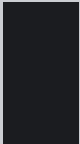


Configuration Manual 10/2005 Edition

simodrive & masterdrives

SIEMENS

SIMODRIVE 611 / MASTERDRIVES MC
1FT6 Synchronous Motors



SIMODRIVE 611, SIMOVERT MASTERDRIVES MC

1FT6 synchronous motors

Configuration Manual

(PFT6), 10.2005 Edition

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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.

Preface

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 1: Configuration Manual, individual sections

Title	Order number (MLFB)	Language
Synchronous Motors, General Section for SIMODRIVE 611, SIMOVERT MASTERDRIVES MC	6SN1197-0AD07-0BP□	German
Synchronous Motors, 1FK7 Motor Section for SIMODRIVE 611 and MASTERDRIVES MC	6SN1197-0AD06-0BP□	German
Synchronous Motors, 1FK6 Motor Section for SIMODRIVE 611 and MASTERDRIVES MC	6SN1197-0AD05-0BP□	German
Synchronous Motors, 1FK6 Motor Section for SIMODRIVE 611 and MASTERDRIVES MC	6SN1197-0AD02-0BP□	German
Synchronous Motors, 1FT5 Motor Section for SIMODRIVE 611	6SN1197-0AD01-0BP□	German

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 Features

Overview

1FT6 motors are permanently excited synchronous motors with compact dimensions.

1FT6 motors with integrated encoders can be operated using the SIMODRIVE 611 digital/universal HR and SIMOVERT MASTERDRIVES MC converter system.

The fully digital control system of the SIMODRIVE611 SIMOVERT MASTERDRIVES MC converter and the encoder technology of the 1FT6 motors fulfill the highest demands in terms of dynamic performance, speed setting range, and rotational and positioning accuracy.

Depending on the cooling type, 1FT6 motors can be selected with natural cooling, forced cooling and also with water cooling. For natural cooling, the power loss is dissipated through the surface of the motor while for forced cooling a mounted fan dissipates the power loss. Maximum power ratings as well as high degree of protection can be achieved using water cooling.

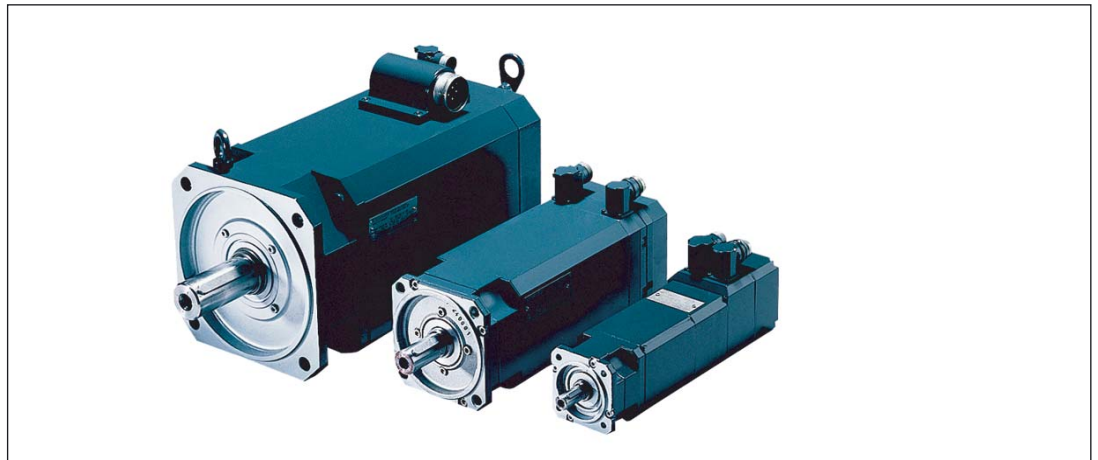


Fig. 1-1

1FT6 motors

Features

Benefits

- Optimum surface quality of the workpiece due to high rotational accuracy (sinusoidal current injection)
- Short non-productive idle times due to high dynamic performance
- Power and signal connections for use in very dirty environments
- Can absorb high cantilever forces
- High thermal reserves for continuous and overload conditions
- High, brief overload capability (250 ms)
- Extremely high efficiency
- Extremely good drive dynamic response due to the lower rotor moments of inertia
- Low torque ripple 1 % (average value)
- High degree of protection

Application

- High-performance machine tools
- Machines with high demands placed on the dynamic response, precision and flexibility - e.g. packaging machines, high-bay racking vehicles, conveyor systems, handling equipment and printing machines.

1.2 Technical features

Table 1-1 Features of the standard design

Technical features	Version
Motor type	Permanent-magnet synchronous motor
Type of construction (acc. to EN60034-7; IEC 60034-7)	IM B5 (IM V1, IM V3) for SH 28 to 132 IM B35 (IM V15, IM V36) for 132 to 160
Degree of protection ⁴⁾ (acc. to EN60034-5; IEC 60034-5)	IP64; core types IP65
Cooling (acc. to EN60034-6; IEC 60034-6)	Naturally cooling ²⁾ Forced ventilation ^{2) 3)} Water cooling
Thermal motor protection (acc. to EN 60034-11; IEC 60034-11)	KTY84 temperature sensor in the stator winding
Shaft end (acc. to DIN 748-3; IEC 60072-1)	Cylindrical; without keyway and without key; tolerance field k6
Radial eccentricity, concentricity and axial eccentricity (acc. to DIN 42955; IEC 60072-1)	Tolerance N (normal)
Vibration severity (acc. to EN 60034-14, IEC 60034-14)	Grade N (normal)
Max. sound pressure level (acc. to DIN EN ISO 1680) + 3 dB	SH 28 to 48: approx. 55 dB(A) SH 63 to 100: approx. 70 dB(A) SH 132 to 160 (naturally cooled or water-cooled): approx. 70 dB(A) SH 132 to 160 (force-ventilated): approx. 74 dB(A) The specified values apply to all shaft heights up to speed n_N .
Bearings	Roller bearings with permanent grease lubrication (lubrication over the bearing life-time) Bearing lifetime: 20000 h SH 36, 48: Locating bearings on the NDE SH 28, 63 to 160: Locating bearing on the DE
Winding insulation (acc. 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 $40 \text{ }^\circ\text{C}$ ($+104^\circ\text{F}$).
Installation altitude (acc. to EN and IEC 60034-1)	= 1000 m above sea level, otherwise power de-rating factor ²⁾ 2000 m factor 0.94 2500 m factor 0.9
Magnet material	Rare-earth magnet material
Electrical connection	The power is connected either through a terminal box or connector. Encoder signals through connectors.
Speed encoder, integrated	Optical encoders: • Incremental encoders sin/cos 1Vpp (I-2048) • Absolute encoder EnDat (A-2048 and A-512) ¹⁾ • Resolver, 2-pole/multi-pole ⁴⁾ For more detailed information, refer to the Chapter "Encoders".
Rating plate	A second rating plate is provided for all motors

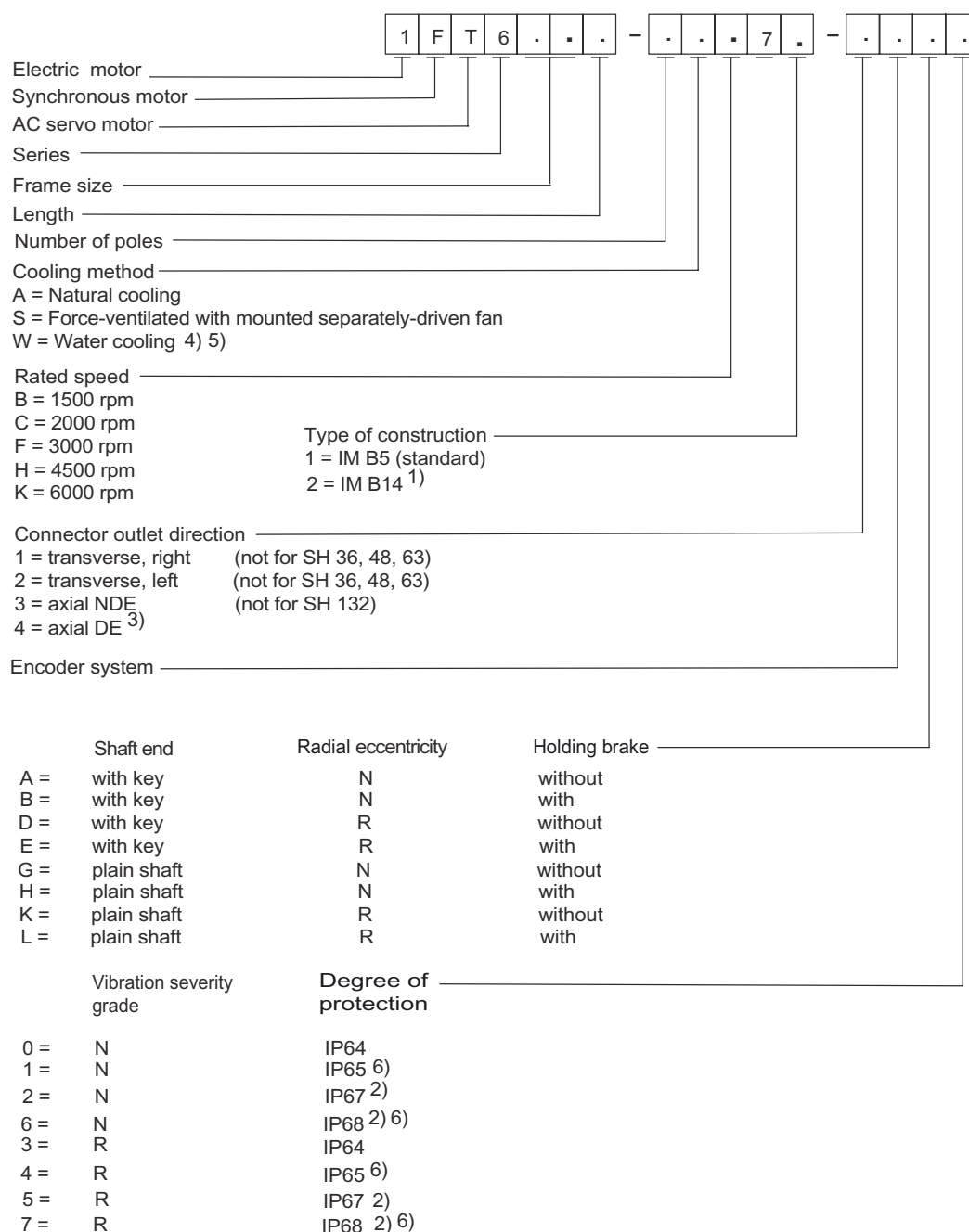
Table 1-1 Features of the standard design

Technical features	Version
Options	- Type of construction (acc. to EN60034–7; IEC 60034–7) IM B14 for SH 63 to SH 100 - Degree of protection (acc. to EN 60034–5; IEC 60034–5) IP65, IP67 ⁵⁾, IP68 ⁵⁾ Notes: Shaft height 28 only available in degree of protection IP64 or IP67. Motors with forced ventilation are only available in degree of protection IP64 and IP65 (fan IP54). Motors with IP67 and IP68 have a sealing air connection. ⁵⁾ - Shaft end (acc. to EN and IEC 60034–14) Cylindrical; with keyway and key; tolerance field k6; half key balancing - Radial eccentricity, concentricity and axial eccentricity (acc. to DIN 42955; IEC 60072–1) Tolerance R (reduced) - Vibration severity (acc. to EN 60034-14, IEC 60034-14) Grade R (reduced) - Build-in/mounted components Mounted planetary gear for SH 28 to 132 (geared motors only available with vibration severity grade N) - Cable outlet for terminal boxes, outlet direction can be selected in steps of 90°

- 1) When using an absolute encoder and natural cooling or forced ventilation, the rated torque is reduced by 10 % (refer to "Selection and ordering data")
- 2) Power de-rating for temperatures > 40 °C and/or installation altitudes > 1000 m, refer to the Configuration Manual "General Section for Synchronous Motors"
- 3) Forced ventilation cannot be used in the presence of flammable, corrosive, electrically conductive or explosive dust.
- 4) The max. operating frequency of 432 Hz must be observed with SIMODRIVE 611 universal (encoder frequency = speed x pole pair number / 60).
- 5) For motors with degree of protection IP67 and IP68, since 01/2001, an M5 inner thread is provided in the cover on the NDE. This allows compressed air to be connected. The pressure in the motor should be within the range from 0.05 to 0.1 bar.
The compressed air must be dry and clean. For instance, the DA300 compressed air service unit from the Heidenhain company can be used.
For 1FT6 motors without optical encoders, it is sufficient to have a pre-filter that filters out any foreign bodies above 3 µm.
For 1FT6 motors with optical encoder, in addition to the pre-filter element, a fine filter is required that filters out foreign bodies above 0.01 µm.

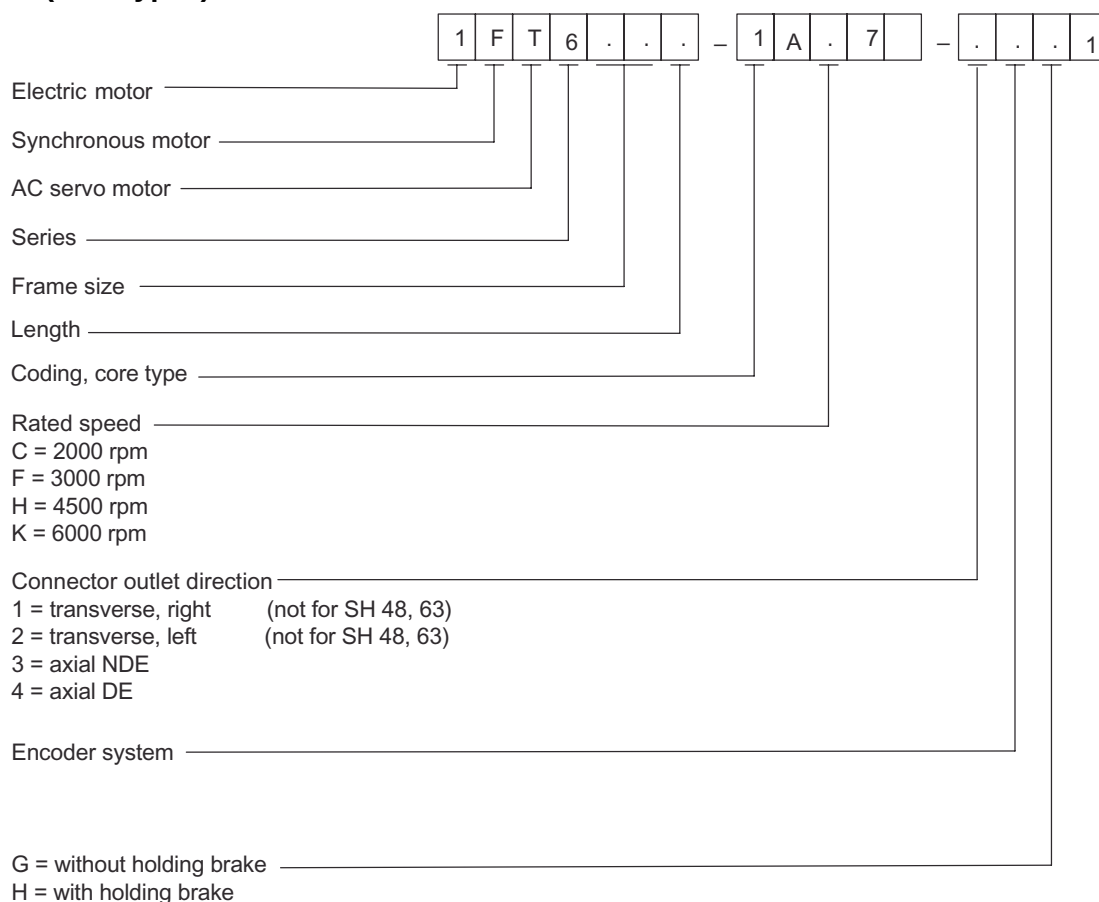
1.3 Order designation

Order designation (standard types), SH 28 to SH 132 (natural cooling, forced ventilation and water cooling)



- 1) Only for SH 63, 80, 100
- 2) Not for motors with forced ventilation
- 3) For 1FT6062, only in conjunction with the water connection either at the side or below.
- 4) Water connection, on the right-hand side (code -ZQ20) or on the left-hand side (-ZQ21) or at the bottom (-ZQ22).
- 5) If code -ZQ2□ is not specified, then the motor is supplied with the water connection at the top.
- 6) Not available for 1FT602□

Order designation (core types)



Order designation for SH 132 water cooling and SH 160 forced ventilation and water cooling

	1	F	T	6	.	.	.	-	.	.	.	7	6	-	.	.	.	.
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Electric motor _____

Synchronous motor _____

AC servo motor _____

Series _____

Number of poles _____

Cooling method _____
S = Force-ventilated
W = Water cooling

Rated speed _____
B = 1500 rpm
D = 2500 rpm

Type of construction _____
6 = IM B35

Terminal box _____
5 = Top-mounted terminal box, cable outlet, transverse, right
6 = Top-mounted terminal box, cable outlet, transverse, left
7 = Top-mounted terminal box, cable outlet, axial NDE
8 = Top-mounted terminal box, cable outlet, axial DE

Encoder system _____

Shaft end _____
A = Shaft end with key, tolerance N, without brake
D = Shaft end with key, tolerance R, without brake
G = Plain shaft end, tolerance N, without brake
K = Plain shaft end, tolerance R, without brake

Vibration severity grade and degree of protection¹⁾ _____
0 = Vibration severity grade N IP64
1 = Vibration severity grade N IP65
3 = Vibration severity grade R IP64
4 = Vibration severity grade R IP65

- 1) Specified degree of protection is valid for water cooling; for air cooling, restrictions apply as a result of the mounted fan IP54

1.4 Technical data

Core types have a gray background. **100 K** values are specified in the table.

Technical data 1FT6, rated speed 1500 RPM

n_N [rpm]	M_0 [Nm]	M_N [Nm]	$M_N^{1)}$ [Nm]	Motor type 1FT6–	I_0 [A]	I_N [A]	Connector size 2)	Cross- section 3) [mm ²]	Cable type 4) 5) 6FX□002– 6)	Terminal box 2)
Natural cooling										
1500	27.0	24.5	22.05	102–8AB7 □	8.7	8.4	1.5	4 x 1.5	5□S21–1 □□0	gk130
1500	50.0	41.0	36.9	105–8AB7 □	16.0	14.5	1.5	4 x 2.5	5□S31–1 □□0	gk130
1500	70.0	61.0	54.9	108–8AB7 □	22.3	20.5	1.5	4 x 4	5□S41–1 □□0	gk130
1500	75.0	62.0	55.8	132–6AB7 □	21.6	19	1.5	4 x 4	5□S41–1 □□0	gk230
1500	95.0	75.0	67.5	134–6AB7 □	27.0	24	1.5	4 x 4	5□S41–1 □□0	gk230
1500	115.0	88.0	79.2	136–6AB7 □	34.0	27	1.5	4 x 10	5□S61–1 □□0	gk230
Forced ventilation										
1500	65.0	59.0	53.1	105–8SB7 □	21.9	21.7	1.5	4 x 4	5□S41–1 □□0	gk130
1500	90.0	83.0	74.7	108–8SB7 □	30.0	31	1.5	4 x 6	5□S51–1 □□0	gk130
1500	110.0	102.0	91.8	132–6SB7 □	36.0	36	3	4 x 10	5□S13–1 □□0	gk230
1500	140.0	130.0	117.0	134–6SB7 □	44.0	45	3	4 x 10	5□S13–1 □□0	gk230
1500	175.0	160.0	144.0	136–6SB7 □	55.0	55	3	4 x 16	5□S23–1 □□0	gk420
1500	425	385	347	163–8SB7 □ 8)	151	136	—	—	—	gk630 11)
1500	600	540	486	168–8SB7 □ 8)	194	174	—	—	—	gk630 11)
Water cooling										
1500	119.0	116.0	116.0	108–8WB7 □	43.0	43	3	4 x 10	5□S13–1 □□0	gk230
1500	155	150	150	132–6WB7 □ 8)	58	58	—	—	—	gk630 9)
1500	200	185	185	134–6WB7 □ 8)	73	67	—	—	—	gk630 10)
1500	240	230	230	136–6WB7 □ 8)	92	90	—	—	—	gk630 11)
1500	300	290	290	138–6WB7 □ 8)	112	112	—	—	—	gk630 11)
1500	450	450	450	163–8WB7 □ 8)	160	160	—	—	—	gk630 11)
1500	700	690	690	168–8WB7 □ 8)	225	221	—	—	—	gk630 11)

Number of poles

without brake cable: with overall shield
with brake cable: with overall shield

C
D

Cables are not included with the motors -
they must be separately ordered.

Lengths⁷⁾ (examples)

5 m AF
10 m BA
15 m BF
18 m BJ
25 m CF

- 1) With absolute encoder (due to the max. encoder temperature)
- 2) Power connector and terminal box mutually exclude each other
- 3) Motor with terminal box, max. cross-section that can be connected, refer to Table "Connections for terminal boxes"
- 4) The shock hazard protection of the power cables depends on the size of the selected power module (refer to the Configuration Manual, Drive Converters)
- 5) Motor with terminal box, power and signal cables, refer to Catalog, Chapter "MOTION-CONNECT connection system"
- 6) 6FX8002 = MOTION-CONNECT 800;
6FX5002 = MOTION-CONNECT 500
- 7) Cables are supplied by the meter; length code, refer to the Configuration Manual "General Section for Synchronous Motors"
- 8) For 1FT613□ motors, the maximum current and rated current of the drive converter must be observed. 1FT616□ motors can only be operated together with SIMOVERT MASTERDRIVES MC drive converters.
- 9) Cable entry 2 x M32 x 1.5
- 10) Cable entry 2 x M40 x 1.5
- 11) Cable entry 2 x M50 x 1.5

Technical data 1FT6, rated speed 2000 RPM

n_N [rpm]	M_0 [Nm]	M_N [Nm]	$M_N^{1)}$ [Nm]	Motor type 1FT6–	I_0 [A]	I_N [A]	Conne- tor size 2)	Cross- section ³⁾ [mm ²]	Cable type 4)5) 6FX□002– 6)	Terminal box 2)
Natural cooling										
2000	4.0	3.7	3.3	061–6AC7□	1.9	1.9	1	4 x 1.5	5□S01–1□□0	—
2000	6.0	5.2	4.6	062–6AC7□	2.7	2.6	1	4 x 1.5	5□S01–1□□0	—
2000	9.5	8.0	7.2	064–6AC7□	4.2	3.8	1	4 x 1.5	5□S01–1□□0	—
2000	8.0	7.5	6.7	081–8AC7□	3.9	4.1	1.5	4 x 1.5	5□S21–1□□0	—
2000	13.0	11.4	10.0	082–8AC7□	6.6	6.6	1.5	4 x 1.5	5□S21–1□□0	—
2000	20.0	16.9	15.2	084–8AC7□	8.8	8.3	1.5	4 x 1.5	5□S21–1□□0	—
2000	27.0	22.5	20.2	086–8AC7□	11.3	10.9	1.5	4 x 1.5	5□S21–1□□0	—
2000	27.0	23.0	20.7	102–□AC7□	12.1	11	1.5	4 x 1.5	5□S21–1□□0	gk130
2000	50.0	38.0	34.2	105–□AC7□	21.4	17.6	1.5	4 x 4	5□S41–1□□0	gk130
2000	70.0	55.0	49.5	108–8AC7□	29.0	24.5	1.5	4 x 6	5□S51–1□□0	gk130
2000	75.0	55.0	49.5	132–6AC7□	29.0	23	1.5	4 x 6	5□S51–1□□0	gk230
2000	95.0	65.0	58.5	134–6AC7□	36.0	27	1.5	4 x 10	5□S61–1□□0	gk230
2000	115.0	74.0	66.6	136–6AC7□	42.0	30	3	4 x 10	5□S13–1□□0	gk230
Forced ventilation										
2000	65.0	56.0	50.4	105–8SC7□	30.0	28	1.5	4 x 6	5□S51–1□□0	gk230
2000	90.0	80.0	72.0	108–8SC7□	41.0	40	3	4 x 10	5□S13–1□□0	gk230
2000	110.0	98.0	88.2	132–6SC7□	47.0	46	3	4 x 10	5□S13–1□□0	gk420
2000	140.0	125.0	112.5	134–6SC7□	58.0	57	3	4 x 16	5□S23–1□□0	gk420
2000	175.0	155.0	139.5	136–6SC7□	77.0	72	3	4 x 25	5DS33–1□□0	gk420
Water cooling										
2000	85.0	82.0	82.0	105–8WC7□	58.0	60	3	4 x 16	5□S23–1□□0	gk230
2000	119.0	115.0	115.0	108–8WC7□	57.0	57	3	4 x 16	5□S23–1□□0	gk230

1
8Core type
Number of poleswithout brake cable: with overall shield
with brake cable: with overall shieldC
DLengths⁷⁾
(examples)5 m AF
10 m BA
15 m BF
18 m BJ
25 m CFCables are not included with the motors -
they must be separately ordered.

Technical data 1FT6, rated speed 2500 RPM

n_N [rpm]	M_0 [Nm]	M_N [Nm]	$M_N^{1)}$ [Nm]	Motor type 1FT6–	I_0 [A]	I_N [A]	Connector size ²⁾	Cross-section ³⁾ [mm ²]	Cable type ^{4) 5)} 6FX□002– ⁶⁾	Terminal box ²⁾
Forced ventilation										
2500	425	340	306	163–8SD 7□ ⁸⁾	226	185	—	—	—	gk630 11)
Water cooling										
2500	155	148	148	132–6WD7 □ ⁸⁾	92	82	—	—	—	gk630 10)
2500	200	185	185	134–6WD7 □ ⁸⁾	122	115	—	—	—	gk630 11)
2500	240	220	220	136–6WD7 □ ⁸⁾	158	149	—	—	—	gk630 11)
2500	300	275	275	138–6WD7 □ ⁸⁾	167	162	—	—	—	gk630 11)
2500	425	340	340	163–8WD7 □ ⁸⁾	240	240	—	—	—	gk630 11)



Number of poles

Cables are not included with the motors -
they must be separately ordered.

- 1) With absolute encoder (due to the max. encoder temperature)
- 2) Power connector and terminal box mutually exclude each other
- 3) Motor with terminal box, max. cross-section that can be connected, refer to Table "Connections for terminal boxes"
- 4) The shock hazard protection of the power cables depends on the size of the selected power module (refer to the Configuration Manual, Drive Converters)
- 5) Motor with terminal box, power and signal cables, refer to Catalog, Chapter "MOTION-CONNECT connection system"
- 6) 6FX8002 = MOTION-CONNECT 800;
6FX5002 = MOTION-CONNECT 500
- 7) Cables are supplied by the meter; length code, refer to the Configuration Manual "General Section for Synchronous Motors"
- 8) For 1FT613□ motors, the maximum current and rated current of the drive converter must be observed. 1FT616□ motors can only be operated together with SIMOVERT MASTERDRIVES MC drive converters.
- 9) Cable entry 2 x M32 x 1.5
- 10) Cable entry 2 x M40 x 1.5
- 11) Cable entry 2 x M50 x 1.5

Technical data 1FT6, rated speed 3000 RPM

n_N [rpm]	M_0 [Nm]	M_N [Nm]	$M_N^{1)}$ [Nm]	Motor type 1FT6--	I_0 [A]	I_N [A]	Connector size 2)	Cross-section 3) [mm ²]	Cable type 4) 5) 6FX□002-- 6)	Terminal box 2)
Natural cooling										
3000	2.6	2.15	2.0	041-4AF7□	1.9	1.7	1	4 x 1.5	5□S01-1 □□0	—
3000	5.0	4.3	4.1	044-□AF7□	3.0	2.9	1	4 x 1.5	5□S01-1 □□0	—
3000	4.0	3.5	3.3	061-6AF7□	2.7	2.6	1	4 x 1.5	5□S01-1 □□0	—
3000	6.0	4.7	4.5	062-□AF7□	4.1	3.4	1	4 x 1.5	5□S01-1 □□0	—
3000	9.5	7.0	6.7	064-□AF7□	6.1	4.9	1	4 x 1.5	5□S01-1 □□0	—
3000	8.0	6.9	6.6	081-8AF7□	5.8	5.6	1.5	4 x 1.5	5□S21-1 □□0	—
3000	13.0	10.3	9.8	082-□AF7□	9.6	8.7	1.5	4 x 1.5	5□S21-1 □□0	—
3000	20.0	14.7	14.0	084-□AF7□	13.2	11	1.5	4 x 1.5	5□S21-1 □□0	—
3000	27.0	18.5	17.6	086-□AF7□	16.4	13	1.5	4 x 2.5	5□S31-1 □□0	—
3000	27.0	19.5	18.5	102-8AF7□	16.9	13.2	1.5	4 x 2.5	5□S31-1 □□0	gk130
3000	50.0	31.0	29.0	105-8AF7□	32.0	22.5	1.5	4 x 6	5□S51-1 □□0	gk130
3000	70.0	37.0	33.3	108-8AF7□	41.0	25	3	4 x 10	5□S13-1 □□0	gk230
3000	75.0	36.0	34.2	132-6AF7□	43.0	23	3	4 x 10	5□S13-1 □□0	gk230
Forced ventilation										
3000	26.0	22.0	21.0	084-8SF7□	18.2	17	1.5	4 x 2.5	5□S31-1 □□0	—
3000	35.0	31.0	29.0	086-8SF7□	25.0	24.5	1.5	4 x 4	5□S41-1 □□0	—
3000	65.0	50.0	48.0	105-8SF7□	42.0	35	3	4 x 10	5□S13-1 □□0	gk230
3000	90.0	70.0	63.0	108-8SF7□	62.0	53	3	4 x 16	5□S23-1 □□0	gk420
3000	110.0	90.0	81.0	132-6SF7□	69.0	62	3	4 x 25	5DS33-1 □□0	gk420
3000	140.0	110.0	99.0	134-6SF7□	83.0	72	3	4 x 25	5DS33-1 □□0	gk420
3000	175.0	145.0	130.5	136-6SF7□	110.0	104	—	—	—	gk420
Water cooling										
3000	10.2	10.1	10.1	062-6WF7□	6.9	6.9	1	4 x 1.5	5□S01-1 □□0	—
3000	16.2	16.1	16.1	064-6WF7□	10.3	10.3	1	4 x 1.5	5□S01-1 □□0	—
3000	35.0	35.0	35.0	084-8WF7□	24.5	27	1.5	4 x 4	5□S41-1 □□0	—
3000	47.0	46.0	46.0	086-8WF7□	34.0	37	1.5	4 x 10	5□S61-1 □□0	—
3000	85.0	78.0	78.0	105-8WF7□	83.0	82	3	4 x 25	5DS33-1 □□0	gk420
3000	119.0	109.0	109.0	108-8WF7□	86.0	81	3	4 x 35	5DS43-1 □□0	gk420

1 Core type
4, 6, 8 Number of poles

without brake cable:
with brake cable:

with overall shield
with overall shield

Lengths ⁷⁾
(examples)

C
D

5 m A F
10 m B A
15 m B F
18 m B J
25 m C F

Cables are not included with the motors - they must
be separately ordered. Footnotes, refer to the next page.

Technical data 1FT6, rated speed 4500 RPM

n _N	M ₀	M _N	M _N ¹⁾	Motor type	I ₀	I _N	Connector size 2)	Cross-section 3)	Cable type 4) 5)	Terminal box 2)
[rpm]	[Nm]	[Nm]	[Nm]	1FT6–	[A]	[A]		[mm ²]	6FX□002– 6)	
Natural cooling										
4500	4.0	2.9	2.6	061–6AH7□	4.0	3.4	1	4 x 1.5	5□S01–1 □□0	—
4500	6.0	3.6	3.2	062–□SH7□	5.7	3.9	1	4 x 1.5	5□S01–1 □□0	—
4500	9.5	4.8	4.3	064–□SH7□	9.0	5.5	1	4 x 1.5	5□S01–1 □□0	—
4500	8.0	5.8	5.2	081–8AH7□	8.6	7.3	1.5	4 x 1.5	5□S21–1 □□0	—
4500	13.0	8.5	7.7	082–□SH7□	14.8	11	1.5	4 x 1.5	5□S21–1 □□0	—
4500	20.0	10.5	9.5	084–□SH7□	19.8	12.5	1.5	4 x 4	5□S41–1 □□0	—
4500	27.0	12.0	10.8	086–□SH7□	23.3	12.6	1.5	4 x 4	5□S41–1 □□0	—
4500	27.0	12.0	10.8	102–8AH7□	24.1	12	1.5	4 x 4	5□S41–1 □□0	gk130
Forced ventilation										
4500	26.0	20.0	18.0	084–8SH7□	26.0	24.5	1.5	4 x 4	5□S41–1 □□0	—
4500	35.0	27.0	24.3	086–8SH7□	38.0	32	3	4 x 10	5□S13–1 □□0	—
4500	65.0	40.0	36.0	105–8SH7□	59.0	41	3	4 x 16	5□S23–1 □□0	gk420
Water cooling										
4500	10.2	10.0	10.0	062–6WH7□	9.7	9.6	1	4 x 1.5	5□S01–1 □□0	—
4500	16.2	16.0	16.0	064–6WH7□	15.4	15.2	1	4 x 2.5	5□S11–1 □□0	—
4500	35.0	35.0	35.0	084–8WH7□	37.0	39	1.5	4 x 10	5□S61–1 □□0	—
4500	47.0	45.0	45.0	086–8WH7□	52.0	53	3	4 x 16	5□S23–1 □□0	—

1 Core type
6, 8 Number of poles

without brake cable: with overall shield
with brake cable: with overall shield

C
D

Lengths 7)
(examples)

5 m A F
10 m B A
15 m B F
18 m B J
25 m C F

Cables are not included with the motors - they must be separately ordered.

- 1) With absolute encoder (due to the max. encoder temperature)
- 2) Power connector and terminal box mutually exclude each other
- 3) Motor with terminal box, max. cross-section that can be connected, refer to Table "Connections for terminal boxes"
- 4) The shock hazard protection of the power cables depends on the size of the selected power module (refer to the Configuration Manual, Drive Converters)
- 5) Motor with terminal box, power and signal cables, refer to Catalog, Chapter "MOTION-CONNECT connection system"
- 6) 6FX8002 = MOTION-CONNECT 800;
6FX5002 = MOTION-CONNECT 500
- 7) Cables are supplied by the meter; length code, refer to the Configuration Manual "General Section for Synchronous Motors"

Technical data 1FT6, rated speed 6000 RPM

n_N [rpm]	M_0 [Nm]	M_N [Nm]	$M_N^{1)}$ [Nm]	Motor type 1FT6–	I_0 [A]	I_N [A]	Connector size ²⁾	Cross-section ³⁾ [mm ²]	Cable type ^{4) 5)} 6FX □□02– ⁶⁾	Terminal box ²⁾
Natural cooling										
6000	0.4	0.3	0.22	021–6AK71	1.25	1.1	1	4 x 1.5	5□S01–1 □□0	—
6000	0.8	0.5	0.37	024–6AK71	1.25	0.9	1	4 x 1.5	5□S01–1 □□0	—
6000	1.0	0.75	0.6	031–4AK71	1.4	1.2	1	4 x 1.5	5□S01–1 □□0	—
6000	2.0	1.4	1.2	034–□AK71	2.6	2.1	1	4 x 1.5	5□S01–1 □□0	—
6000	2.6	1.7	1.4	041–4AK71	3.0	2.4	1	4 x 1.5	5□S01–1 □□0	—
6000	5.0	3.0	2.6	044–4AK71	5.9	4.1	1	4 x 1.5	5□S01–1 □□0	—
6000	4.0	2.1	1.8	061–6AK7□	5.0	3.1	1	4 x 1.5	5□S01–1 □□0	—
6000	6.0	2.1	1.8	062–6AK7□	7.6	3.2	1	4 x 1.5	5□S01–1 □□0	—
6000	9.5	2.1	1.8	064–6AK7□	12.0	3.5	1	4 x 1.5	5□S01–1 □□0	—
6000	8.0	4.6	3.9	081–8AK7□	11.1	7.7	1.5	4 x 1.5	5□S21–1 □□0	—
6000	13.0	5.5	4.7	082–8AK7□	17.3	9.1	1.5	4 x 2.5	5□S31–1 □□0	—
6000	20.0	6.5	5.5	084–□AK7□	24.1	9.2	1.5	4 x 4	5□S41–1 □□0	—
Forced ventilation										
6000	26.0	17.0	14.5	084–8SK7□	35.0	25.5	1.5	4 x 10	5□S61–1 □□0	—
6000	35.0	22.0	18.7	086–8SK7□	44.0	29.0	3	4 x 10	5□S13–1 □□0	—
Water cooling										
6000	10.2	9.8	9.8	062–6WK7□	12.9	12.7	1	4 x 1.5	5□S01–1 □□0	—
6000	16.2	15.8	15.8	064–6WK7□	20.5	20	1	4 x 2.5	5□S11–1 □□0	—
6000	35.0	34.0	34.0	084–8WK7□	47.0	51	3	4 x 10	5□S13–1 □□0	—
6000	47.0	44.0	44.0	086–8WK7□	59.0	58	3	4 x 16	5□S23–1 □□0	—

1
4, 8Core type
Number of poleswithout brake cable:
with brake cable:with overall shield
with overall shieldLengths ⁷⁾
(examples)C
D

5 m	A F
10 m	B A
15 m	B F
18 m	B J
25 m	C F

Cables are not included with the motors - they must be separately ordered.

- 1) With absolute encoder (due to the max. encoder temperature)
- 2) Power connector and terminal box mutually exclude each other
- 3) Motor with terminal box, max. cross-section that can be connected, refer to Table "Connections for terminal boxes"
- 4) The shock hazard protection of the power cables depends on the size of the selected power module (refer to the Configuration Manual, Drive Converters)
- 5) Motor with terminal box, power and signal cables, refer to Catalog, Chapter "MOTION-CONNECT connection system"
- 6) 6FX8002 = MOTION-CONNECT 800;
6FX5002 = MOTION-CONNECT 500
- 7) Cables are supplied by the meter; length code, refer to the Configuration Manual "General Section for Synchronous Motors"

1.5 Armature short-circuit braking

Definition as described in the Configuration Manual "General Section for Synchronous Motors".

Dimensioning the braking resistors for optimum short-circuit braking

The correct dimensioning ensures an optimum braking time. The braking torques which are obtained are also listed in the tables. Data apply for braking from the rated speed and moment of inertia $J_{\text{external}} = J_{\text{mot}}$. If the motor brakes from another speed, then the braking time **cannot** be linearly reduced. However, longer braking times cannot occur if the speed at the start of braking is less than the rated speed.

The data in the following table is calculated for rated values according to the data sheet. The variance during production as well as iron saturation have not been taken into account here. Higher currents and torques can occur than those calculated as a result of the saturation.

The ratings of the resistors must match the particular I^2t load capability, refer to the Configuration Manual "General Section for Synchronous Motors".

Natural cooling

Table 1-2 Resistor braking for the 1FT6 series, shaft heights 28 to 48, natural cooling

Motor type	Braking resistor external 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
SH 28, SH 36, SH 48, naturally cooled						
1FT6021-6AK7□	–	1.1	–	1.6	6.8	–
1FT6024-6AK7□	–	2.7	–	3.7	8.3	–
1FT6031-4AK7□	4.4	2.1	2.3	2.8	6.9	6.4
1FT6034-4AK7□	3.7	3.6	4.4	5.5	13	12
1FT6041-4AF7□	0.31	6.7	6.8	8.4	10	10
1FT6041-4AK7□	2.6	5.8	6.8	8.4	18	17
1FT6044-4AF7□	2.0	13	14	17	18	17
1FT6044-4AK7□	1.8	10	14	17	37	33

Table 1-3 Resistor braking for the 1FT6 series, shaft heights 63 to 80, naturally cooled

Motor type	Braking resistor external 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
SH 63 naturally cooled						
1FT6061-6AC7□	9.2	3.2	3.6	4.5	4.0	3.7
1FT6061-6AF7□	9.4	2.7	3.6	4.5	5.7	5.2
1FT6061-6AH7□	7.3	2.2	3.6	4.5	8.7	7.8
1FT6061-6AK7□	7.1	1.8	3.6	4.5	10	9.3
1FT6062-6AC7□	7.7	4.7	5.7	7.0	5.9	5.4
1FT6062-6AF7□	6.4	4.0	5.7	7.0	9.0	8.1
1FT6062-6AH7□	5.5	3.2	5.7	7.0	13	11
1FT6062-6AK7□	4.4	2.6	5.7	7.0	17	15
1FT6064-6AC7□	5.9	6.8	9.1	11	9.3	8.5
1FT6064-6AF7□	5.0	5.5	9.1	11	14	12
1FT6064-6AH7□	3.6	4.4	9.1	11	20	18
1FT6064-6AK7□	2.9	3.6	9.1	11	27	24

Table 1-3 Resistor braking for the 1FT6 series, shaft heights 63 to 80, naturally cooled

Motor type	Braking resistor external 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
SH 80 naturally cooled						
1FT6081-8AC7□	6.5	5.1	6.9	8.6	7.8	7.1
1FT6081-8AF7□	5.1	4.1	6.9	8.6	12	11
1FT6081-8AH7□	3.7	3.2	6.9	8.6	18	16
1FT6081-8AK7□	3.4	2.4	6.9	8.6	21	19
1FT6082-8AC7□	4.2	6.0	11	13	13	11
1FT6082-8AF7□	3.2	5.8	11	13	19	17
1FT6082-8AH7□	2.4	3.9	11	13	27	24
1FT6082-8AK7□	2.2	3.8	11	13	35	31
1FT6084-8AC7□	3.5	11	18	22	19	17
1FT6084-8AF7□	2.6	8.2	18	22	28	25
1FT6084-8AH7□	1.7	6.8	18	22	44	39
1FT6084-8AK7□	1.7	4.7	18	22	49	44
1FT6086-8AC7□	2.7	15	27	34	26	23
1FT6086-8AF7□	2.1	12	27	34	38	34
1FT6086-8AH7□	1.6	10	27	34	57	51

Table 1-4 Resistor braking for the 1FT6 series, shaft heights 100 to 132, naturally cooled

Motor type	Braking re- sistor external 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 resis- tor	with external braking resis- tor		without external braking resis- tor	with external braking resis- tor
SH 100 naturally cooled						
1FT6102-8AB7□	3.9	13	24	30	18	16
1FT6102-8AC7□	2.8	11	24	30	25	23
1FT6102-8AF7□	2.3	8.1	24	30	35	31
1FT6102-8AH7□	1.7	6.5	24	30	51	46
1FT6105-8AB7□	2.2	21	43	54	33	29
1FT6105-8AC7□	1.7	17	43	54	44	39
1FT6105-8AF7□	1.2	13	43	54	65	58
1FT6108-8AB7□	1.4	32	71	88	53	47
1FT6108-8AC7□	1.2	26	71	88	68	61
1FT6108-8AF7□	0.9	21	71	88	99	89

Armature short-circuit braking

Table 1-4 Resistor braking for the 1FT6 series, shaft heights 100 to 132, naturally cooled

Motor type	Braking re- sistor external 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 resis- tor	with external braking resis- tor		without external braking resis- tor	with external braking resis- tor
SH 132 naturally cooled						
1FT6132-6AB7□	1.0 ¹⁾	37	83	105	56	50
1FT6132-6AC7□	1.2 ¹⁾	32	83	105	75	67
1FT6132-6AF7□	0.8 ¹⁾	23	83	105	110	100
1FT6134-6AB7□	1.2 ¹⁾	47	110	140	72	65
1FT6134-6AC7□	0.9 ¹⁾	40	110	140	99	89
1FT6136-6AB7□	0.9 ¹⁾	55	130	170	91	82
1FT6136-6AC7□	0.8 ¹⁾	45	130	170	115	105

- 1) When utilized to M0 (100 K), a braking resistor must be used in order to prevent partial de-magnetization. When utilized to M0 (60 K), the additional braking resistor is not required.

Forced ventilation

Table 1-5 Resistor braking for the 1FT6 series, force-ventilated

Motor type	Braking resistor external 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
SH 80, force ventilated						
1FT6084-8SF7□	2.3	8.1	18	22	29	26
1FT6084-8SH7□	1.7	6.8	18	22	44	39
1FT6084-8SK7□	1.4	4.7	18	22	54	48
1FT6086-8SF7□	1.6	11	27	34	42	38
1FT6086-8SH7□	1.1	7.5	27	34	61	55
1FT6086-8SK7□	1.1	6.6	27	34	74	66
SH 100, force ventilated						
1FT6105-8SB7□	2.0	21	44	55	35	31
1FT6105-8SC7□	1.5	17	44	55	47	42
1FT6105-8SF7□	1.2	13	44	55	65	58

Table 1-5 Resistor braking for the 1FT6 series, force-ventilated

Motor type	Braking resistor external 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
1FT6105-8SH7□	0.9	10	44	55	96	86
1FT6108-8SB7□	1.2	33	71	88	58	52
1FT6108-8SC7□	0.9	27	71	88	77	69
1FT6108-8SF7□	0.6	20	71	88	115	103
SH 132, force ventilated						
1FT6132-6SB7□	1.2	36 ¹⁾	83	105	63	57
1FT6132-6SC7□	1.0	30 ¹⁾	83	105	83	74
1FT6132-6SF7□	0.7	23 ¹⁾	83	105	120	110
1FT6134-6SB7□	0.9	49 ¹⁾	110	140	81	73
1FT6134-6SC7□	0.8	40 ¹⁾	110	140	105	95
1FT6134-6SF7□	0.6	30 ¹⁾	110	140	150	140
1FT6136-6SB7□	0.8	54 ¹⁾	130	170	99	88
1FT6136-6SC7□	0.6	43 ¹⁾	130	170	130	120
1FT6136-6SF7□	0.5	33 ¹⁾	130	170	190	170
SH 160, force ventilated						
1FT6163-8SB7□	0.3 ²⁾	–	380	490	–	270
1FT6163-8SD7□	0.25 ²⁾	–	380	490	–	390
1FT6168-8SB7□	0.27 ²⁾	–	530	680	–	340

- 1) When utilized acc. to M0 (100 K), a series braking resistor must be used in order to prevent partial de-magnetization.
When utilized according to M0 (60 K), the additional braking resistor is not required.
- 2) In order to prevent that the motors are de-magnetized, when short-circuit braking from the rated speed, the above specified supplementary resistors must be connected in series.

Water cooling

Table 1-6 Resistor braking for the 1FT6 series, water cooling

Motor type	Braking resistor external 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	Max. braking torque M _{br max} [Nm]
SH 60, water cooling						
1FT6062-6WF7□	6.4	4.0	5.7	7.0	9	8.1
1FT6062-6WH7□	5.5	3.2	5.7	7.0	13	11
1FT6062-6WK7□	4.4	2.6	5.7	7.0	17	15
1FT6064-6WF7□	5.0	5.5	9.1	11	14	12
1FT6064-6WH7□	3.6	4.4	9.1	11	20	18
1FT6064-6WK7□	2.9	3.6	9.1	11	27	24
SH 80, water cooling						
1FT6084-8WF7□	2.3	8.1	18	22	29	26
1FT6084-8WH7□	1.6	6.5	18	22	44	40
1FT6084-8WK7□	1.4	4.7	18	22	54	48
1FT6086-8WF7□	1.6	11	27	34	42	38
1FT6086-8WH7□	1.1	7.5	27	34	61	55
1FT6086-8WK7□	1.1	6.6	27	34	74	66
SH 100, water cooling						
1FT6105- □WC7□	0.8	17	44	55	65	58
1FT6105- □WF7□	0.6	14	44	55	96	86
1FT6108- □WB7□	1.2	33	71	88	58	52
1FT6108- □WC7□	0.9	27	71	88	77	69
1FT6108- □WF7□	0.6	21	71	88	115	103
SH 132, water cooling						
1FT6132-6WB7□	0.9	40 ¹⁾	85	105	72	65
1FT6132-6WD7□	0.7	27 ¹⁾	85	105	115	100
1FT6134-6WB7□	0.7	47 ¹⁾	110	140	92	82
1FT6134-6WD7□	0.5	33 ¹⁾	110	140	150	140
1FT6136-6WB7□	0.6	56 ¹⁾	130	170	115	100
1FT6136-6WD7□	0.35	40 ¹⁾	130	170	200	180
1FT6138-6WB7□	0.42	69 ¹⁾	170	220	150	140
1FT6138-6WD7□	0.32	50 ¹⁾	170	220	240	210
SH 160, water cooling						
1FT6163-8WB7□	0.3 ²⁾	–	380	490	–	270

Table 1-6 Resistor braking for the 1FT6 series, water cooling

Motor type	Braking resistor external 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	Max. braking torque $M_{br\ max}$ [Nm]
1FT6163-8WD7□	0.25 ²⁾	–	380	490	–	390
1FT6168-8WB7□	0.27 ²⁾	–	530	680	–	340

- 1) When utilized acc. to M0 (100 K), a series braking resistor must be used in order to prevent partial de-magnetization.
When utilized according to M0 (60 K), the additional braking resistor is not required.
- 2) It is absolutely prohibited to short-circuit the winding when using smaller supplementary resistors than those specified. When braking from the rated speed, the resistors listed prevent partial de-magnetization of the rotor.

1.6 Cooling

1.6.1 Cooling methods

The different cooling methods are defined in the Configuration Manual "General Section for Synchronous Motors".

1.6.2 Forced ventilation

Degree of protection IP54 (acc. to EN 60529).

Degrees of protection IP67 and IP68 are not possible.

The hot discharged air may not be drawn in again.



Caution

Forced ventilation cannot be used in the presence of flammable, corrosive, electrically conductive or explosive dust.

Forced ventilation, SH 80 and SH 100

Air flow direction from NDE to DE.

If the air flow direction is reversed, this reduces the torque yield by approx. 20 %.

Mechanical changes to the motor with respect to naturally cooled versions:

- The power connector is about 12 mm higher.
- A sheet metal envelope is located over the motor frame from the non-drive end side. The axial fan is mounted in this sheet metal envelope. There is a cut-out in the sheet metal envelope at the connector positions. This means that the motor is only partially cooled by the air flow (three-sided ventilation).
- The motor dimensions can be taken from the dimension drawings.

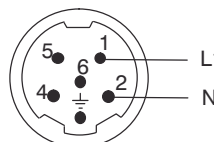
Connection: Connector, Size 1, Order No.: 6FX2003-0CA10

Pre-fabricated connecting cable: Order No.: 6FX5002-5CA01-□□□□

Supply voltage: 1-ph. 230/260 V AC, 50/60 Hz

Maximum current: 0.3 A

Connector assignment for fan connections
SH 80 and SH 100:



Forced ventilation, SH 132

Air flow direction from DE to NDE.

The air is blow through the enclosure corners of the extruded profile using a mounted radial fan.

Connection:	via terminal box
Supply voltage:	3-ph. 400/480 V AC, 50/60 Hz
Maximum current:	0.4 A

Forced ventilation, SH 160

Air flow direction from DE to NDE.

The air is blow through the enclosure corners of the extruded profile using a mounted radial fan.

Connection:	via terminal box
Supply voltage:	3-ph. 400/480 V AC, 50/60 Hz
Maximum current:	0.8 A

Minimum clearance between parts and components mounted by the customer and the air discharge opening

The following minimum clearance must be maintained between parts and components mounted by the customer and the air discharge opening:

Table 1-7 Minimum clearance to parts and components mounted by the customer

Shaft height [mm]	Minimum clearance [mm]
80	20
100	30
132	60
160	80

1.6.3 Water cooling

The power loss generated by the motor is dissipated using a water cooling system. The machinery construction company must connect up a cooling system (e.g. heat exchanger).

The rated motor torques, specified in the motor data sheets, apply for water-cooled operation and a water intake temperature of $< 30\text{ }^{\circ}\text{C}$.

Notice

If the motor is operated without water cooling, then the rated motor torque is reduced as a function of the heat losses which can be dissipated by convection and radiation. In this case, the data for naturally cooled operation apply.

Note

It is not possible to retrofit a motor for water cooling.

The cooling medium must be pre-cleaned and filtered in order to prevent the cooling circuit from becoming blocked. The maximum permissible particle size after filtering is $100\text{ }\mu\text{m}$.

Cooling circuit

Notice

If current is flowing through the motor, then the cooling circuit must be activated.

Table 1-8 Technical data for the cooling circuit

Motor type	Water flow rate [l]	Max. permissible pressure [bar]	Flow rate [l/min]
1FT6062	0.2	2.5	5
1FT6064	0.26	2.5	5
1FT6084	0.5	2.5	5
1FT6086	0.6	2.5	5
1FT6105	1.1	2.5	5
1FT6108	1.5	2.5	5
1FT6132	2.1	6.0	8
1FT6134	2.4	6.0	8
1FT6136	2.7	6.0	8
1FT6138	3.1	6.0	8
1FT6163	4.7	6.0	10
1FT6168	5.7	6.0	10

Pressure drop, intake/return: $< 0.1\text{ bar}$

Materials used in the cooling circuits

The anti-corrosion additives used should be harmonized with the cooling system manufacturer - i.e. the materials of the motor cooler and the materials of the fittings and cooling medium hoses listed in Table.

