FK7082-7	LP155-M01	155 (6.10)	120 (4.72)	40 (1.57)	140 (5.51)	M 10	82 (3.23)	8 (0.31)	15 (0.59)	20 (0.79)	43 (1.69)	12 (0.47)	150 (5.91)	266 (10.47)			
	1FK7085-7																	
	1FK7086-7																	
1FK7033-7 1FK704-7 1FK706-7 1FK708-7																		
																		

Appendix

A.1 References

An overview of publications that is updated monthly is provided in a number of languages in the Internet at:

<<http://www.siemens.com/motioncontrol>>
through "Support", "Technical Documentation", "Documentation Overview"

General Documentation

/D 21.2/	SINAMICS S120 Catalog SINAMICS S120 Servo Control Drive System
/NC 61/	SINUMERIK and SIMODRIVE Catalog Automation Systems for Machine Tools
/DA65.3/	SIMOVERT MASTERDRIVES Catalog Synchronous and Induction Motors for SIMOVERT MASTERDRIVES

Electronic Documentation

/CD1/	DOC ON CD The SINUMERIK System (includes all SINUMERIK 840D/810D and SIMODRIVE 611D)
/CD2/	DOC ON CD The SINAMICS System

Manufacturer/Service Documentation

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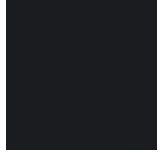
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