Table 1-9 Materials used in the motor cooling circuit

Motor type	Bearing end shield	Enclosure	Sealing agent	Connecting plate
1FT606□ 1FT608□ 1FT610□	Aluminum	Aluminum	Type Terostat	Stainless steel
1FT613□ 1FT616□	Gray cast iron	Aluminum	Type Terostat	—

Cooling medium and anti-corrosion protection

Notice

It is not permissible that ice forms in the cooling circuit, neither during transport, nor in operation or during storage.

The checking and change intervals for the cooling medium should be harmonized with the companies supplying the anti-corrosion agent and the cooling system.

We recommend that an anti-corrosion agent is added to water as cooling-medium (e.g. Antifrogen N from the Hoechst Company or Tyfocor from Tyforop Chemie GmbH, refer to the Table below).

Observe the specifications of the anti-corrosion agent manufacturer regarding the ratio of water to anti-corrosion agent.

For Tyfocor, the ratio of 75 % water and 25 % anti-corrosion agent should not be exceeded.

When using another cooling medium (e.g. oil, cooling-lubricating medium), de-rating may be required in order that the thermal motor limit is not exceeded. The de-rating can be determined using the following data:

Specific density:	ρ [kg/m ³]
Specific thermal capacitance:	c_p [J/(kg K)]
Intake temperature:	t_v [°C]
Flow quantity:	v [l/min]

The enquiry must be sent to the manufacturer's plant (Hotline).

The motor power still does not have to be reduced for oil-water mixtures with less than 10 %.

Note

Different anti-corrosion agents should not be mixed.

Table 1-10 Manufacturers of chemical additives

Company	Address	Telephone/URL
Tyforop Chemie GmbH	Hellbrookstr. 5a, D-22305 Hamburg	URL: www.tyfo.de
Joh.A. Beckiser Wassertechnik GmbH	Bergstr. 17 D-40699 Erkrath	Tel.: 02104 / 40075
CINCINNATI CIMCOOL Cincinnati Milacron b. v./ Cimcool Division	Postfach 98 NL-3031 AB Vlaardingen	Tel.: 003110 / 4600660
Fuchs Petrolub AG	Friesenheimer Strasse 17 D-68169 Mannheim	Tel.: 0621 / 3802-0 URL: www.fuchs-oil.com
Hebro Chemie GmbH	Rostocker Straße D-41199 Mönchengladbach	Tel.: 02166 / 6009-0 URL: www.hebro-chemie.de
Fa. Hoechst	Refer to the Internet address	URL: www.hoechst.com
Houghton Lubricor GmbH	Werkstrasse 26 D-52076 Aachen	Tel.: 02408 / 14060
Schilling-Chemie GmbH u. Produktions KG	Steinbeißstr. 20 D-71691 Freiberg	Tel.: 07141 / 7030

Note

These recommendations involve third-party products which we know to be basically suitable. It goes without saying that equivalent products from other manufacturers may be used. Our recommendations should be considered as such. We cannot accept any liability for the quality and properties/features of third-party products.

Cooling-medium intake temperature

The intake temperatures should be selected so that no moisture condensation forms on the surface of the motor: $T_{\text{cool}} = T_{\text{ambient}} - 2\text{ °C}$

The motors are designed for operation up to a cooling medium temperature of +30 °C, but still maintaining all of the specified motor data. The continuous torque changes for other intake temperatures.

Cooling-medium intake temperature	= 30°C	35°C	40°C	45°C
De-rating factor	1.0	0.97	0.95	0.92

Cooling powers to be dissipated

The values specified in the table refer to a cooling medium temperature of 30 °C and maximum speed in S1 duty.

Table 1-11 Cooling powers to be dissipated

Motor type	To be dissipated cooling power [W]
1FT6062-6WF7□	600
1FT6062-6WH7□	650
1FT6062-6WK7□	700
1FT6064-6WF7□	800
1FT6064-6WH7□	850
1FT6064-6WK7□	900
1FT6084-8WF7□	1500
1FT6084-8WH7□	1900
1FT6084-8WK7□	2200
1FT6086-8WF7□	1800
1FT6086-8WH7□	2000
1FT6086-8WK7□	2400
1FT6105-8WC7□	2000
1FT6105-8WF7□	2100
1FT6108-8WB7□	1900
1FT6108-8WC7□	2100
1FT6108-8WF7□	2300
1FT6132-6WB7□	2600
1FT6132-6WD7□	2700
1FT6134-6WB7□	2700
1FT6134-6WD7□	3100
1FT6136-6WB7□	3300
1FT6136-6WD7□	3600
1FT6138-6WB7□	3600
1FT6138-6WD7□	4000
1FT6163-8WB7□	4500
1FT6163-8WD7□	6000
1FT6168-8WB7□	7500

Cooling system

A cooling system (i.e. heat exchanger) must be used in order to guarantee a cooling medium intake temperature of +30 °C. It is possible to operate several motors from a single cooling system. The cooling system is not included in the scope of supply.

The cooling power is calculated from the sum of the power losses of the connected motors. The power of the pump and the distribution to different cooling circuits should be engineered corresponding to the specified flow and the pressure losses of the individual cooling circuits.

If one pump is used with distribution to several cooling circuits, then it may be necessary to use a flow controller.

Table 1-12 Addresses of cooling system manufacturers

Name/address	Tel./Fax:	Internet address / E-mail
Hyfra Industriekühlanlagen Industriestrasse, 56593 Krunkel	Tel.: +49 (0) 26 87 - 898 0 Fax: +49 (0) 26 87 - 898 25	
BKW Kälte-Wärme-Versorgungstechnik Benzstrasse 2, 72649 Wolfschlungen	Tel.: +49 (0) 70 22 - 50 03 0 Fax: +49 (0) 70 22 - 50 03 30	info@bkw-kuema.de
KKT Kraus Industriekühlung GmbH Mühlach 131, 90552 Röthenbach	Tel.: +49 (0) 911 - 95333 - 40 Fax: +49 (0) 911 - 95333 - 33	glitschach@kkt-kraus.com
KKW Kulmbacher Klimageräte-Werk GmbH RIEDEL Kältetechnik Division Am Goldenen Feld 18, 95326 Kulmbach	Tel.: +49 (0) 9221 - 709 555 Fax: +49 (0) 9221 - 709 549	info@riedel-kkw.de
Helmut Schimpke Industriekühlanlagen Ginsterweg 25-27, 42781 Haan	Tel.: +49 (0) 2129 - 943 80 Fax: +49 (0) 2129 - 99	
Pfannenberg, Werner-Witt-Straße 121035 Hamburg, Germany	Tel.: +49 (0) 40 - 73412 127 Fax: +49 (0) 40 - 73412 101	www.pfannenberg.de werner.hille@pfannenberg.com

Electrical Connections

2.1 Connection assignment, connector



Warning

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

Connection assignment, power connectors, signal connectors and temperature sensors at the motor

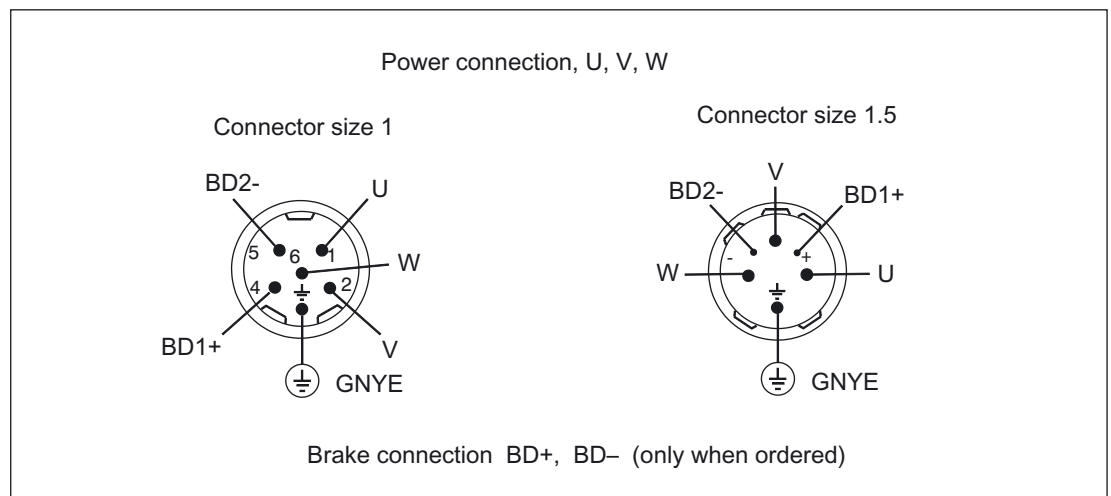


Fig. 2-1 Connection assignment: Power, brake

2.2 Connection through a terminal box

- The terminal assignment in the terminal box must be implemented according to the diagram.
- The protective conductor must be connected.
- Cable lugs acc. to DIN 46234 must be used.
- Connect up an optional brake (refer to the diagram).

Notice

Motors with a rated power of more than 100 kW must be grounded using the additional M12 grounding stud provided at the NDE bearing endshield.

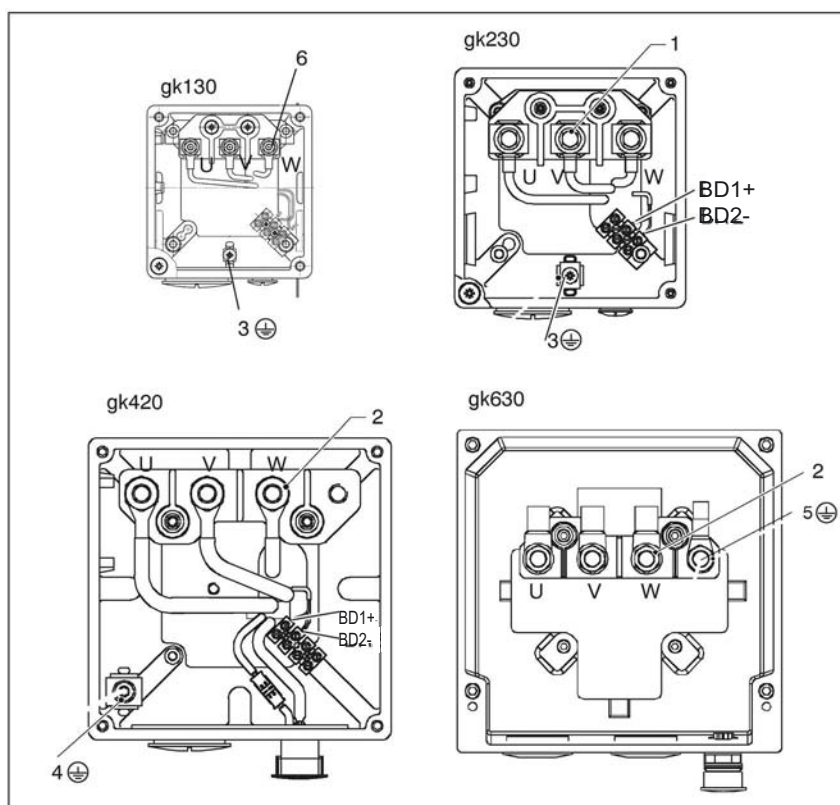


Fig. 2-2 Terminal assignment in the terminal boxes

Table 2-1 Description of the diagram

No.	Description	No.	Description
1	M5 connecting studs	5	M10 grounding studs
2	M10 connecting studs	6	M4 connecting studs
3	M4 grounding stud	BD1+ / BD2-	Brake connection
4	M6 grounding stud		

Table 2-2 Connections for the terminal box

Terminal box type	Cable entry	Max. outer cable diameter ³⁾ [mm]	RMS current per terminal [A] ¹⁾	No. of main terminals	Max. cross-section per terminal	Ground connection	Tightening torque [Nm]	Brake connection ²⁾
gk130	1 x Pg29 / 1 x Pg9	30	36	3 x M4	1 x 6 mm ²	M4	0.8 - 1.2	1.5 mm ²
gk230	1 x Pg29 / 1 x Pg9	30	66	3 x M5	1 x 16 mm ²	M4	0.8 - 1.2	1.5 mm ²
gk420	1 x Pg36	37	104	4 x M10	1 x 35 mm ²	M6	2.7 - 4	1.5 mm ²
gk630	2 x M32 x 1.5	25	112	3 x M10	2 x 16 mm ²	M10	9 - 13	—
gk630	2 x M40 x 1.5	32	176	3 x M10	2 x 35 mm ²	M10	9 - 13	—
gk630	2 x M50 x 1.5	41	209	3 x M10	2 x 50 mm ²	M10	9 - 13	—

1) Data according to DIN EN 60204-1 (routing type C, ambient temperature 40 °C)

2) BD1+/BD2- (terminal strip, only for versions with brake)

3) Dependent on the seal used

Routing cables in a wet/moist environment

Notice

For motors in wet/moist environments, cables should be routed as shown in the following diagram.

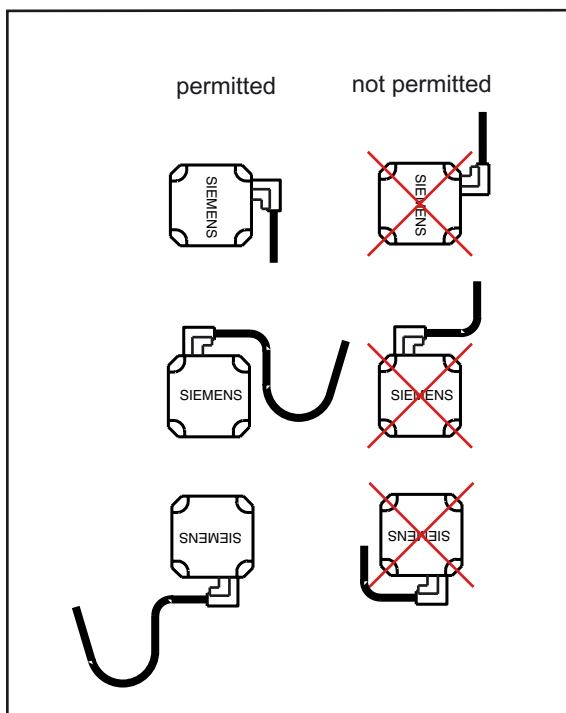


Fig. 2-3 Routing cables in a wet/moist environment

Technical Data and Characteristics

3.1 Speed-torque diagrams

3.1.1 Introduction

Note

Refer to the Configuration Manual "General Section for Synchronous Motors" for a description of how the voltage limiting characteristics are shifted.

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

- 1 min cycle duration for SH 28
 - 10 min cycle duration for SH 36, 48, 63, 80, 100, 132, 160
-

3.1.2 1FT6 series, natural cooling

Table 3-1 1FT6021 natural cooling

1FT6021				
Technical data	Code	Units	-6AK71	
Engineering data				
Rated speed	n_N	rpm	6000	
Number of poles	2p		6	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	0.3	
Rated current (100K)	I_N	A	1.1	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	0.33	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	0.40	
Stall current (60K)	$I_{0(60\text{ K})}$	A	1.0	
Stall current (100K)	$I_{0(100\text{ K})}$	A	1.25	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	0.28	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	0.21	
Optimum operating point				
Optimum speed	n_{opt}	rpm	6000	
Optimum power	P_{opt}	kW	0.19	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	12000	
Maximum torque	M_{max}	Nm	1.5	
Maximum current	I_{max}	A	5	
Physical constants				
Torque constant	k_T	Nm/A	0.32	
Voltage constant	k_E	V/1000 rpm	20.5	
Winding resistance at 20 °C	R_{ph}	Ohm	7.2	
Rotating field inductance	L_D	mH	4	
Electrical time constant	T_{el}	ms	0.56	
Shaft torsional stiffness	c_t	Nm/rad	3000	
Mechanical time constant	T_{mech}	ms	4.4	
Thermal time constant	T_{th}	min	15	
Weight with brake	m	kg	1.4	
Weight without brake	m	kg	1.2	

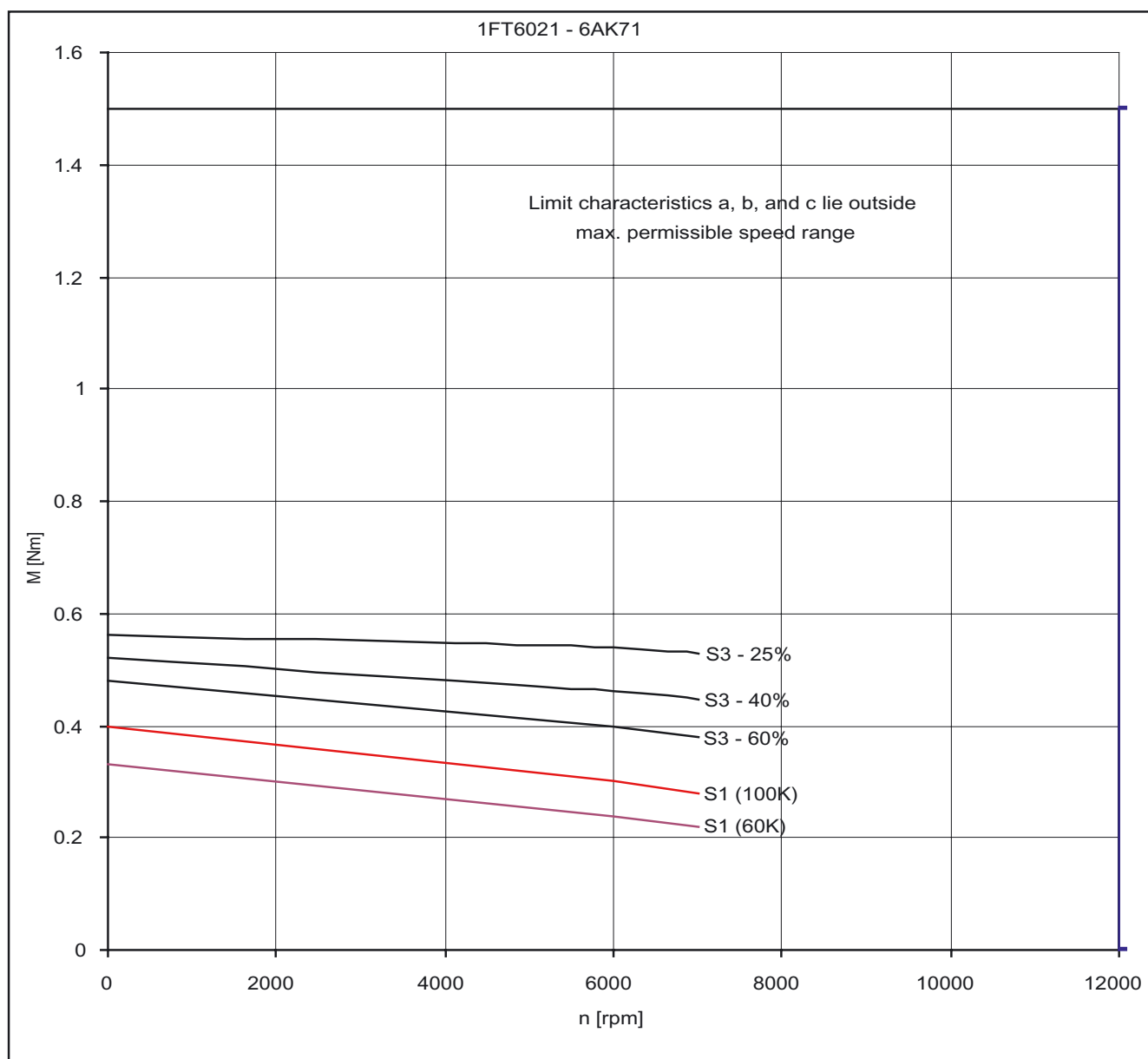


Fig. 3-1 Speed-torque diagram 1FT6021-6AK71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-2 1FT6024 natural cooling

1FT6024				
Technical data	Code	Units	-6AK71	
Engineering data				
Rated speed	n_N	rpm	6000	
Number of poles	2p		6	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	0.5	
Rated current (100K)	I_N	A	0.9	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	0.66	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	0.8	
Stall current (60K)	$I_{0(60\ K)}$	A	1.0	
Stall current (100K)	$I_{0(100\ K)}$	A	1.25	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	0.41	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	0.34	
Optimum operating point				
Optimum speed	n_{opt}	rpm	6000	
Optimum power	P_{opt}	kW	0.31	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	12000	
Maximum torque	M_{max}	Nm	3.15	
Maximum current	I_{max}	A	5	
Physical constants				
Torque constant	k_T	Nm/A	0.63	
Voltage constant	k_E	V/1000 rpm	41	
Winding resistance at 20 °C	R_{ph}	Ohm	10.9	
Rotating field inductance	L_D	mH	7	
Electrical time constant	T_{el}	ms	0.64	
Shaft torsional stiffness	c_t	Nm/rad	3000	
Mechanical time constant	T_{mech}	ms	2.8	
Thermal time constant	T_{th}	min	15	
Weight with brake	m	kg	2.3	
Weight without brake	m	kg	2.1	

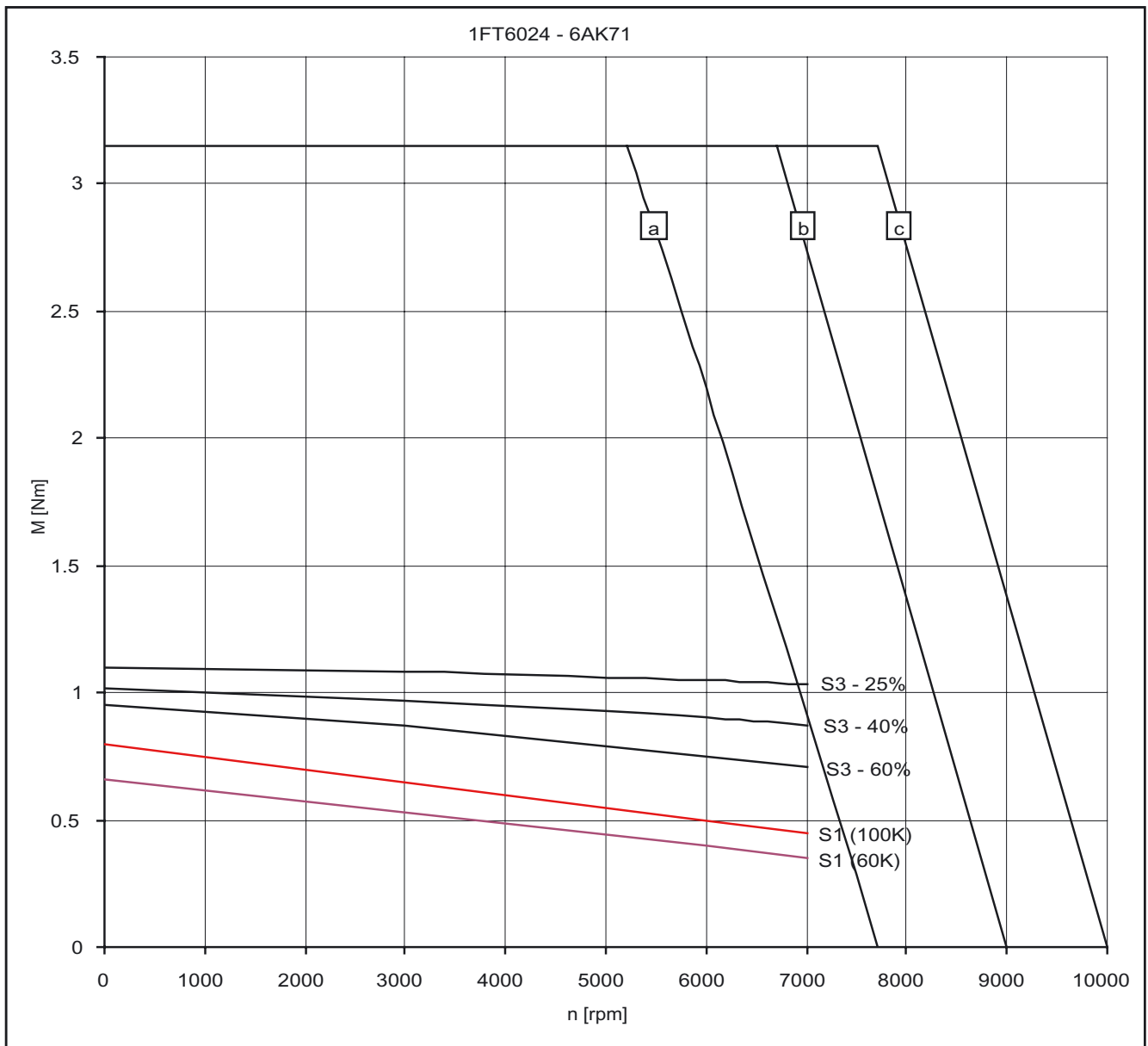


Fig. 3-2 Speed-torque diagram 1FT6024-6AK71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-3 1FT6031 natural cooling

1FT6031				
Technical data	Code	Units	-4AK71	
Engineering data				
Rated speed	n_N	rpm	6000	
Number of poles	2p		4	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	0.75	
Rated current (100K)	I_N	A	1.2	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	0.83	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	1.0	
Stall current (60K)	$I_{0(60\text{ K})}$	A	1.1	
Stall current (100K)	$I_{0(100\text{ K})}$	A	1.4	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	0.77	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	0.65	
Optimum operating point				
Optimum speed	n_{opt}	rpm	6000	
Optimum power	P_{opt}	kW	0.47	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	9700	
Maximum torque	M_{max}	Nm	4	
Maximum current	I_{max}	A	5.8	
Physical constants				
Torque constant	k_T	Nm/A	0.72	
Voltage constant	k_E	V/1000 rpm	47	
Winding resistance at 20 °C	R_{ph}	Ohm	6.9	
Rotating field inductance	L_D	mH	18	
Electrical time constant	T_{el}	ms	2.6	
Shaft torsional stiffness	c_t	Nm/rad	7500	
Mechanical time constant	T_{mech}	ms	2.6	
Thermal time constant	T_{th}	min	20	
Weight with brake	m	kg	3.5	
Weight without brake	m	kg	3.1	

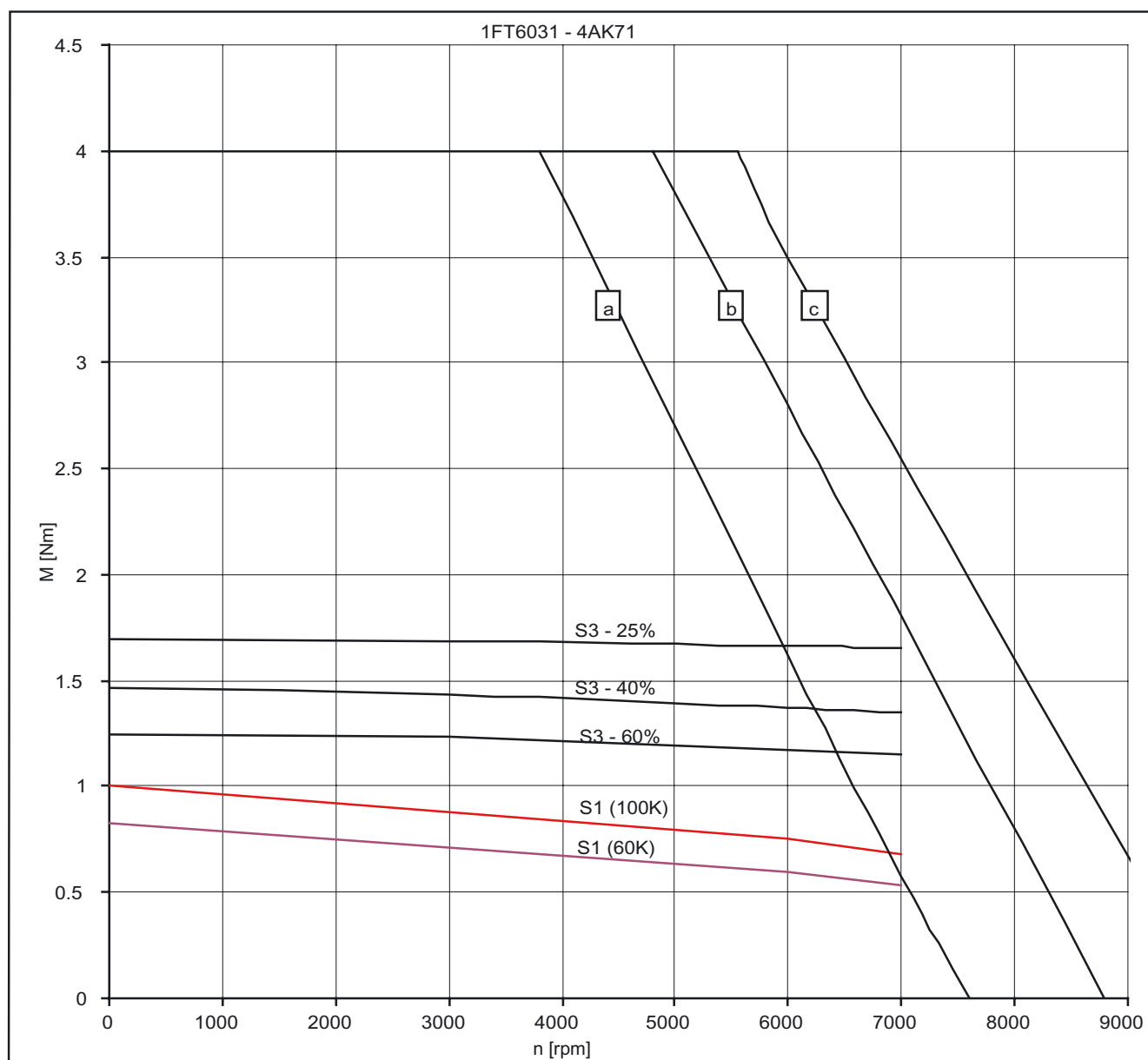


Fig. 3-3 Speed-torque diagram 1FT6031-4AK71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-4 1FT6034 natural cooling

1FT6034				
Technical data	Code	Units	-4AK71	
Engineering data				
Rated speed	n_N	rpm	6000	
Number of poles	2p		4	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	1.4	
Rated current (100K)	I_N	A	2.1	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	1.65	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	2	
Stall current (60K)	$I_{0(60\text{ K})}$	A	2.1	
Stall current (100K)	$I_{0(100\text{ K})}$	A	2.6	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	1.22	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	1.1	
Optimum operating point				
Optimum speed	n_{opt}	rpm	6000	
Optimum power	P_{opt}	kW	0.88	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	9700	
Maximum torque	M_{max}	Nm	7.7	
Maximum current	I_{max}	A	10.5	
Physical constants				
Torque constant	k_T	Nm/A	0.75	
Voltage constant	k_E	V/1000 rpm	49	
Winding resistance at 20 °C	R_{ph}	Ohm	2.6	
Rotating field inductance	L_D	mH	10	
Electrical time constant	T_{el}	ms	3.8	
Shaft torsional stiffness	c_t	Nm/rad	7500	
Mechanical time constant	T_{mech}	ms	1.5	
Thermal time constant	T_{th}	min	20	
Weight with brake	m	kg	4.8	
Weight without brake	m	kg	4.4	

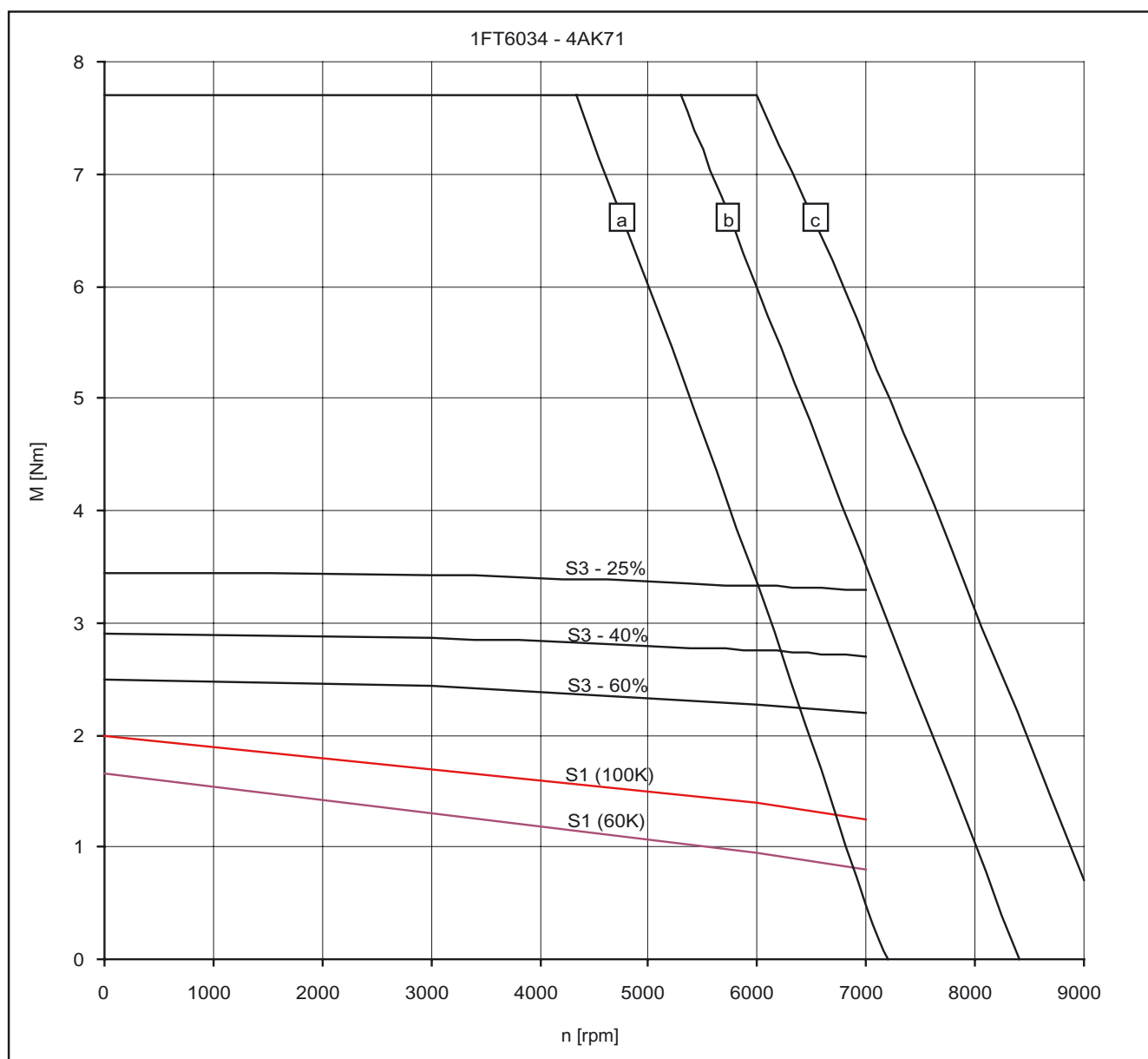


Fig. 3-4 Speed-torque diagram 1FT6034

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-5 1FT6041 natural cooling

1FT6041					
Technical data	Code	Units	-4AF71	-4AK71	
Engineering data					
Rated speed	n_N	rpm	3000	6000	
Number of poles	2p		4	4	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	2.15	1.7	
Rated current (100K)	I_N	A	1.7	2.4	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	2.15	2.15	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	2.6	2.6	
Stall current (60K)	$I_{0(60\text{ K})}$	A	1.5	2.5	
Stall current (100K)	$I_{0(100\text{ K})}$	A	1.9	3.0	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	3.98	3.98	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	2.9	2.9	
Optimum operating point					
Optimum speed	n_{opt}	rpm	3000	6000	
Optimum power	P_{opt}	kW	0.68	1.07	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	7700	7700	
Maximum torque	M_{max}	Nm	10	10	
Maximum current	I_{max}	A	7.7	12.8	
Physical constants					
Torque constant	k_T	Nm/A	1.38	0.83	
Voltage constant	k_E	V/1000 rpm	90	54	
Winding resistance at 20 °C	R_{ph}	Ohm	6.6	2.37	
Rotating field inductance	L_D	mH	22	8	
Electrical time constant	T_{el}	ms	3.3	3.4	
Shaft torsional stiffness	c_t	Nm/rad	14000	14000	
Mechanical time constant	T_{mech}	ms	3	3	
Thermal time constant	T_{th}	min	30	30	
Weight with brake	m	kg	7.8	7.8	
Weight without brake	m	kg	6.6	6.6	

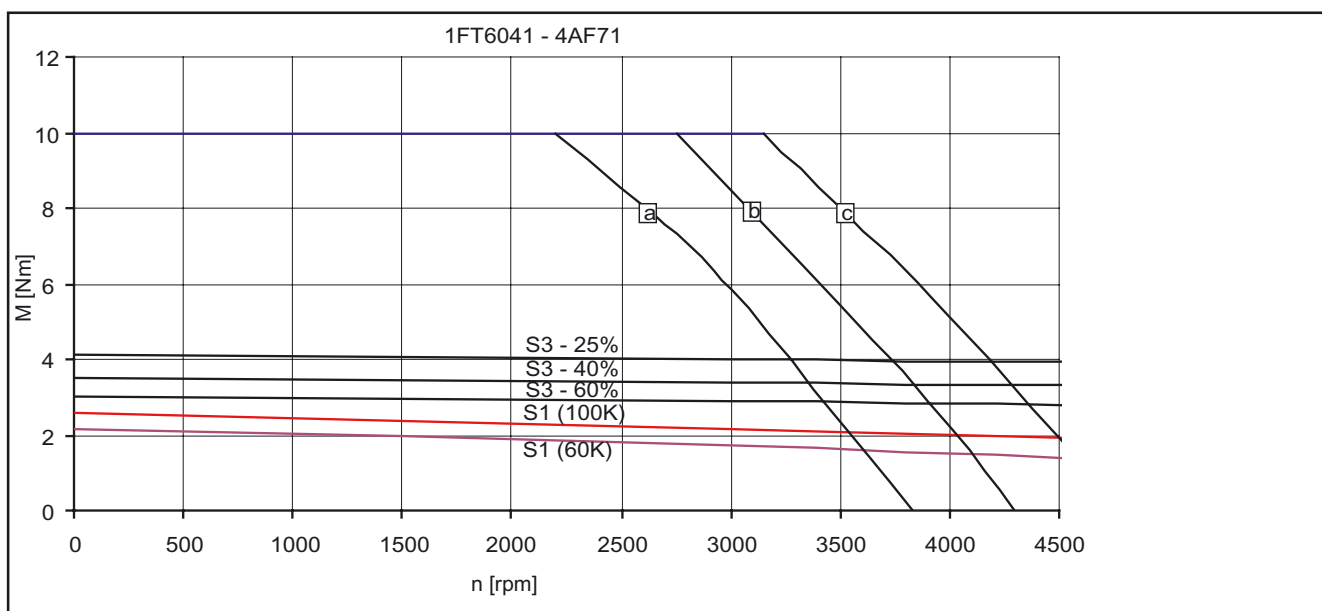


Fig. 3-5 Speed-torque diagram 1FT6041-4AF71

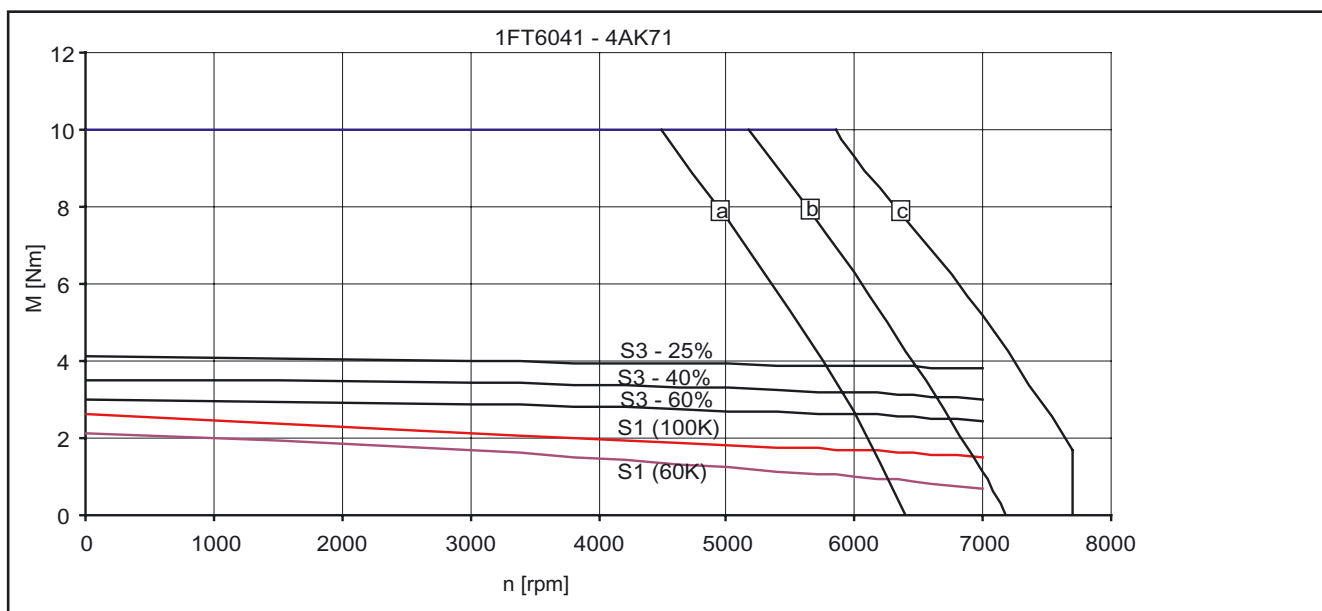


Fig. 3-6 Speed-torque diagram 1FT6041-4AK71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-6 1FT6044 natural cooling

1FT6044				
Technical data	Code	Units	-4AF7□	-4AK7□
Engineering data				
Rated speed	n_N	rpm	3000	6000
Number of poles	2p		4	4
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	4.3	3.0
Rated current (100K)	I_N	A	2.9	4.1
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	4.2	4.2
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	5.0	5.0
Stall current (60K)	$I_{0(60\text{ K})}$	A	2.4	4.8
Stall current (100K)	$I_{0(100\text{ K})}$	A	3.0	5.9
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	6.18	6.18
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	5.1	5.1
Optimum operating point				
Optimum speed	n_{opt}	rpm	3000	6000
Optimum power	P_{opt}	kW	1.35	1.88
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	7700	7700
Maximum torque	M_{max}	Nm	18	18
Maximum current	I_{max}	A	11	22
Physical constants				
Torque constant	k_T	Nm/A	1.68	0.85
Voltage constant	k_E	V/1000 rpm	109	55
Winding resistance at 20 °C	R_{ph}	Ohm	3.05	0.78
Rotating field inductance	L_D	mH	16	4.1
Electrical time constant	T_{el}	ms	5.2	5.3
Shaft torsional stiffness	c_t	Nm/rad	11000	11000
Mechanical time constant	T_{mech}	ms	1.7	1.7
Thermal time constant	T_{th}	min	40	40
Weight with brake	m	kg	9.5	9.5
Weight without brake	m	kg	8.3	8.3

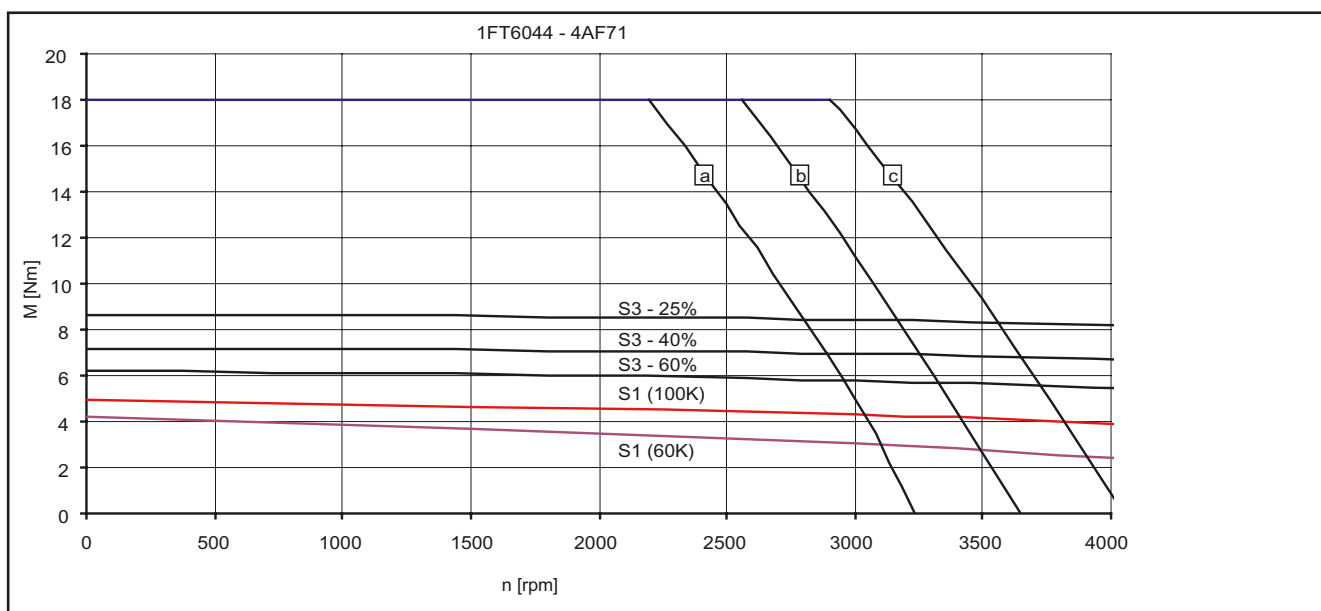


Fig. 3-7 Speed-torque diagram 1FT6044-□AF71

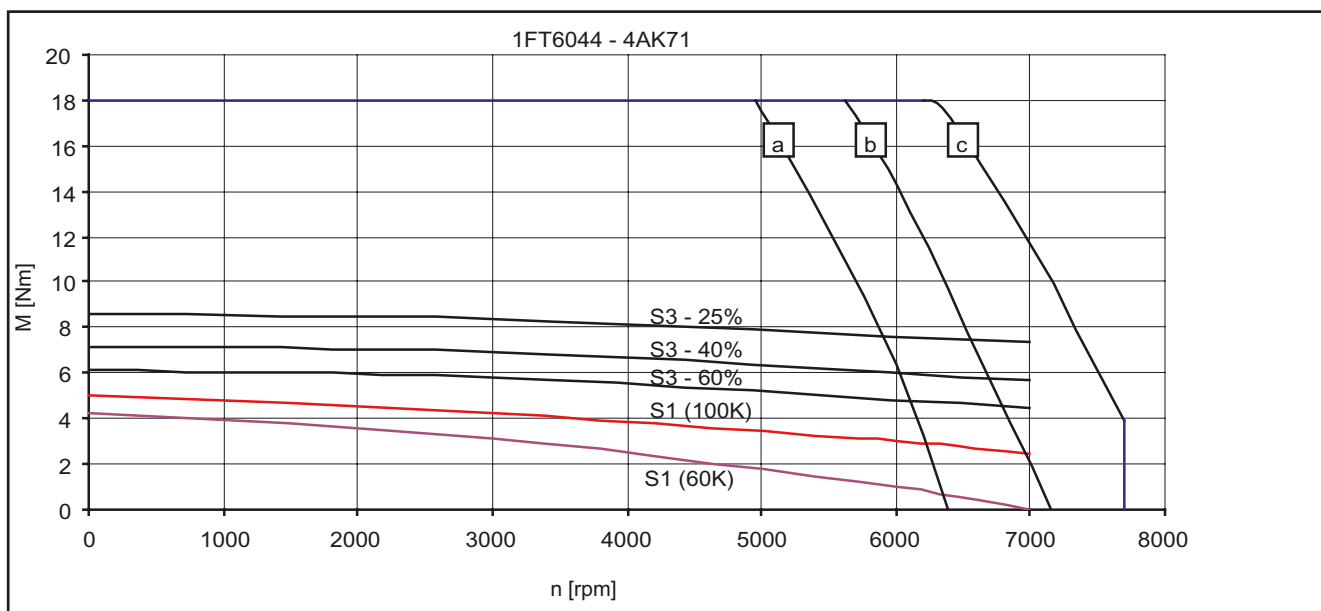


Fig. 3-8 Speed-torque diagram 1FT6044-4AK71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 V_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 V_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 V_{rms}$

Speed-torque diagrams

Table 3-7 1FT6061 natural cooling

1FT6061				
Technical data	Code	Units	-6AC7□	-6AF7□
Engineering data				
Rated speed	n_N	rpm	2000	3000
Number of poles	2p		6	6
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	3.7	3.5
Rated current (100K)	I_N	A	1.9	2.6
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	3.3	3.3
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	4.0	4.0
Stall current (60K)	$I_{0(60\text{ K})}$	A	1.6	2.2
Stall current (100K)	$I_{0(100\text{ K})}$	A	1.9	2.7
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	9.3	9.3
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	6	6
Optimum operating point				
Optimum speed	n_{opt}	rpm	2000	3000
Optimum power	P_{opt}	kW	0.77	1.1
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	9100	9100
Maximum torque	M_{max}	Nm	16	16
Maximum current	I_{max}	A	10	14
Physical constants				
Torque constant	k_T	Nm/A	2.07	1.48
Voltage constant	k_E	V/1000 rpm	132	94
Winding resistance at 20 °C	R_{ph}	Ohm	9.3	4.71
Rotating field inductance	L_D	mH	59	30
Electrical time constant	T_{el}	ms	6.3	6.4
Shaft torsional stiffness	c_t	Nm/rad	34000	34000
Mechanical time constant	T_{mech}	ms	3.9	3.9
Thermal time constant	T_{th}	min	27	27
Weight with brake	m	kg	9.5	9.5
Weight without brake	m	kg	8	8

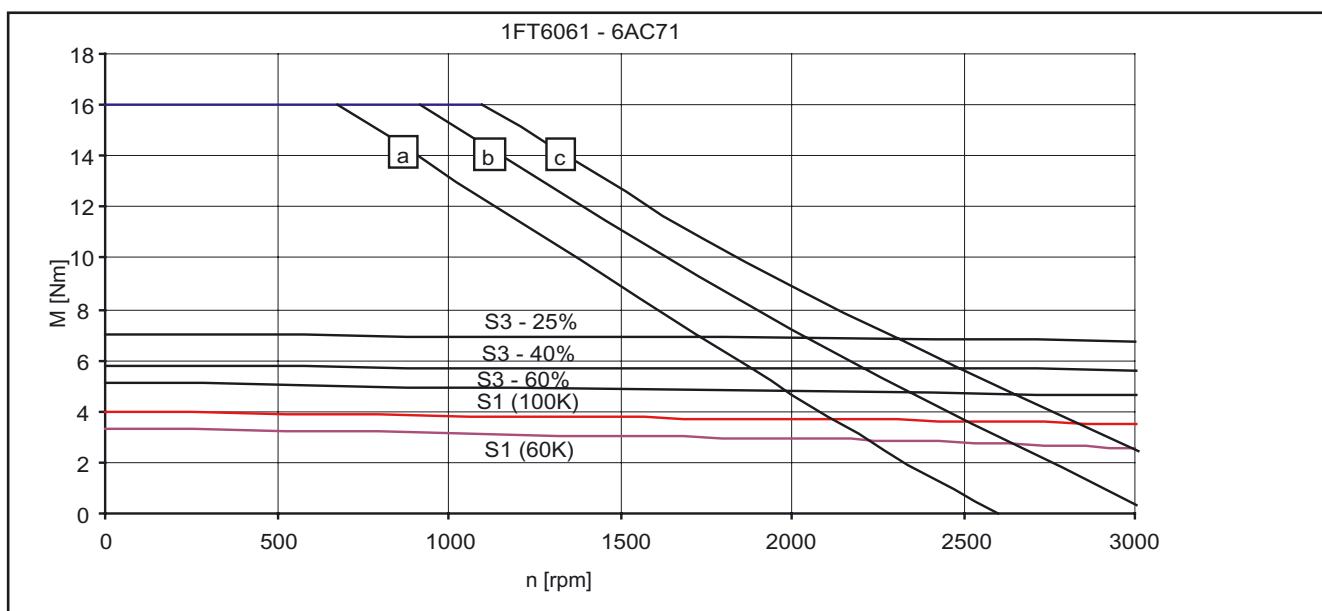


Fig. 3-9 Speed-torque diagram 1FT6061-6AC71

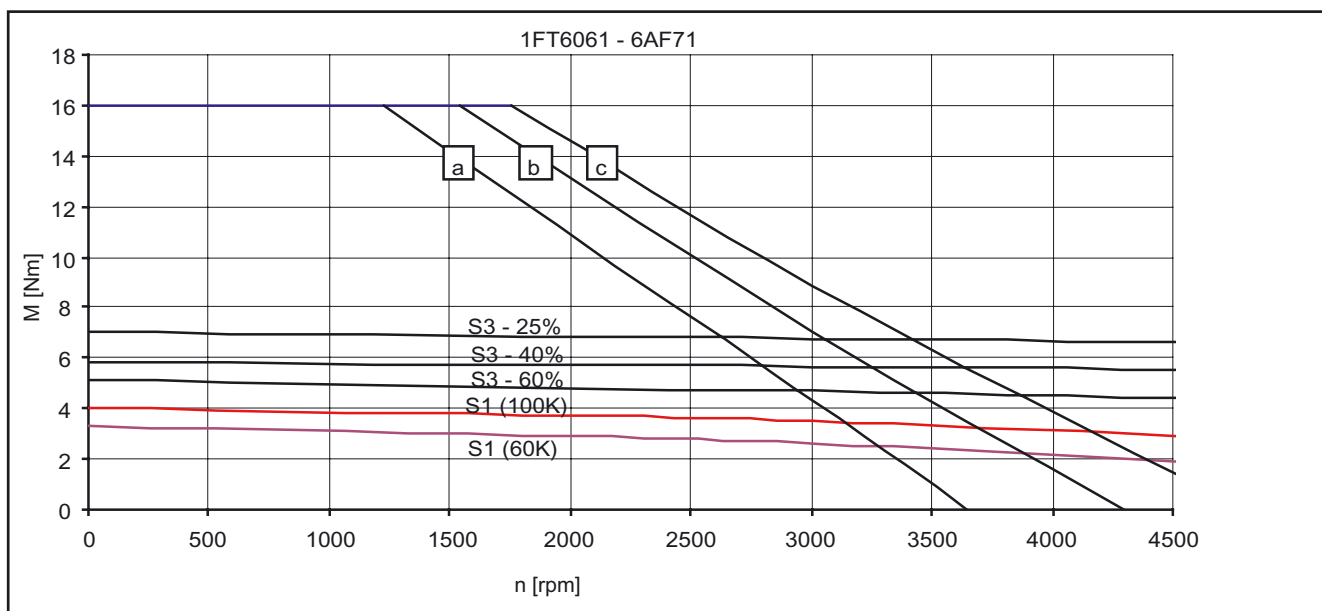


Fig. 3-10 Speed-torque diagram 1FT6061-6AF71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-8 1FT6061 natural cooling

1FT6061				
Technical data	Code	Units	-6AH7□	-6AK7□
Engineering data				
Rated speed	n_N	rpm	4500	6000
Number of poles	2p		6	6
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	2.9	2.1
Rated current (100K)	I_N	A	3.4	3.1
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	3.3	3.3
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	4	4
Stall current (60K)	$I_{0(60\text{ K})}$	A	3.3	4
Stall current (100K)	$I_{0(100\text{ K})}$	A	4	5
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	9.3	9.3
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	6	6
Optimum operating point				
Optimum speed	n_{opt}	rpm	4500	6000
Optimum power	P_{opt}	kW	1.37	1.38
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	9100	9100
Maximum torque	M_{max}	Nm	16	16
Maximum current	I_{max}	A	21	26
Physical constants				
Torque constant	k_T	Nm/A	0.99	0.80
Voltage constant	k_E	V/1000 rpm	63	51
Winding resistance at 20 °C	R_{ph}	Ohm	2.1	1.42
Rotating field inductance	L_D	mH	13.3	9
Electrical time constant	T_{el}	ms	6.3	6.3
Shaft torsional stiffness	c_t	Nm/rad	34000	34000
Mechanical time constant	T_{mech}	ms	3.9	4.0
Thermal time constant	T_{th}	min	27	27
Weight with brake	m	kg	9.5	9.5
Weight without brake	m	kg	8	8

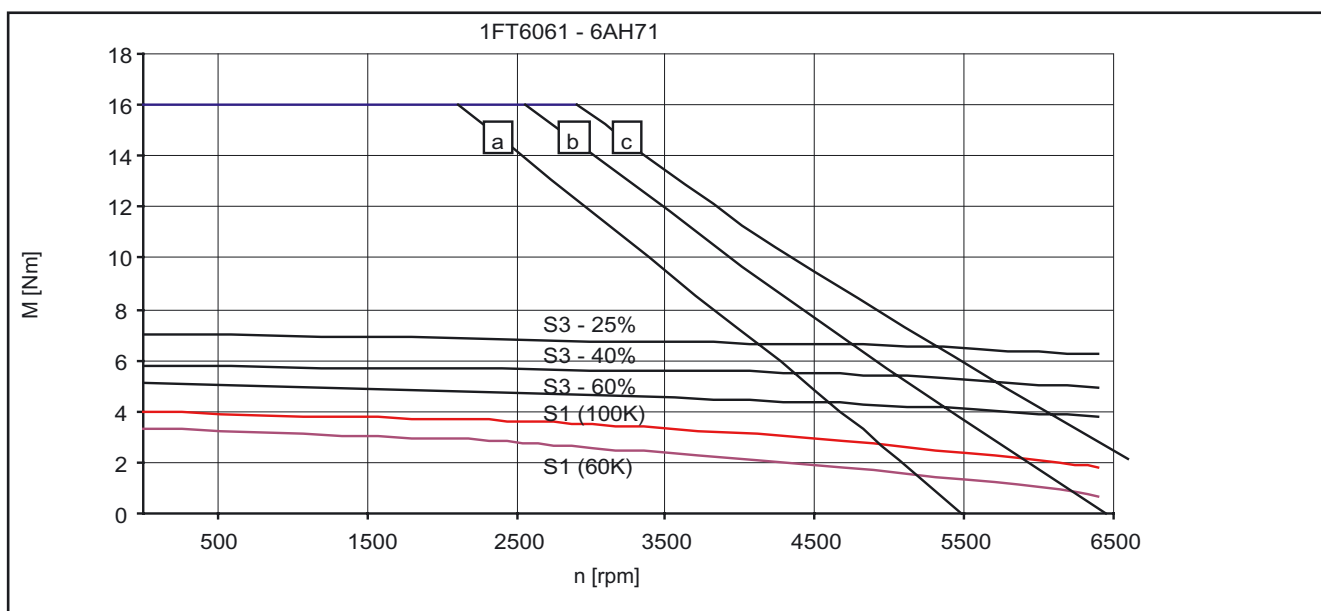


Fig. 3-11 Speed-torque diagram 1FT6061-6AH7

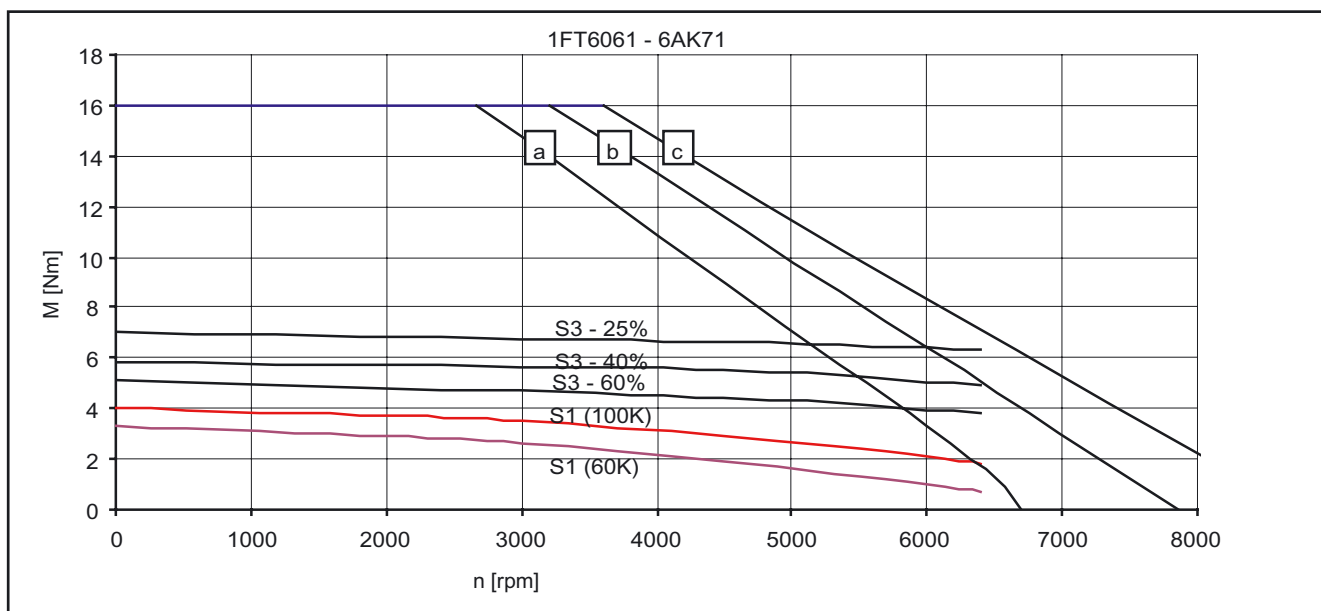


Fig. 3-12 Speed-torque diagram 1FT6061-6AK7

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-9 1FT6062 natural cooling

1FT6062				
Technical data	Code	Units	-6AC7□	-6AF7□
Engineering data				
Rated speed	n_N	rpm	2000	3000
Number of poles	2p		6	6
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	5.2	4.7
Rated current (100K)	I_N	A	2.6	3.4
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	5	5
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	6	6
Stall current (60K)	$I_{0(60\text{ K})}$	A	2.2	3.3
Stall current (100K)	$I_{0(100\text{ K})}$	A	2.7	4.1
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	11.8	11.8
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	8.5	8.5
Optimum operating point				
Optimum speed	n_{opt}	rpm	2000	3000
Optimum power	P_{opt}	kW	1.09	1.48
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	9100	9100
Maximum torque	M_{max}	Nm	24	24
Maximum current	I_{max}	A	15	22
Physical constants				
Torque constant	k_T	Nm/A	2.22	1.48
Voltage constant	k_E	V/1000 rpm	141	94
Winding resistance at 20 °C	R_{ph}	Ohm	5.8	2.57
Rotating field inductance	L_D	mH	43	19
Electrical time constant	T_{el}	ms	7.4	7.4
Shaft torsional stiffness	c_t	Nm/rad	32000	32000
Mechanical time constant	T_{mech}	ms	3.0	3.0
Thermal time constant	T_{th}	min	30	30
Weight with brake	m	kg	11	11
Weight without brake	m	kg	9.5	9.5

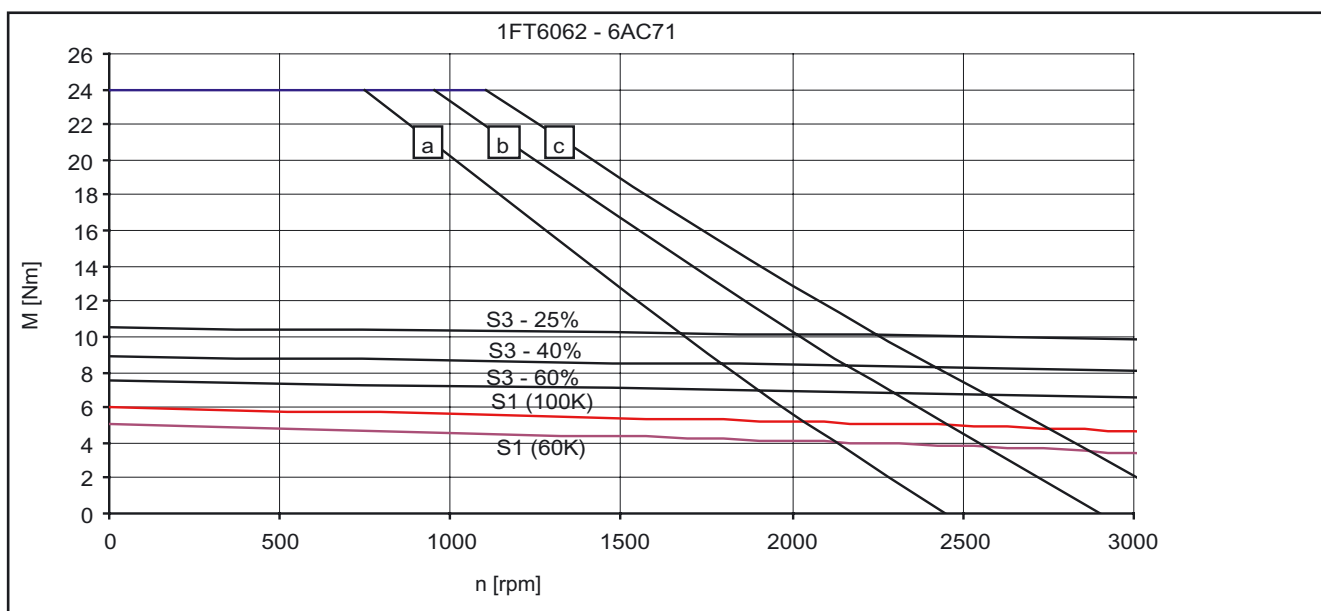


Fig. 3-13 Speed-torque diagram 1FT6062-6AC7

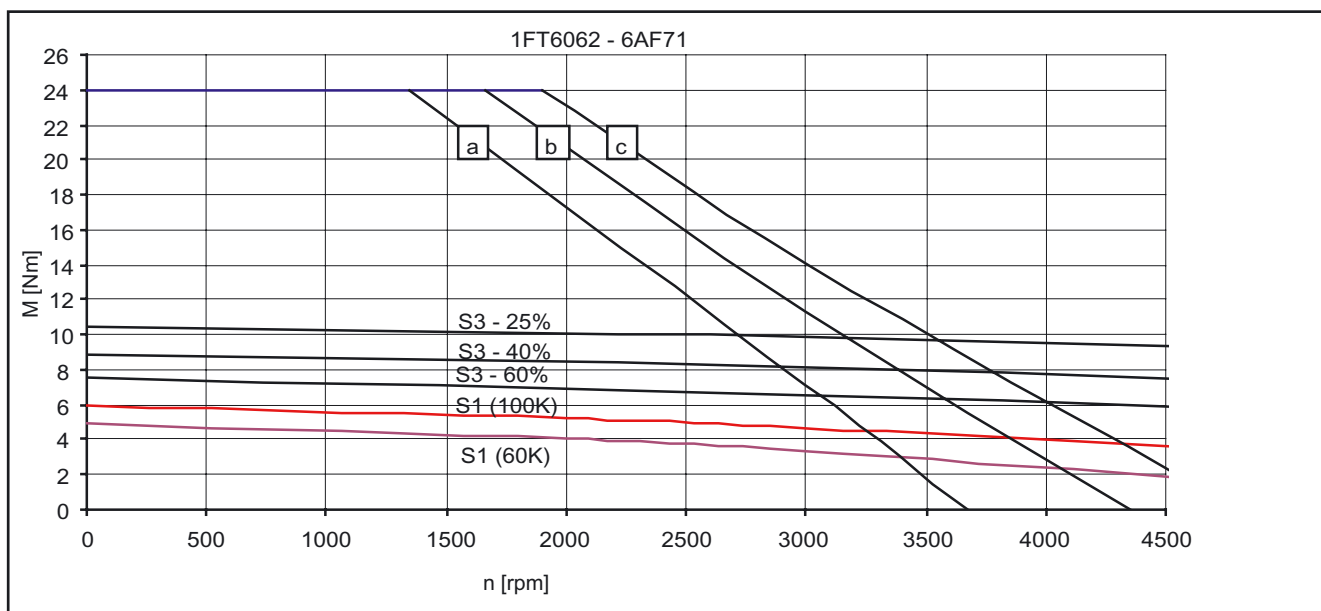


Fig. 3-14 Speed-torque diagram 1FT6062-6AF7

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-10 1FT6062 natural cooling

1FT6062				
Technical data	Code	Units	-6AH7□	-6AK7□
Engineering data				
Rated speed	n_N	rpm	4500	6000
Number of poles	2p		6	6
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	3.6	2.1
Rated current (100K)	I_N	A	3.9	3.2
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	5	5
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	6	6
Stall current (60K)	$I_{0(60\text{ K})}$	A	4.7	6.2
Stall current (100K)	$I_{0(100\text{ K})}$	A	5.7	7.6
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	11.8	11.8
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	8.5	8.5
Optimum operating point				
Optimum speed	n_{opt}	rpm	4500	4500
Optimum power	P_{opt}	kW	1.70	1.70
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	9100	9100
Maximum torque	M_{max}	Nm	24	24
Maximum current	I_{max}	A	31	41
Physical constants				
Torque constant	k_T	Nm/A	1.05	0.79
Voltage constant	k_E	V/1000 rpm	67	50
Winding resistance at 20 °C	R_{ph}	Ohm	1.31	0.74
Rotating field inductance	L_D	mH	9.7	5.5
Electrical time constant	T_{el}	ms	7.4	7.4
Shaft torsional stiffness	c_t	Nm/rad	32000	32000
Mechanical time constant	T_{mech}	ms	3.0	3.0
Thermal time constant	T_{th}	min	30	30
Weight with brake	m	kg	11	11
Weight without brake	m	kg	9.5	9.5

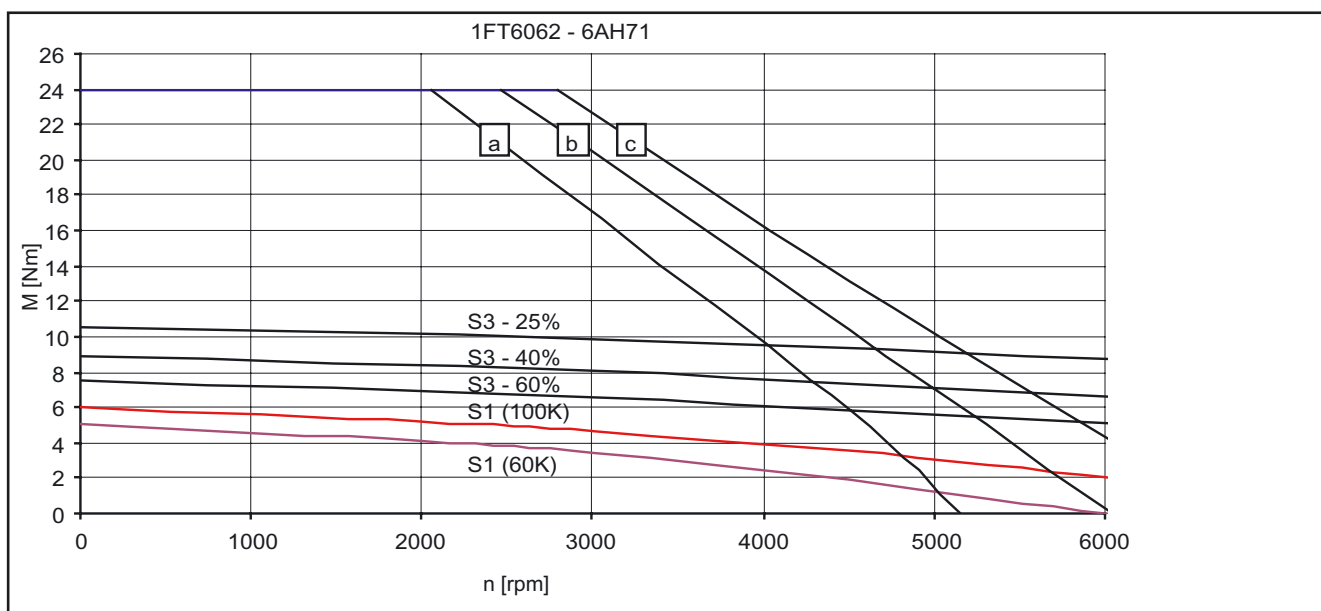


Fig. 3-15 Speed-torque diagram 1FT6062-6AH7□

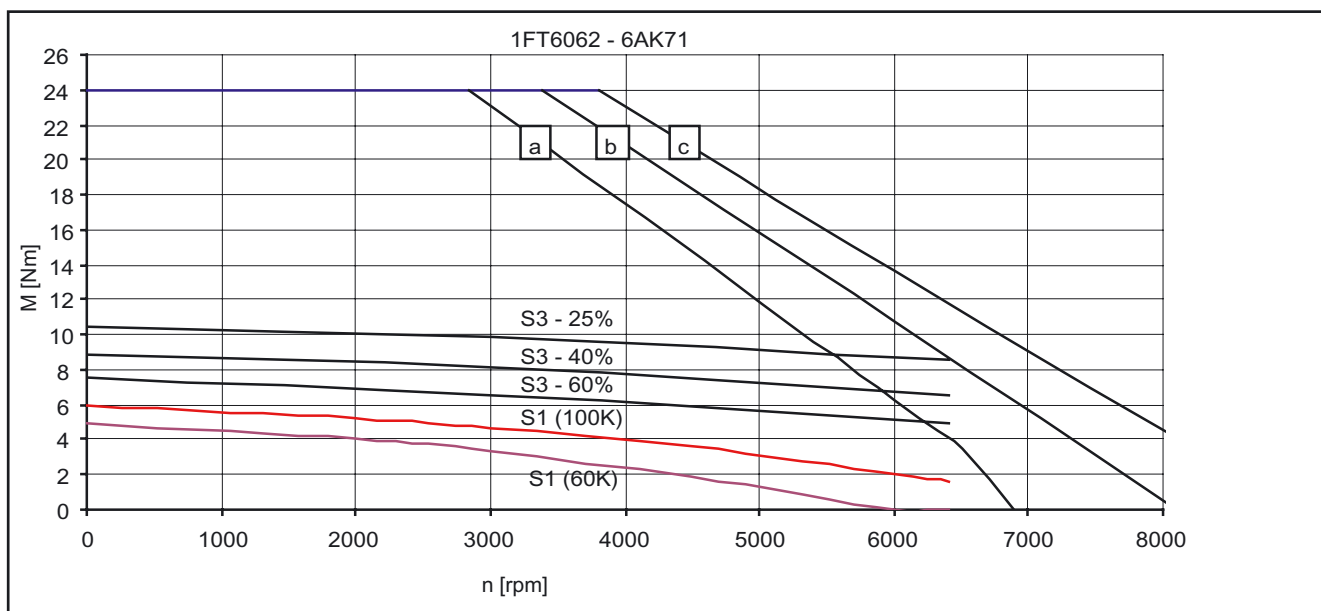


Fig. 3-16 Speed-torque diagram 1FT6062-6AK7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-11 1FT6064 natural cooling

1FT6064				
Technical data	Code	Units	-6AC7□	-6AF7□
Engineering data				
Rated speed	n_N	rpm	2000	3000
Number of poles	2p		6	6
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	8.0	7.0
Rated current (100K)	I_N	A	3.8	4.9
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	7.9	7.9
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	9.5	9.5
Stall current (60K)	$I_{0(60\text{ K})}$	A	3.4	4.9
Stall current (100K)	$I_{0(100\text{ K})}$	A	4.2	6.1
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	16.3	16.3
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	13	13
Optimum operating point				
Optimum speed	n_{opt}	rpm	2000	3000
Optimum power	P_{opt}	kW	1.68	2.20
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	9100	9100
Maximum torque	M_{max}	Nm	38	38
Maximum current	I_{max}	A	23	33
Physical constants				
Torque constant	k_T	Nm/A	2.26	1.57
Voltage constant	k_E	V/1000 rpm	144	100
Winding resistance at 20 °C	R_{ph}	Ohm	2.93	1.40
Rotating field inductance	L_D	mH	28	13.5
Electrical time constant	T_{el}	ms	9.6	9.6
Shaft torsional stiffness	c_t	Nm/rad	27000	27000
Mechanical time constant	T_{mech}	ms	2.2	2.2
Thermal time constant	T_{th}	min	35	35
Weight with brake	m	kg	13	13
Weight without brake	m	kg	12.5	12.5

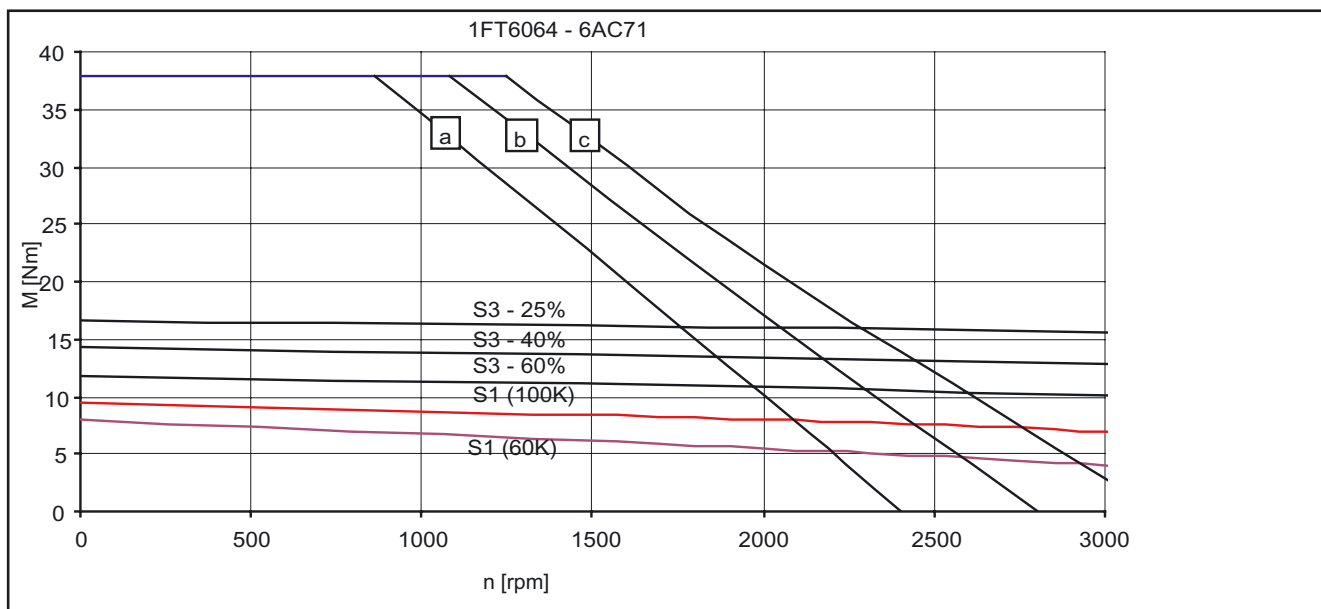


Fig. 3-17 Speed-torque diagram 1FT6064-6AC7□

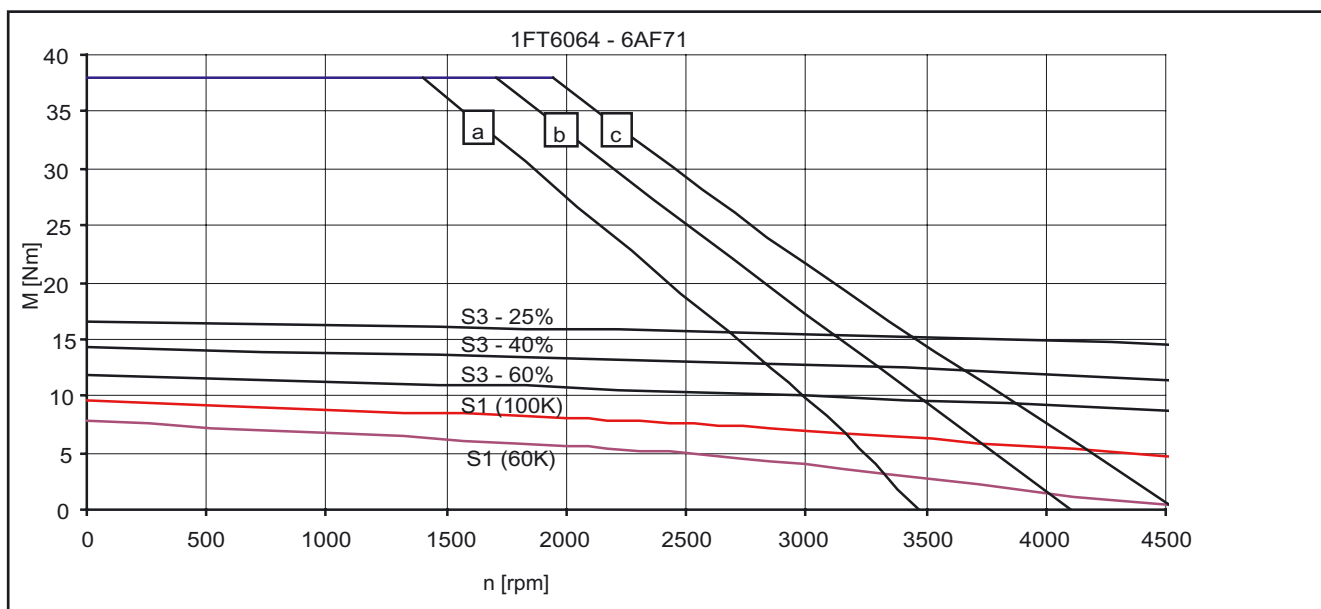


Fig. 3-18 Speed-torque diagram 1FT6064-6AF7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-12 1FT6064 natural cooling

1FT6064					
Technical data	Code	Units	-6AH7□	-6AK7□	
Engineering data					
Rated speed	n_N	rpm	4500	6000	
Number of poles	2p		6	6	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	4.8	2.1	
Rated current (100K)	I_N	A	5.5	3.5	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	7.9	7.9	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	9.5	9.5	
Stall current (60K)	$I_{0(60\text{ K})}$	A	7.3	9.8	
Stall current (100K)	$I_{0(100\text{ K})}$	A	9.0	12.0	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	16.3	16.3	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	13	13	
Optimum operating point					
Optimum speed	n_{opt}	rpm	4500	4500	
Optimum power	P_{opt}	kW	2.26	2.26	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	9100	9100	
Maximum torque	M_{max}	Nm	38	38	
Maximum current	I_{max}	A	49	66	
Physical constants					
Torque constant	k_T	Nm/A	1.05	0.79	
Voltage constant	k_E	V/1000 rpm	67	50	
Winding resistance at 20 °C	R_{ph}	Ohm	0.63	0.35	
Rotating field inductance	L_D	mH	6	3.4	
Electrical time constant	T_{el}	ms	9.5	9.7	
Shaft torsional stiffness	c_t	Nm/rad	27000	27000	
Mechanical time constant	T_{mech}	ms	2.2	2.2	
Thermal time constant	T_{th}	min	30	30	
Weight with brake	m	kg	13	13	
Weight without brake	m	kg	12.5	12.5	

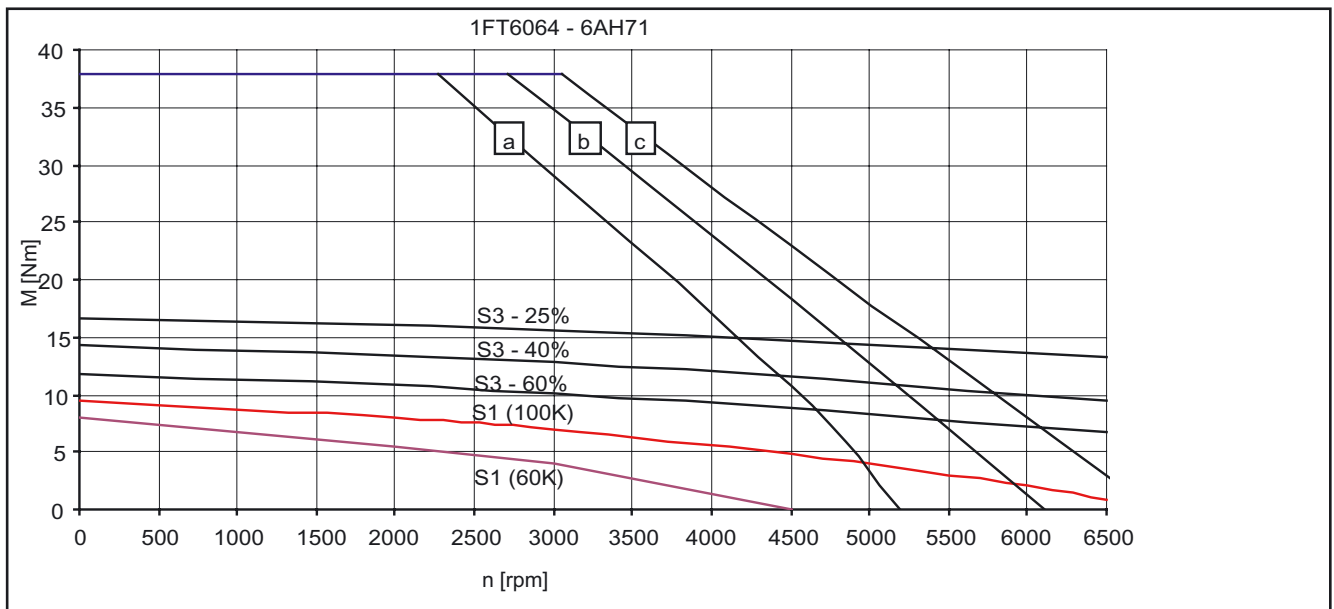


Fig. 3-19 Speed-torque diagram 1FT6064-6AH7□

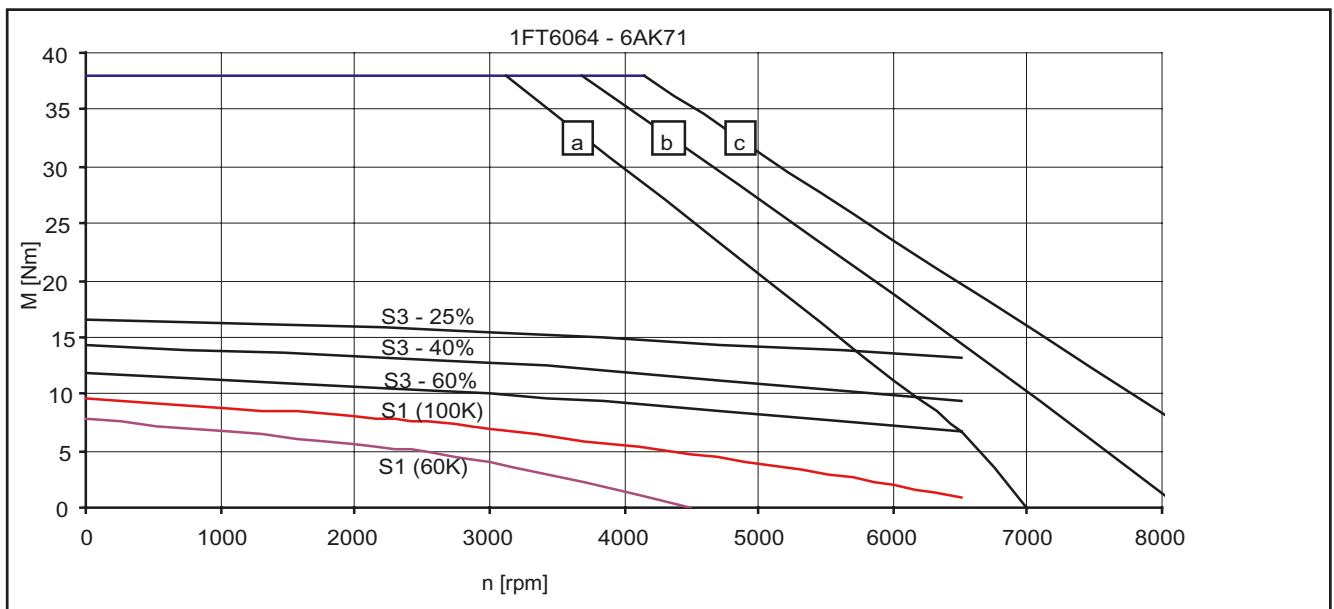


Fig. 3-20 Speed-torque diagram 1FT6064-6AK7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-13 1FT6081 natural cooling

1FT6081						
Technical data	Code	Units	-8AC7□	-8AF7□		
Engineering data						
Rated speed	n_N	rpm	2000	3000		
Number of poles	2p		8	8		
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	7.5	6.9		
Rated current (100K)	I_N	A	4.1	5.6		
Stall torque (60K)	$M_{0(60\ K)}$	Nm	6.6	6.6		
Stall torque (100K)	$M_{0(100\ K)}$	Nm	8.0	8.0		
Stall current (60K)	$I_{0(60\ K)}$	A	3.1	4.7		
Stall current (100K)	$I_{0(100\ K)}$	A	3.9	5.8		
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	24.8	24.8		
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	21	21		
Optimum operating point						
Optimum speed	n_{opt}	rpm	2000	3000		
Optimum power	P_{opt}	kW	1.57	2.17		
Limiting data						
Max. permissible speed (mech.)	n_{max}	rpm	7900	7900		
Maximum torque	M_{max}	Nm	26	26		
Maximum current	I_{max}	A	16.5	24.5		
Physical constants						
Torque constant	k_T	Nm/A	2.07	1.38		
Voltage constant	k_E	V/1000 rpm	132	88		
Winding resistance at 20 °C	R_{ph}	Ohm	3.08	1.37		
Rotating field inductance	L_D	mH	23	10.3		
Electrical time constant	T_{el}	ms	7.5	7.5		
Shaft torsional stiffness	c_t	Nm/rad	100000	100000		
Mechanical time constant	T_{mech}	ms	4.5	4.5		
Thermal time constant	T_{th}	min	25	25		
Weight with brake	m	kg	14	14		
Weight without brake	m	kg	12.5	12.5		

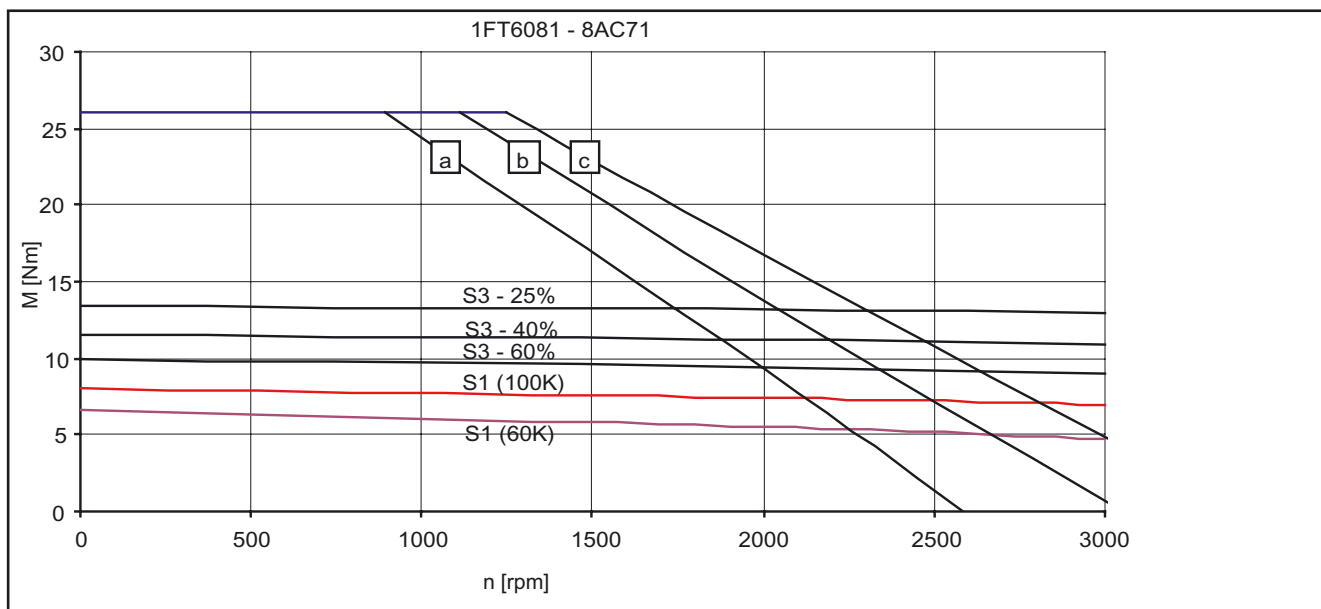


Fig. 3-21 Speed-torque diagram 1FT6081-8AC7□

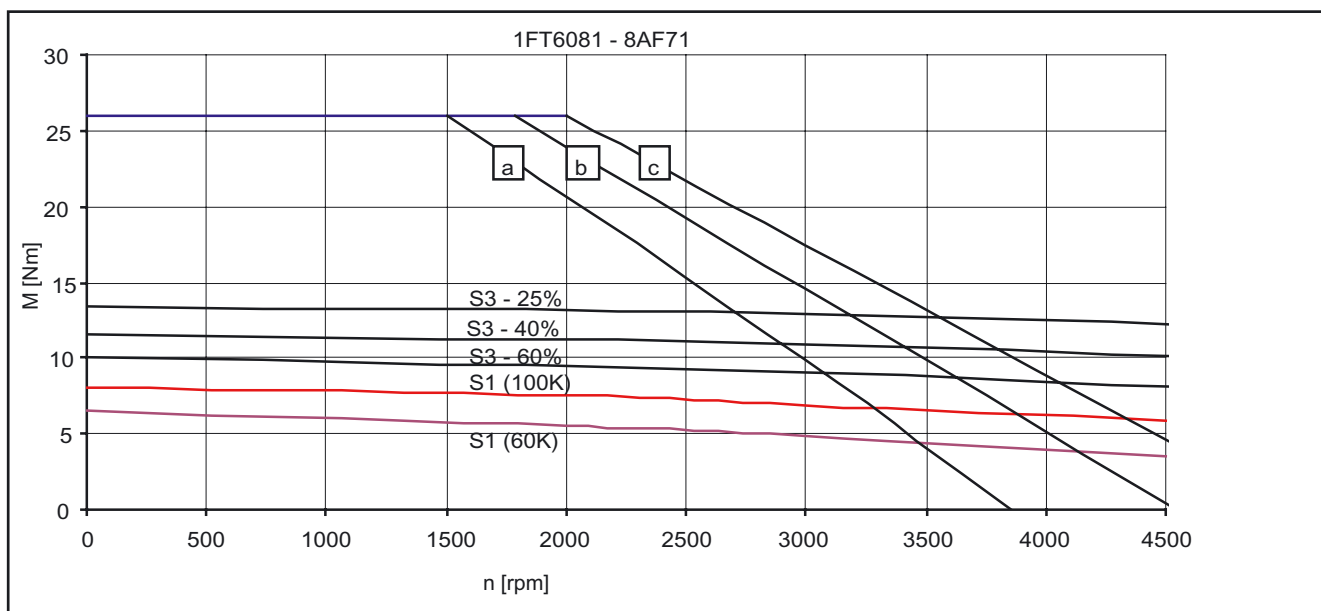


Fig. 3-22 Speed-torque diagram 1FT6081-8AF7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-14 1FT6081 natural cooling

1FT6081					
Technical data	Code	Units	-8AH7□	-8AK7□	
Engineering data					
Rated speed	n_N	rpm	4500	6000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	5.8	4.6	
Rated current (100K)	I_N	A	7.3	7.7	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	6.6	6.6	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	8.0	8.0	
Stall current (60K)	$I_{0(60\ K)}$	A	7.0	8.9	
Stall current (100K)	$I_{0(100\ K)}$	A	8.6	11.1	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	24.8	24.8	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	21	21	
Optimum operating point					
Optimum speed	n_{opt}	rpm	4500	6000	
Optimum power	P_{opt}	kW	2.73	2.89	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	7900	7900	
Maximum torque	M_{max}	Nm	26	26	
Maximum current	I_{max}	A	37	46	
Physical constants					
Torque constant	k_T	Nm/A	0.93	0.72	
Voltage constant	k_E	V/1000 rpm	59	46	
Winding resistance at 20 °C	R_{ph}	Ohm	0.61	0.38	
Rotating field inductance	L_D	mH	4.6	3	
Electrical time constant	T_{el}	ms	7.5	7.9	
Shaft torsional stiffness	c_t	Nm/rad	100000	100000	
Mechanical time constant	T_{mech}	ms	4.4	4.6	
Thermal time constant	T_{th}	min	25	25	
Weight with brake	m	kg	14	14	
Weight without brake	m	kg	12.5	12.5	

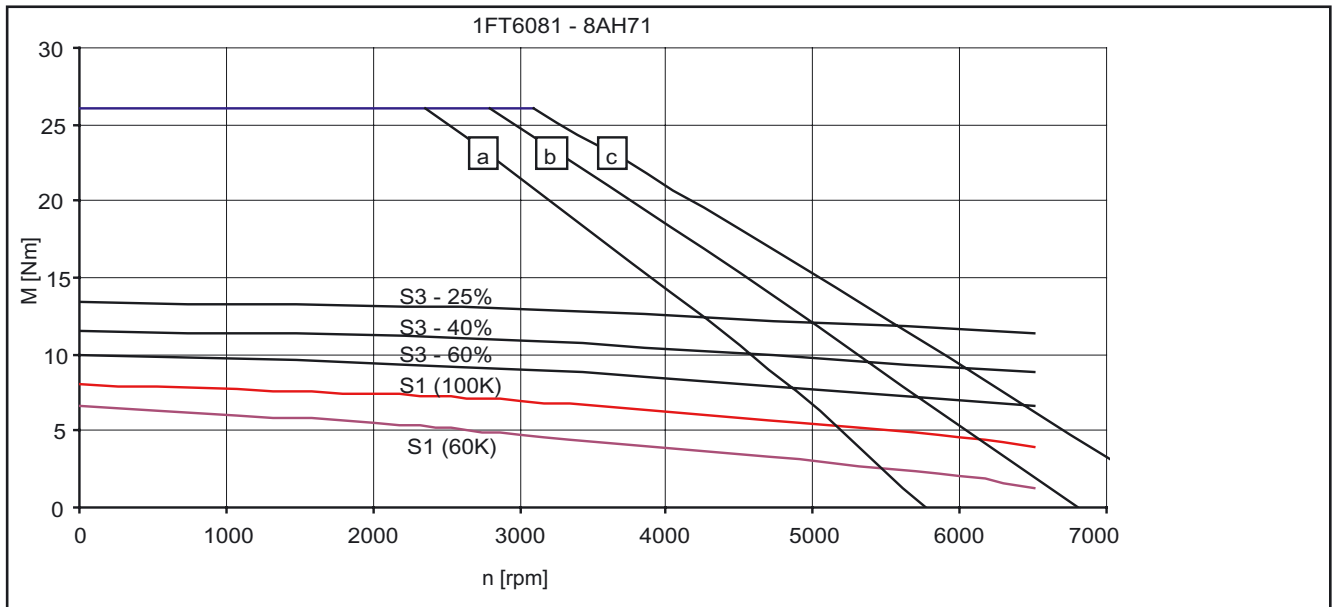


Fig. 3-23 Speed-torque diagram 1FT6081-8AH7□

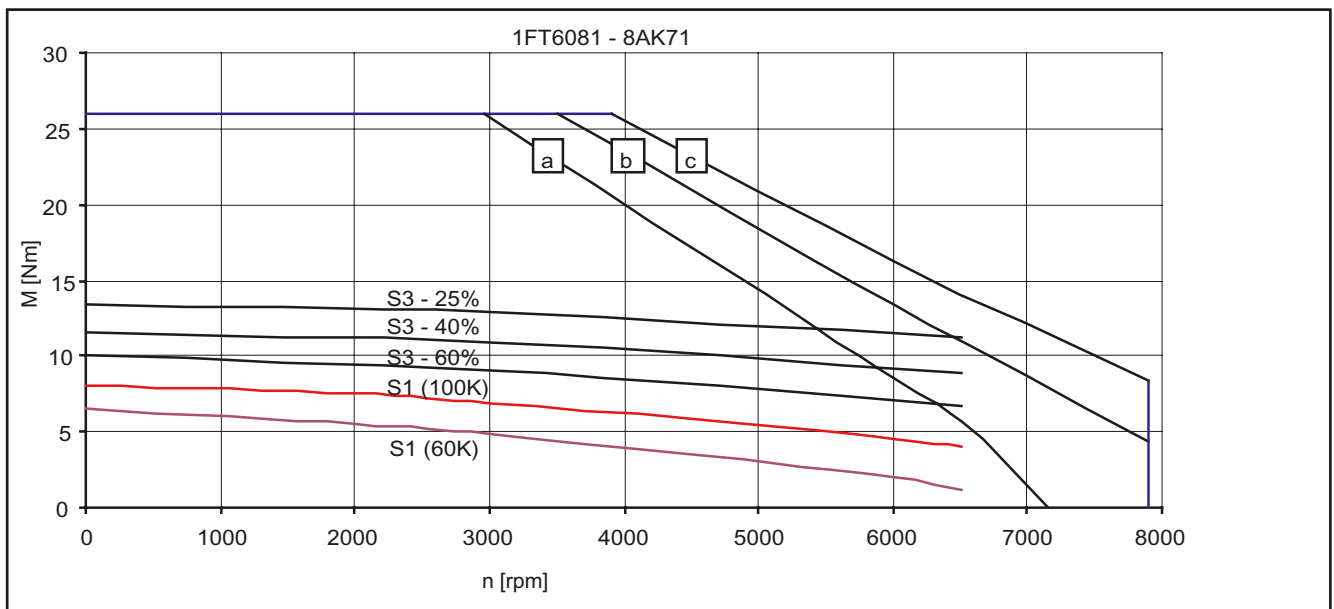


Fig. 3-24 Speed-torque diagram 1FT6081-8AH7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-15 1FT6082 natural cooling

1FT6082					
Technical data	Code	Units	-8AC7□	-□AF7□	
Engineering data					
Rated speed	n_N	rpm	2000	3000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	11.4	10.3	
Rated current (100K)	I_N	A	6.6	8.7	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	10.8	10.8	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	13	13	
Stall current (60K)	$I_{0(60\ K)}$	A	5.4	7.8	
Stall current (100K)	$I_{0(100\ K)}$	A	6.6	9.6	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	33.8	33.8	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	30	30	
Optimum operating point					
Optimum speed	n_{opt}	rpm	2000	3000	
Optimum power	P_{opt}	kW	2.39	3.24	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	7900	7900	
Maximum torque	M_{max}	Nm	42	42	
Maximum current	I_{max}	A	28	41	
Physical constants					
Torque constant	k_T	Nm/A	1.96	1.35	
Voltage constant	k_E	V/1000 rpm	125	86	
Winding resistance at 20 °C	R_{ph}	Ohm	1.48	0.69	
Rotating field inductance	L_D	mH	13.6	6.2	
Electrical time constant	T_{el}	ms	9.2	9.0	
Shaft torsional stiffness	c_t	Nm/rad	90000	90000	
Mechanical time constant	T_{mech}	ms	3.5	3.4	
Thermal time constant	T_{th}	min	30	30	
Weight with brake	m	kg	16.5	16.5	
Weight without brake	m	kg	15	15	

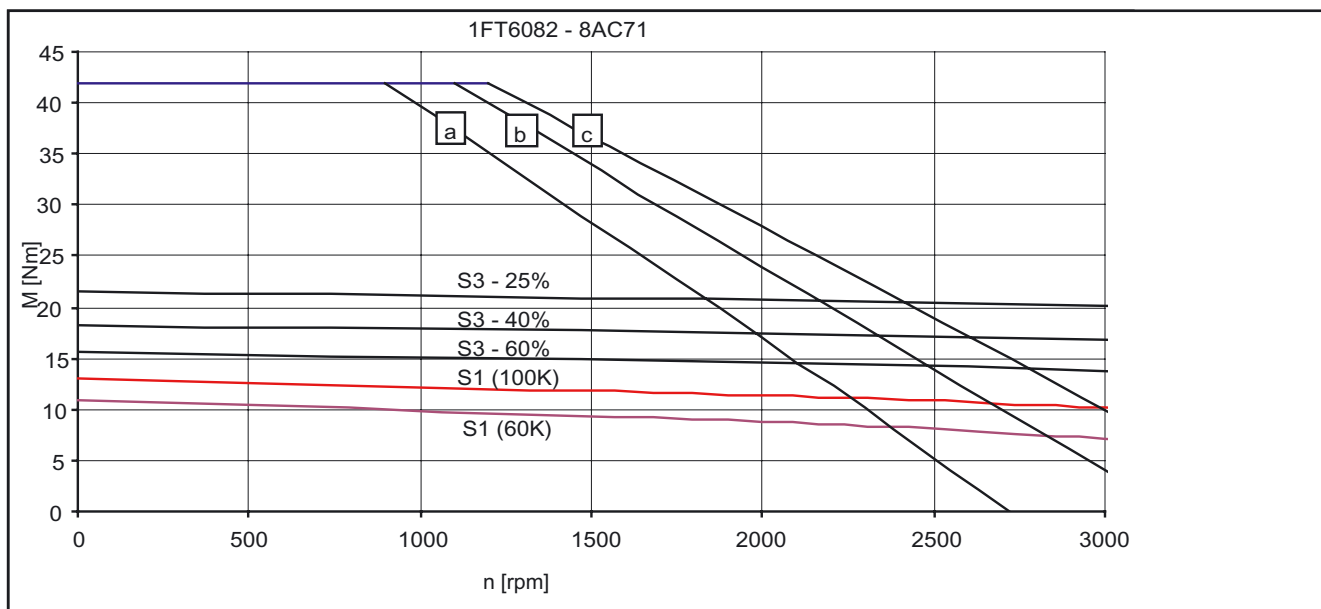


Fig. 3-25 Speed-torque diagram 1FT6082-8AC7□

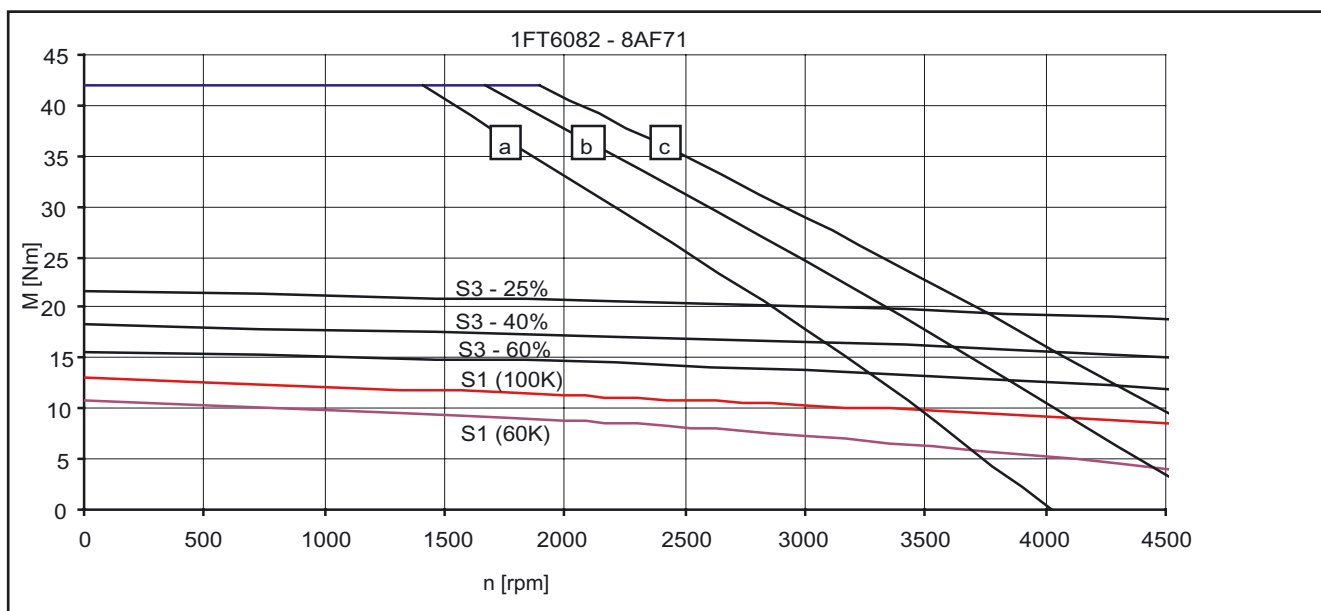


Fig. 3-26 Speed-torque diagram 1FT6082-8AF7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-16 1FT6082 natural cooling

1FT6082					
Technical data	Code	Units	-8AH7□	-8AK7□	
Engineering data					
Rated speed	n_N	rpm	4500	6000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	8.5	5.5	
Rated current (100K)	I_N	A	11	9.1	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	10.8	10.8	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	13.0	13.0	
Stall current (60K)	$I_{0(60\text{ K})}$	A	12.0	14.0	
Stall current (100K)	$I_{0(100\text{ K})}$	A	14.8	17.3	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	33.8	33.8	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	30	30	
Optimum operating point					
Optimum speed	n_{opt}	rpm	4500	4500	
Optimum power	P_{opt}	kW	4.01	4.01	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	7900	7900	
Maximum torque	M_{max}	Nm	42	42	
Maximum current	I_{max}	A	60	73	
Physical constants					
Torque constant	k_T	Nm/A	0.88	0.75	
Voltage constant	k_E	V/1000 rpm	56	48	
Winding resistance at 20 °C	R_{ph}	Ohm	0.30	0.21	
Rotating field inductance	L_D	mH	2.9	1.9	
Electrical time constant	T_{el}	ms	9.7	9.0	
Shaft torsional stiffness	c_t	Nm/rad	90000	90000	
Mechanical time constant	T_{mech}	ms	3.5	3.4	
Thermal time constant	T_{th}	min	30	30	
Weight with brake	m	kg	16.5	16.5	
Weight without brake	m	kg	15	15	

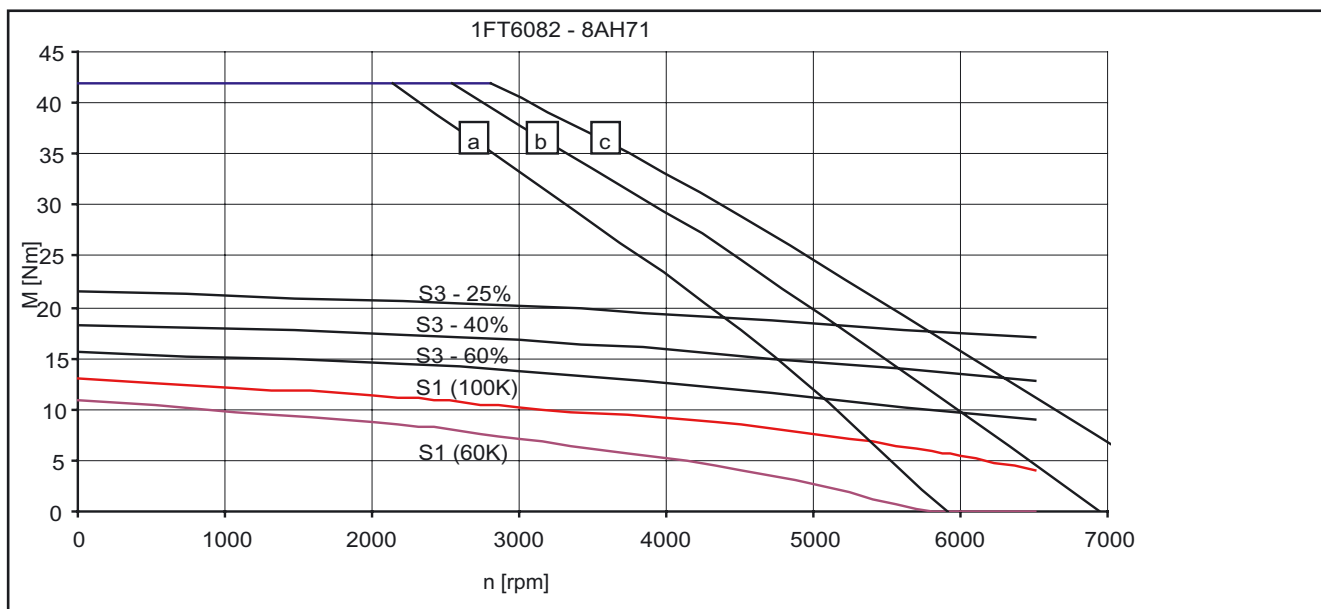


Fig. 3-27 Speed-torque diagram 1FT6082-8AH71

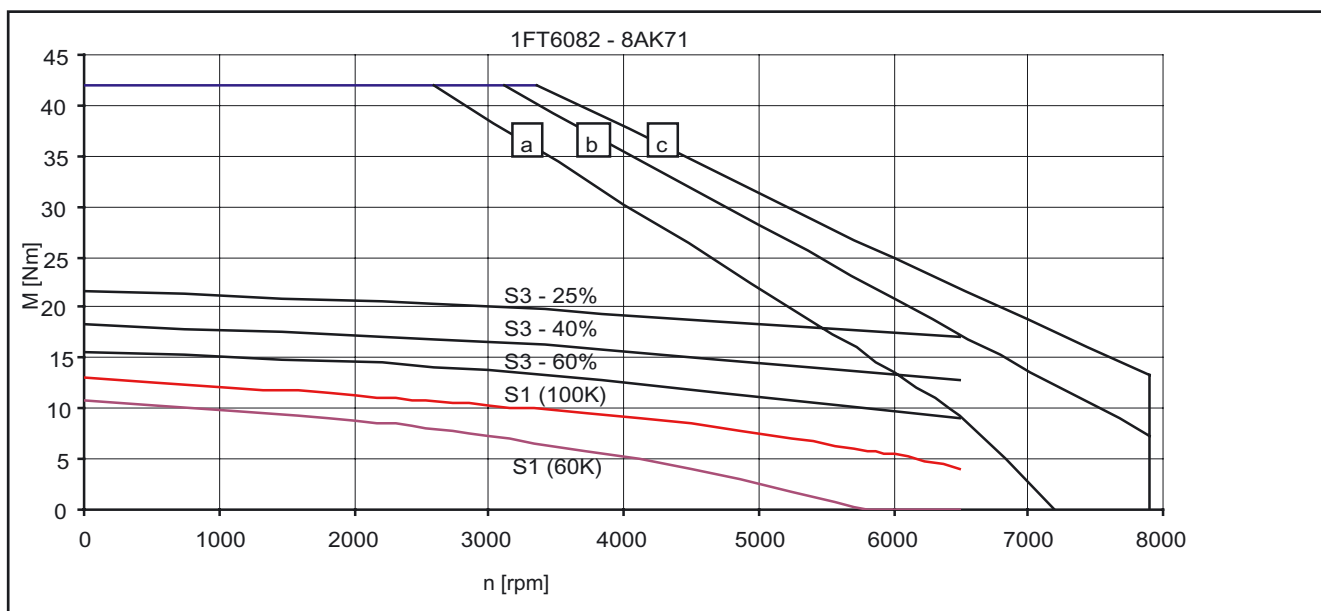


Fig. 3-28 Speed-torque diagram 1FT6082-8AK71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-17 1FT6084 natural cooling

1FT6084					
Technical data	Code	Units	-8AC7□	-□AF7□	
Engineering data					
Rated speed	n_N	rpm	2000	3000	
Number of poles	2p		4	4	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	16.9	14.7	
Rated current (100K)	I_N	A	8.3	11	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	16.6	16.6	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	20	20	
Stall current (60K)	$I_{0(60\text{ K})}$	A	7.2	10.7	
Stall current (100K)	$I_{0(100\text{ K})}$	A	8.8	13.2	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	61.1	61.1	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	48	48	
Optimum operating point					
Optimum speed	n_{opt}	rpm	2000	3000	
Optimum power	P_{opt}	kW	3.54	4.62	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	7900	7900	
Maximum torque	M_{max}	Nm	65	65	
Maximum current	I_{max}	A	38	56	
Physical constants					
Torque constant	k_T	Nm/A	2.26	1.52	
Voltage constant	k_E	V/1000 rpm	144	97	
Winding resistance at 20 °C	R_{ph}	Ohm	0.91	0.41	
Rotating field inductance	L_D	mH	10.4	4.8	
Electrical time constant	T_{el}	ms	11.4	11.7	
Shaft torsional stiffness	c_t	Nm/rad	76000	76000	
Mechanical time constant	T_{mech}	ms	2.6	2.6	
Thermal time constant	T_{th}	min	35	35	
Weight with brake	m	kg	24	24	
Weight without brake	m	kg	20.5	20.5	

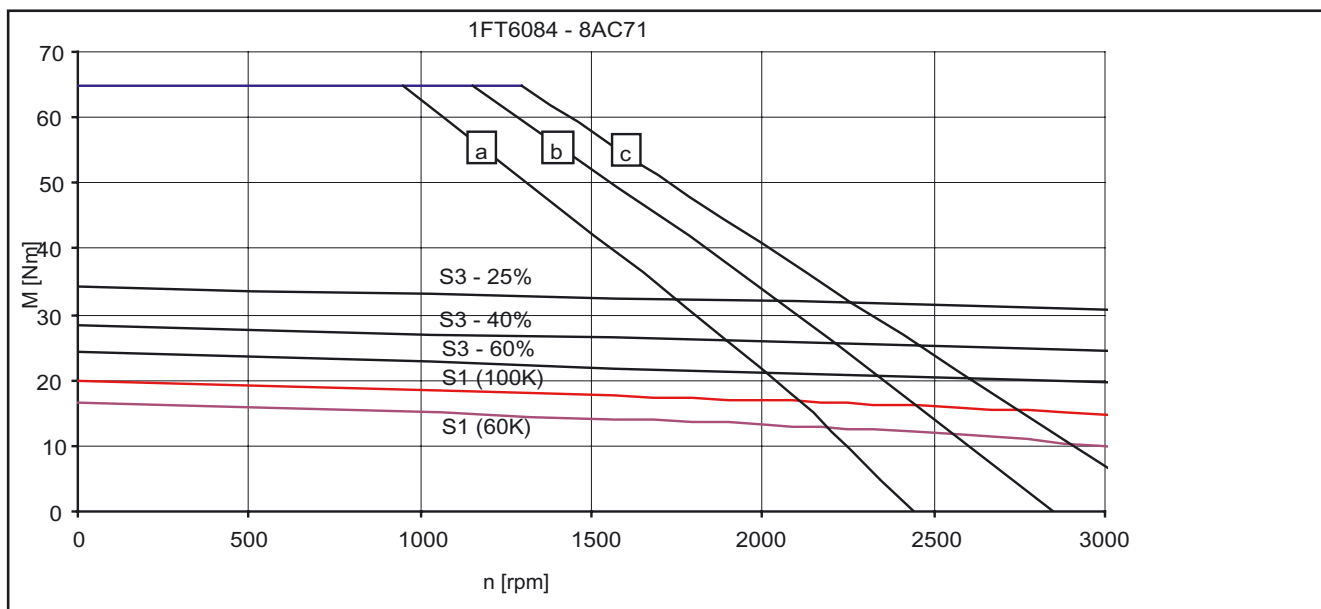


Fig. 3-29 Speed-torque diagram 1FT6084-8AC7□

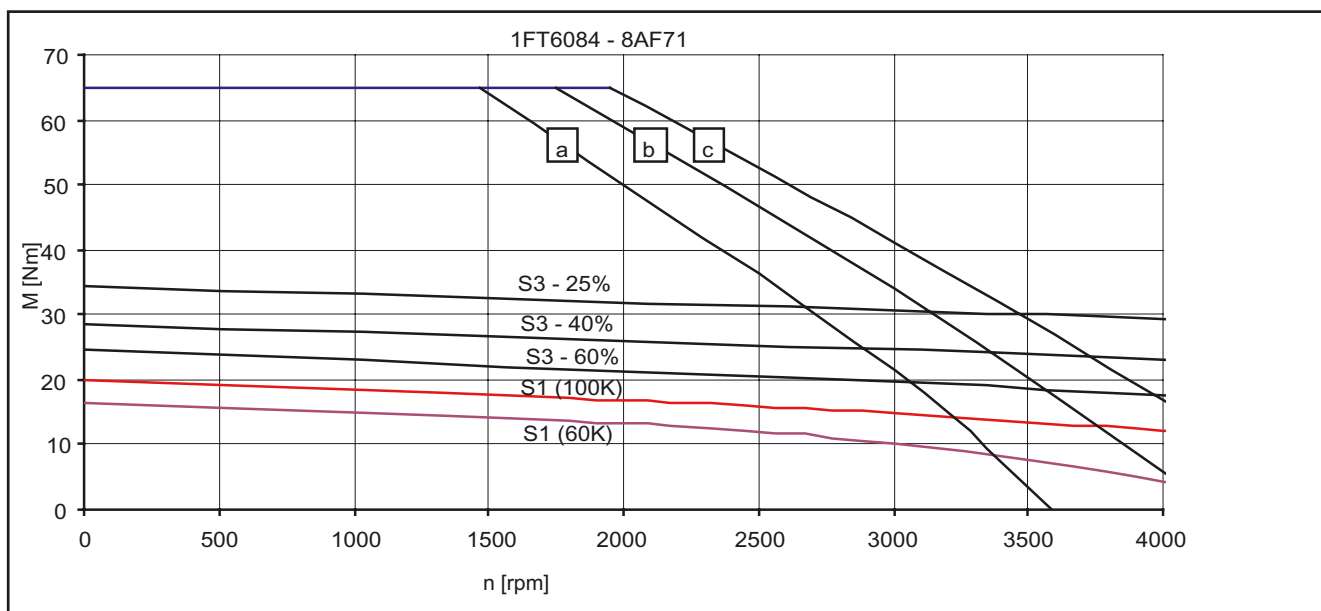


Fig. 3-30 Speed-torque diagram 1FT6084-□AF7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-18 1FT6084 natural cooling

1FT6084					
Technical data	Code	Units	-□AH7□	-□AK7□	
Engineering data					
Rated speed	n_N	rpm	4500	6000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	10.5	6.5	
Rated current (100K)	I_N	A	12.5	9.2	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	16.6	16.6	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	20	20	
Stall current (60K)	$I_{0(60\ K)}$	A	16.2	19.5	
Stall current (100K)	$I_{0(100\ K)}$	A	19.8	24.1	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	61.1	61.1	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	48	48	
Optimum operating point					
Optimum speed	n_{opt}	rpm	4000	4000	
Optimum power	P_{opt}	kW	5.03	5.03	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	7900	7900	
Maximum torque	M_{max}	Nm	65	65	
Maximum current	I_{max}	A	86	100	
Physical constants					
Torque constant	k_T	Nm/A	1.01	0.83	
Voltage constant	k_E	V/1000 rpm	64	53	
Winding resistance at 20 °C	R_{ph}	Ohm	0.18	0.12	
Rotating field inductance	L_D	mH	2	1.5	
Electrical time constant	T_{el}	ms	11.1	12.5	
Shaft torsional stiffness	c_t	Nm/rad	76000	76000	
Mechanical time constant	T_{mech}	ms	2.5	2.5	
Thermal time constant	T_{th}	min	35	35	
Weight with brake	m	kg	24	24	
Weight without brake	m	kg	20.5	20.5	

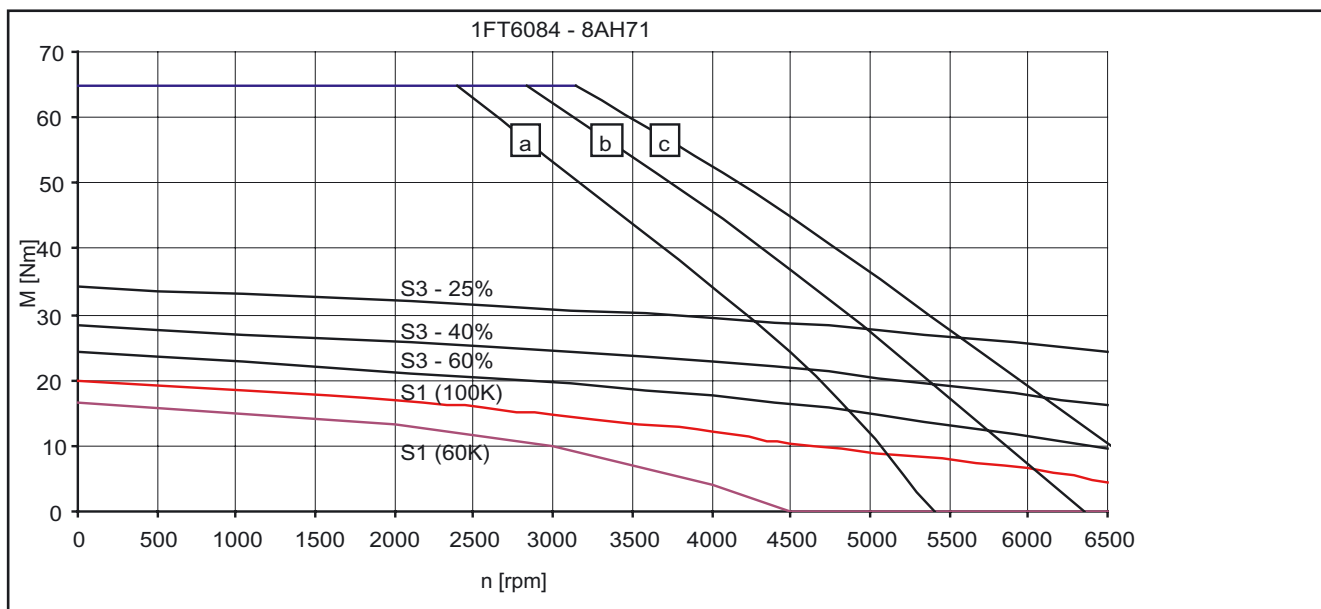


Fig. 3-31 Speed-torque diagram 1FT6084-□AH7□

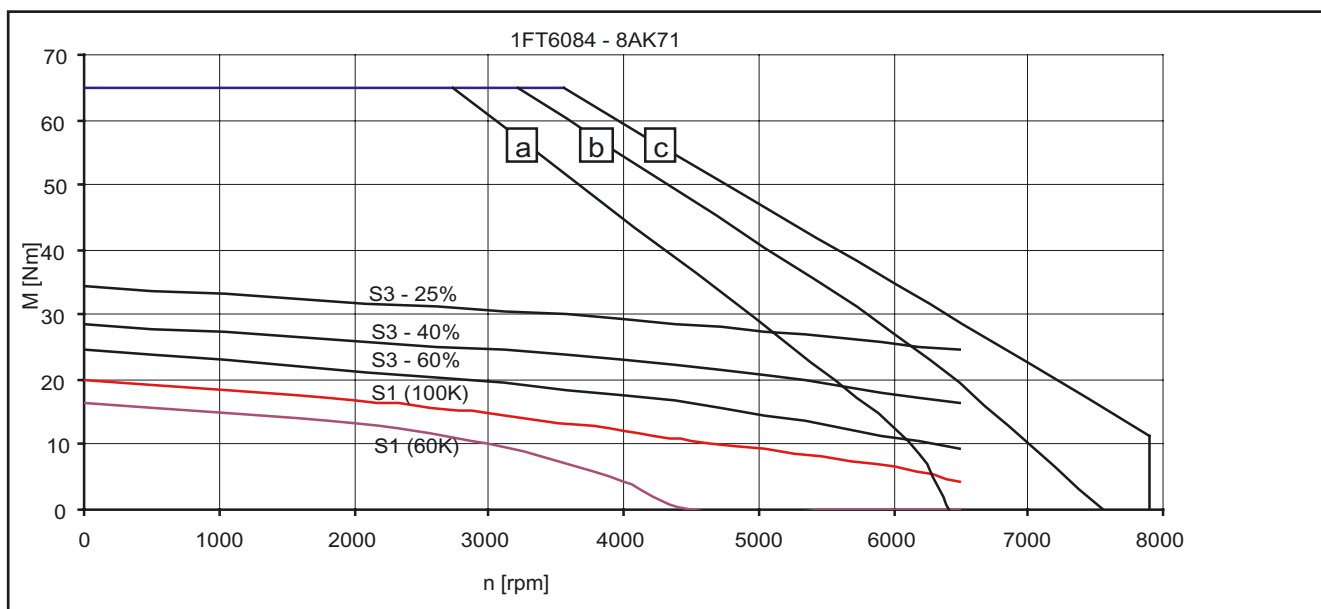


Fig. 3-32 Speed-torque diagram 1FT6084-□AK7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-19 1FT6086 natural cooling

1FT6086				
Technical data	Code	Units	-8AC7□	
Engineering data				
Rated speed	n_N	rpm	2000	
Number of poles	2p		8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	22.5	
Rated current (100K)	I_N	A	10.9	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	22.4	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	27	
Stall current (60K)	$I_{0(60\text{ K})}$	A	9.2	
Stall current (100K)	$I_{0(100\text{ K})}$	A	11.3	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	79.6	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	66.5	
Optimum operating point				
Optimum speed	n_{opt}	rpm	2000	
Optimum power	P_{opt}	kW	4.71	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	7900	
Maximum torque	M_{max}	Nm	90	
Maximum current	I_{max}	A	48	
Physical constants				
Torque constant	k_T	Nm/A	2.39	
Voltage constant	k_E	V/1000 rpm	152	
Winding resistance at 20 °C	R_{ph}	Ohm	0.65	
Rotating field inductance	L_D	mH	8	
Electrical time constant	T_{el}	ms	12.3	
Shaft torsional stiffness	c_t	Nm/rad	65000	
Mechanical time constant	T_{mech}	ms	2.3	
Thermal time constant	T_{th}	min	45	
Weight with brake	m	kg	29	
Weight without brake	m	kg	25.5	

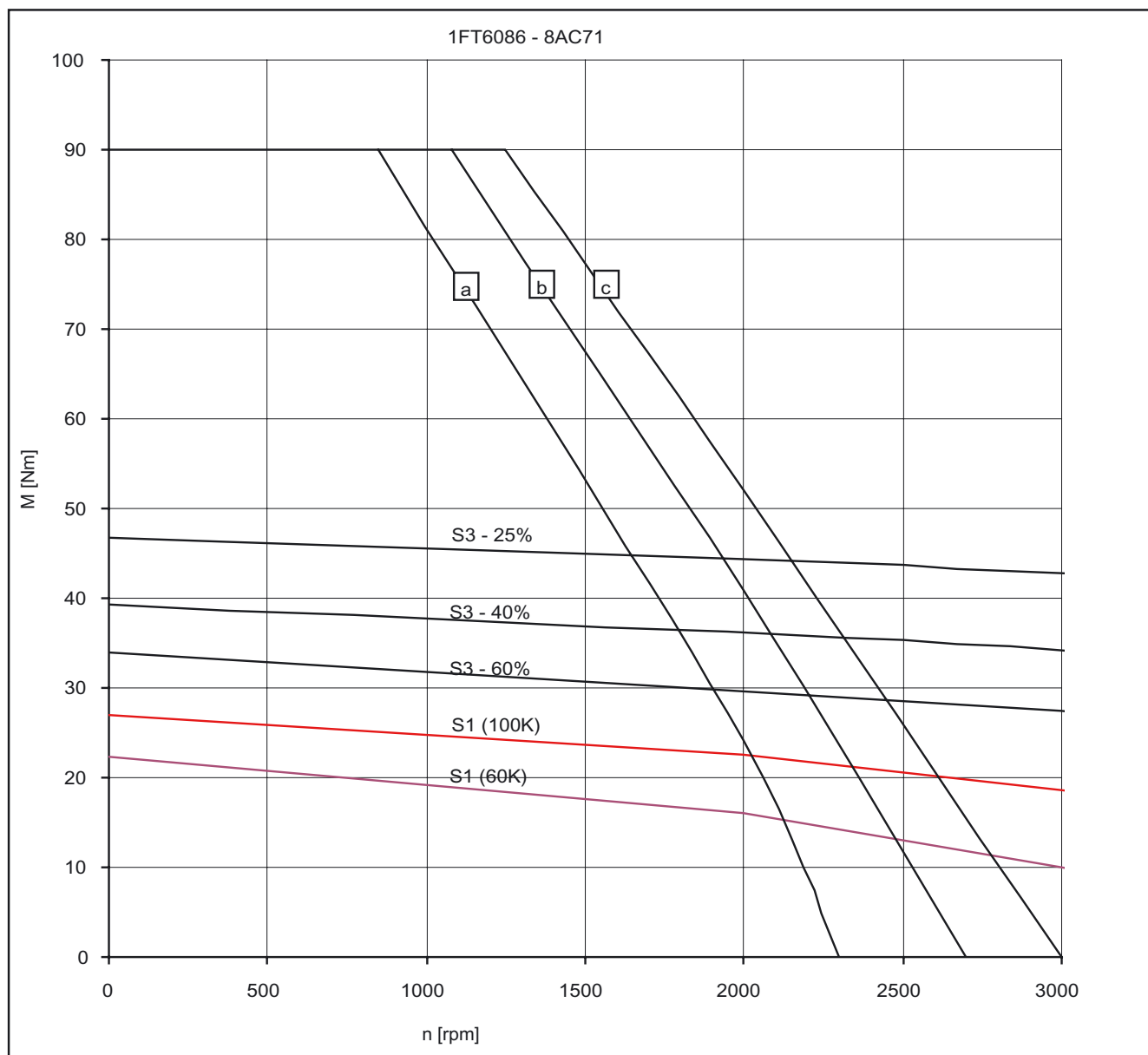


Fig. 3-33 Speed-torque diagram 1FT6086-8AC71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-20 1FT6086 natural cooling

1FT6086					
Technical data	Code	Units	-□AF7□	-□AH7□	
Engineering data					
Rated speed	n_N	rpm	3000	4500	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	18.5	12	
Rated current (100K)	I_N	A	13	12.6	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	22.4	22.4	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	27	27	
Stall current (60K)	$I_{0(60\ K)}$	A	13.3	18.9	
Stall current (100K)	$I_{0(100\ K)}$	A	16.4	23.3	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	79.6	79.6	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	66.5	66.5	
Optimum operating point					
Optimum speed	n_{opt}	rpm	3000	3500	
Optimum power	P_{opt}	kW	5.81	6	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	7900	7900	
Maximum torque	M_{max}	Nm	90	90	
Maximum current	I_{max}	A	71	102	
Physical constants					
Torque constant	k_T	Nm/A	1.65	1.16	
Voltage constant	k_E	V/1000 rpm	105	74	
Winding resistance at 20 °C	R_{ph}	Ohm	0.31	0.15	
Rotating field inductance	L_D	mH	3.8	1.8	
Electrical time constant	T_{el}	ms	12.3	12	
Shaft torsional stiffness	c_t	Nm/rad	65000	65000	
Mechanical time constant	T_{mech}	ms	2.3	2.2	
Thermal time constant	T_{th}	min	45	45	
Weight with brake	m	kg	29	29	
Weight without brake	m	kg	25.5	25.5	

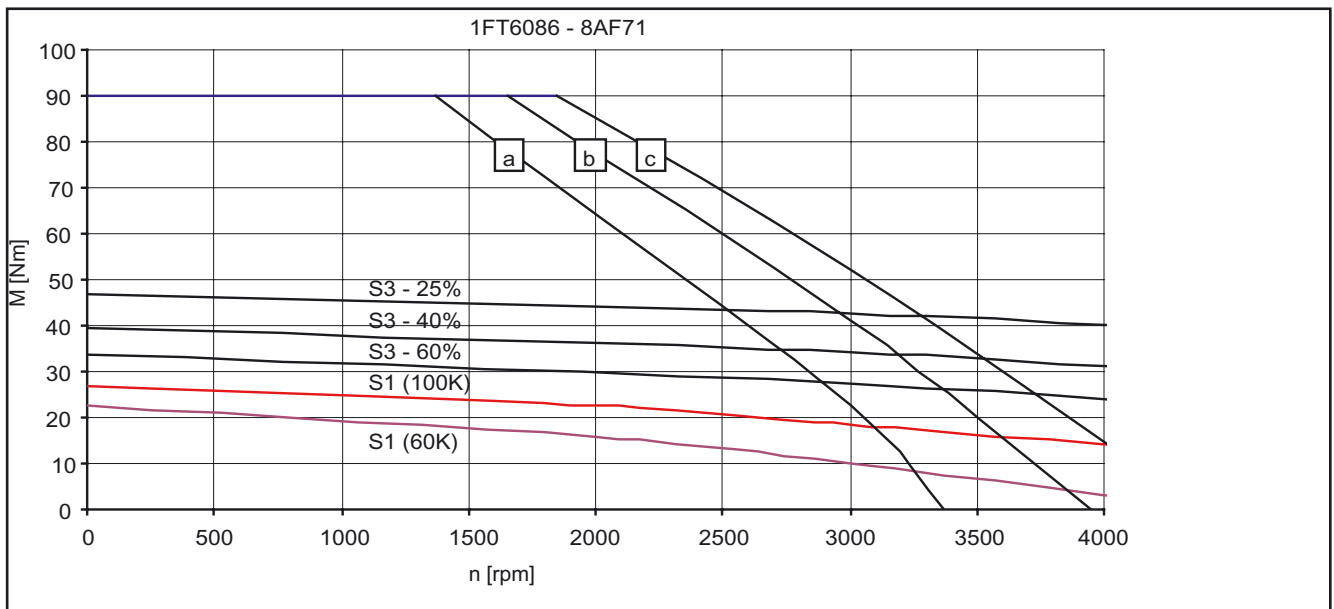


Fig. 3-34 Speed-torque diagram 1FT6086-□AF7□

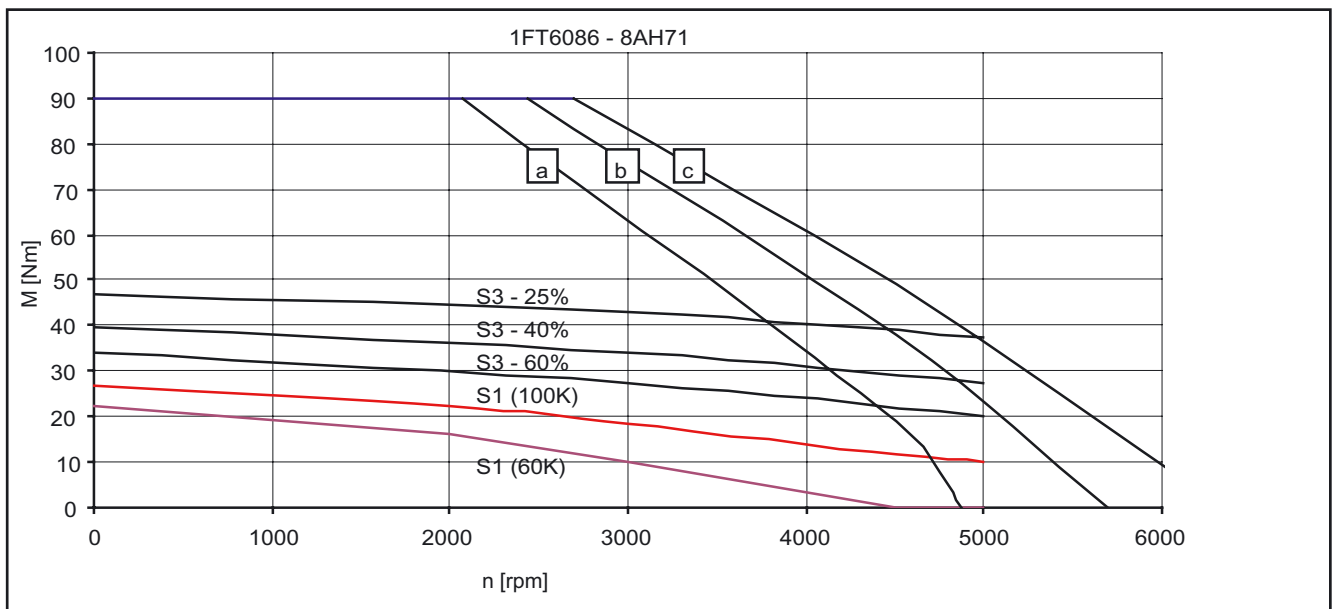


Fig. 3-35 Speed-torque diagram 1FT6086-□AH7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-22 1FT6102 natural cooling

1FT6102					
Technical data	Code	Units	-8AB7□	-□AC7□	
Engineering data					
Rated speed	n_N	rpm	1500	2000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	24.5	23	
Rated current (100K)	I_N	A	8.4	11	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	22.4	22.4	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	27	27	
Stall current (60K)	$I_{0(60\text{ K})}$	A	7.0	9.8	
Stall current (100K)	$I_{0(100\text{ K})}$	A	8.7	12.1	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	130	130	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	99	99	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2000	
Optimum power	P_{opt}	kW	3.85	4.82	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	5600	5600	
Maximum torque	M_{max}	Nm	80	80	
Maximum current	I_{max}	A	42	59	
Physical constants					
Torque constant	k_T	Nm/A	3.11	2.23	
Voltage constant	k_E	V/1000 rpm	198	142	
Winding resistance at 20 °C	R_{ph}	Ohm	0.82	0.42	
Rotating field inductance	L_D	mH	15.1	7.7	
Electrical time constant	T_{el}	ms	18	18	
Shaft torsional stiffness	c_t	Nm/rad	137000	137000	
Mechanical time constant	T_{mech}	ms	2.5	2.5	
Thermal time constant	T_{th}	min	40	40	
Weight with brake	m	kg	32	32	
Weight without brake	m	kg	27.5	27.5	

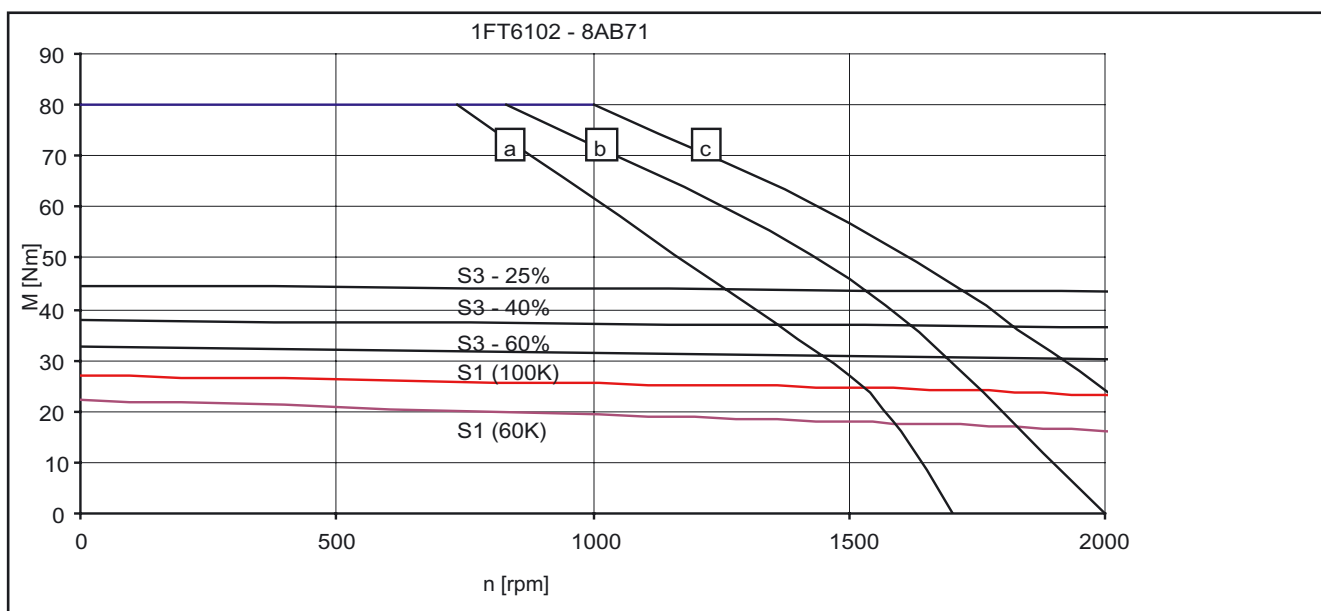


Fig. 3-36 Speed-torque diagram 1FT6102-8AB7□

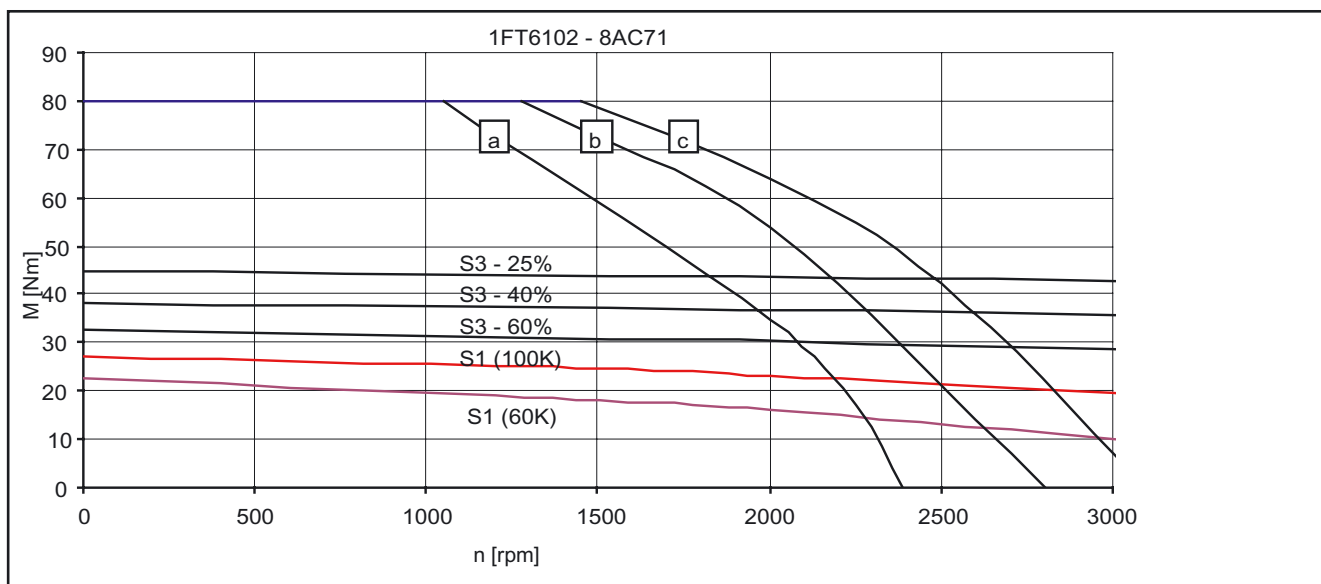


Fig. 3-37 Speed-torque diagram 1FT6102-8AC7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-23 1FT6102 natural cooling

1FT6102					
Technical data	Code	Units	-8AF7□	-8AH7□	
Engineering data					
Rated speed	n_N	rpm	3000	4500	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	19.5	12	
Rated current (100K)	I_N	A	13.2	12	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	22.4	22.4	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	27	27	
Stall current (60K)	$I_{0(60\text{ K})}$	A	13.7	19.7	
Stall current (100K)	$I_{0(100\text{ K})}$	A	16.9	24.1	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	130	130	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	99	99	
Optimum operating point					
Optimum speed	n_{opt}	rpm	3000	3500	
Optimum power	P_{opt}	kW	6.13	6.3	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	5600	5600	
Maximum torque	M_{max}	Nm	80	80	
Maximum current	I_{max}	A	82	118	
Physical constants					
Torque constant	k_T	Nm/A	1.60	1.12	
Voltage constant	k_E	V/1000 rpm	102	71	
Winding resistance at 20 °C	R_{ph}	Ohm	0.22	0.11	
Rotating field inductance	L_D	mH	4	1.9	
Electrical time constant	T_{el}	ms	18	17	
Shaft torsional stiffness	c_t	Nm/rad	137000	137000	
Mechanical time constant	T_{mech}	ms	2.6	2.6	
Thermal time constant	T_{th}	min	40	40	
Weight with brake	m	kg	32	32	
Weight without brake	m	kg	27.5	27.5	

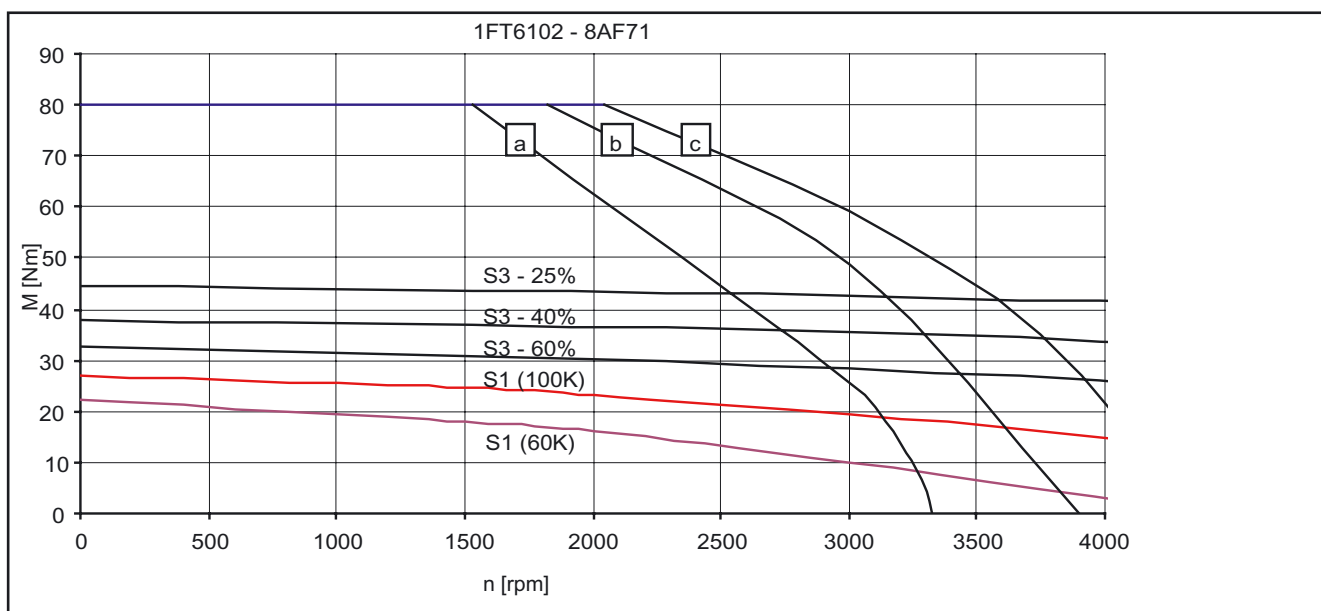


Fig. 3-38 Speed-torque diagram 1FT6102-8AF7□

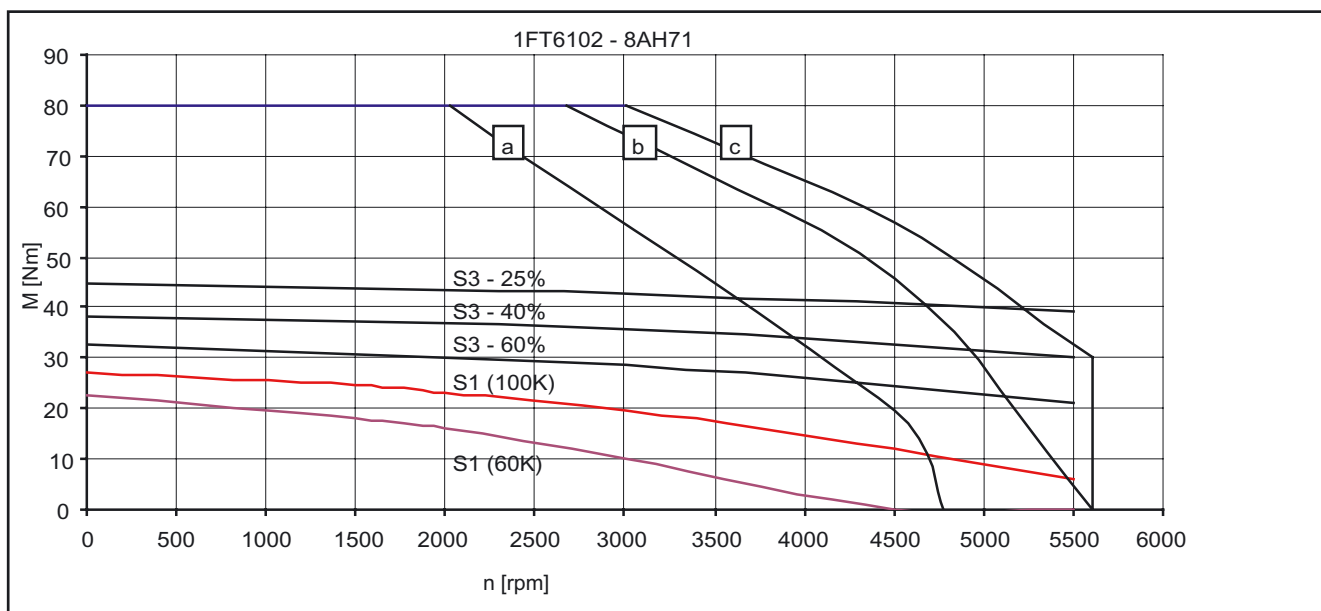


Fig. 3-39 Speed-torque diagram 1FT6102-8AH7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-24 1FT6105 natural cooling

1FT6105					
Technical data	Code	Units	-8AB7□	-8AC7□	
Engineering data					
Rated speed	n_N	rpm	1500	2000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	41	38	
Rated current (100K)	I_N	A	14.5	17.6	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	42	42	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	50	50	
Stall current (60K)	$I_{0(60\text{ K})}$	A	13.1	17.6	
Stall current (100K)	$I_{0(100\text{ K})}$	A	16	21.4	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	199	199	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	168	168	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2000	
Optimum power	P_{opt}	kW	6.44	7.96	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	5600	5600	
Maximum torque	M_{max}	Nm	140	140	
Maximum current	I_{max}	A	77	103	
Physical constants					
Torque constant	k_T	Nm/A	3.13	2.34	
Voltage constant	k_E	V/1000 rpm	199	149	
Winding resistance at 20 °C	R_{ph}	Ohm	0.39	0.22	
Rotating field inductance	L_D	mH	8.4	4.7	
Electrical time constant	T_{el}	ms	22	21	
Shaft torsional stiffness	c_t	Nm/rad	113000	113000	
Mechanical time constant	T_{mech}	ms	2.0	2.0	
Thermal time constant	T_{th}	min	45	45	
Weight with brake	m	kg	44	44	
Weight without brake	m	kg	39.5	39.5	

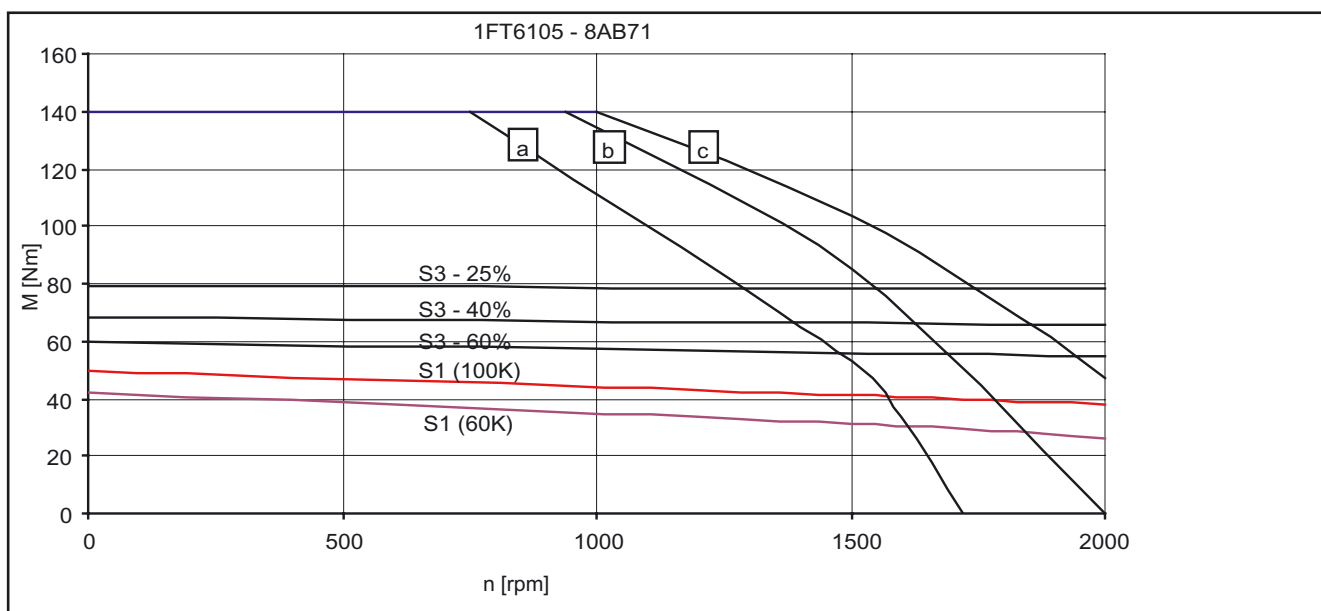


Fig. 3-40 Speed-torque diagram 1FT6105-8AB71

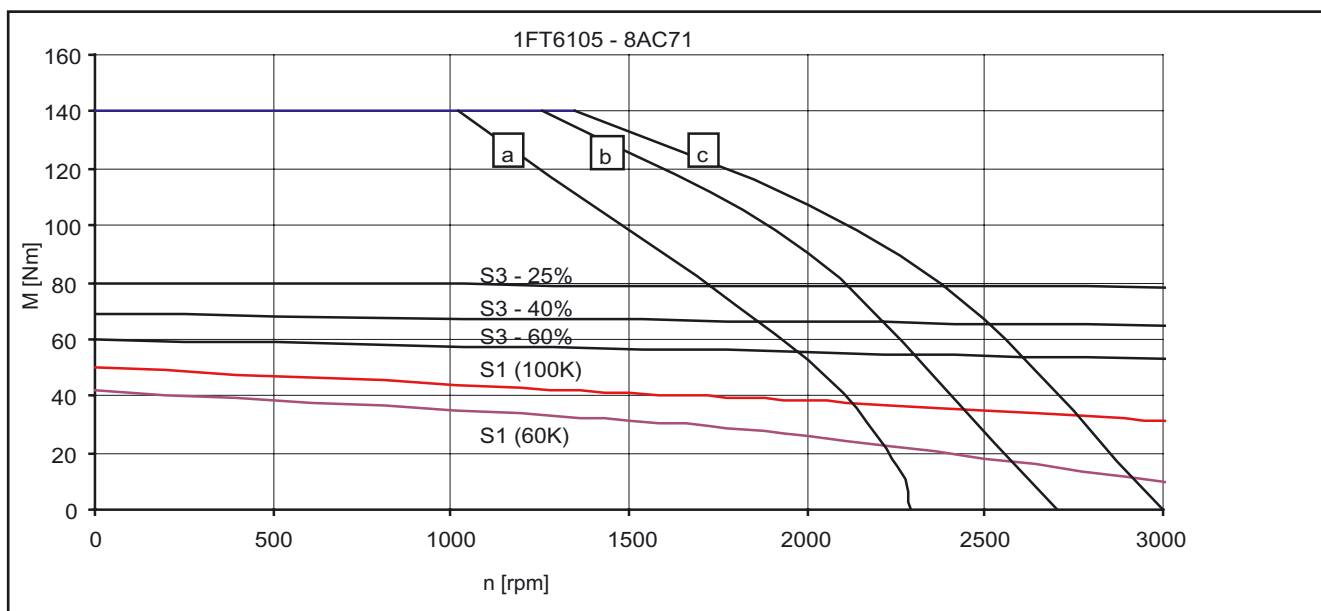


Fig. 3-41 Speed-torque diagram 1FT6105-8AC71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-25 1FT6105 natural cooling

1FT6105				
Technical data	Code	Units	-8AF7□	
Engineering data				
Rated speed	n_N	rpm	3000	
Number of poles	2p		8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	31	
Rated current (100K)	I_N	A	22.5	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	42	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	50	
Stall current (60K)	$I_{0(60\text{ K})}$	A	26	
Stall current (100K)	$I_{0(100\text{ K})}$	A	32	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	199	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	168	
Optimum operating point				
Optimum speed	n_{opt}	rpm	3000	
Optimum power	P_{opt}	kW	9.74	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	5600	
Maximum torque	M_{max}	Nm	140	
Maximum current	I_{max}	A	155	
Physical constants				
Torque constant	k_T	Nm/A	1.56	
Voltage constant	k_E	V/1000 rpm	99	
Winding resistance at 20 °C	R_{ph}	Ohm	0.098	
Rotating field inductance	L_D	mH	2.1	
Electrical time constant	T_{el}	ms	21	
Shaft torsional stiffness	c_t	Nm/rad	113000	
Mechanical time constant	T_{mech}	ms	2.0	
Thermal time constant	T_{th}	min	45	
Weight with brake	m	kg	44	
Weight without brake	m	kg	39.5	

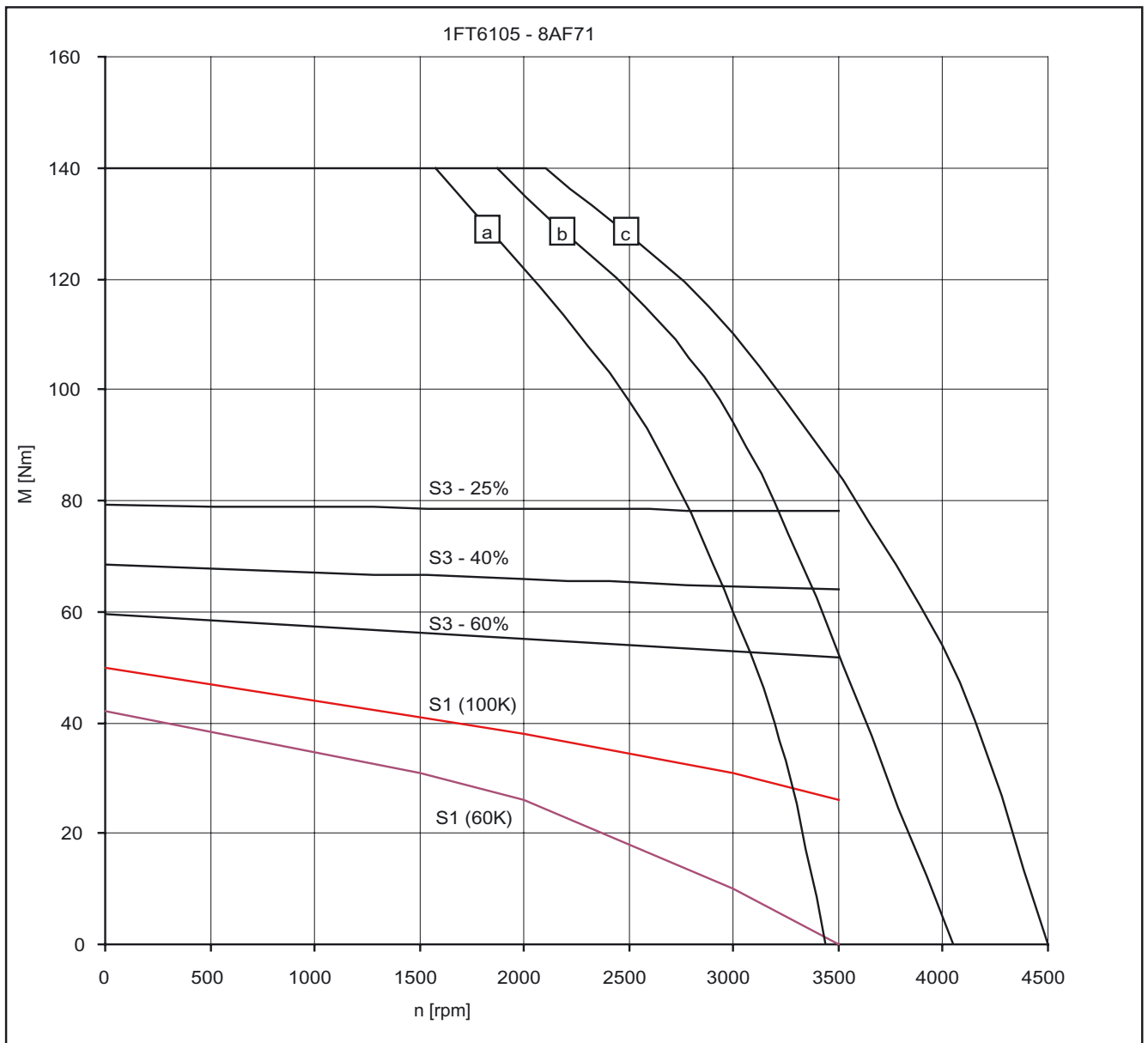


Fig. 3-42 Speed-torque diagram 1FT6105-8AF7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-26 1FT6108 natural cooling

1FT6108					
Technical data	Code	Units	-8AB7□	-8AC7□	
Engineering data					
Rated speed	n_N	rpm	1500	2000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	61	55	
Rated current (100K)	I_N	A	20.5	24.5	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	58	58	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	70	70	
Stall current (60K)	$I_{0(60\text{ K})}$	A	18.1	23.5	
Stall current (100K)	$I_{0(100\text{ K})}$	A	22.3	29	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	291	291	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	260	260	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2000	
Optimum power	P_{opt}	kW	9.58	11.5	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	5600	5600	
Maximum torque	M_{max}	Nm	220	220	
Maximum current	I_{max}	A	107	139	
Physical constants					
Torque constant	k_T	Nm/A	3.14	2.42	
Voltage constant	k_E	V/1000 rpm	200	154	
Winding resistance at 20 °C	R_{ph}	Ohm	0.22	0.13	
Rotating field inductance	L_D	mH	5.2	3.1	
Electrical time constant	T_{el}	ms	24	24	
Shaft torsional stiffness	c_t	Nm/rad	92000	92000	
Mechanical time constant	T_{mech}	ms	1.7	1.7	
Thermal time constant	T_{th}	min	55	55	
Weight with brake	m	kg	60	60	
Weight without brake	m	kg	55.5	55.5	

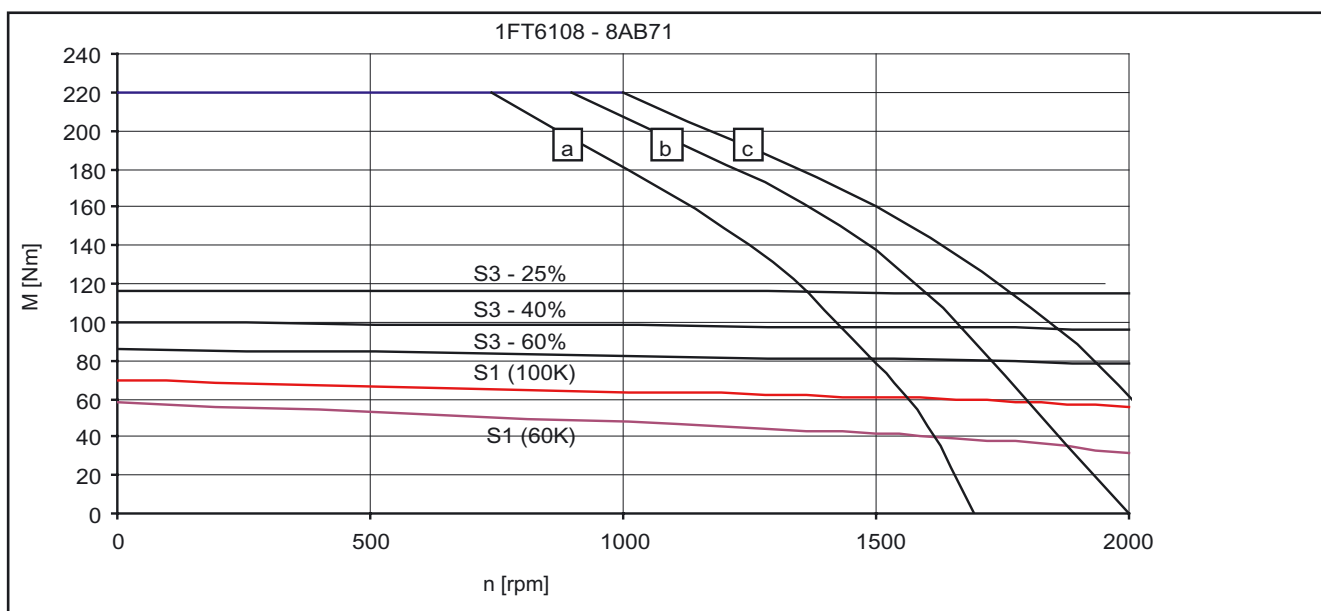


Fig. 3-43 Speed-torque diagram 1FT6108-8AB71

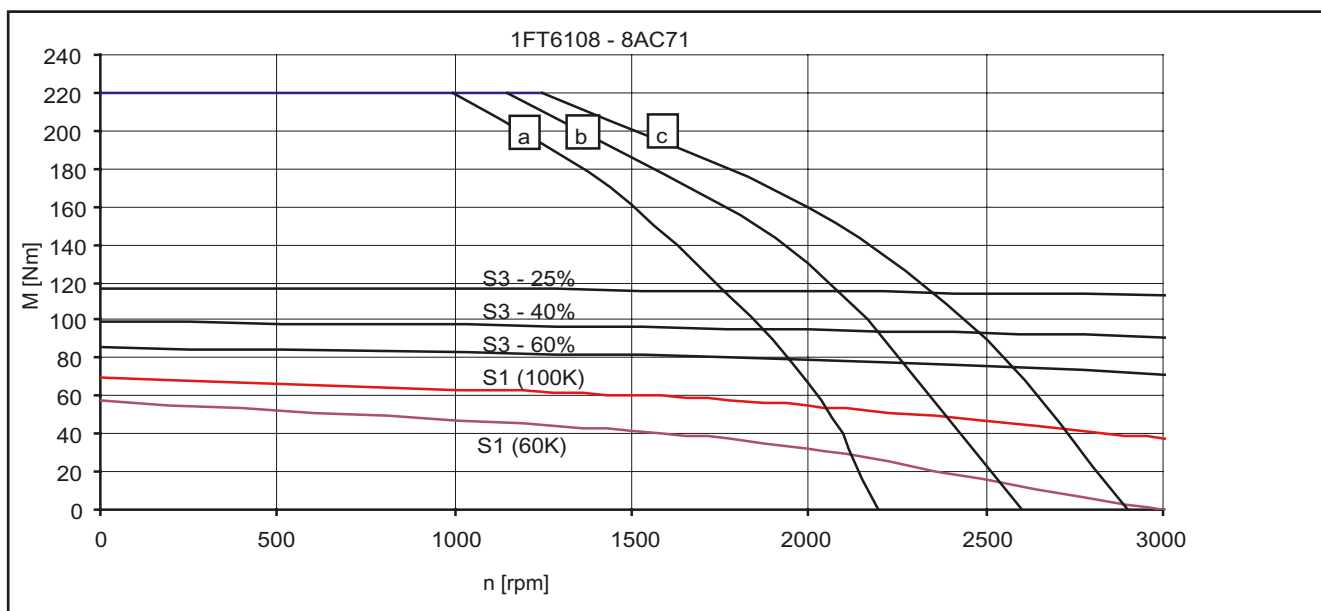


Fig. 3-44 Speed-torque diagram 1FT6108-8AC71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-27 1FT6108 natural cooling

1FT6108				
Technical data	Code	Units	-8AF7□	
Engineering data				
Rated speed	n_N	rpm	3000	
Number of poles	2p		8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	37	
Rated current (100K)	I_N	A	25	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	58	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	70	
Stall current (60K)	$I_{0(60\text{ K})}$	A	33	
Stall current (100K)	$I_{0(100\text{ K})}$	A	41	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	291	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	260	
Optimum operating point				
Optimum speed	n_{opt}	rpm	2500	
Optimum power	P_{opt}	kW	12.0	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	5600	
Maximum torque	M_{max}	Nm	220	
Maximum current	I_{max}	A	198	
Physical constants				
Torque constant	k_T	Nm/A	1.70	
Voltage constant	k_E	V/1000 rpm	108	
Winding resistance at 20 °C	R_{ph}	Ohm	0.065	
Rotating field inductance	L_D	mH	1.5	
Electrical time constant	T_{el}	ms	23	
Shaft torsional stiffness	c_t	Nm/rad	92000	
Mechanical time constant	T_{mech}	ms	1.8	
Thermal time constant	T_{th}	min	55	
Weight with brake	m	kg	60	
Weight without brake	m	kg	55.5	

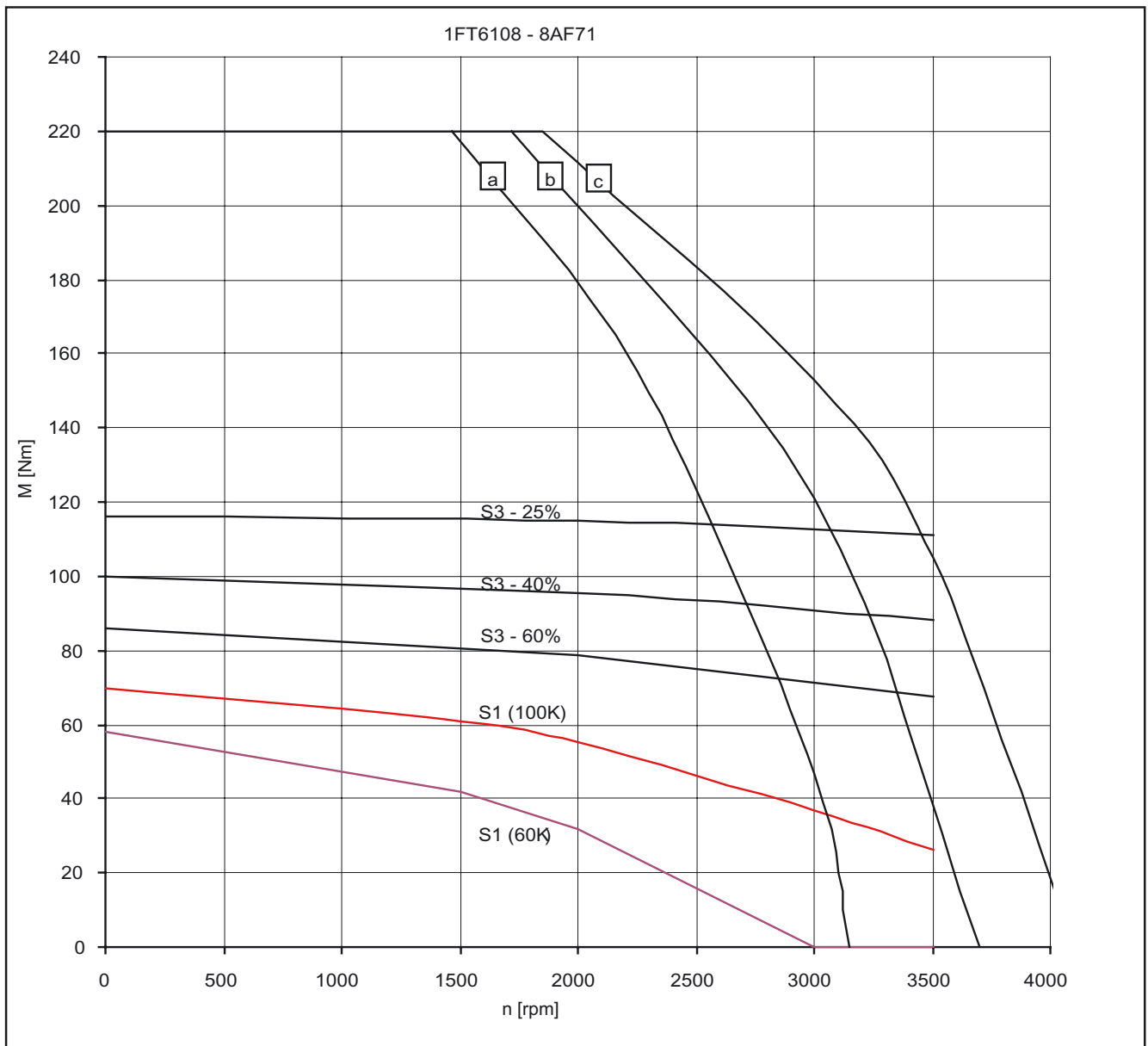


Fig. 3-45 Speed-torque diagram 1FT6108-8AF7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-28 1FT6132 natural cooling

1FT6132					
Technical data	Code	Units	-6AB71	-6AC71	
Engineering data					
Rated speed	n_N	rpm	1500	2000	
Number of poles	2p		6	6	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	62	55	
Rated current (100K)	I_N	A	19	23	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	62	62	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	75	75	
Stall current (60K)	$I_{0(60\ K)}$	A	17.4	23.1	
Stall current (100K)	$I_{0(100\ K)}$	A	21.6	29	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	508	508	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	430	430	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2000	
Optimum power	P_{opt}	kW	9.74	11.5	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	3600	3600	
Maximum torque	M_{max}	Nm	248	248	
Maximum current	I_{max}	A	96	128	
Physical constants					
Torque constant	k_T	Nm/A	3.48	2.61	
Voltage constant	k_E	V/1000 rpm	224	168	
Winding resistance at 20 °C	R_{ph}	Ohm	0.23	0.13	
Rotating field inductance	L_D	mH	7.4	4.15	
Electrical time constant	T_{el}	ms	37	36	
Shaft torsional stiffness	c_t	Nm/rad	258000	258000	
Mechanical time constant	T_{mech}	ms	2.4	2.5	
Thermal time constant	T_{th}	min	65	65	
Weight with brake	m	kg	95	95	
Weight without brake	m	kg	85	85	

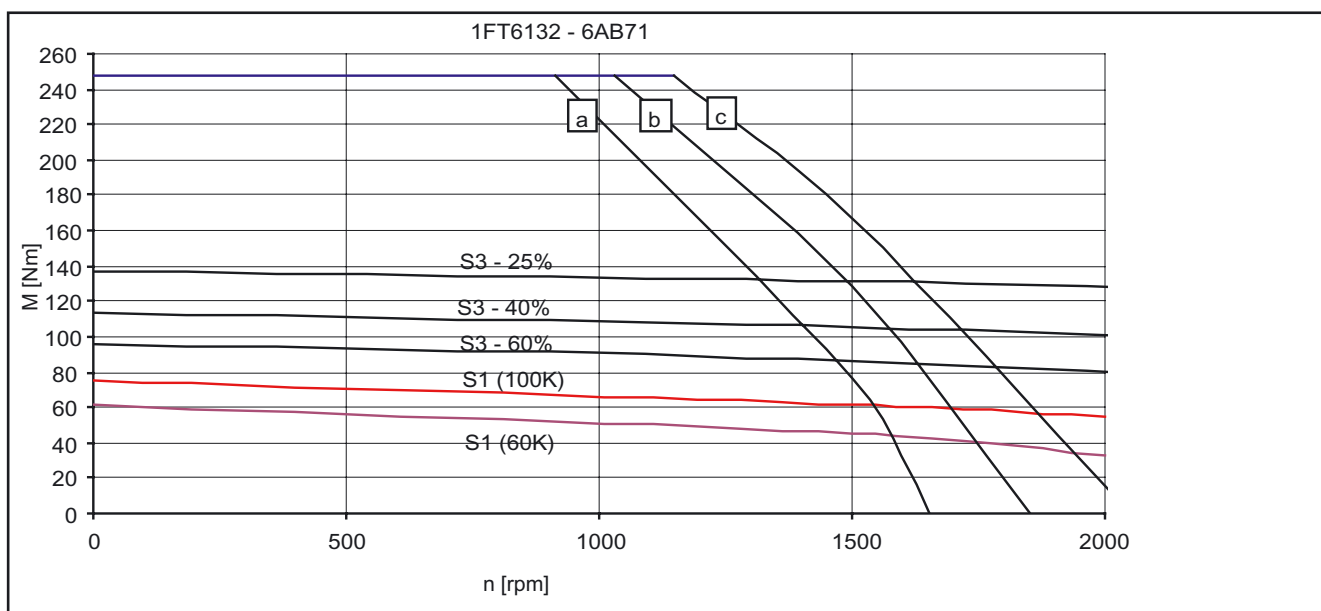


Fig. 3-46 Speed-torque diagram 1FT6132-6AB71

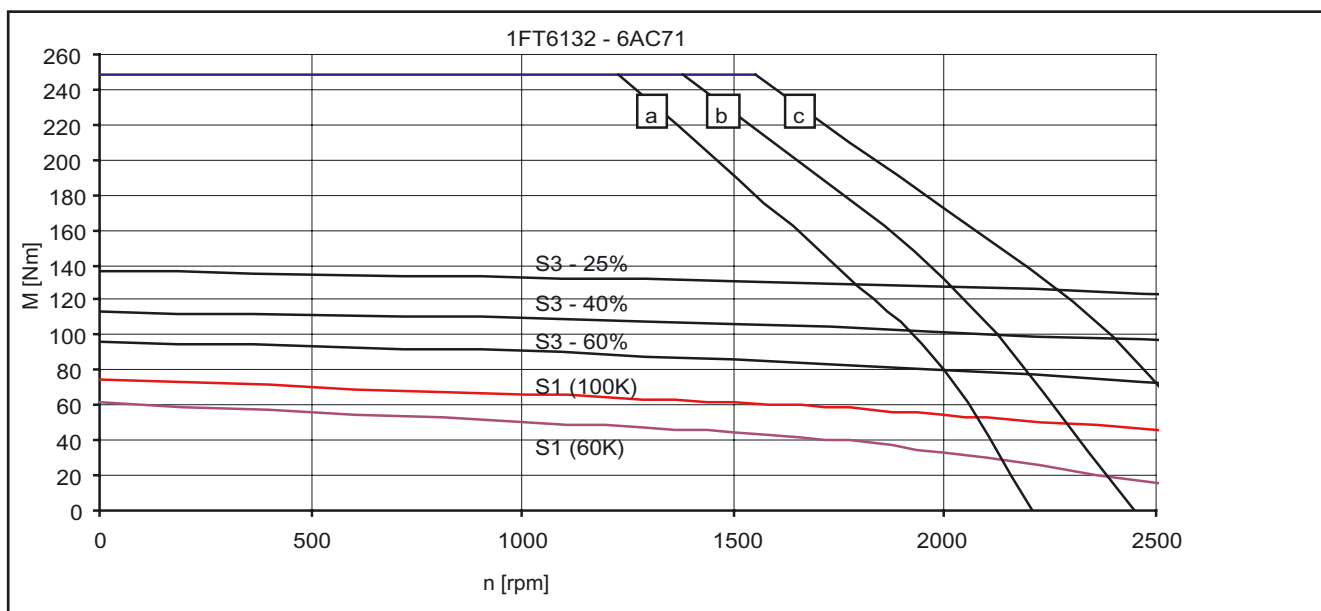


Fig. 3-47 Speed-torque diagram 1FT6132-6AC71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-29 1FT6132 natural cooling

1FT6132				
Technical data	Code	Units	-6AF71	
Engineering data				
Rated speed	n_N	rpm	3000	
Number of poles	2p		6	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	36	
Rated current (100K)	I_N	A	23	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	62	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	75	
Stall current (60K)	$I_{0(60\text{ K})}$	A	35	
Stall current (100K)	$I_{0(100\text{ K})}$	A	43	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	508	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	430	
Optimum operating point				
Optimum speed	n_{opt}	rpm	2500	
Optimum power	P_{opt}	kW	12.0	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	3600	
Maximum torque	M_{max}	Nm	248	
Maximum current	I_{max}	A	192	
Physical constants				
Torque constant	k_T	Nm/A	1.74	
Voltage constant	k_E	V/1000 rpm	112	
Winding resistance at 20 °C	R_{ph}	Ohm	0.057	
Rotating field inductance	L_D	mH	1.85	
Electrical time constant	T_{el}	ms	37	
Shaft torsional stiffness	c_t	Nm/rad	258000	
Mechanical time constant	T_{mech}	ms	2.4	
Thermal time constant	T_{th}	min	65	
Weight with brake	m	kg	95	
Weight without brake	m	kg	85	

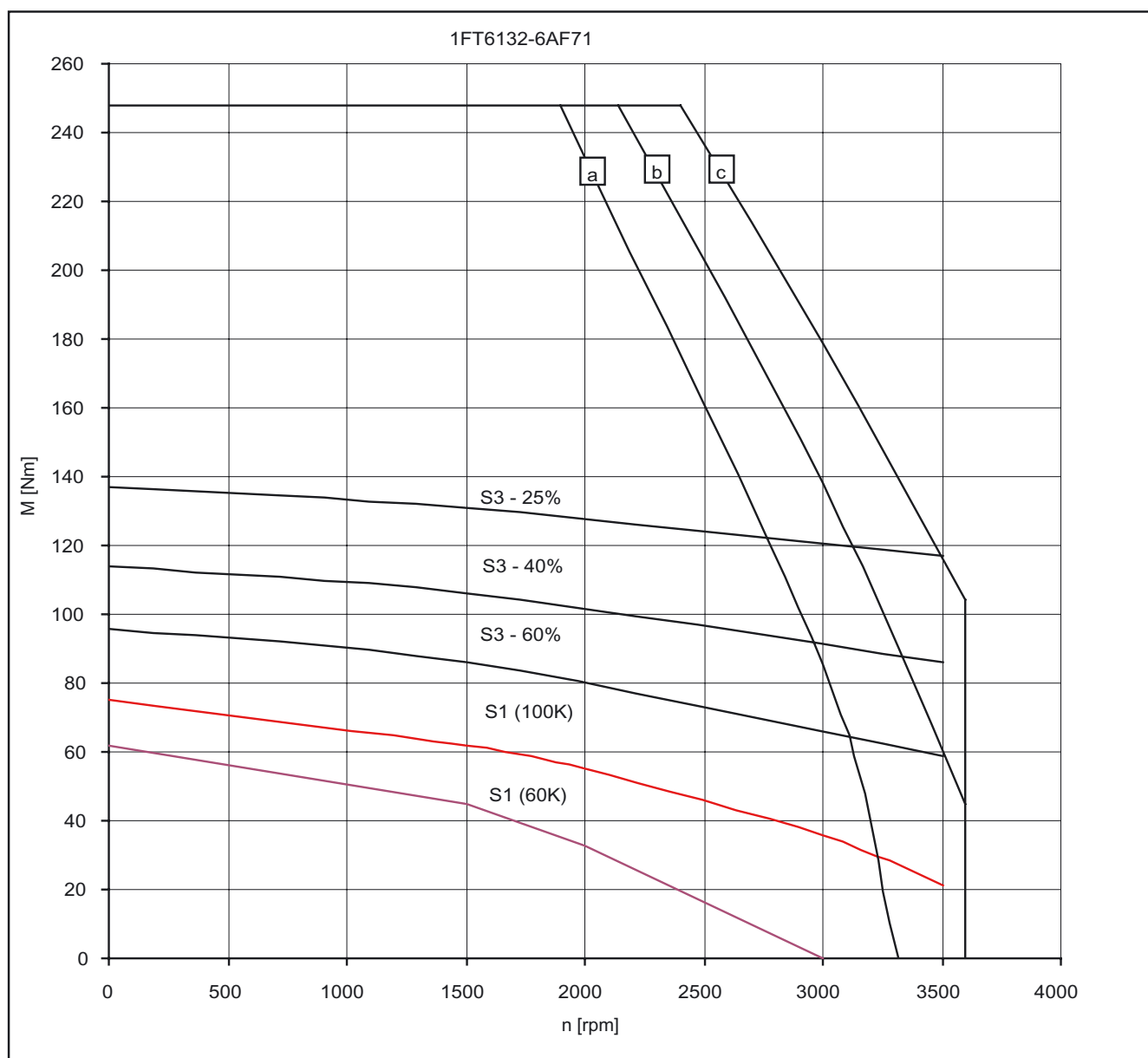


Fig. 3-48 Speed-torque diagram 1FT6132-6AF71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-30 1FT6134 natural cooling

1FT6134					
Technical data	Code	Units	-6AB71	-6AC71	
Engineering data					
Rated speed	n_N	rpm	1500	2000	
Number of poles	2p		6	6	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	75	65	
Rated current (100K)	I_N	A	24	27	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	79	79	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	95	95	
Stall current (60K)	$I_{0(60\text{ K})}$	A	21.7	30	
Stall current (100K)	$I_{0(100\text{ K})}$	A	27	36	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	625	625	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	547	547	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2000	
Optimum power	P_{opt}	kW	11.8	13.6	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	3600	3600	
Maximum torque	M_{max}	Nm	316	316	
Maximum current	I_{max}	A	125	170	
Physical constants					
Torque constant	k_T	Nm/A	3.54	2.61	
Voltage constant	k_E	V/1000 rpm	228	168	
Winding resistance at 20 °C	R_{ph}	Ohm	0.17	0.094	
Rotating field inductance	L_D	mH	5.8	3.1	
Electrical time constant	T_{el}	ms	34	33	
Shaft torsional stiffness	c_t	Nm/rad	234000	234000	
Mechanical time constant	T_{mech}	ms	2.2	2.3	
Thermal time constant	T_{th}	min	70	70	
Weight with brake	m	kg	110	110	
Weight without brake	m	kg	100	100	

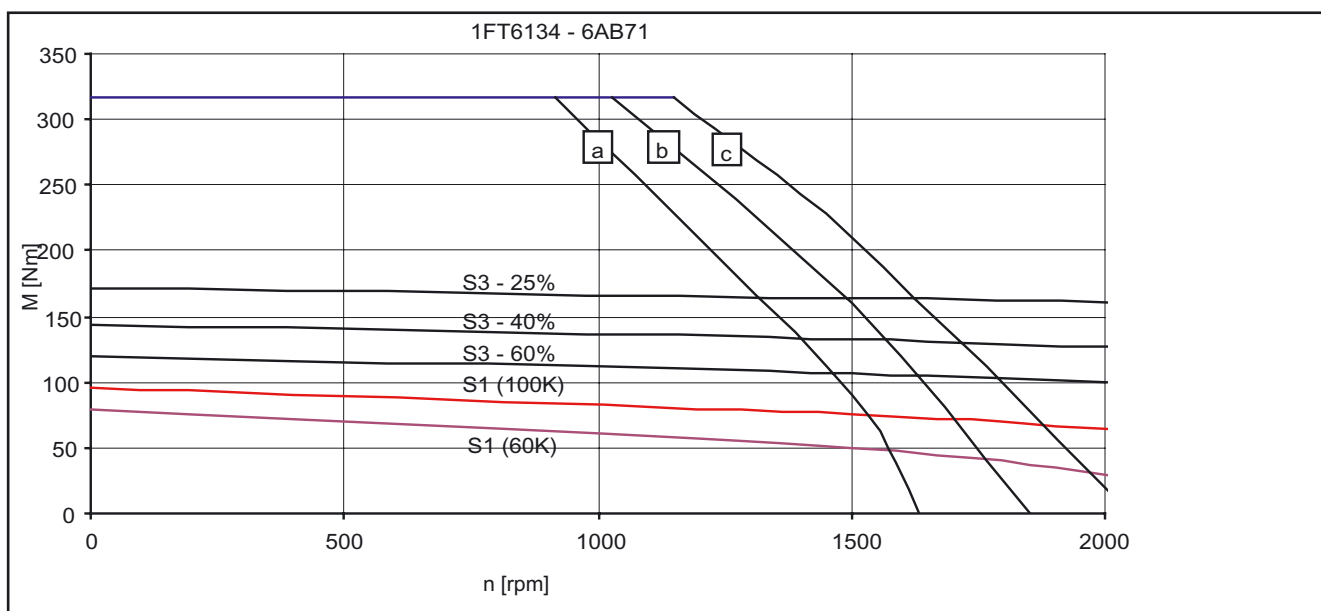


Fig. 3-49 Speed-torque diagram 1FT6134-6AB71

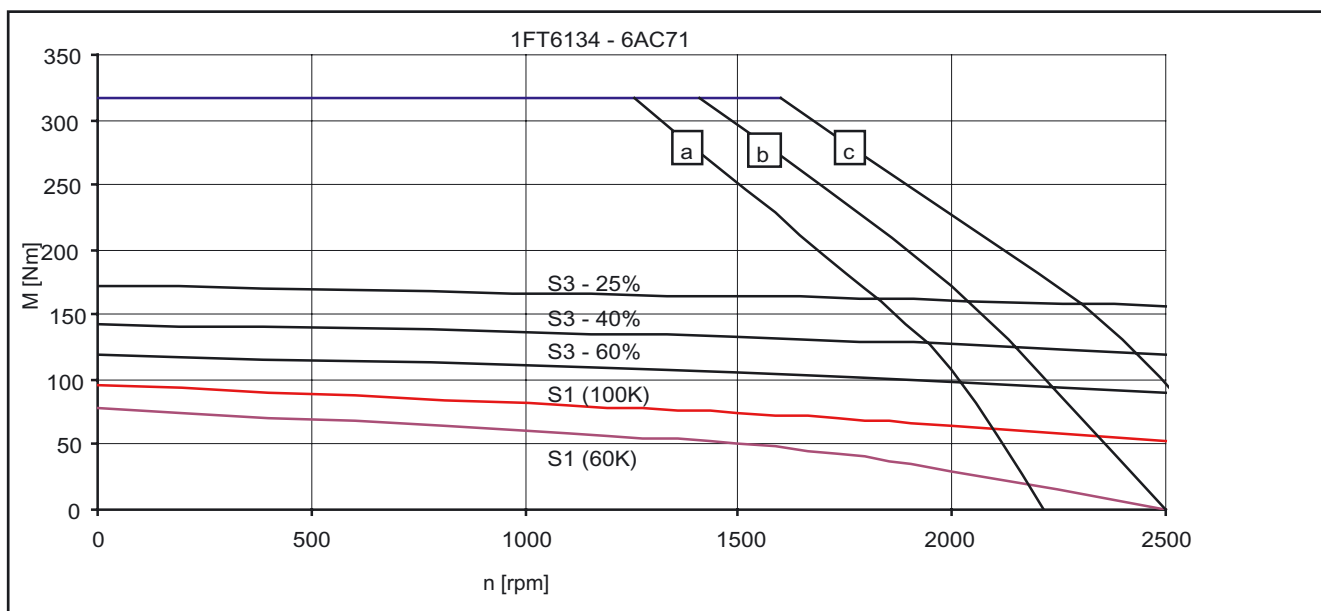


Fig. 3-50 Speed-torque diagram 1FT6134-6AC71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-31 1FT6136 natural cooling

1FT6136					
Technical data	Code	Units	-6AB71	-6AC7□	
Engineering data					
Rated speed	n_N	rpm	1500	2000	
Number of poles	2p		6	6	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	88	74	
Rated current (100K)	I_N	A	27	30	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	95	95	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	115	115	
Stall current (60K)	$I_{0(60\text{ K})}$	A	27	34	
Stall current (100K)	$I_{0(100\text{ K})}$	A	34	42	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	742	742	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	664	664	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2000	
Optimum power	P_{opt}	kW	13.8	15.5	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	3600	3600	
Maximum torque	M_{max}	Nm	380	380	
Maximum current	I_{max}	A	146	183	
Physical constants					
Torque constant	k_T	Nm/A	3.40	2.72	
Voltage constant	k_E	V/1000 rpm	219	175	
Winding resistance at 20 °C	R_{ph}	Ohm	0.12	0.075	
Rotating field inductance	L_D	mH	4.9	3.1	
Electrical time constant	T_{el}	ms	41	41	
Shaft torsional stiffness	c_t	Nm/rad	214000	214000	
Mechanical time constant	T_{mech}	ms	2.1	2.0	
Thermal time constant	T_{th}	min	75	75	
Weight with brake	m	kg	125	125	
Weight without brake	m	kg	117	117	

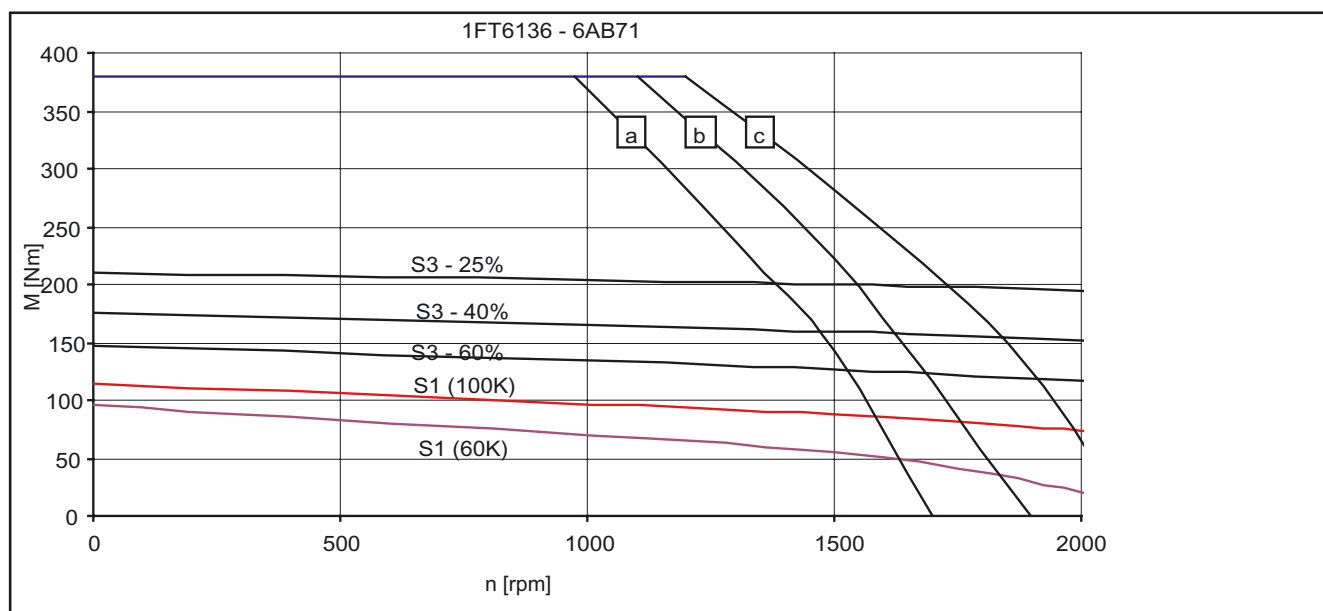


Fig. 3-51 Speed-torque diagram 1FT6136-6AB71

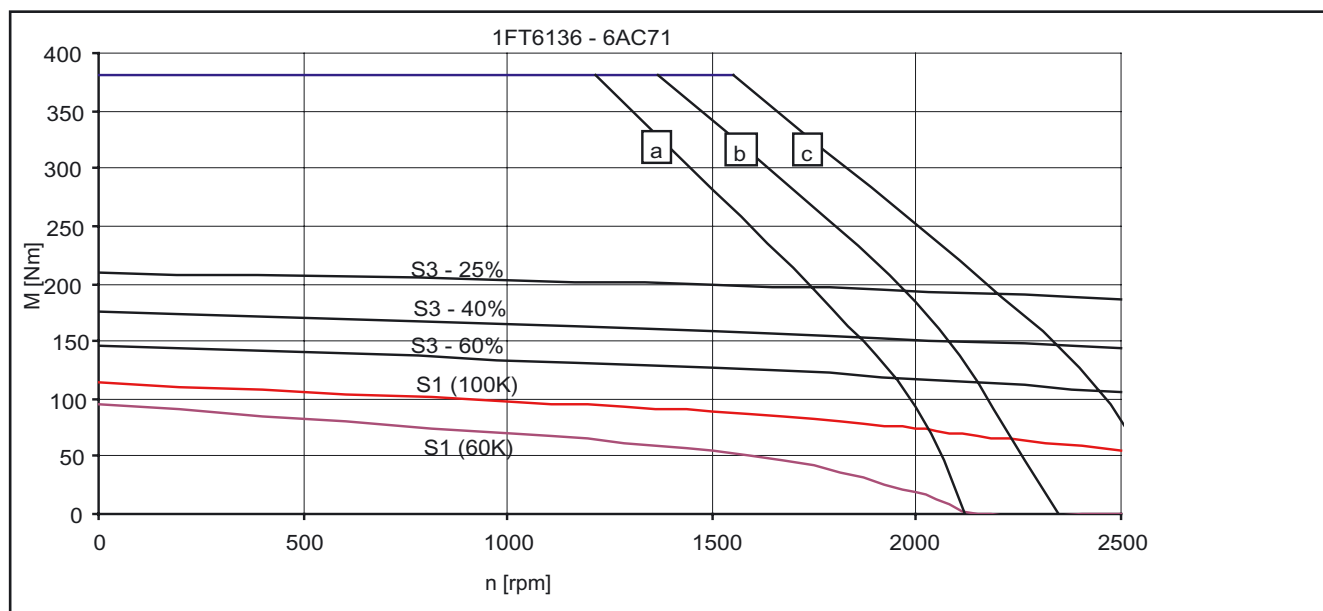


Fig. 3-52 Speed-torque diagram 1FT6136-6AC71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

3.1.3 1FT6 series, force ventilated

Table 3-32 1FT6084 force ventilated

1FT6084				
Technical data	Code	Units	-8SF7□	
Engineering data				
Rated speed	n_N	rpm	3000	
Number of poles	2p		8	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	22.0	
Rated current (100K)	I_N	A	17.0	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	21.6	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	26.0	
Stall current (60K)	$I_{0(60\ K)}$	A	14.8	
Stall current (100K)	$I_{0(100\ K)}$	A	18.2	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	61.1	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	48.0	
Optimum operating point				
Optimum speed	n_{opt}	rpm	3000	
Optimum power	P_{opt}	kW	6.91	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	7900	
Maximum torque	M_{max}	Nm	65	
Maximum current	I_{max}	A	59	
Physical constants				
Torque constant	k_T	Nm/A	1.43	
Voltage constant	k_E	V/1000 rpm	91	
Winding resistance at 20 °C	R_{ph}	Ohm	0.37	
Rotating field inductance	L_D	mH	4.3	
Electrical time constant	T_{el}	ms	11.6	
Shaft torsional stiffness	c_t	Nm/rad	76000	
Mechanical time constant	T_{mech}	ms	2.6	
Thermal time constant	T_{th}	min	15	
Weight with brake	m	kg	28.5	
Weight without brake	m	kg	25.0	

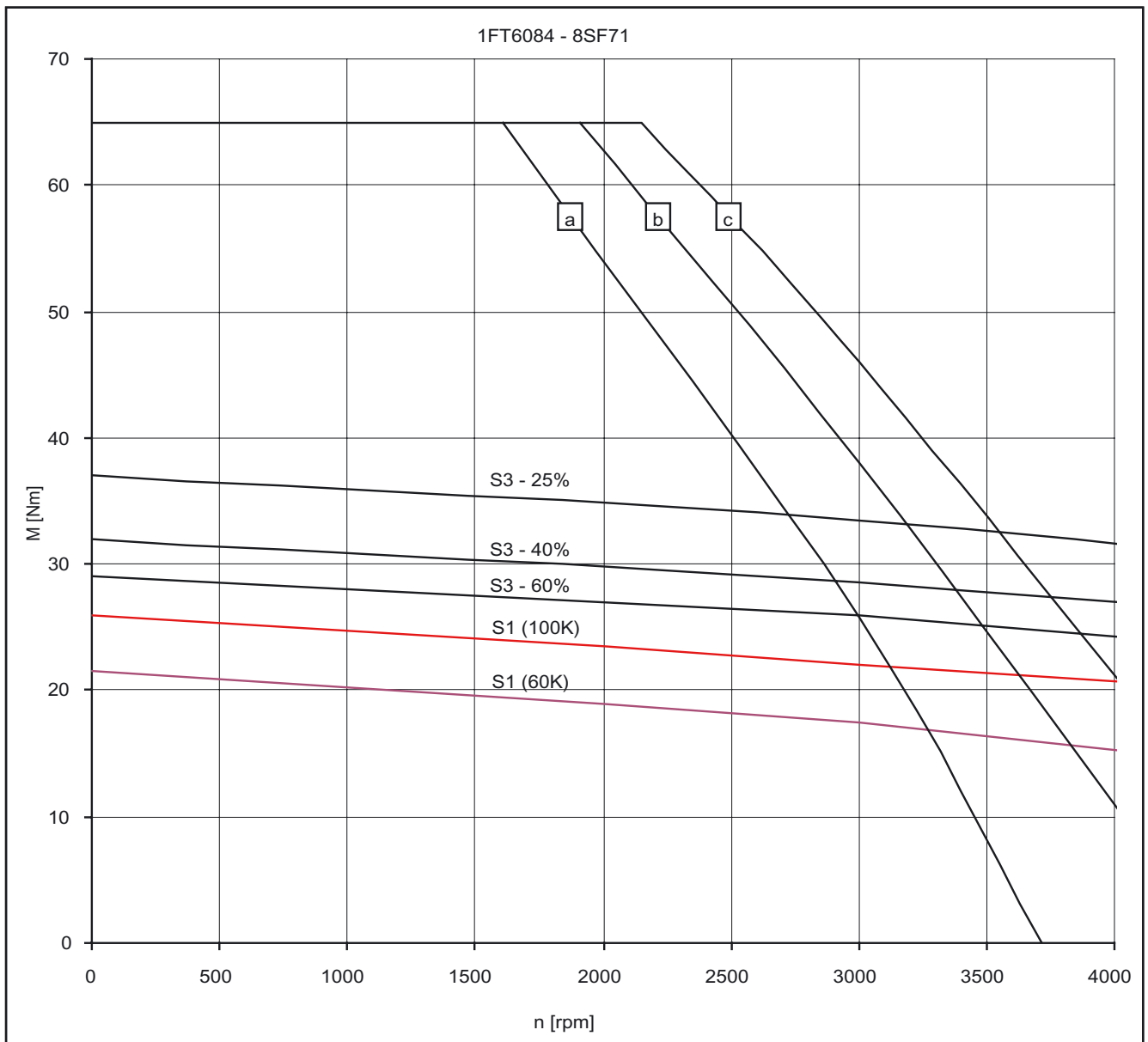


Fig. 3-53 Speed-torque diagram 1FT6084-8SF7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611(ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-33 1FT6084 force ventilated

1FT6084					
Technical data	Code	Units	-8SH7□	-8SK7□	
Engineering data					
Rated speed	n_N	rpm	4500	6000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	20.0	17.0	
Rated current (100K)	I_N	A	24.5	25.5	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	21.6	21.6	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	26.0	26.0	
Stall current (60K)	$I_{0(60\ K)}$	A	21.0	29.0	
Stall current (100K)	$I_{0(100\ K)}$	A	26.0	35.0	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	61.1	61.1	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	48.0	48.0	
Optimum operating point					
Optimum speed	n_{opt}	rpm	4500	6000	
Optimum power	P_{opt}	kW	9.42	10.68	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	7900	7900	
Maximum torque	M_{max}	Nm	65	65	
Maximum current	I_{max}	A	86	112	
Physical constants					
Torque constant	k_T	Nm/A	1.01	0.74	
Voltage constant	k_E	V/1000 rpm	64	47	
Winding resistance at 20 °C	R_{ph}	Ohm	0.18	0.1	
Rotating field inductance	L_D	mH	2.0	1.2	
Electrical time constant	T_{el}	ms	11.1	12.0	
Shaft torsional stiffness	c_t	Nm/rad	76000	76000	
Mechanical time constant	T_{mech}	ms	2.5	2.6	
Thermal time constant	T_{th}	min	15	15	
Weight with brake	m	kg	28.5	28.5	
Weight without brake	m	kg	25.0	25.0	

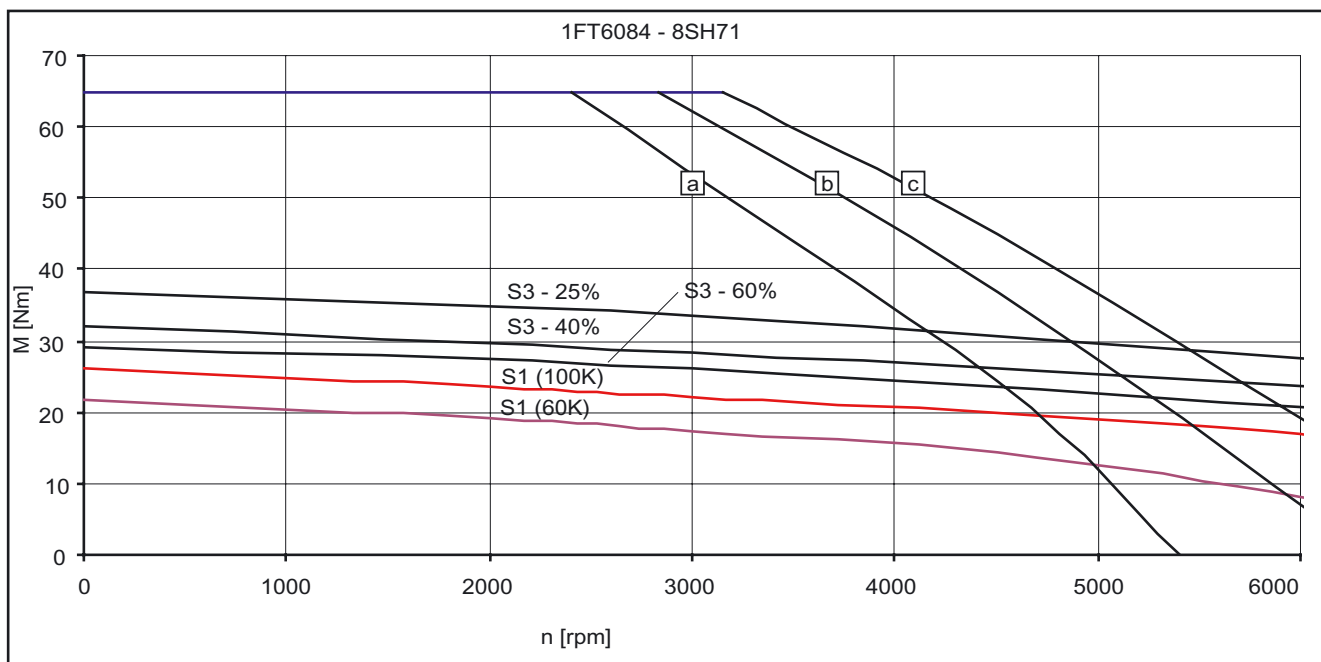


Fig. 3-54 Speed-torque diagram 1FT6084-8SH7□

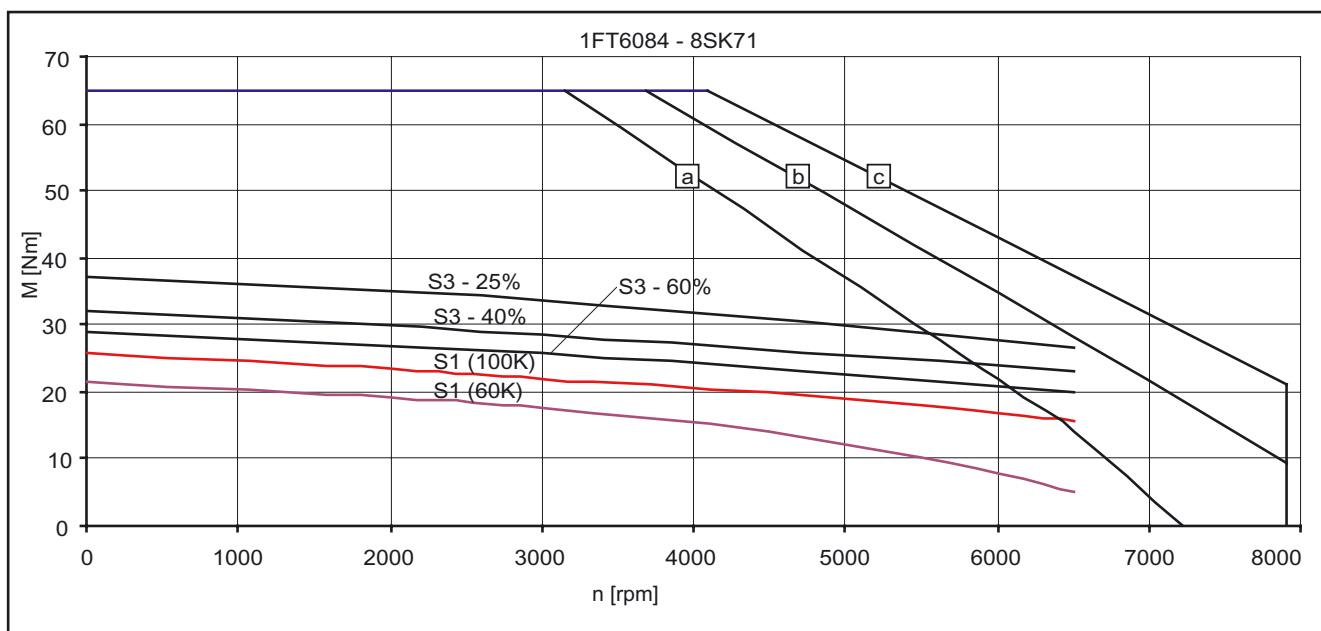


Fig. 3-55 Speed-torque diagram 1FT6084-8SK7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611(ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-34 1FT6086 force ventilated

1FT6086				
Technical data	Code	Units	-8SF7□	
Engineering data				
Rated speed	n_N	rpm	3000	
Number of poles	2p		8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	31.0	
Rated current (100K)	I_N	A	24.5	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	29.0	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	35.0	
Stall current (60K)	$I_{0(60\text{ K})}$	A	20.3	
Stall current (100K)	$I_{0(100\text{ K})}$	A	25.0	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	79.6	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	66.5	
Optimum operating point				
Optimum speed	n_{opt}	rpm	3000	
Optimum power	P_{opt}	kW	9.74	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	7900	
Maximum torque	M_{max}	Nm	90	
Maximum current	I_{max}	A	80	
Physical constants				
Torque constant	k_T	Nm/A	1.40	
Voltage constant	k_E	V/1000 rpm	89	
Winding resistance at 20 °C	R_{ph}	Ohm	0.23	
Rotating field inductance	L_D	mH	2.9	
Electrical time constant	T_{el}	ms	12.6	
Shaft torsional stiffness	c_t	Nm/rad	65000	
Mechanical time constant	T_{mech}	ms	2.3	
Thermal time constant	T_{th}	min	15	
Weight with brake	m	kg	33.5	
Weight without brake	m	kg	30.0	

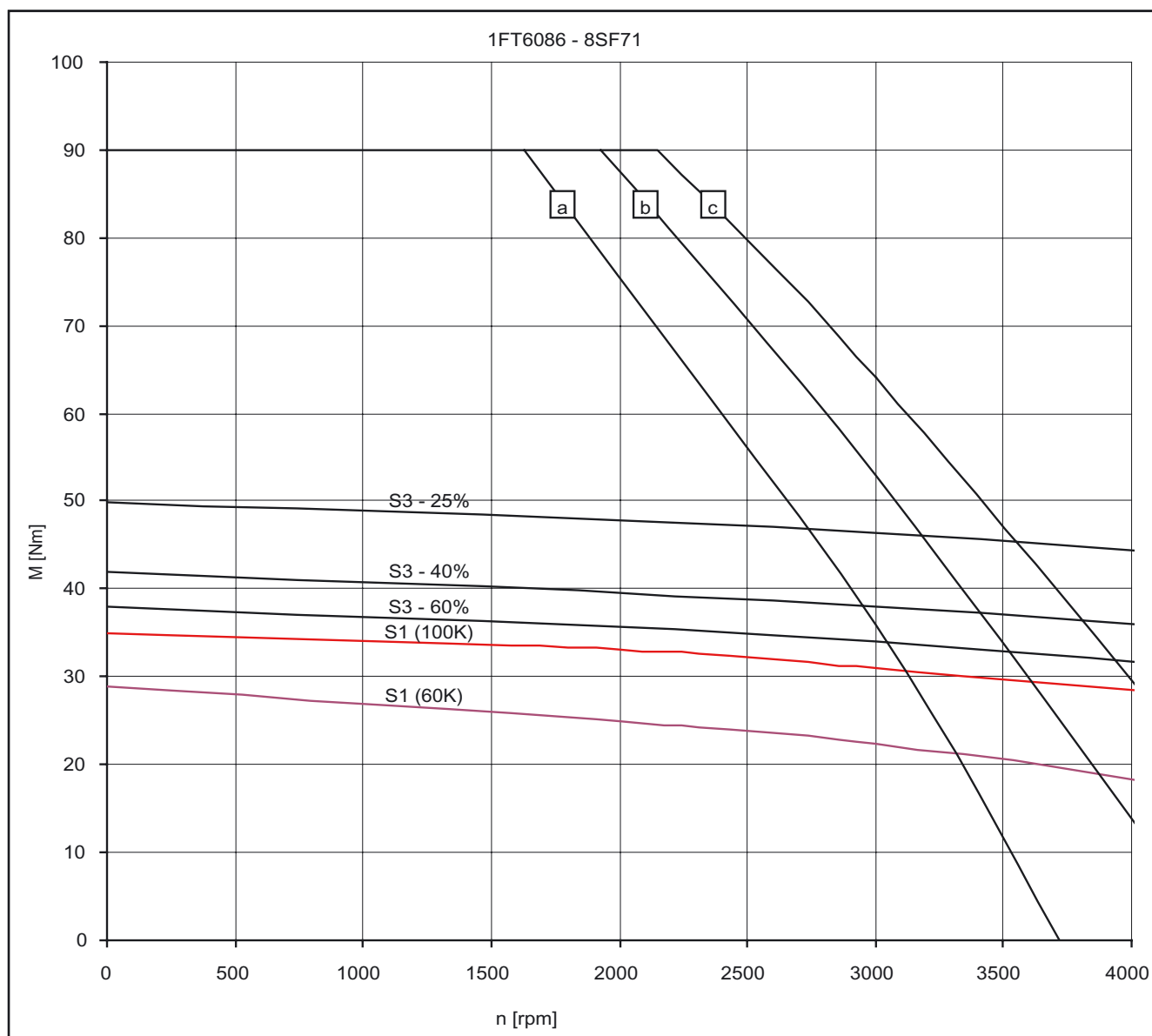


Fig. 3-56 Speed-torque diagram 1FT6086-8SF71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{mot} = 340 V_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 V_{rms}$
- [c] SIMODRIVE 611(ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 425 V_{rms}$

Speed-torque diagrams

Table 3-35 1FT6086 force ventilated

1FT6086					
Technical data	Code	Units	-8SH7□	-8SK7□	
Engineering data					
Rated speed	n_N	rpm	4500	6000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	27.0	22.0	
Rated current (100K)	I_N	A	32.0	29.0	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	29.0	29.0	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	35.0	35.0	
Stall current (60K)	$I_{0(60\ K)}$	A	31.0	35.0	
Stall current (100K)	$I_{0(100\ K)}$	A	38.0	44.0	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	79.6	79.6	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	66.5	66.5	
Optimum operating point					
Optimum speed	n_{opt}	rpm	4500	5800	
Optimum power	P_{opt}	kW	12.7	14.0	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	7900	7900	
Maximum torque	M_{max}	Nm	90	90	
Maximum current	I_{max}	A	122	141	
Physical constants					
Torque constant	k_T	Nm/A	0.91	0.80	
Voltage constant	k_E	V/1000 rpm	58	51	
Winding resistance at 20 °C	R_{ph}	Ohm	0.096	0.072	
Rotating field inductance	L_D	mH	1.3	0.95	
Electrical time constant	T_{el}	ms	13.5	13.2	
Shaft torsional stiffness	c_t	Nm/rad	65000	65000	
Mechanical time constant	T_{mech}	ms	2.3	2.2	
Thermal time constant	T_{th}	min	15	15	
Weight with brake	m	kg	33.5	33.5	
Weight without brake	m	kg	30.0	30.0	

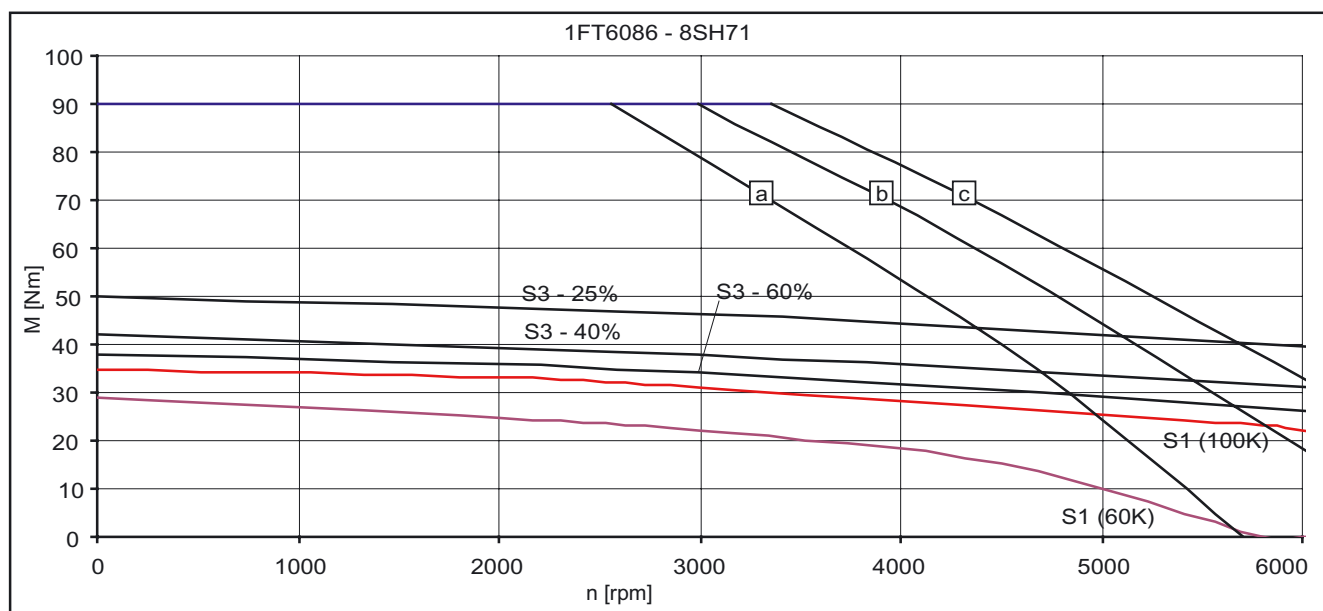


Fig. 3-57 Speed-torque diagram 1FT6086-8SH7□

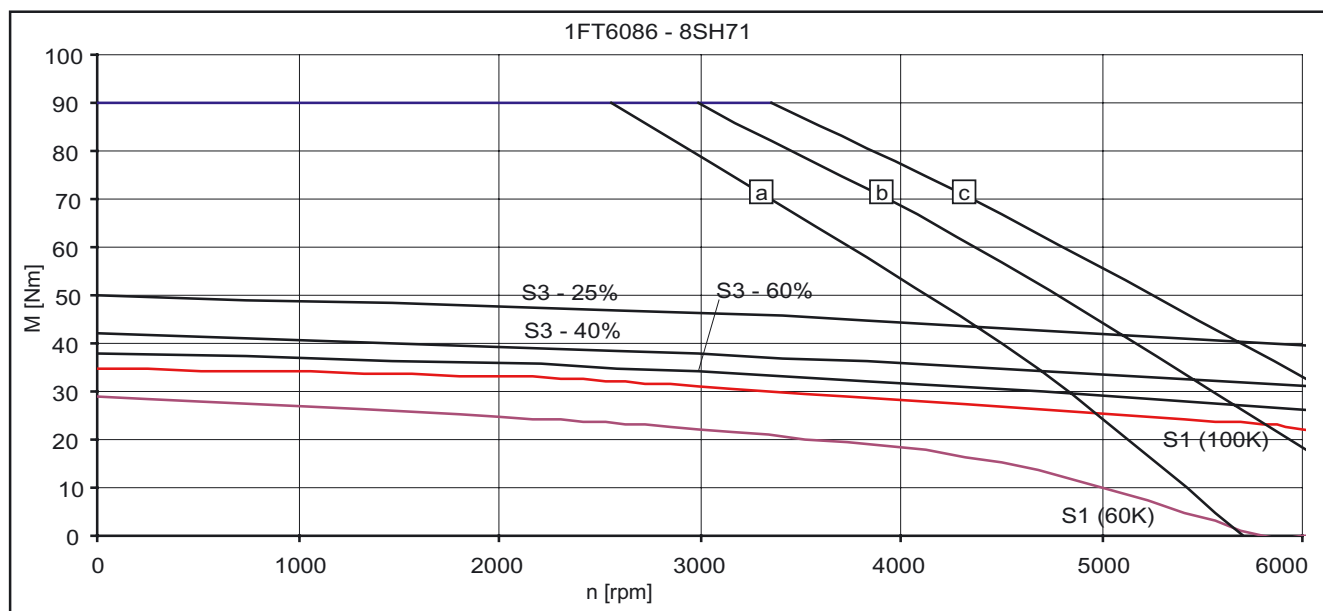


Fig. 3-58 Speed-torque diagram 1FT6086-8SK7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{\text{mot}} = 340 \text{ V}_{\text{rms}}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{\text{mot}} = 380 \text{ V}_{\text{rms}}$
- [c] SIMODRIVE 611(ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{\text{mot}} = 425 \text{ V}_{\text{rms}}$

Speed-torque diagrams

Table 3-36 1FT6105 force ventilated

1FT6105					
Technical data	Code	Units	-8SB7□	-8SC7□	
Engineering data					
Rated speed	n_N	rpm	1500	2000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	59.0	56.0	
Rated current (100K)	I_N	A	21.7	28.0	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	54.0	54.0	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	65.0	65.0	
Stall current (60K)	$I_{0(60\text{ K})}$	A	17.8	24.2	
Stall current (100K)	$I_{0(100\text{ K})}$	A	21.9	30.0	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	199	199	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	168	168	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2000	
Optimum power	P_{opt}	kW	9.27	11.73	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	5600	5600	
Maximum torque	M_{max}	Nm	140	140	
Maximum current	I_{max}	A	81	110	
Physical constants					
Torque constant	k_T	Nm/A	2.97	2.18	
Voltage constant	k_E	V/1000 rpm	189	139	
Winding resistance at 20 °C	R_{ph}	Ohm	0.35	0.19	
Rotating field inductance	L_D	mH	7.5	4.1	
Electrical time constant	T_{el}	ms	21.0	22.0	
Shaft torsional stiffness	c_t	Nm/rad	113000	113000	
Mechanical time constant	T_{mech}	ms	2.0	2.0	
Thermal time constant	T_{th}	min	20	20	
Weight with brake	m	kg	50	50	
Weight without brake	m	kg	45.5	45.5	

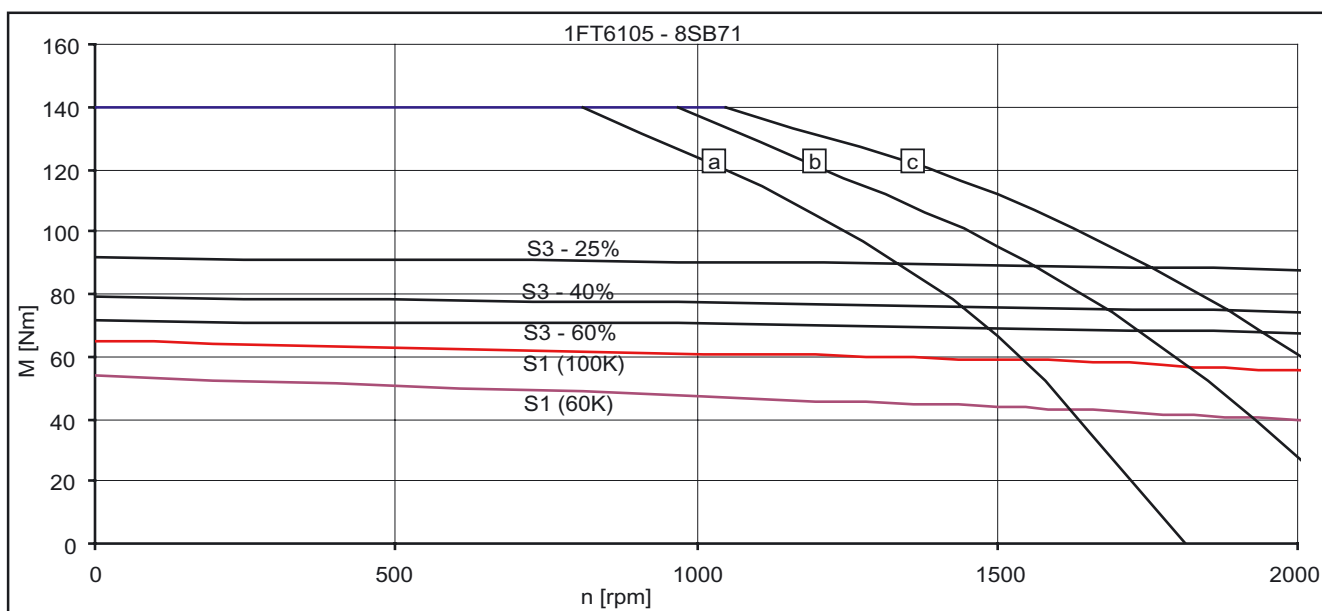


Fig. 3-59 Speed-torque diagram 1FT6105-8SB71

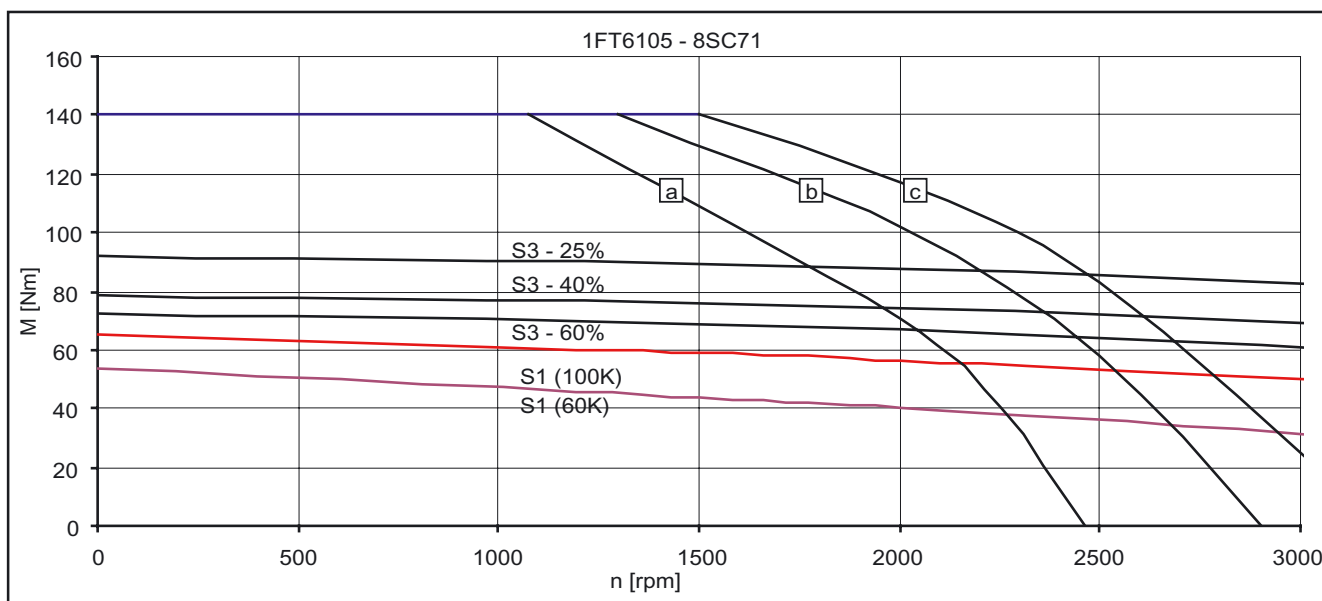


Fig. 3-60 Speed-torque diagram 1FT6105-8SC71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{mot} = 340 V_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 V_{rms}$
- [c] SIMODRIVE 611(ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 425 V_{rms}$

Speed-torque diagrams

Table 3-37 1FT6105 force ventilated

1FT6105					
Technical data	Code	Units	-8SF7□	-8SH7□	
Engineering data					
Rated speed	n_N	rpm	3000	4500	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	50.0	40.0	
Rated current (100K)	I_N	A	35.0	41.0	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	54.0	54.0	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	65.0	65.0	
Stall current (60K)	$I_{0(60\text{ K})}$	A	34.0	48.0	
Stall current (100K)	$I_{0(100\text{ K})}$	A	42.0	59.0	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	199	199	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	168	168	
Optimum operating point					
Optimum speed	n_{opt}	rpm	3000	4500	
Optimum power	P_{opt}	kW	15.7	18.8	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	5600	5600	
Maximum torque	M_{max}	Nm	140	140	
Maximum current	I_{max}	A	155	221	
Physical constants					
Torque constant	k_T	Nm/A	1.56	1.10	
Voltage constant	k_E	V/1000 rpm	99	70	
Winding resistance at 20 °C	R_{ph}	Ohm	0.098	0.048	
Rotating field inductance	L_D	mH	2.1	1.0	
Electrical time constant	T_{el}	ms	21.0	21.0	
Shaft torsional stiffness	c_t	Nm/rad	113000	113000	
Mechanical time constant	T_{mech}	ms	2.0	2.0	
Thermal time constant	T_{th}	min	20	20	
Weight with brake	m	kg	50	50	
Weight without brake	m	kg	45.5	45.5	

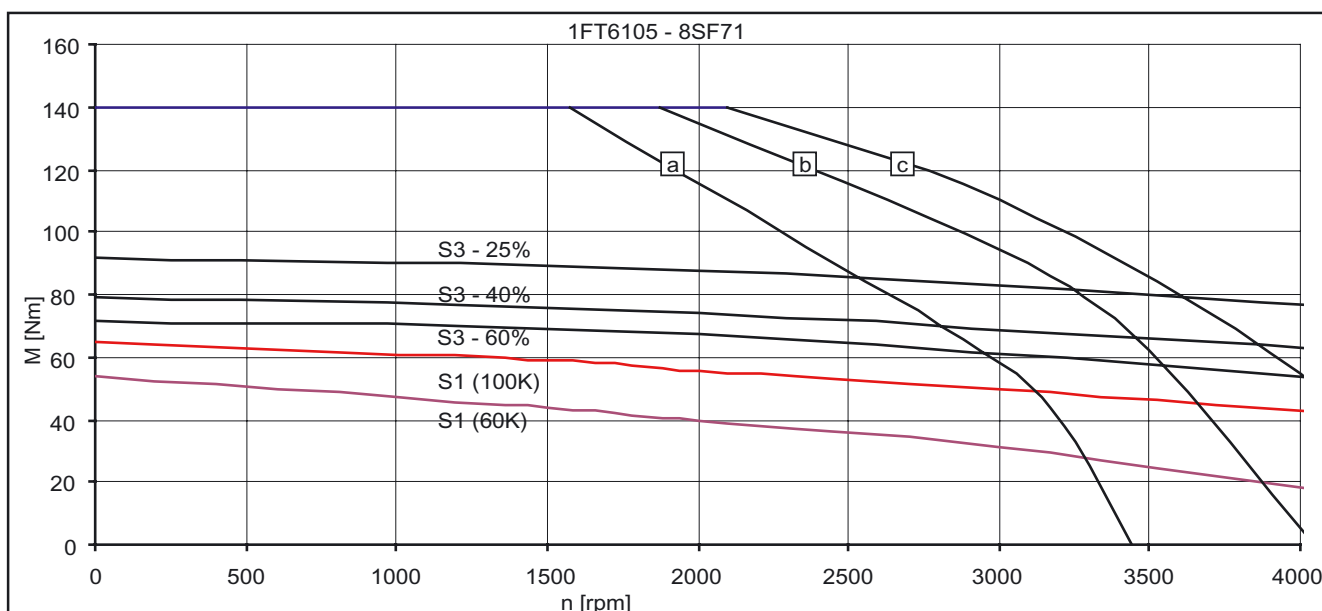


Fig. 3-61 Speed-torque diagram 1FT6105-8SF7□

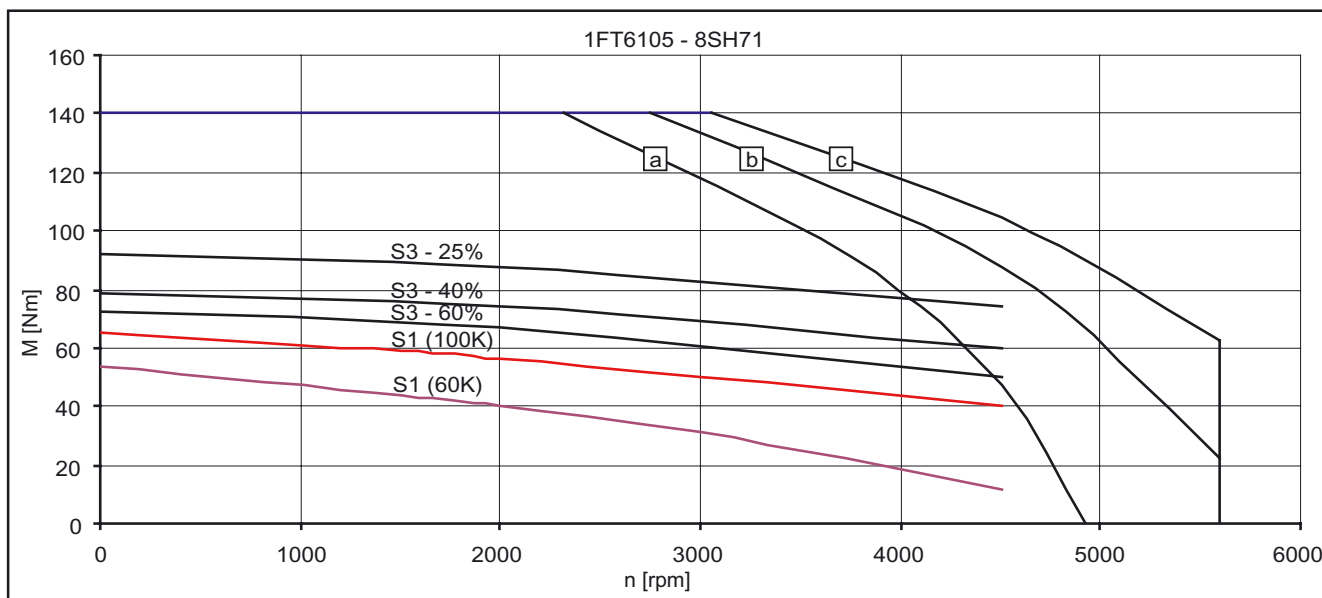


Fig. 3-62 Speed-torque diagram 1FT6105-8SH7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611(ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-38 1FT6108 force ventilated

1FT6108					
Technical data	Code	Units	-8SB7□	-8SC7□	
Engineering data					
Rated speed	n_N	rpm	1500	2000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	83	80	
Rated current (100K)	I_N	A	31	40	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	75	75	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	90	90	
Stall current (60K)	$I_{0(60\ K)}$	A	25	34	
Stall current (100K)	$I_{0(100\ K)}$	A	31	41	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	291	291	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	260	260	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2000	
Optimum power	P_{opt}	kW	13.0	16.8	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	5600	5600	
Maximum torque	M_{max}	Nm	220	220	
Maximum current	I_{max}	A	116	154	
Physical constants					
Torque constant	k_T	Nm/A	2.91	2.18	
Voltage constant	k_E	V/1000 rpm	185	139	
Winding resistance at 20 °C	R_{ph}	Ohm	0.19	0.11	
Rotating field inductance	L_D	mH	4.4	2.5	
Electrical time constant	T_{el}	ms	23.0	23.0	
Shaft torsional stiffness	c_t	Nm/rad	92000	92000	
Mechanical time constant	T_{mech}	ms	1.8	1.8	
Thermal time constant	T_{th}	min	20	20	
Weight with brake	m	kg	66	66	
Weight without brake	m	kg	61.5	61.5	

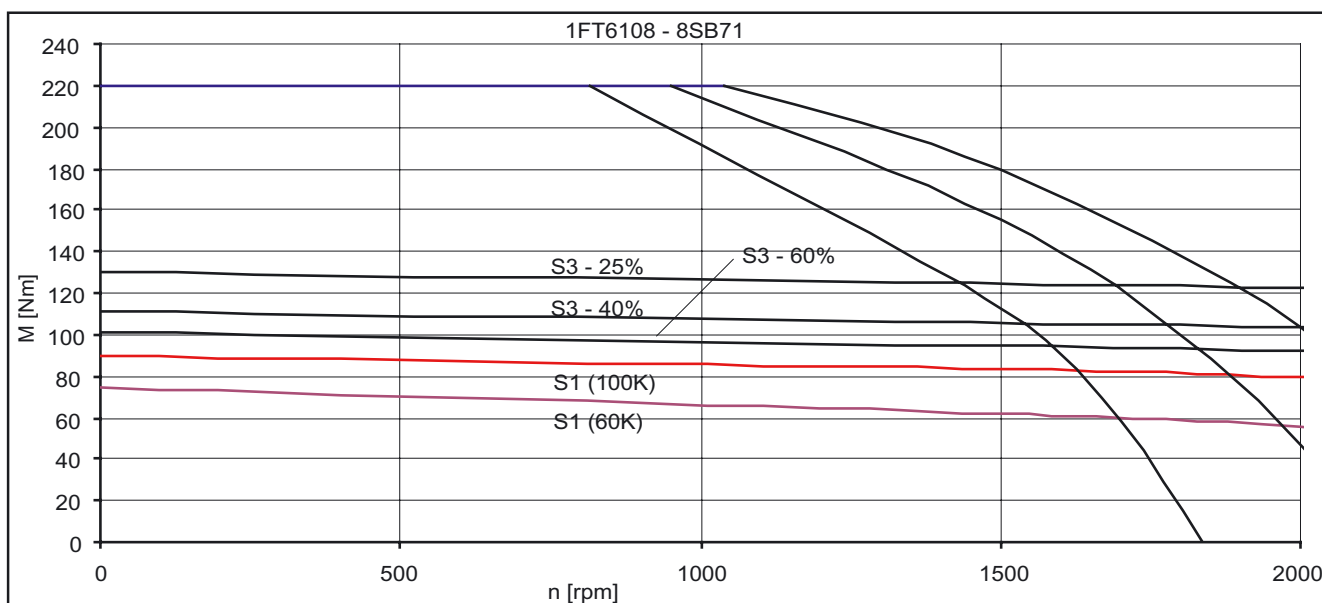


Fig. 3-63 Speed-torque diagram 1FT6108-8SB7□

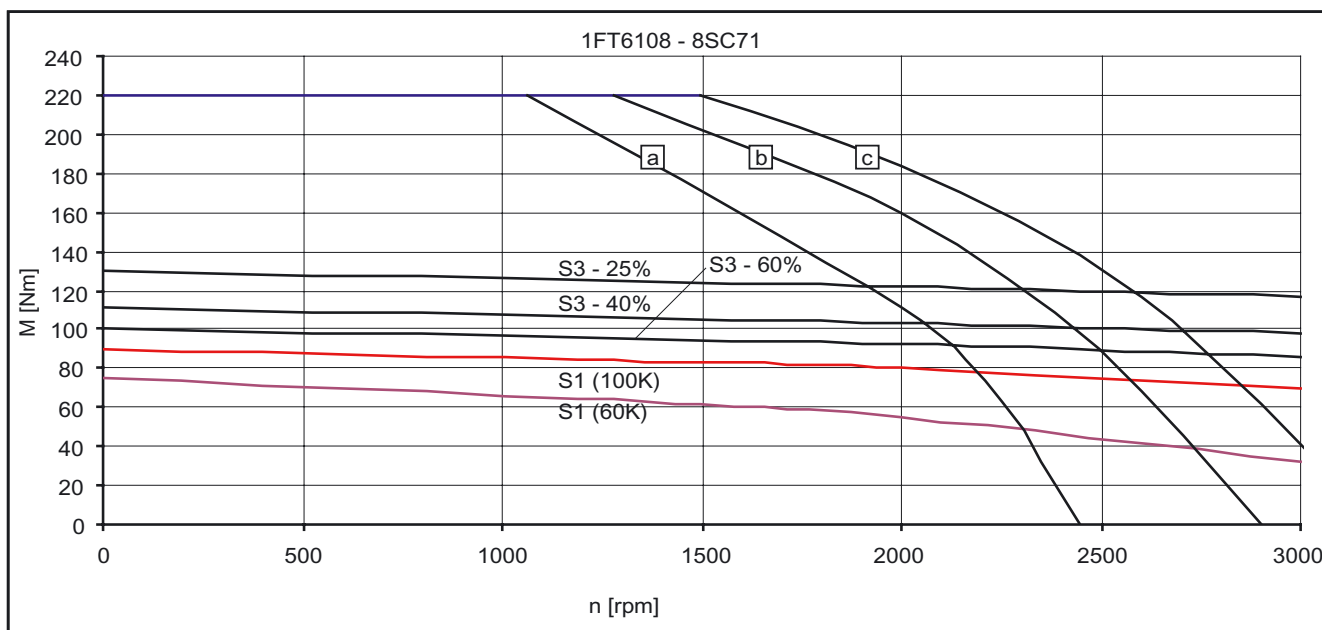


Fig. 3-64 Speed-torque diagram 1FT6108-8SC7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{mot} = 340 V_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 V_{rms}$
- [c] SIMODRIVE 611(ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 425 V_{rms}$

Speed-torque diagrams

Table 3-39 1FT6108 force ventilated

1FT6108				
Technical data	Code	Units	-8SF7□	
Engineering data				
Rated speed	n_N	rpm	3000	
Number of poles	2p		8	
Rated torque (100 K)	$M_{N(100 K)}$	Nm	70	
Rated current (100K)	I_N	A	53	
Stall torque (60K)	$M_{0(60 K)}$	Nm	75	
Stall torque (100K)	$M_{0(100 K)}$	Nm	90	
Stall current (60K)	$I_{0(60 K)}$	A	51	
Stall current (100K)	$I_{0(100 K)}$	A	62	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	291	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	260	
Optimum operating point				
Optimum speed	n_{opt}	rpm	3000	
Optimum power	P_{opt}	kW	22.0	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	5600	
Maximum torque	M_{max}	Nm	220	
Maximum current	I_{max}	A	231	
Physical constants				
Torque constant	k_T	Nm/A	1.45	
Voltage constant	k_E	V/1000 rpm	92	
Winding resistance at 20 °C	R_{ph}	Ohm	0.048	
Rotating field inductance	L_D	mH	1.1	
Electrical time constant	T_{el}	ms	23.0	
Shaft torsional stiffness	c_t	Nm/rad	92000	
Mechanical time constant	T_{mech}	ms	1.8	
Thermal time constant	T_{th}	min	20	
Weight with brake	m	kg	66	
Weight without brake	m	kg	61.5	

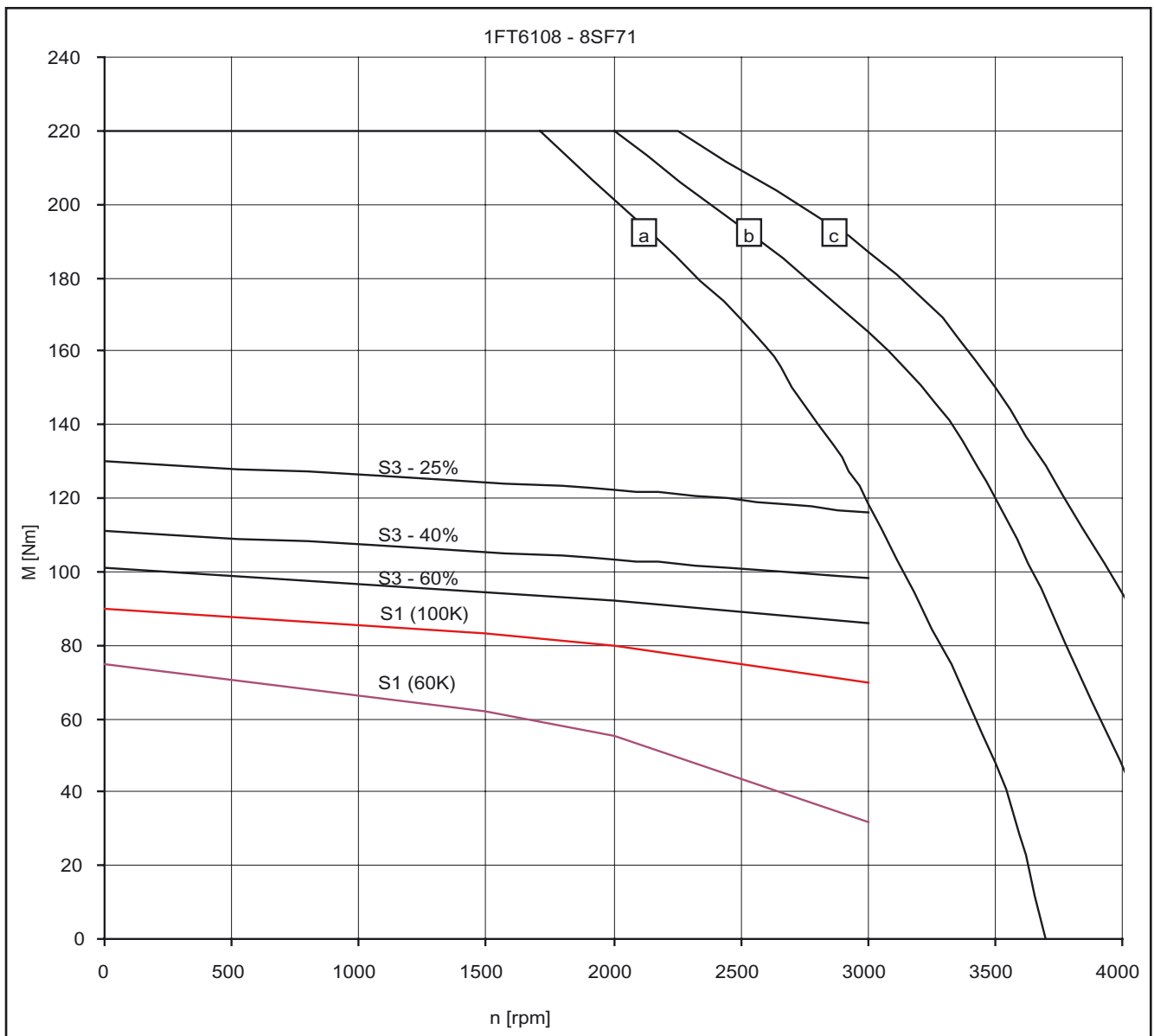


Fig. 3-65 Speed-torque diagram 1FT6108-8SF71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611(ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-40 1FT6132 force ventilated

1FT6132					
Technical data	Code	Units	-6SB71	-6SC71	
Engineering data					
Rated speed	n_N	rpm	1500	2000	
Number of poles	2p		6	6	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	102	98	
Rated current (100K)	I_N	A	36	46	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	91	91	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	110	110	
Stall current (60K)	$I_{0(60\ K)}$	A	29	38	
Stall current (100K)	$I_{0(100\ K)}$	A	36	47	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	508	508	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	430	430	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2000	
Optimum power	P_{opt}	kW	16.0	20.5	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	3600	3600	
Maximum torque	M_{max}	Nm	248	248	
Maximum current	I_{max}	A	108	144	
Physical constants					
Torque constant	k_T	Nm/A	3.05	2.32	
Voltage constant	k_E	V/1000 rpm	196	149	
Winding resistance at 20 °C	R_{ph}	Ohm	0.17	0.10	
Rotating field inductance	L_D	mH	6.4	3.7	
Electrical time constant	T_{el}	ms	38	37	
Shaft torsional stiffness	c_t	Nm/rad	258000	258000	
Mechanical time constant	T_{mech}	ms	2.4	2.4	
Thermal time constant	T_{th}	min	25	25	
Weight with brake	m	kg	101	101	
Weight without brake	m	kg	91	91	

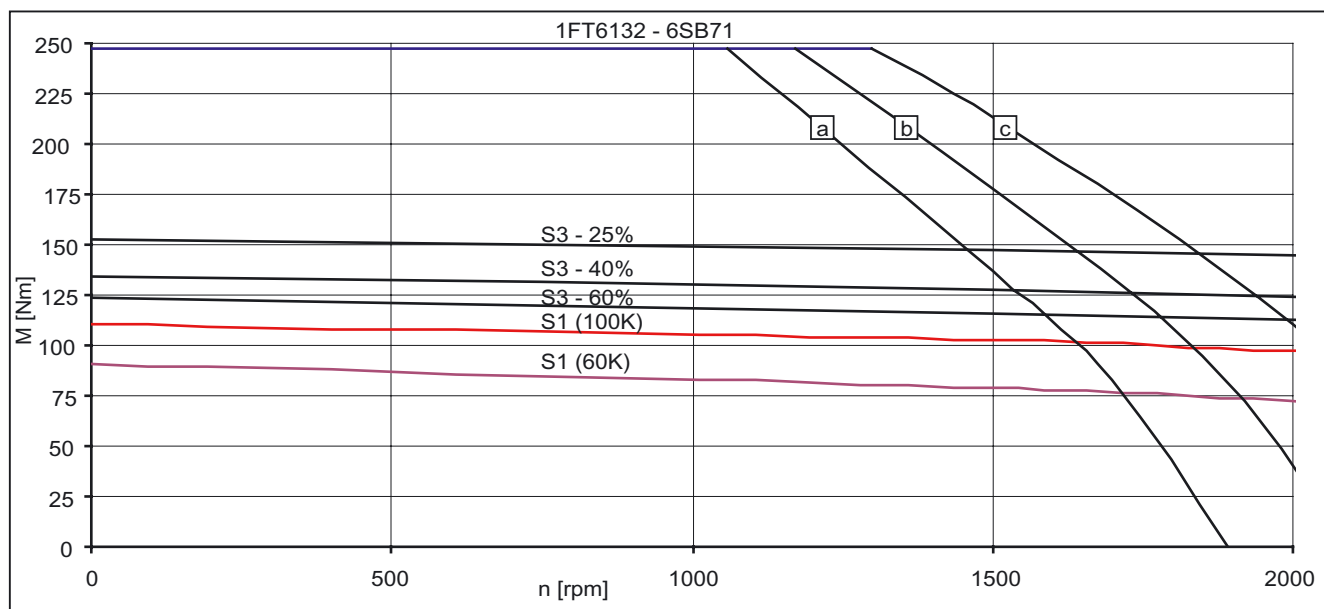


Fig. 3-66 Speed-torque diagram 1FT6132-6SB71

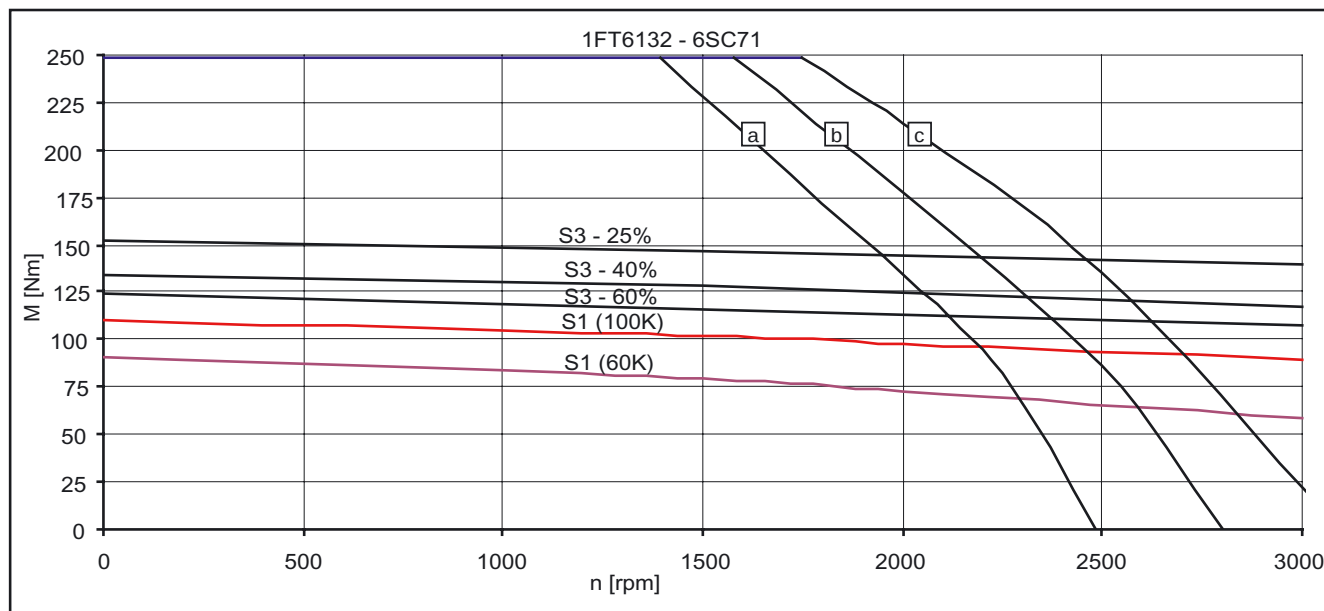


Fig. 3-67 Speed-torque diagram 1FT6132-6SC71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611(ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-41 1FT6132 force ventilated

1FT6132				
Technical data	Code	Units	-6SF71	
Engineering data				
Rated speed	n_N	rpm	3000	
Number of poles	2p		6	
Rated torque (100 K)	$M_{N(100 K)}$	Nm	90	
Rated current (100K)	I_N	A	62	
Stall torque (60K)	$M_{0(60 K)}$	Nm	91	
Stall torque (100K)	$M_{0(100 K)}$	Nm	110	
Stall current (60K)	$I_{0(60 K)}$	A	55	
Stall current (100K)	$I_{0(100 K)}$	A	69	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	508	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	430	
Optimum operating point				
Optimum speed	n_{opt}	rpm	3000	
Optimum power	P_{opt}	kW	28.3	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	3600	
Maximum torque	M_{max}	Nm	248	
Maximum current	I_{max}	A	209	
Physical constants				
Torque constant	k_T	Nm/A	1.6	
Voltage constant	k_E	V/1000 rpm	103	
Winding resistance at 20 °C	R_{ph}	Ohm	0.048	
Rotating field inductance	L_D	mH	1.8	
Electrical time constant	T_{el}	ms	37	
Shaft torsional stiffness	c_t	Nm/rad	258000	
Mechanical time constant	T_{mech}	ms	2.4	
Thermal time constant	T_{th}	min	25	
Weight with brake	m	kg	101	
Weight without brake	m	kg	91	

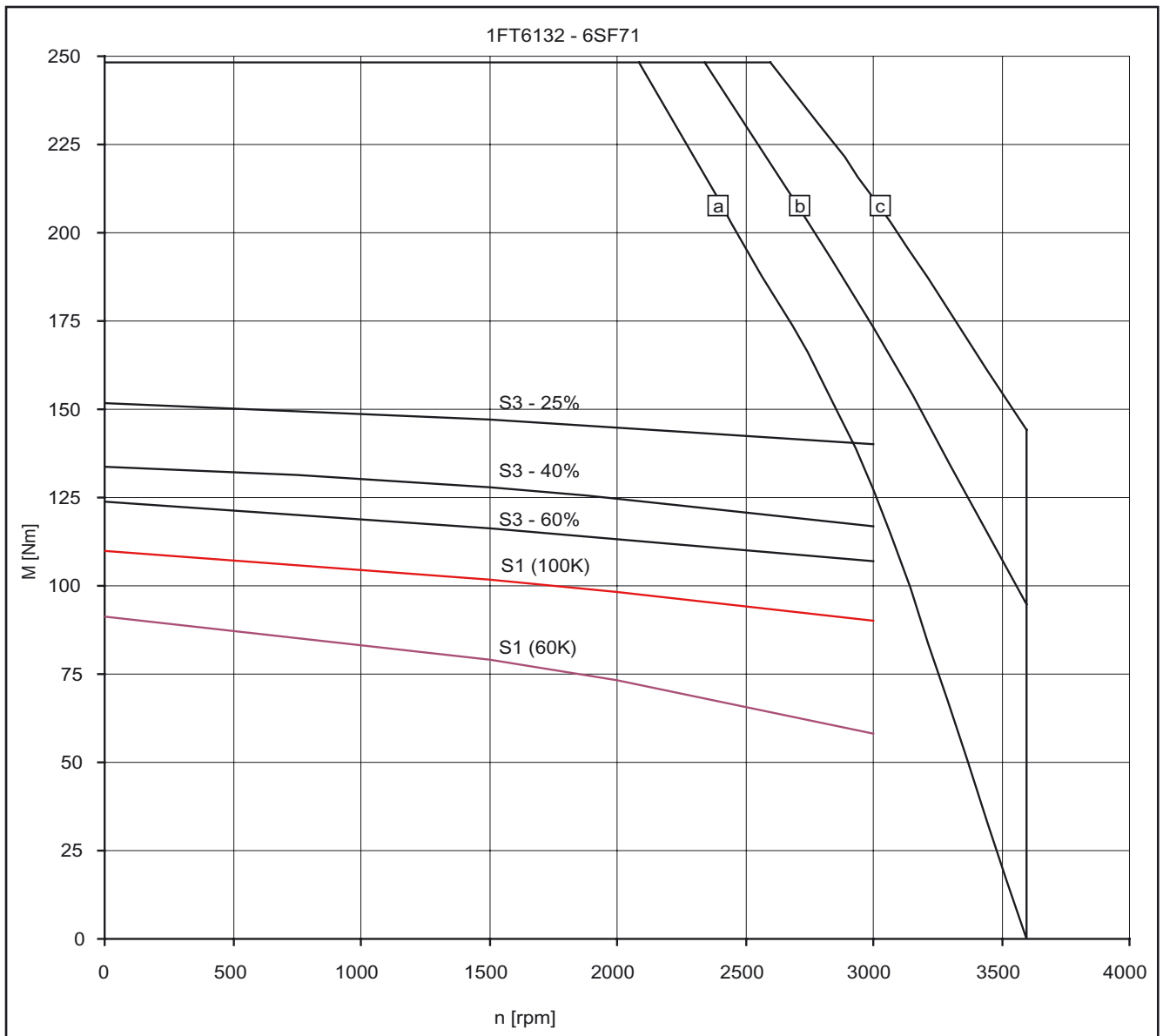


Fig. 3-68 Speed-torque diagram 1FT6132-6SF71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{mot} = 340 V_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 V_{rms}$
- [c] SIMODRIVE 611(ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 425 V_{rms}$

Speed-torque diagrams

Table 3-43 1FT6134 force ventilated

1FT6134					
Technical data	Code	Units	-6SB71	-6SC71	
Engineering data					
Rated speed	n_N	rpm	1500	2000	
Number of poles	2p		6	6	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	130	125	
Rated current (100K)	I_N	A	45	57	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	116	116	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	140	140	
Stall current (60K)	$I_{0(60\ K)}$	A	36	47	
Stall current (100K)	$I_{0(100\ K)}$	A	44	58	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	625	625	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	547	547	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2000	
Optimum power	P_{opt}	kW	20.4	26.2	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	3600	3600	
Maximum torque	M_{max}	Nm	316	316	
Maximum current	I_{max}	A	140	182	
Physical constants					
Torque constant	k_T	Nm/A	3.17	2.43	
Voltage constant	k_E	V/1000 rpm	204	156	
Winding resistance at 20 °C	R_{ph}	Ohm	0.14	0.081	
Rotating field inductance	L_D	mH	4.6	2.7	
Electrical time constant	T_{el}	ms	33	33	
Shaft torsional stiffness	c_t	Nm/rad	234000	234000	
Mechanical time constant	T_{mech}	ms	2.3	2.3	
Thermal time constant	T_{th}	min	25	25	
Weight with brake	m	kg	116	116	
Weight without brake	m	kg	106	106	

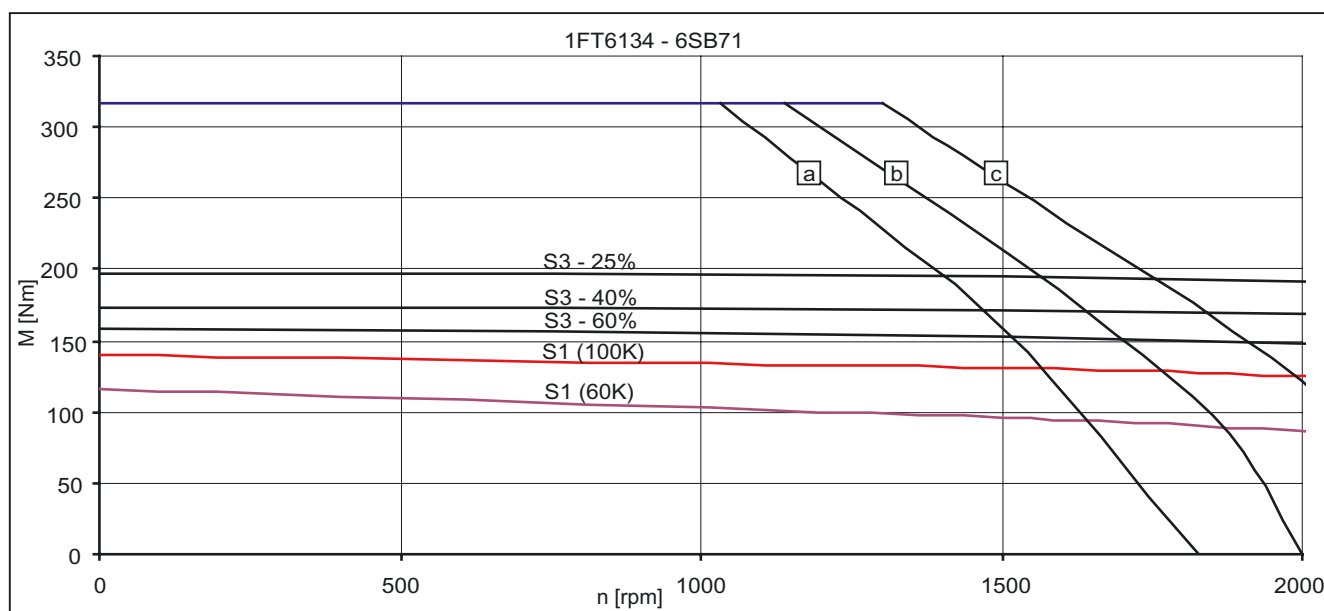


Fig. 3-69 Speed-torque diagram 1FT6134-6SB71

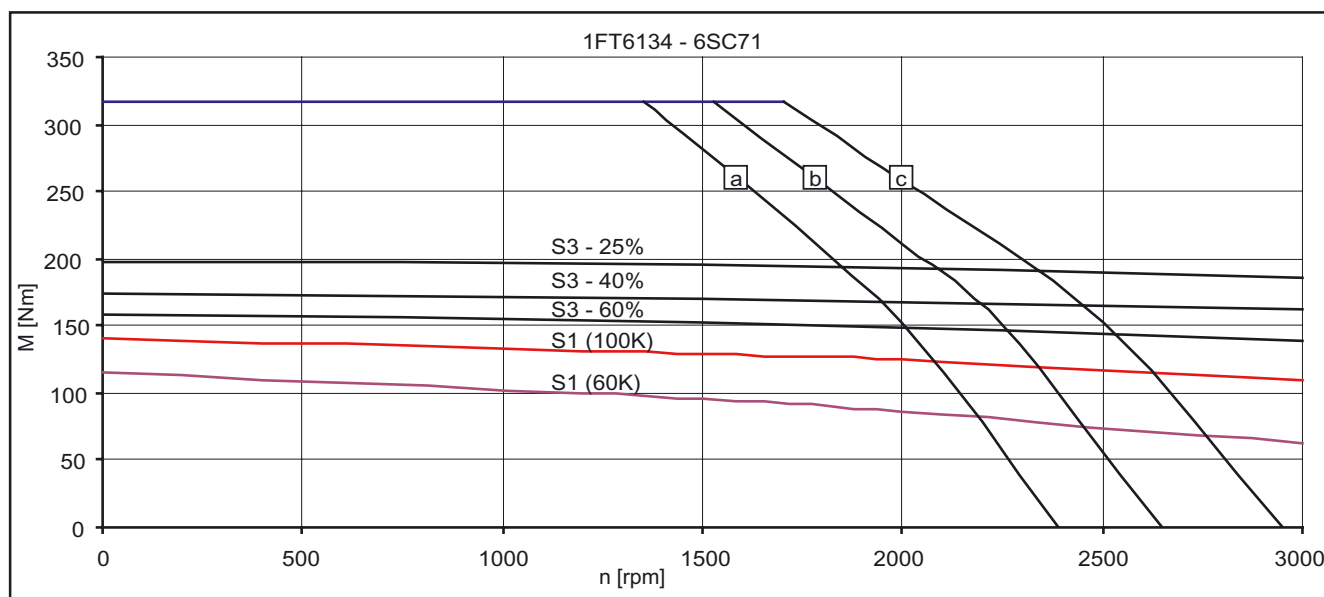


Fig. 3-70 Speed-torque diagram 1FT6134-6SC71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-44 1FT6134 force ventilated

1FT6134					
Technical data	Code	Units	-6SF71		
Engineering data					
Rated speed	n_N	rpm	3000		
Number of poles	2p		6		
Rated torque (100 K)	$M_{N(100 K)}$	Nm	110		
Rated current (100K)	I_N	A	72		
Stall torque (60K)	$M_{0(60 K)}$	Nm	116		
Stall torque (100K)	$M_{0(100 K)}$	Nm	140		
Stall current (60K)	$I_{0(60 K)}$	A	67		
Stall current (100K)	$I_{0(100 K)}$	A	83		
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	625		
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	547		
Optimum operating point					
Optimum speed	n_{opt}	rpm	3000		
Optimum power	P_{opt}	kW	35		
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	3600		
Maximum torque	M_{max}	Nm	316		
Maximum current	I_{max}	A	264		
Physical constants					
Torque constant	k_T	Nm/A	1.68		
Voltage constant	k_E	V/1000 rpm	108		
Winding resistance at 20 °C	R_{ph}	Ohm	0.039		
Rotating field inductance	L_D	mH	1.3		
Electrical time constant	T_{el}	ms	33		
Shaft torsional stiffness	c_t	Nm/rad	234000		
Mechanical time constant	T_{mech}	ms	2.3		
Thermal time constant	T_{th}	min	25		
Weight with brake	m	kg	116		
Weight without brake	m	kg	106		

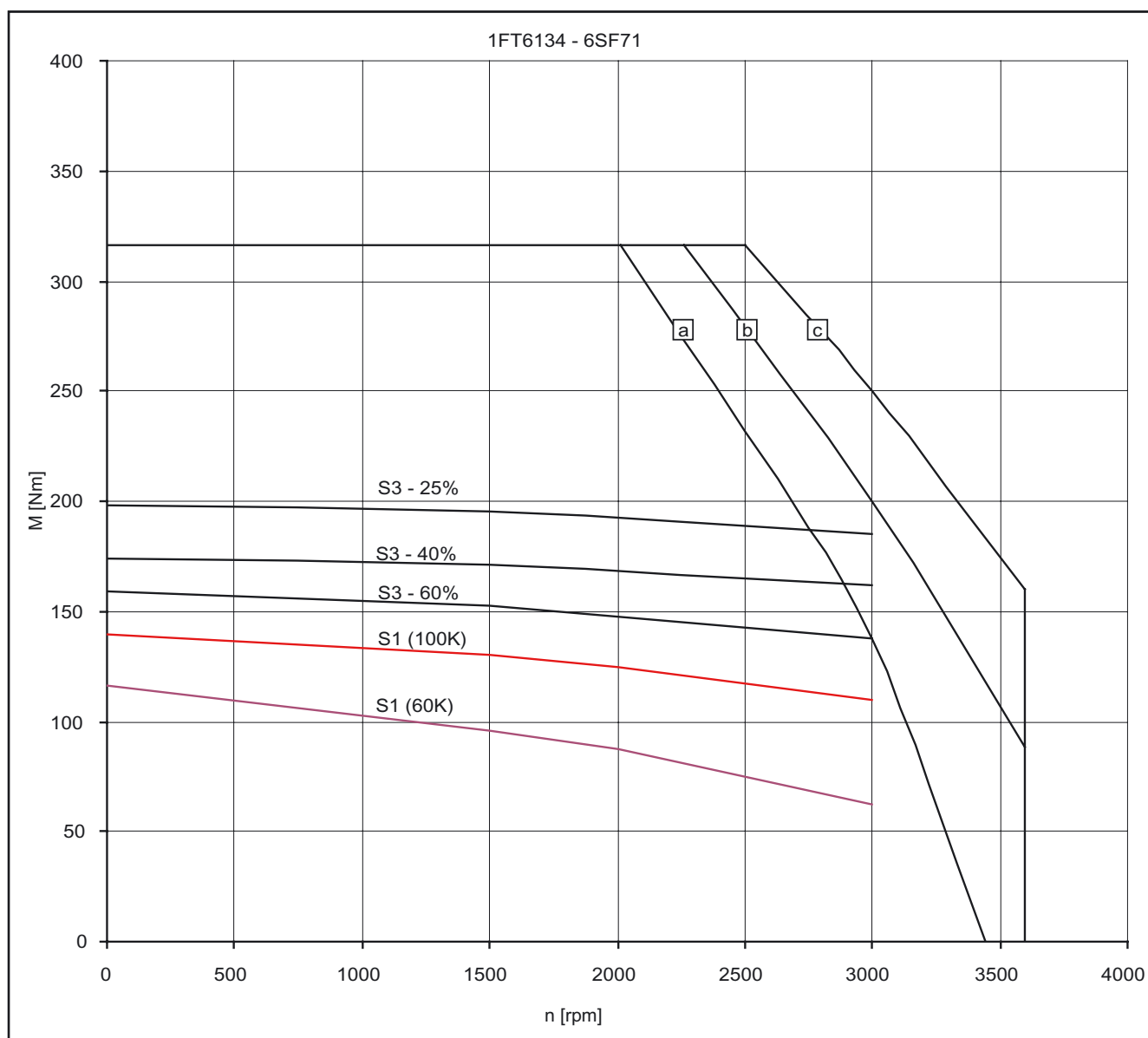


Fig. 3-71 Speed-torque diagram 1FT6134-6SF71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-45 1FT6136 force ventilated

1FT6136					
Technical data	Code	Units	-6SB71	-6SC71	
Engineering data					
Rated speed	n_N	rpm	1500	2000	
Number of poles	2p		6	6	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	160	155	
Rated current (100K)	I_N	A	55	72	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	145	145	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	175	175	
Stall current (60K)	$I_{0(60\ K)}$	A	45	62	
Stall current (100K)	$I_{0(100\ K)}$	A	55	77	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	742	742	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	664	664	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2000	
Optimum power	P_{opt}	kW	25	32	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	3600	3600	
Maximum torque	M_{max}	Nm	380	380	
Maximum current	I_{max}	A	156	219	
Physical constants					
Torque constant	k_T	Nm/A	3.17	2.27	
Voltage constant	k_E	V/1000 rpm	204	146	
Winding resistance at 20 °C	R_{ph}	Ohm	0.1	0.052	
Rotating field inductance	L_D	mH	4.3	2.2	
Electrical time constant	T_{el}	ms	43	42	
Shaft torsional stiffness	c_t	Nm/rad	214000	214000	
Mechanical time constant	T_{mech}	ms	2.0	2.0	
Thermal time constant	T_{th}	min	25	25	
Weight with brake	m	kg	131	131	
Weight without brake	m	kg	123	123	

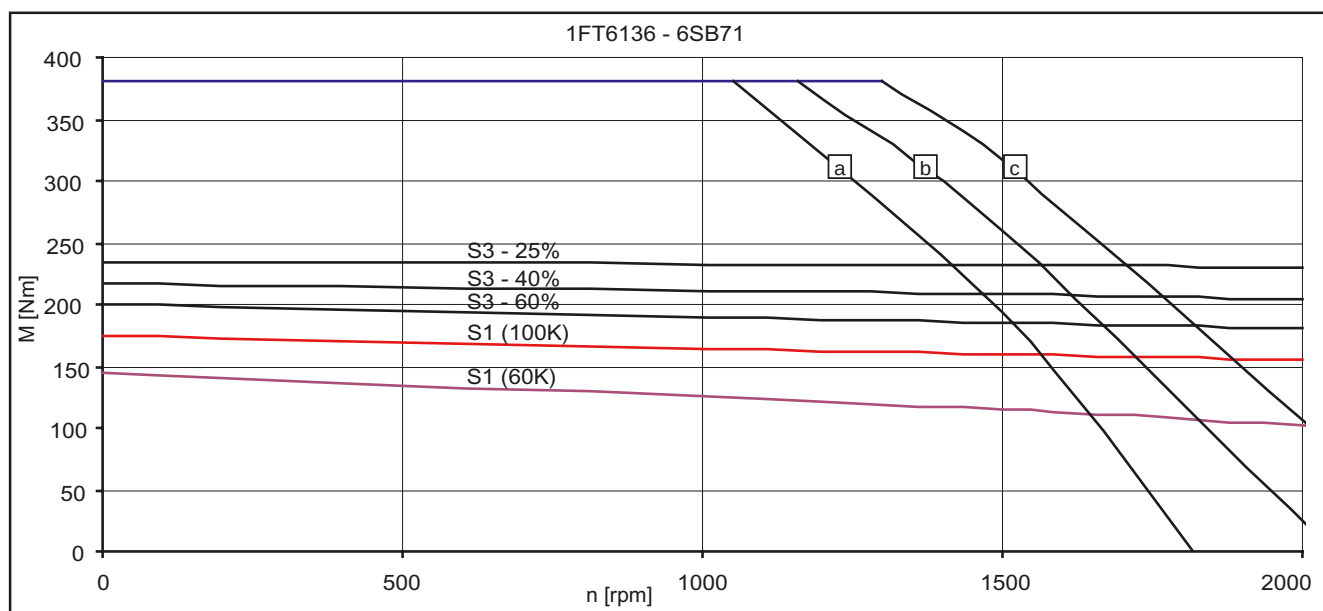


Fig. 3-72 Speed-torque diagram 1FT6136-6SB71

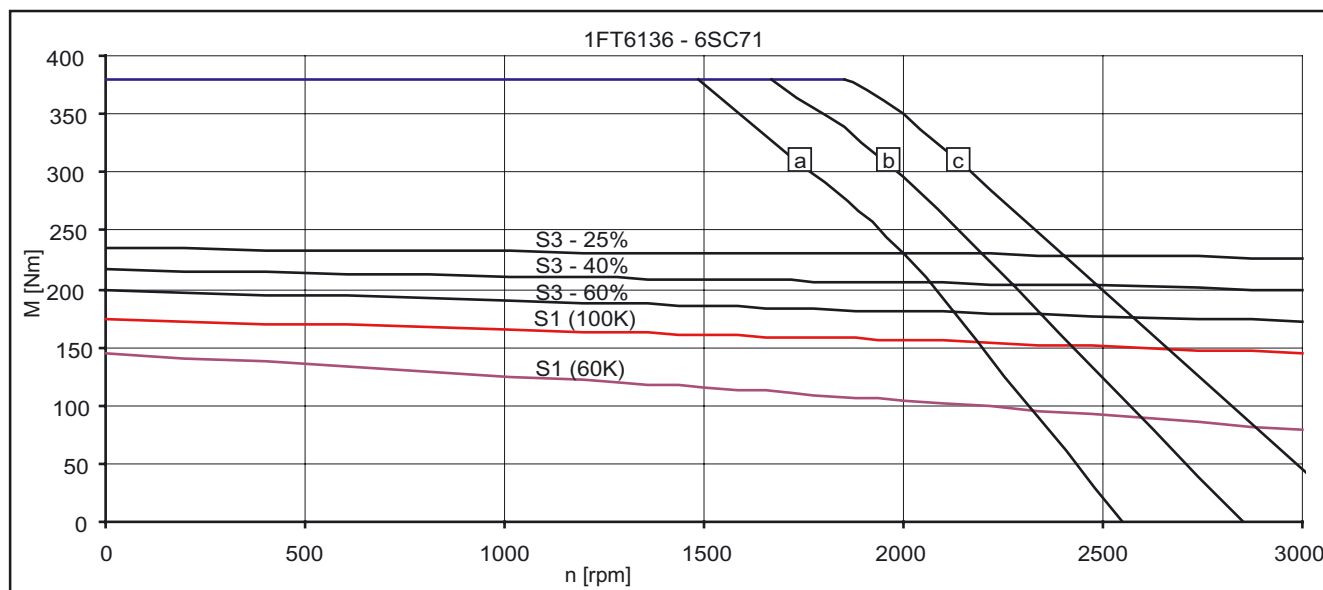


Fig. 3-73 Speed-torque diagram 1FT6136-6SC71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-46 1FT6136 force ventilated

1FT6136				
Technical data	Code	Units	-6SF71	
Engineering data				
Rated speed	n_N	rpm	3000	
Number of poles	2p		6	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	145	
Rated current (100K)	I_N	A	104	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	145	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	175	
Stall current (60K)	$I_{0(60\text{ K})}$	A	89	
Stall current (100K)	$I_{0(100\text{ K})}$	A	110	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	742	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	664	
Optimum operating point				
Optimum speed	n_{opt}	rpm	3000	
Optimum power	P_{opt}	kW	46	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	3600	
Maximum torque	M_{max}	Nm	380	
Maximum current	I_{max}	A	313	
Physical constants				
Torque constant	k_T	Nm/A	1.59	
Voltage constant	k_E	V/1000 rpm	102	
Winding resistance at 20 °C	R_{ph}	Ohm	0.025	
Rotating field inductance	L_D	mH	0.96	
Electrical time constant	T_{el}	ms	44	
Shaft torsional stiffness	c_t	Nm/rad	214000	
Mechanical time constant	T_{mech}	ms	2.0	
Thermal time constant	T_{th}	min	25	
Weight with brake	m	kg	131	
Weight without brake	m	kg	123	

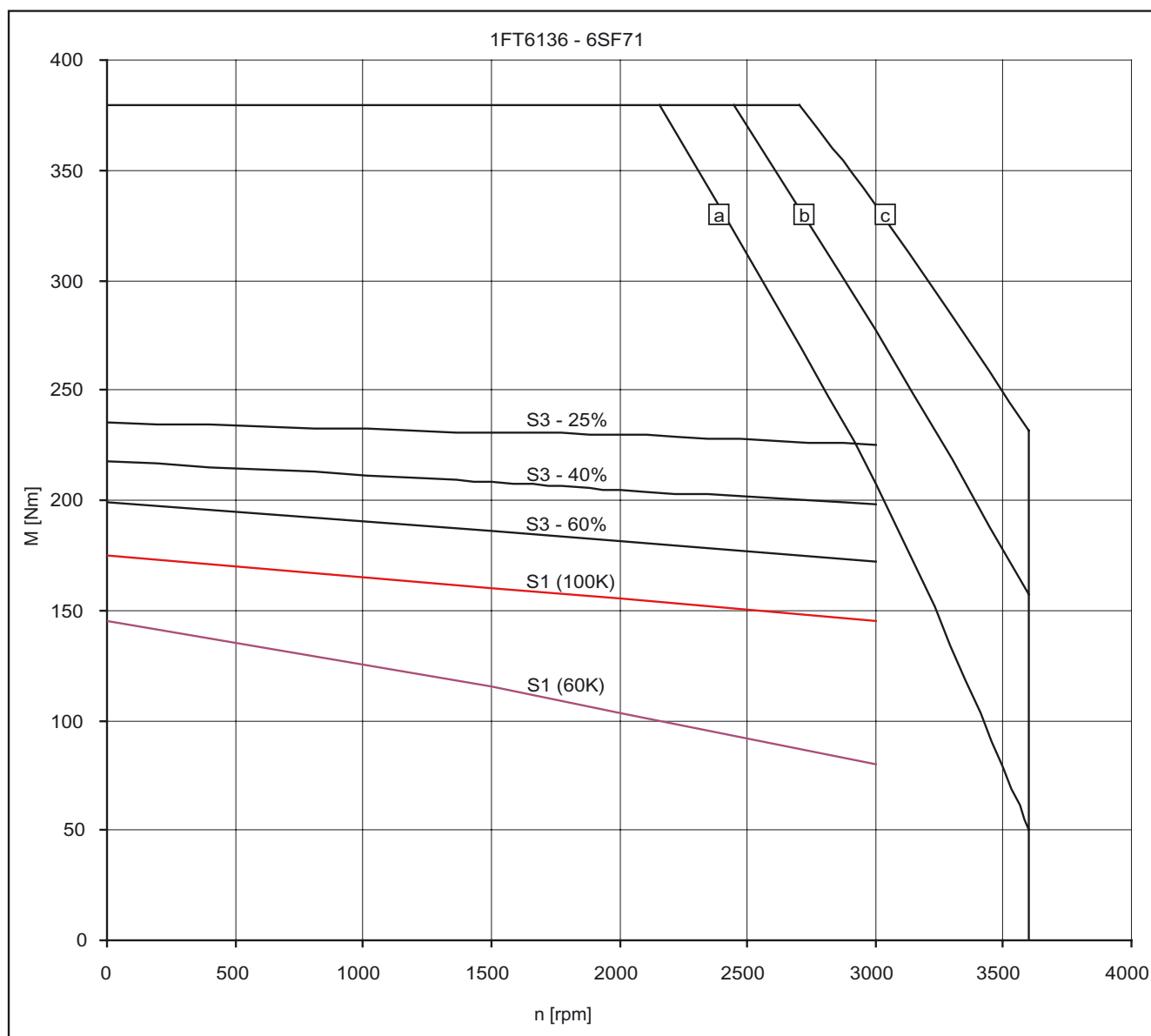


Fig. 3-74 Speed-torque diagram 1FT6136-6SF71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-47 1FT6163 force ventilated

1FT6163 ¹⁾					
Technical data	Code	Units	-8SB7	-8SD7	
Engineering data					
Rated speed	n_N	rpm	1500	2500 ²⁾	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	385	340 ²⁾	
Rated current (100K)	I_N	A	136	185 ²⁾	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	360	360	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	425	425	
Stall current (60K)	$I_{0(60\ K)}$	A	124	186	
Stall current (100K)	$I_{0(100\ K)}$	A	151	226	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	—	—	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	2300	2300	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2500 ²⁾	
Optimum power	P_{opt}	kW	60.5	89.0 ²⁾	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	3100	3100	
Maximum torque	M_{max}	Nm	900 ¹⁾	900 ²⁾	
Maximum current	I_{max}	A	372	558	
Physical constants					
Torque constant	k_T	Nm/A	2.81	1.88	
Voltage constant	k_E	V/1000 rpm	186	124	
Winding resistance at 20 °C	R_{ph}	Ohm	0.026	0.012	
Rotating field inductance	L_D	mH	0.81	0.36	
Electrical time constant	T_{el}	ms	31	30	
Shaft torsional stiffness	c_t	Nm/rad	472100	472100	
Mechanical time constant	T_{mech}	ms	2.3	2.3	
Thermal time constant	T_{th}	min	25	25	
Weight with brake	m	kg	—	—	
Weight without brake	m	kg	170	170	

1) Only valid for MASTERDRIVES MC

2) Only valid for MASTERDRIVES MC (AFE)

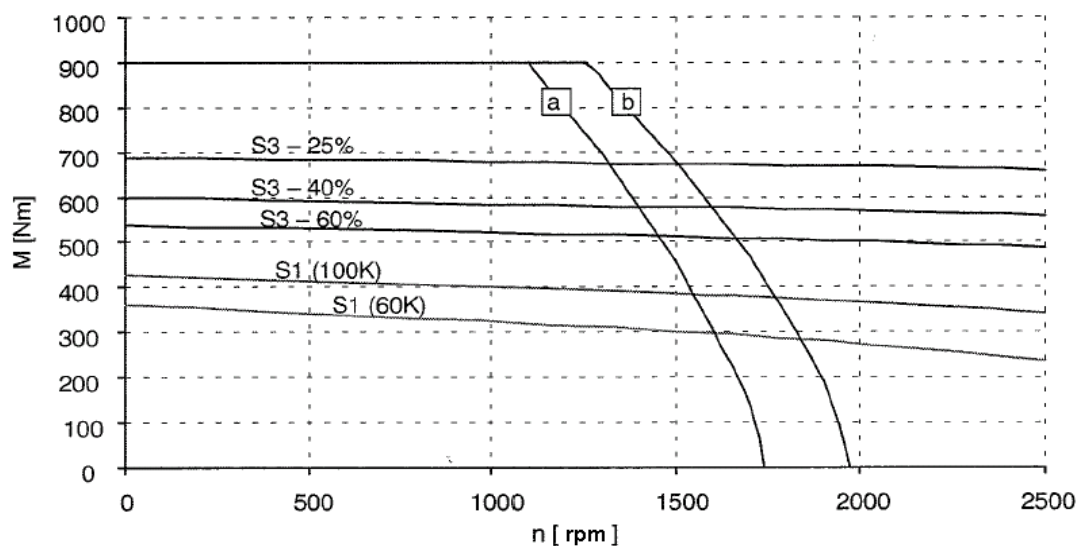


Fig. 3-75 Speed-torque diagram 1FT6163-8SB7

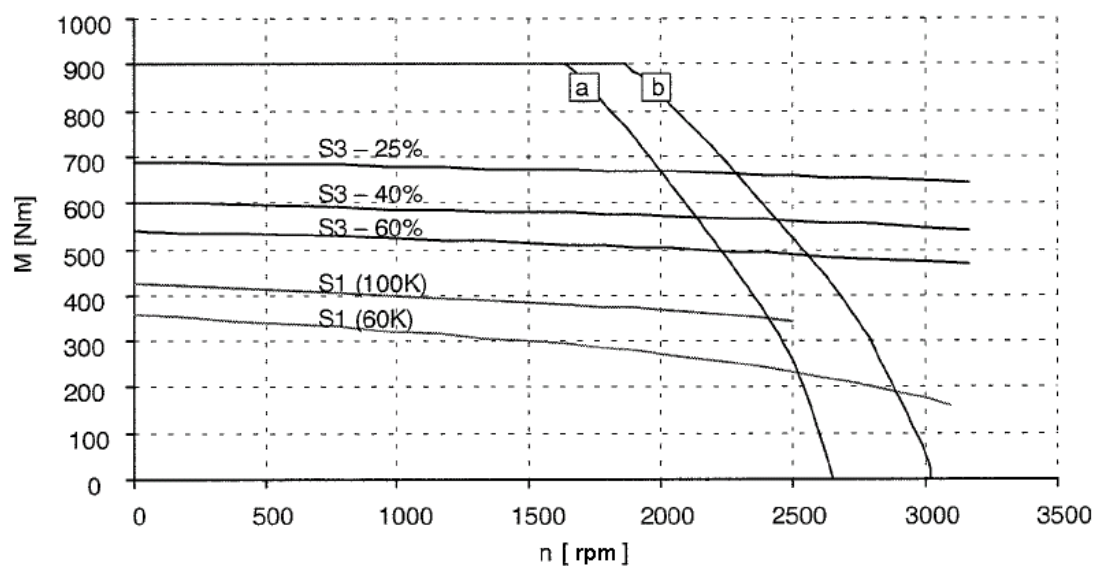


Fig. 3-76 Speed-torque diagram 1FT6163-8SD7

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-48 1FT6168 force ventilated

1FT6168 ¹⁾				
Technical data	Code	Units	-8SB7	
Engineering data				
Rated speed	n_N	rpm	1500	
Number of poles	2p		8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	540	
Rated current (100K)	I_N	A	174	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	510	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	600	
Stall current (60K)	$I_{0(60\text{ K})}$	A	165	
Stall current (100K)	$I_{0(100\text{ K})}$	A	194	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	—	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	3100	
Optimum operating point				
Optimum speed	n_{opt}	rpm	1500	
Optimum power	P_{opt}	kW	85	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	3100	
Maximum torque	M_{max}	Nm	1200	
Maximum current	I_{max}	A	479	
Physical constants				
Torque constant	k_T	Nm/A	3.09	
Voltage constant	k_E	V/1000 rpm	203	
Winding resistance at 20 °C	R_{ph}	Ohm	0.02	
Rotating field inductance	L_D	mH	0.69	
Electrical time constant	T_{el}	ms	35	
Shaft torsional stiffness	c_t	Nm/rad	432000	
Mechanical time constant	T_{mech}	ms	1.9	
Thermal time constant	T_{th}	min	25	
Weight with brake	m	kg	—	
Weight without brake	m	kg	210	

1) Only valid for MASTERDRIVES MC (AFE)

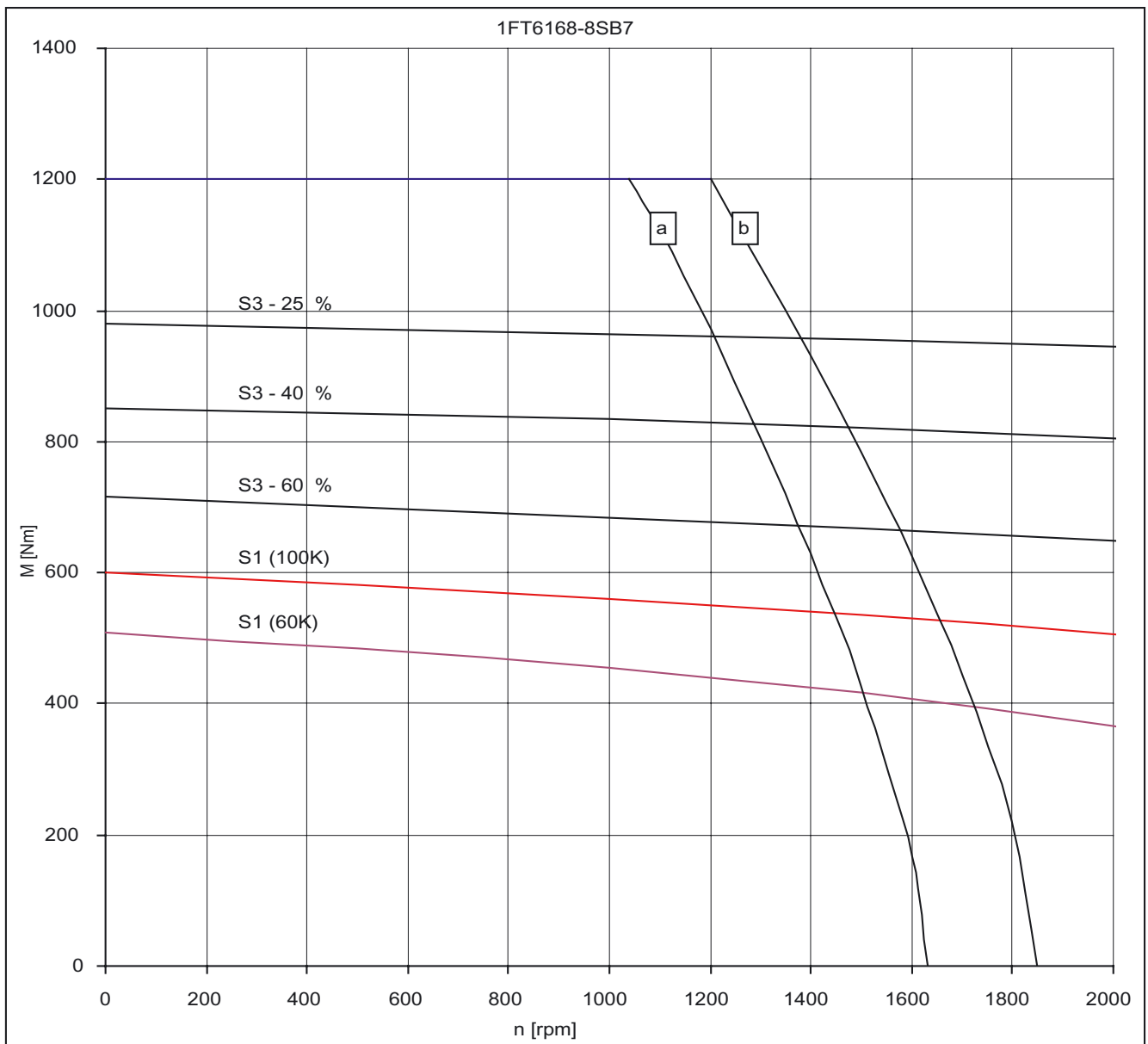


Fig. 3-77 Speed-torque diagram 1FT6168-8SB7

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540$ V (DC), $V_{Mot} = 340$ V_{rms}
- [b] MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600$ V (DC), $V_{mot} = 380$ V_{rms}

3.1.4 1FT6 series, water cooled

Table 3-49 1FT6062, water cooled

1FT6062					
Technical data	Code	Units	-6WF7□		
Engineering data					
Rated speed	n_N	rpm	3000		
Number of poles	2p		6		
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	10.1		
Rated current (100K)	I_N	A	6.9		
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	8.5		
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	10.2		
Stall current (60K)	$I_{0(60\text{ K})}$	A	5.6		
Stall current (100K)	$I_{0(100\text{ K})}$	A	6.9		
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	11.8		
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	8.5		
Optimum operating point					
Optimum speed	n_{opt}	rpm	3000		
Optimum power	P_{opt}	kW	3.19		
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	9100		
Maximum torque	M_{max}	Nm	24		
Maximum current	I_{max}	A	22		
Physical constants					
Torque constant	k_T	Nm/A	1.48		
Voltage constant	k_E	V/1000 rpm	94		
Winding resistance at 20 °C	R_{ph}	Ohm	2.57		
Rotating field inductance	L_D	mH	19		
Electrical time constant	T_{el}	ms	7.4		
Shaft torsional stiffness	c_t	Nm/rad	32000		
Mechanical time constant	T_{mech}	ms	3.0		
Thermal time constant	T_{th}	min	1.5		
Weight with brake	m	kg	11		
Weight without brake	m	kg	9.5		

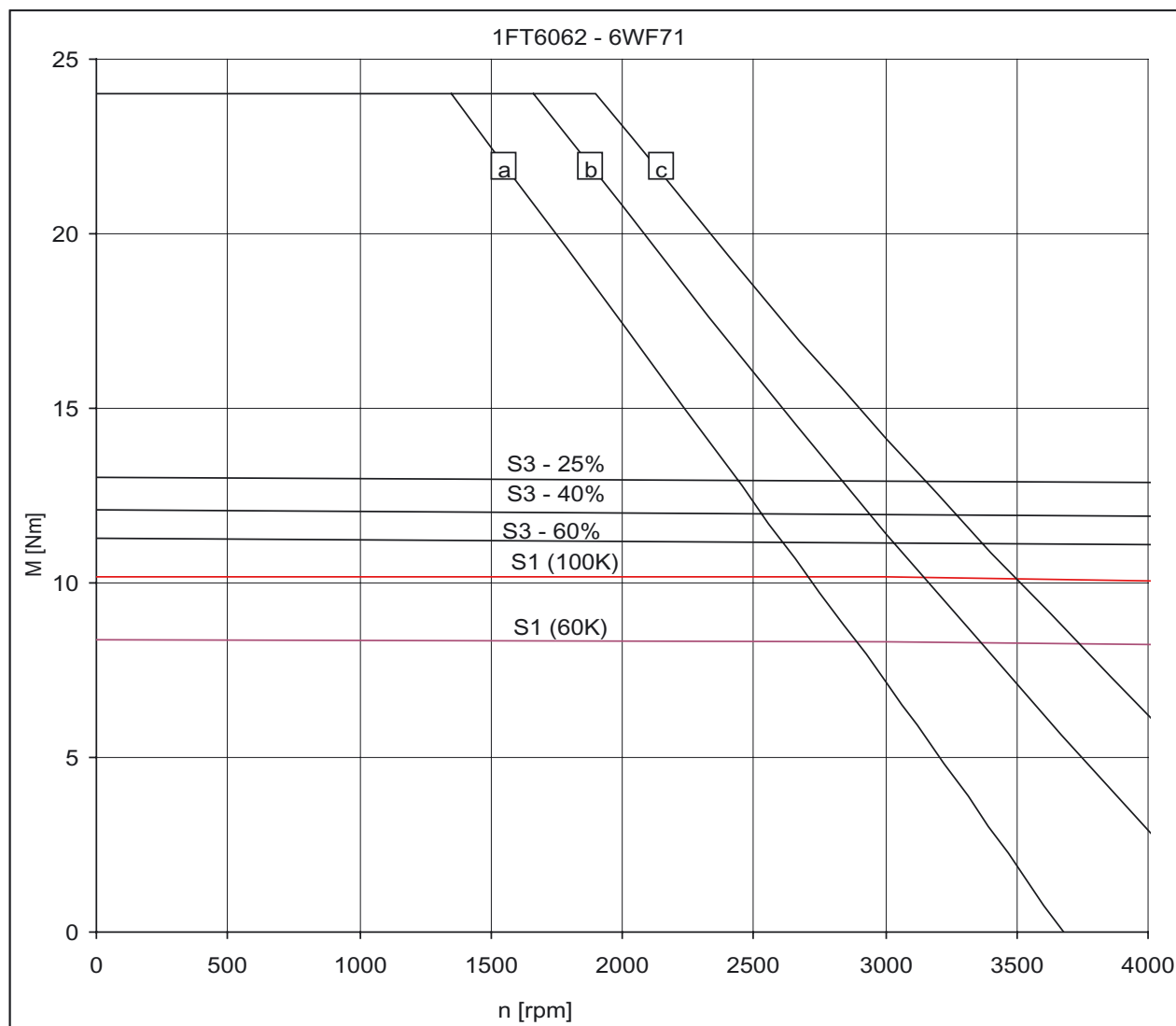


Fig. 3-78 Speed-torque diagram 1FT6062-6WF7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-50 1FT6062, water cooled

1FT6062					
Technical data	Code	Units	-6WH7□	-6WK7□	
Engineering data					
Rated speed	n_N	rpm	4500	6000	
Number of poles	2p		6	6	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	10	9.8	
Rated current (100K)	I_N	A	9.6	12.7	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	8.5	8.5	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	10.2	10.2	
Stall current (60K)	$I_{0(60\text{ K})}$	A	7.9	10.6	
Stall current (100K)	$I_{0(100\text{ K})}$	A	9.7	12.9	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	11.8	11.8	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	8.5	8.5	
Optimum operating point					
Optimum speed	n_{opt}	rpm	4500	6000	
Optimum power	P_{opt}	kW	4.71	6.16	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	9100	9100	
Maximum torque	M_{max}	Nm	24	24	
Maximum current	I_{max}	A	31	41	
Physical constants					
Torque constant	k_T	Nm/A	1.05	0.79	
Voltage constant	k_E	V/1000 rpm	67	50	
Winding resistance at 20 °C	R_{ph}	Ohm	1.31	0.74	
Rotating field inductance	L_D	mH	9.7	5.5	
Electrical time constant	T_{el}	ms	7.4	7.4	
Shaft torsional stiffness	c_t	Nm/rad	32000	32000	
Mechanical time constant	T_{mech}	ms	3.0	3.0	
Thermal time constant	T_{th}	min	1.5	1.5	
Weight with brake	m	kg	11	11	
Weight without brake	m	kg	9.5	9.5	

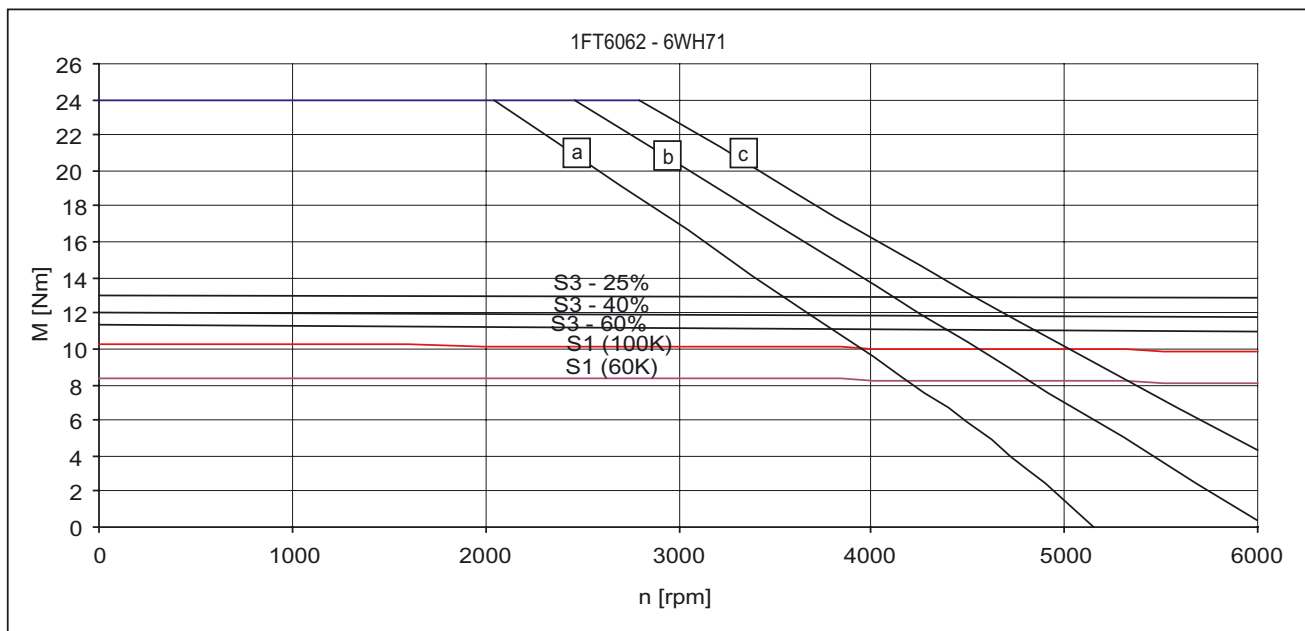


Fig. 3-79 Speed-torque diagram 1FT6062-6WH71

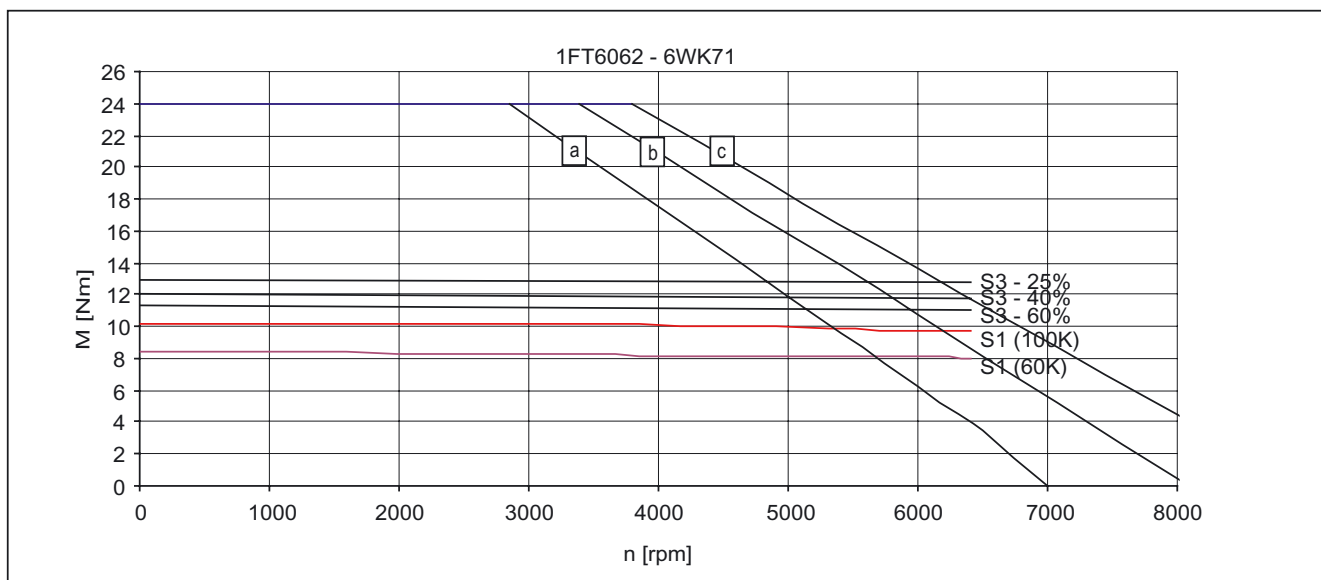


Fig. 3-80 Speed-torque diagram 1FT6062-6WK71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-51 1FT6064, water cooled

1FT6064				
Technical data	Code	Units	-6WF7□	
Engineering data				
Rated speed	n_N	rpm	3000	
Number of poles	2p		6	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	16.1	
Rated current (100K)	I_N	A	10.3	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	13.4	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	16.2	
Stall current (60K)	$I_{0(60\text{ K})}$	A	8.4	
Stall current (100K)	$I_{0(100\text{ K})}$	A	10.3	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	16.3	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	13	
Optimum operating point				
Optimum speed	n_{opt}	rpm	3000	
Optimum power	P_{opt}	kW	5.06	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	9100	
Maximum torque	M_{max}	Nm	38	
Maximum current	I_{max}	A	33	
Physical constants				
Torque constant	k_T	Nm/A	1.57	
Voltage constant	k_E	V/1000 rpm	100	
Winding resistance at 20 °C	R_{ph}	Ohm	1.40	
Rotating field inductance	L_D	mH	13.5	
Electrical time constant	T_{el}	ms	9.6	
Shaft torsional stiffness	c_t	Nm/rad	27000	
Mechanical time constant	T_{mech}	ms	2.2	
Thermal time constant	T_{th}	min	1.5	
Weight with brake	m	kg	13	
Weight without brake	m	kg	12.5	

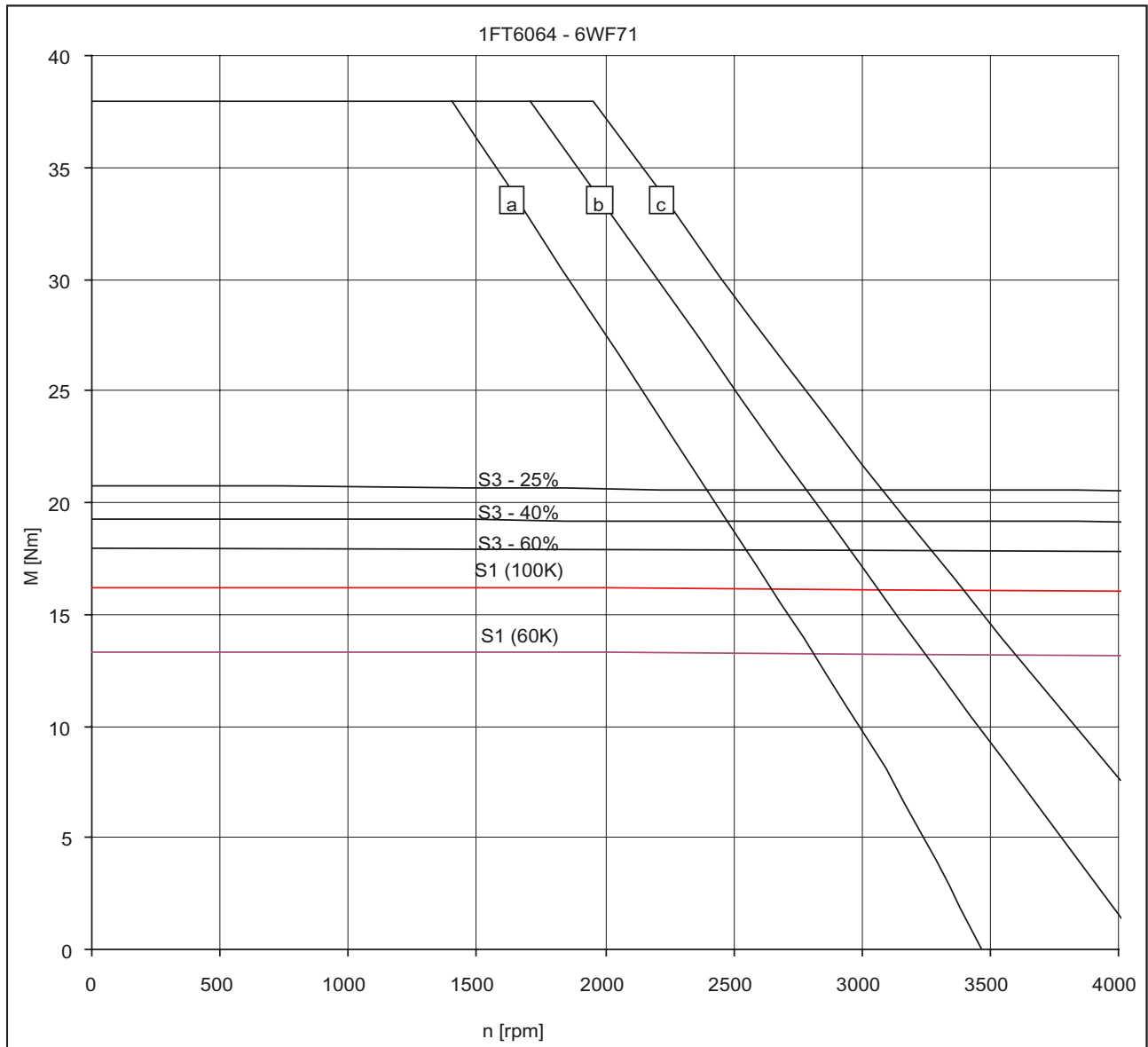


Fig. 3-81 Speed-torque diagram 1FT6064-6WF7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-52 1FT6064, water cooled

1FT6064					
Technical data	Code	Units	-6WH7□	-6WK7□	
Engineering data					
Rated speed	n_N	rpm	4500	6000	
Number of poles	2p		6	6	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	16	15.8	
Rated current (100K)	I_N	A	15.2	20	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	13.4	13.4	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	16.2	16.2	
Stall current (60K)	$I_{0(60\text{ K})}$	A	12.5	16.7	
Stall current (100K)	$I_{0(100\text{ K})}$	A	15.4	20.5	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	16.3	16.3	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	13	13	
Optimum operating point					
Optimum speed	n_{opt}	rpm	4500	6000	
Optimum power	P_{opt}	kW	7.54	9.93	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	9100	9100	
Maximum torque	M_{max}	Nm	38	38	
Maximum current	I_{max}	A	49	66	
Physical constants					
Torque constant	k_T	Nm/A	1.05	0.79	
Voltage constant	k_E	V/1000 rpm	67	50	
Winding resistance at 20 °C	R_{ph}	Ohm	0.63	0.35	
Rotating field inductance	L_D	mH	6	3.4	
Electrical time constant	T_{el}	ms	9.5	9.7	
Shaft torsional stiffness	c_t	Nm/rad	27000	27000	
Mechanical time constant	T_{mech}	ms	2.2	2.2	
Thermal time constant	T_{th}	min	1.5	1.5	
Weight with brake	m	kg	13	13	
Weight without brake	m	kg	12.5	12.5	

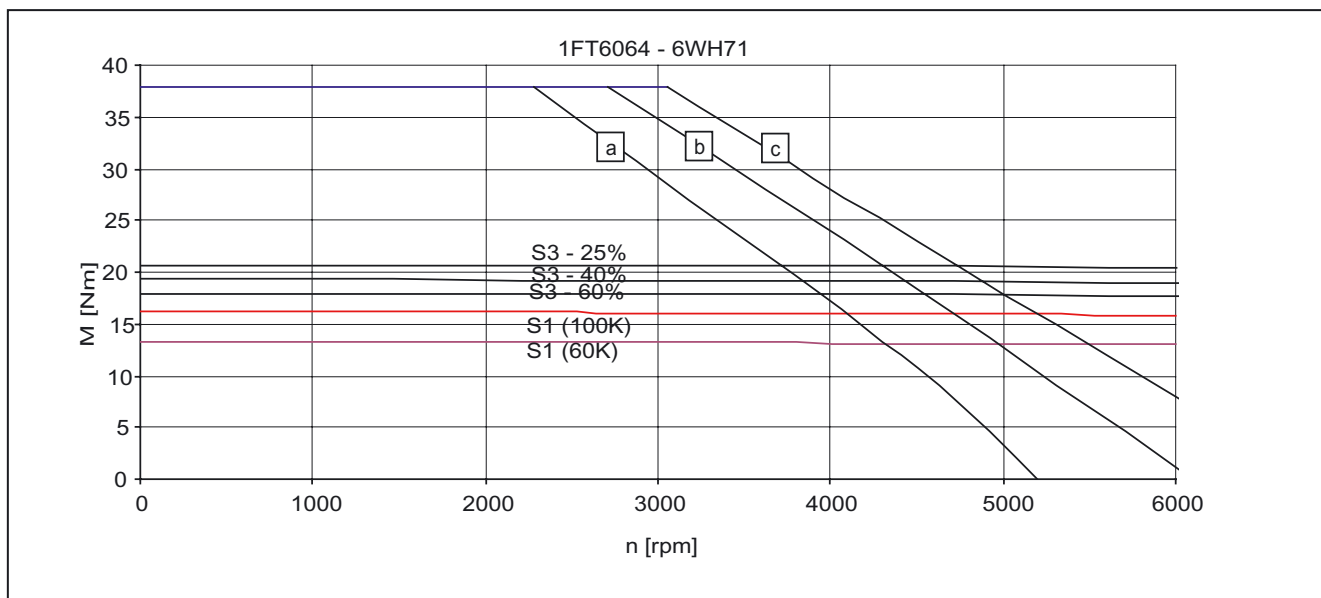


Fig. 3-82 Speed-torque diagram 1FT6064-6WH7□

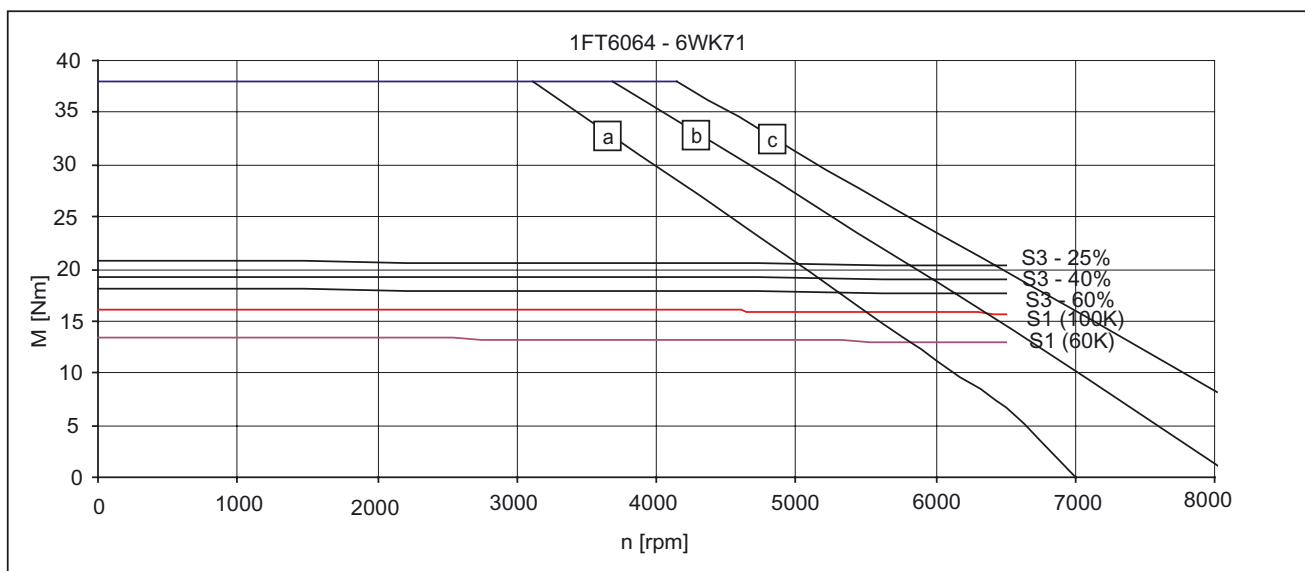


Fig. 3-83 Speed-torque diagram 1FT6064-6WK7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-53 1FT6084, water cooled

1FT6084				
Technical data	Code	Units	-8WF7□	
Engineering data				
Rated speed	n_N	rpm	3000	
Number of poles	2p		8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	35	
Rated current (100K)	I_N	A	27	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	29	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	35	
Stall current (60K)	$I_{0(60\text{ K})}$	A	19.9	
Stall current (100K)	$I_{0(100\text{ K})}$	A	24.5	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	61.1	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	48	
Optimum operating point				
Optimum speed	n_{opt}	rpm	3000	
Optimum power	P_{opt}	kW	11.0	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	7900	
Maximum torque	M_{max}	Nm	65	
Maximum current	I_{max}	A	59	
Physical constants				
Torque constant	k_T	Nm/A	1.43	
Voltage constant	k_E	V/1000 rpm	91	
Winding resistance at 20 °C	R_{ph}	Ohm	0.37	
Rotating field inductance	L_D	mH	4.3	
Electrical time constant	T_{el}	ms	11.6	
Shaft torsional stiffness	c_t	Nm/rad	76000	
Mechanical time constant	T_{mech}	ms	2.6	
Thermal time constant	T_{th}	min	1.5	
Weight with brake	m	kg	24.5	
Weight without brake	m	kg	21	

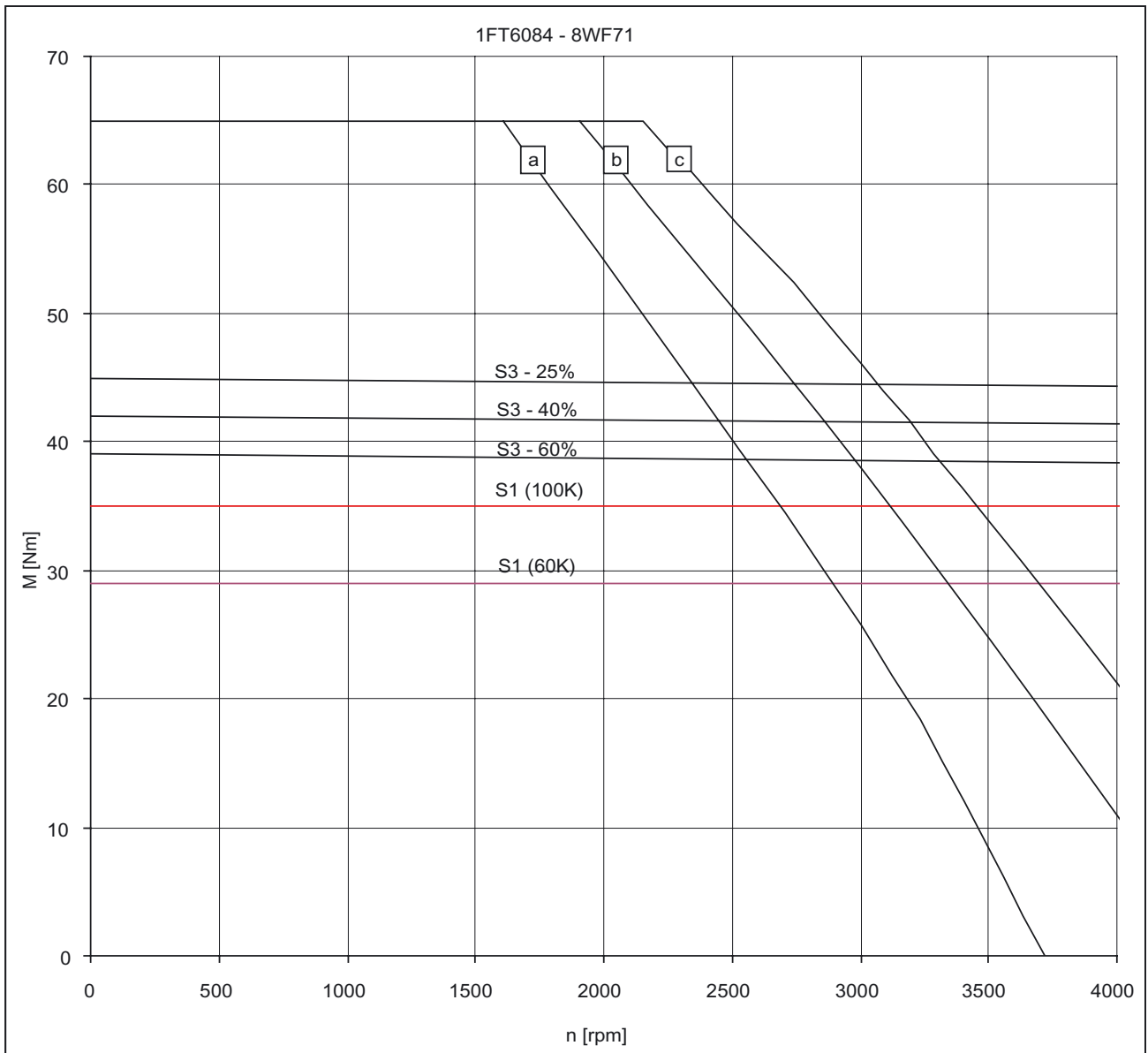


Fig. 3-84 Speed-torque diagram 1FT6084-8WF7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-54 1FT6084, water cooled

1FT6084					
Technical data	Code	Units	-8WH7□	-8WK7□	
Engineering data					
Rated speed	n_N	rpm	4500	6000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	35	34	
Rated current (100K)	I_N	A	39	51	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	29	29	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	35	35	
Stall current (60K)	$I_{0(60\ K)}$	A	30	38	
Stall current (100K)	$I_{0(100\ K)}$	A	37	47	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	61.5	61.5	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	48	48	
Optimum operating point					
Optimum speed	n_{opt}	rpm	4500	6000	
Optimum power	P_{opt}	kW	16.5	21.4	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	7900	7900	
Maximum torque	M_{max}	Nm	65	65	
Maximum current	I_{max}	A	90	112	
Physical constants					
Torque constant	k_T	Nm/A	0.96	0.74	
Voltage constant	k_E	V/1000 rpm	61	47	
Winding resistance at 20 °C	R_{ph}	Ohm	0.17	0.1	
Rotating field inductance	L_D	mH	1.9	1.2	
Electrical time constant	T_{el}	ms	11.2	12.0	
Shaft torsional stiffness	c_t	Nm/rad	76000	76000	
Mechanical time constant	T_{mech}	ms	2.7	2.6	
Thermal time constant	T_{th}	min	1.5	1.5	
Weight with brake	m	kg	24	24	
Weight without brake	m	kg	21	21	

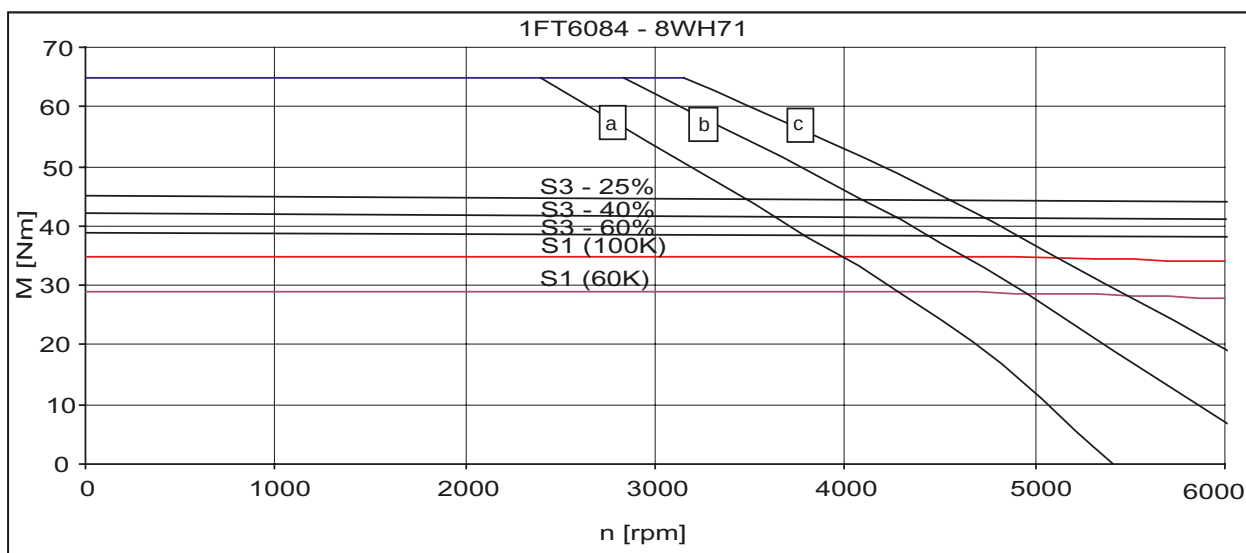


Fig. 3-85 Speed-torque diagram 1FT6084-8WH71

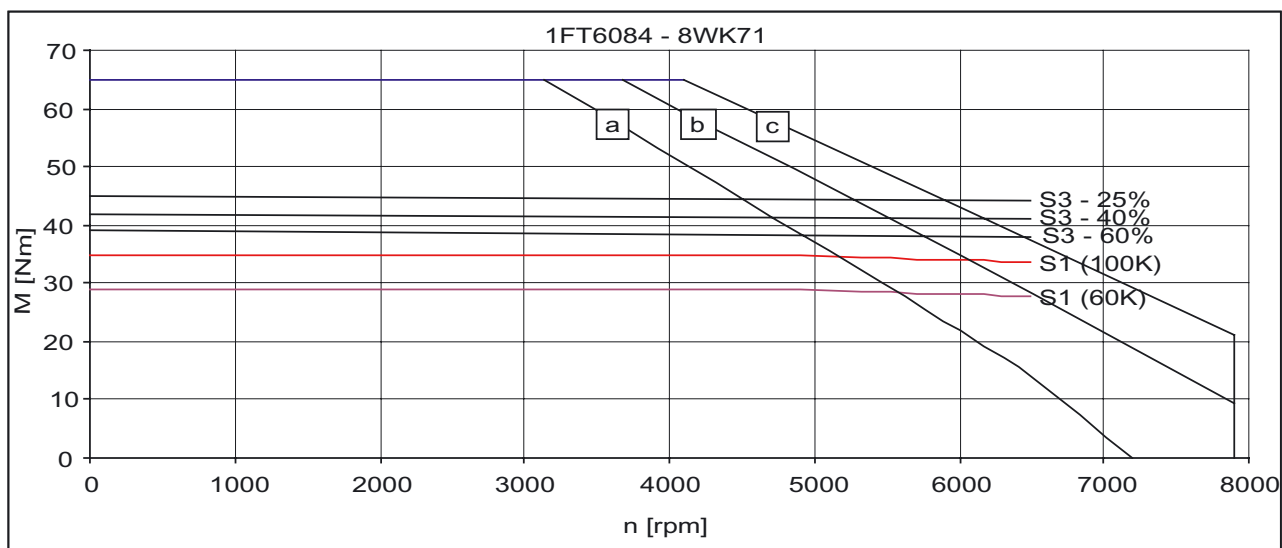


Fig. 3-86 Speed-torque diagram 1FT6084-8WK71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-55 1FT6086, water cooled

1FT6086				
Technical data	Code	Units	-8WF7□	
Engineering data				
Rated speed	n_N	rpm	3000	
Number of poles	2p		8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	46	
Rated current (100K)	I_N	A	37	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	39	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	47	
Stall current (60K)	$I_{0(60\text{ K})}$	A	27	
Stall current (100K)	$I_{0(100\text{ K})}$	A	34	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	79.6	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	66.5	
Optimum operating point				
Optimum speed	n_{opt}	rpm	3000	
Optimum power	P_{opt}	kW	14.5	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	7900	
Maximum torque	M_{max}	Nm	90	
Maximum current	I_{max}	A	80	
Physical constants				
Torque constant	k_T	Nm/A	1.4	
Voltage constant	k_E	V/1000 rpm	89	
Winding resistance at 20 °C	R_{ph}	Ohm	0.23	
Rotating field inductance	L_D	mH	2.9	
Electrical time constant	T_{el}	ms	12.6	
Shaft torsional stiffness	c_t	Nm/rad	65000	
Mechanical time constant	T_{mech}	ms	2.3	
Thermal time constant	T_{th}	min	1.5	
Weight with brake	m	kg	29.5	
Weight without brake	m	kg	26	

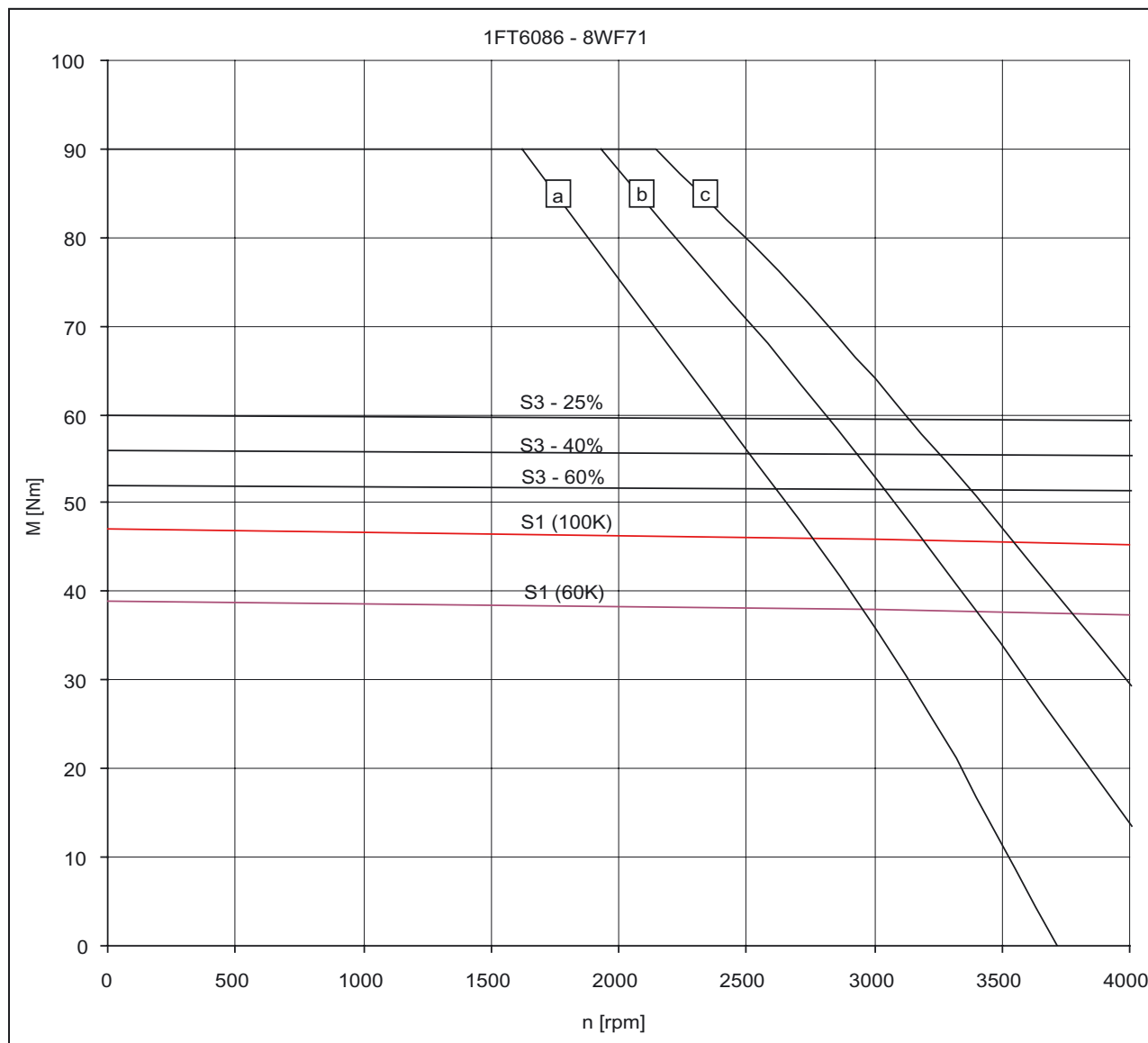


Fig. 3-87 Speed-torque diagram 1FT6086-8WF7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-56 1FT6086, water cooled

1FT6086					
Technical data	Code	Units	-8WH7□	-8WK7□	
Engineering data					
Rated speed	n_N	rpm	4500	6000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	45	44	
Rated current (100K)	I_N	A	53	58	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	39	39	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	47	47	
Stall current (60K)	$I_{0(60\text{ K})}$	A	42	48	
Stall current (100K)	$I_{0(100\text{ K})}$	A	52	59	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	79.6	79.6	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	66.5	66.5	
Optimum operating point					
Optimum speed	n_{opt}	rpm	4500	6000	
Optimum power	P_{opt}	kW	21.2	27.6	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	7900	7900	
Maximum torque	M_{max}	Nm	90	90	
Maximum current	I_{max}	A	122	141	
Physical constants					
Torque constant	k_T	Nm/A	0.91	0.80	
Voltage constant	k_E	V/1000 rpm	58	51	
Winding resistance at 20 °C	R_{ph}	Ohm	0.096	0.072	
Rotating field inductance	L_D	mH	1.3	0.95	
Electrical time constant	T_{el}	ms	13.5	13.2	
Shaft torsional stiffness	c_t	Nm/rad	65000	65000	
Mechanical time constant	T_{mech}	ms	2.3	2.2	
Thermal time constant	T_{th}	min	1.5	1.5	
Weight with brake	m	kg	29.5	29.5	
Weight without brake	m	kg	26	26	

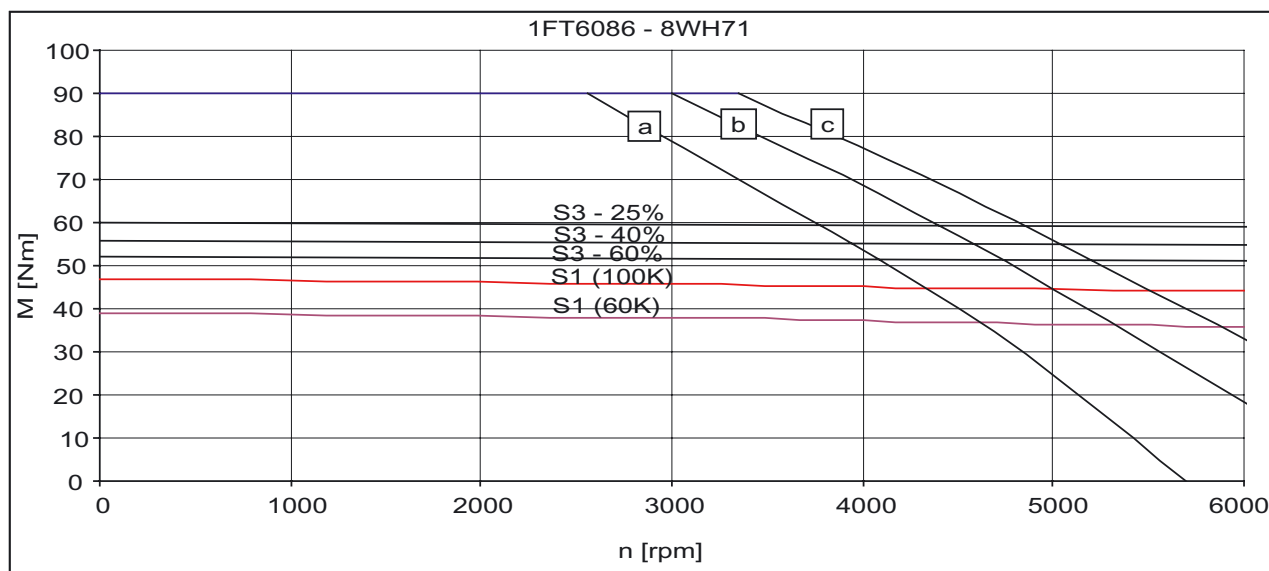


Fig. 3-88 Speed-torque diagram 1FT6086-8WH71

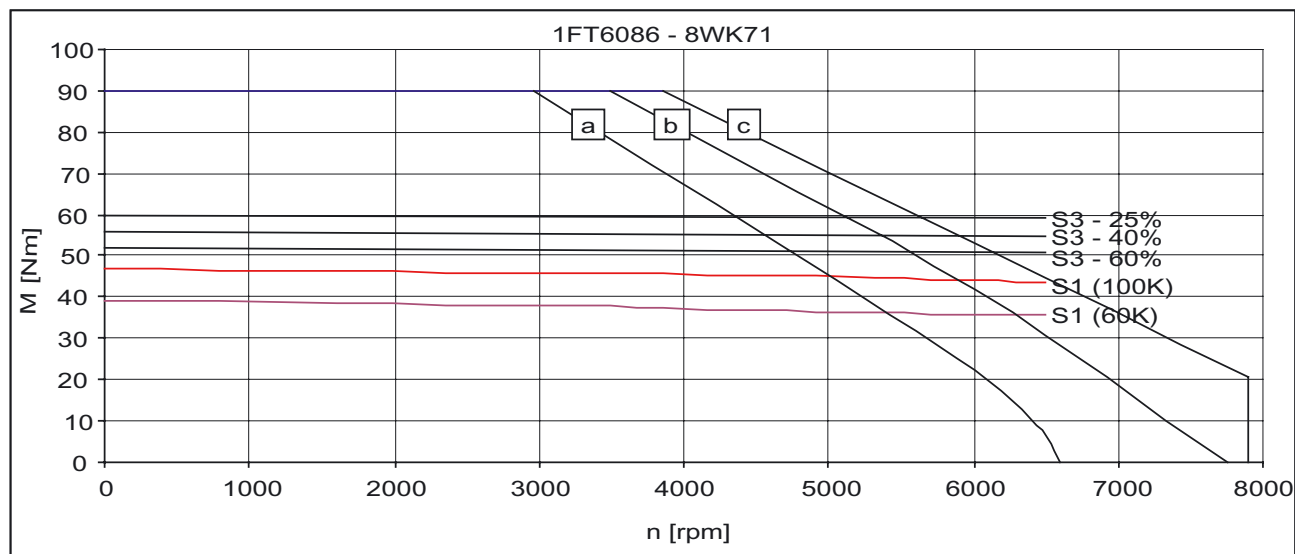


Fig. 3-89 Speed-torque diagram 1FT6086-8WK71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 V_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 V_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 V_{rms}$

Speed-torque diagrams

Table 3-57 1FT6105, water cooled

1FT6105					
Technical data	Code	Units	-8WC7□	-8WF7□	
Engineering data					
Rated speed	n_N	rpm	2000	3000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\ K)}$	Nm	82	78	
Rated current (100K)	I_N	A	60	82	
Stall torque (60K)	$M_{0(60\ K)}$	Nm	70	70	
Stall torque (100K)	$M_{0(100\ K)}$	Nm	85	85	
Stall current (60K)	$I_{0(60\ K)}$	A	47	67	
Stall current (100K)	$I_{0(100\ K)}$	A	58	83	
Moment of inertia (with brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	199	199	
Moment of inertia (without brake)	J_{mot}	$10^{-4}\ \text{kgm}^2$	168	168	
Optimum operating point					
Optimum speed	n_{opt}	rpm	2000	3000	
Optimum power	P_{opt}	kW	17.2	24.5	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	5600	5600	
Maximum torque	M_{max}	Nm	140	140	
Maximum current	I_{max}	A	155	221	
Physical constants					
Torque constant	k_T	Nm/A	1.45	1.02	
Voltage constant	k_E	V/1000 rpm	99	70	
Winding resistance at 20 °C	R_{ph}	Ohm	0.098	0.048	
Rotating field inductance	L_D	mH	2.1	1.0	
Electrical time constant	T_{el}	ms	21	21	
Shaft torsional stiffness	c_t	Nm/rad	113000	113000	
Mechanical time constant	T_{mech}	ms	2.3	2.3	
Thermal time constant	T_{th}	min	1.5	1.5	
Weight with brake	m	kg	50	50	
Weight without brake	m	kg	45.5	45.5	

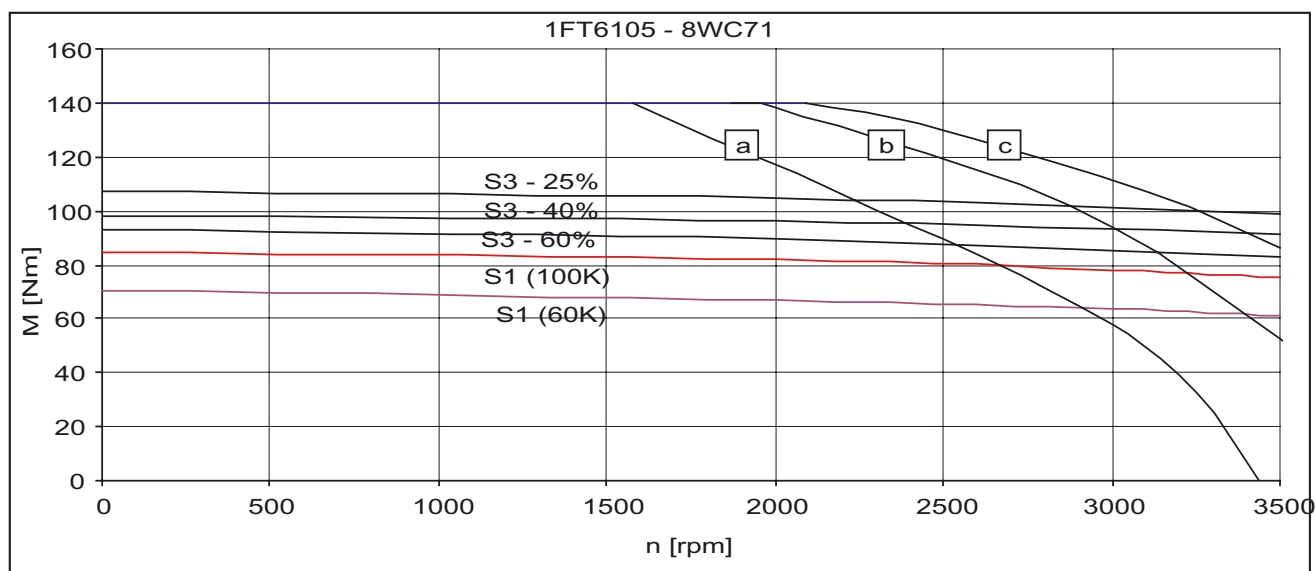


Fig. 3-90 Speed-torque diagram 1FT6105-8WC71

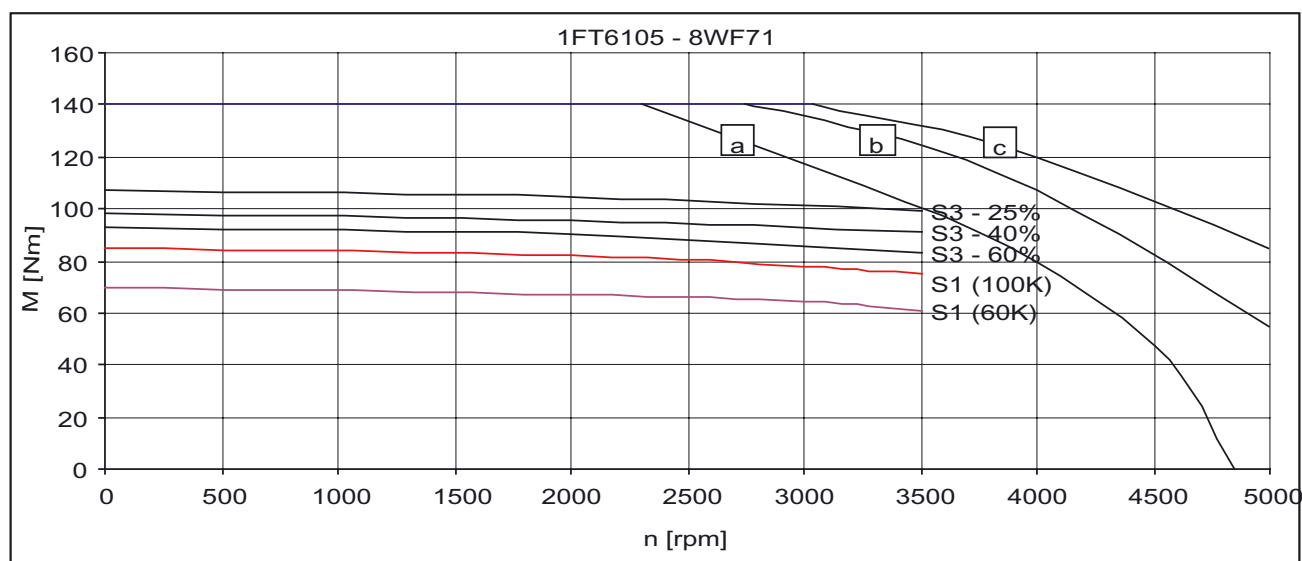


Fig. 3-91 Speed-torque diagram 1FT6105-8WF71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-58 1FT6108, water cooled

1FT6108					
Technical data	Code	Units	-8WB7	-8WC7	
Engineering data					
Rated speed	n_N	rpm	1500	2000	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	116	115	
Rated current (100K)	I_N	A	43	57	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	98	98	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	119	119	
Stall current (60K)	$I_{0(60\text{ K})}$	A	35	46	
Stall current (100K)	$I_{0(100\text{ K})}$	A	43	57	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	291	291	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	260	260	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2000	
Optimum power	P_{opt}	kW	18.2	24.1	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	5600	5600	
Maximum torque	M_{max}	Nm	220	220	
Maximum current	I_{max}	A	116	154	
Physical constants					
Torque constant	k_T	Nm/A	2.76	2.07	
Voltage constant	k_E	V/1000 rpm	185	139	
Winding resistance at 20 °C	R_{ph}	Ohm	0.19	0.11	
Rotating field inductance	L_D	mH	4.4	2.5	
Electrical time constant	T_{el}	ms	23	23	
Shaft torsional stiffness	c_t	Nm/rad	92000	92000	
Mechanical time constant	T_{mech}	ms	1.9	2.0	
Thermal time constant	T_{th}	min	1.5	1.5	
Weight with brake	m	kg	66	66	
Weight without brake	m	kg	61.5	61.5	

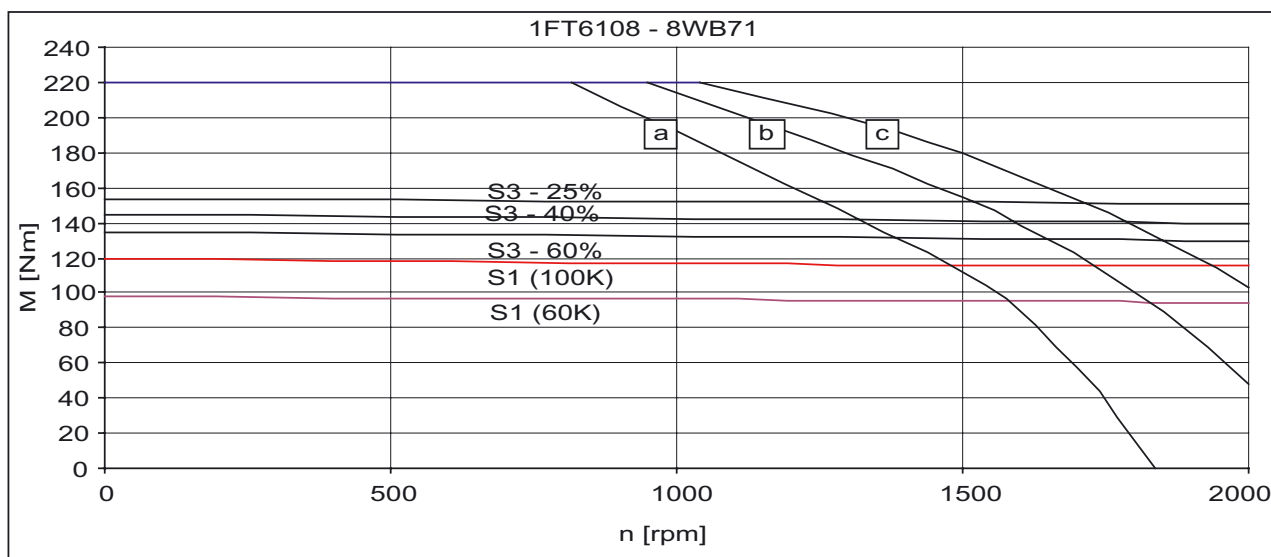


Fig. 3-92 Speed-torque diagram 1FT6108-8WB71

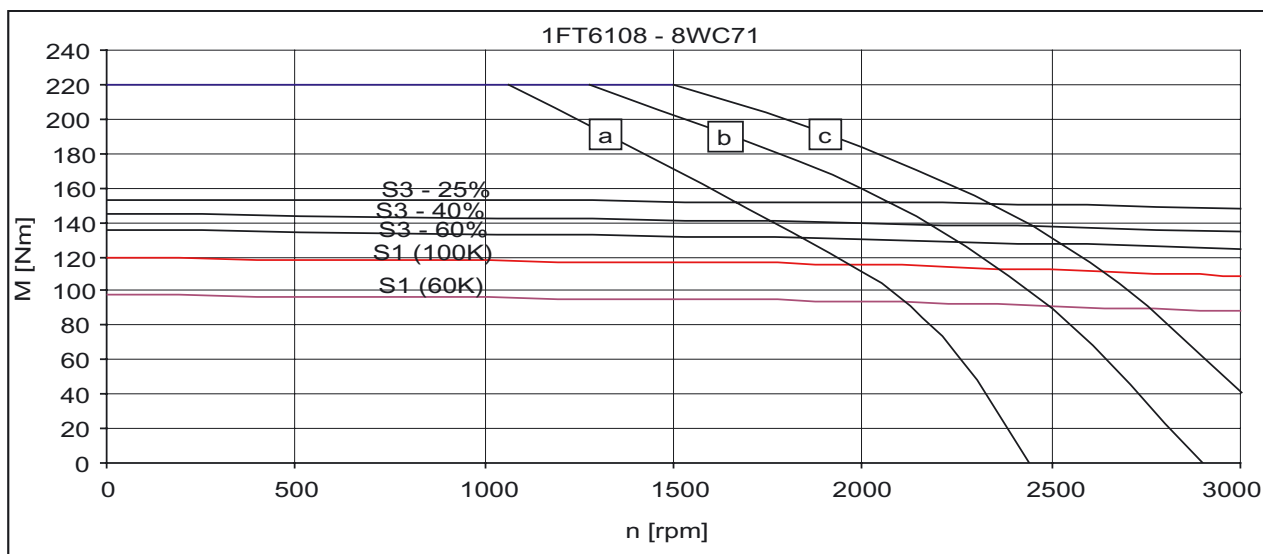


Fig. 3-93 Speed-torque diagram 1FT6108-8WC71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-60 1FT6108, water cooled

1FT6108				
Technical data	Code	Units	-8WF7□	
Engineering data				
Rated speed	n_N	rpm	3000	
Number of poles	2p		8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	109	
Rated current (100K)	I_N	A	81	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	98	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	119	
Stall current (60K)	$I_{0(60\text{ K})}$	A	70	
Stall current (100K)	$I_{0(100\text{ K})}$	A	86	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	291	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	260	
Optimum operating point				
Optimum speed	n_{opt}	rpm	3000	
Optimum power	P_{opt}	kW	34	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	5600	
Maximum torque	M_{max}	Nm	220	
Maximum current	I_{max}	A	231	
Physical constants				
Torque constant	k_T	Nm/A	1.38	
Voltage constant	k_E	V/1000 rpm	92	
Winding resistance at 20 °C	R_{ph}	Ohm	0.048	
Rotating field inductance	L_D	mH	1.1	
Electrical time constant	T_{el}	ms	23	
Shaft torsional stiffness	c_t	Nm/rad	92000	
Mechanical time constant	T_{mech}	ms	2.0	
Thermal time constant	T_{th}	min	1.5	
Weight with brake	m	kg	66	
Weight without brake	m	kg	61.5	

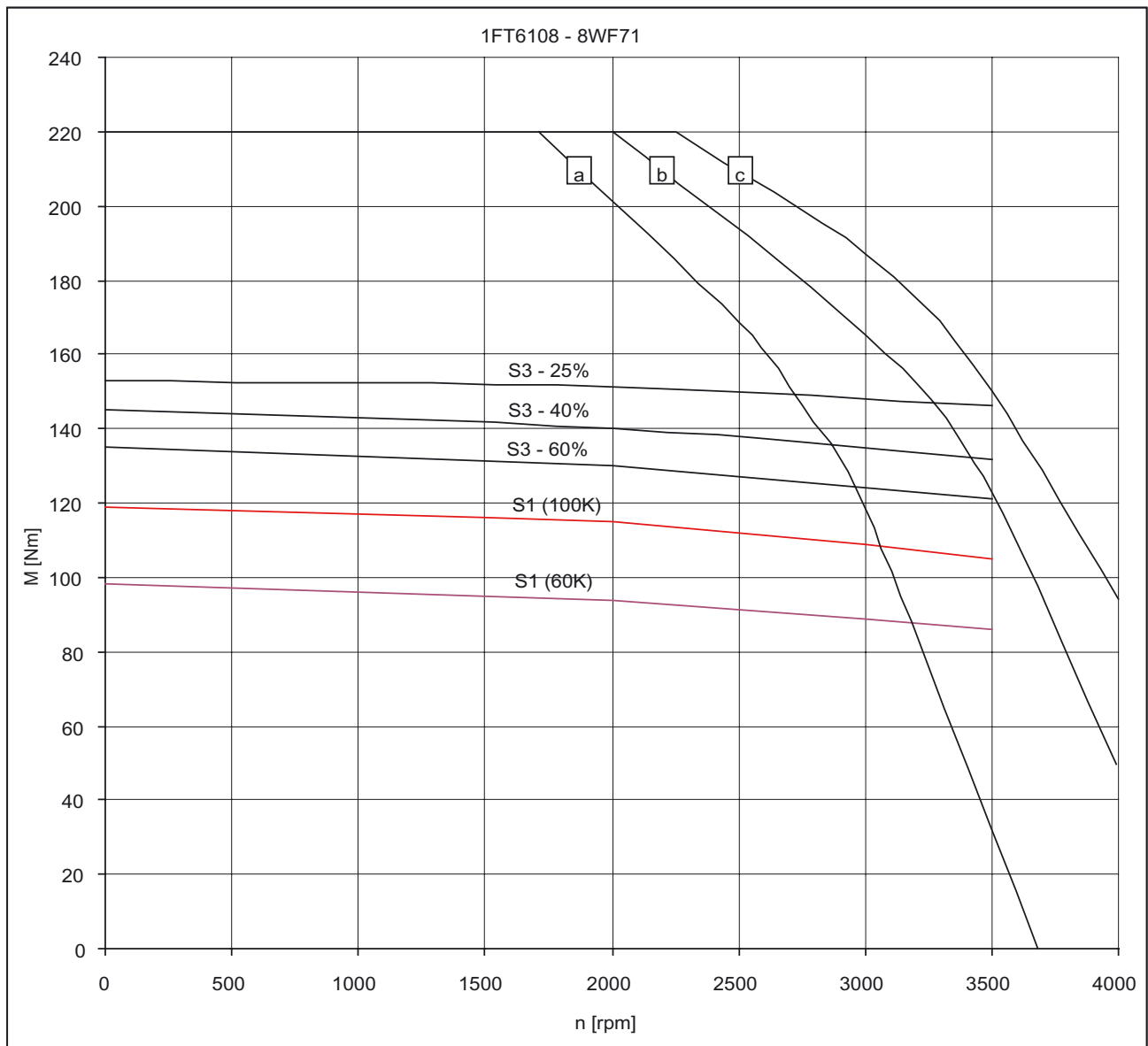


Fig. 3-94 Speed-torque diagram 1FT6108-8WF71

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-61 1FT6132, water cooled

1FT6132					
Technical data	Code	Units	-6WB7□	-6WD7□	
Engineering data					
Rated speed	n_N	rpm	1500 ¹⁾	2500 ¹⁾	
Number of poles	2p		6	6	
Rated torque (100 K)	$M_{N(100 K)}$	Nm	150 ¹⁾	135 ¹⁾	
Rated current (100K)	I_N	A	58 ¹⁾	82 ¹⁾	
Stall torque (60K)	$M_{0(60 K)}$	Nm	120	120	
Stall torque (100K)	$M_{0(100 K)}$	Nm	155	155	
Stall current (60K)	$I_{0(60 K)}$	A	45	71	
Stall current (100K)	$I_{0(100 K)}$	A	58	92	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	—	—	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	430	430	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2500	
Optimum power	P_{opt}	kW	23.6	35.3	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	3600	3600	
Maximum torque	M_{max}	Nm	250	250	
Maximum current	I_{max}	A	125	197 ²⁾	
Physical constants					
Torque constant	k_T	Nm/A	2.67	1.68	
Voltage constant	k_E	V/1000 rpm	177	112	
Winding resistance at 20 °C	R_{ph}	Ohm	0.15	0.057	
Rotating field inductance	L_D	mH	4.5	1.8	
Electrical time constant	T_{el}	ms	30	32	
Shaft torsional stiffness	c_t	Nm/rad	262300	262300	
Mechanical time constant	T_{mech}	ms	2.7	2.6	
Thermal time constant	T_{th}	min	6	6	
Weight with brake	m	kg	—	—	
Weight without brake	m	kg	90	90	

1) Rated point only valid for MASTERDRIVES MC (AFE) or SIMODRIVE 611

2) Observe the maximum drive converter current

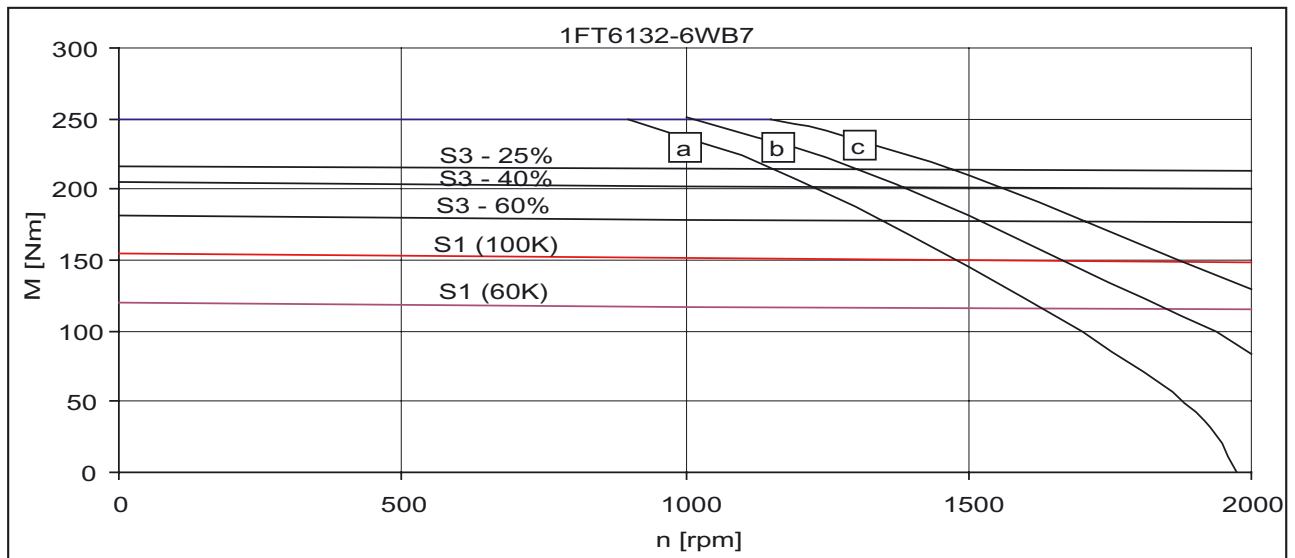


Fig. 3-95 Speed-torque diagram 1FT6132-6WB7□

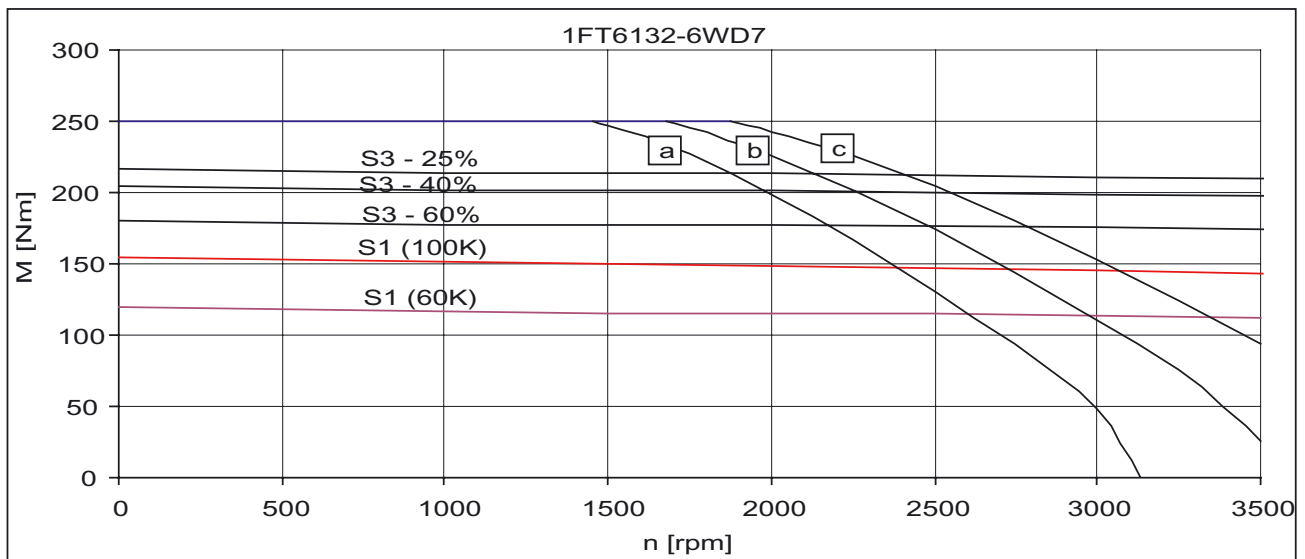


Fig. 3-96 Speed-torque diagram 1FT6132-6WD7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-62 1FT6134, water cooled

1FT6134					
Technical data	Code	Units	-6WB7□	-6WD7□	
Engineering data					
Rated speed	n_N	rpm	1500 ¹⁾	2500 ¹⁾	
Number of poles	2p		6	6	
Rated torque (100 K)	$M_{N(100 K)}$	Nm	185 ¹⁾	185 ¹⁾	
Rated current (100K)	I_N	A	67 ¹⁾	115 ¹⁾	
Stall torque (60K)	$M_{0(60 K)}$	Nm	155	155	
Stall torque (100K)	$M_{0(100 K)}$	Nm	200	200	
Stall current (60K)	$I_{0(60 K)}$	A	57	95	
Stall current (100K)	$I_{0(100 K)}$	A	73	122	
Moment of inertia (with brake)	J_{mot}	10 ⁻⁴ kgm ²	—	—	
Moment of inertia (without brake)	J_{mot}	10 ⁻⁴ kgm ²	547	547	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2500	
Optimum power	P_{opt}	kW	29	48.4	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	3600	3600	
Maximum torque	M_{max}	Nm	320	320	
Maximum current	I_{max}	A	158	263 ²⁾	
Physical constants					
Torque constant	k_T	Nm/A	2.74	1.64	
Voltage constant	k_E	V/1000 rpm	180	108	
Winding resistance at 20 °C	R_{ph}	Ohm	0.105	0.038	
Rotating field inductance	L_D	mH	3.6	1.3	
Electrical time constant	T_{el}	ms	34	34	
Shaft torsional stiffness	c_t	Nm/rad	237500	237500	
Mechanical time constant	T_{mech}	ms	2.3	2.3	
Thermal time constant	T_{th}	min	6	6	
Weight with brake	m	kg	—	—	
Weight without brake	m	kg	103	103	

1) Rated point only valid for MASTERDRIVES MC (AFE) or SIMODRIVE 611

2) Observe the maximum drive converter current

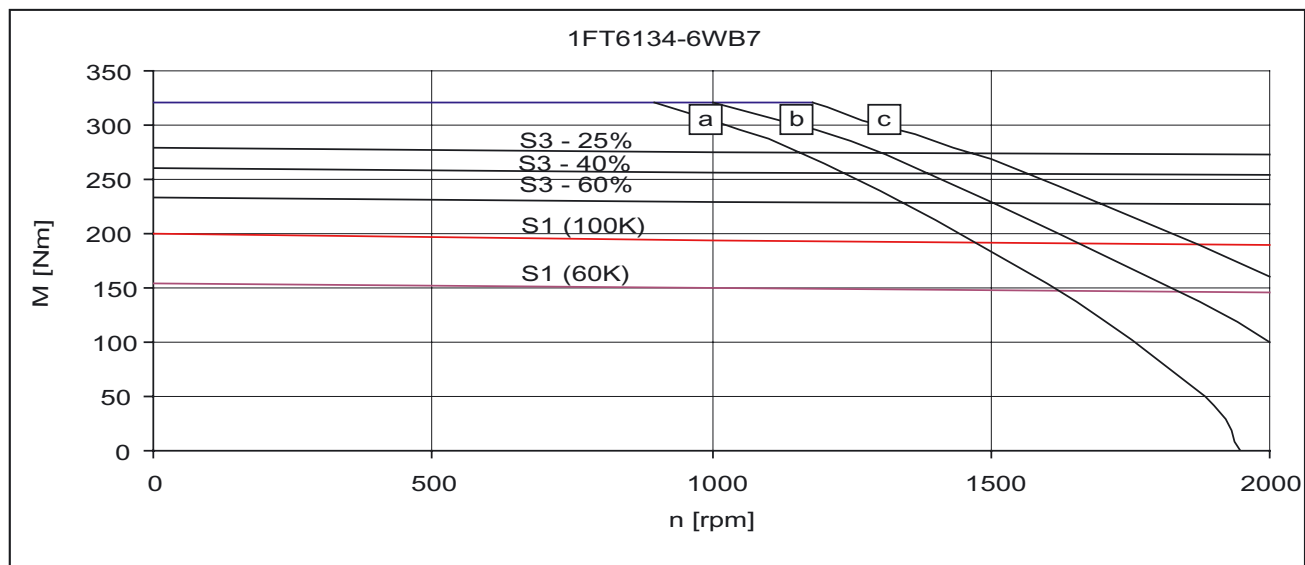


Fig. 3-97 Speed-torque diagram 1FT6134-6WB7□

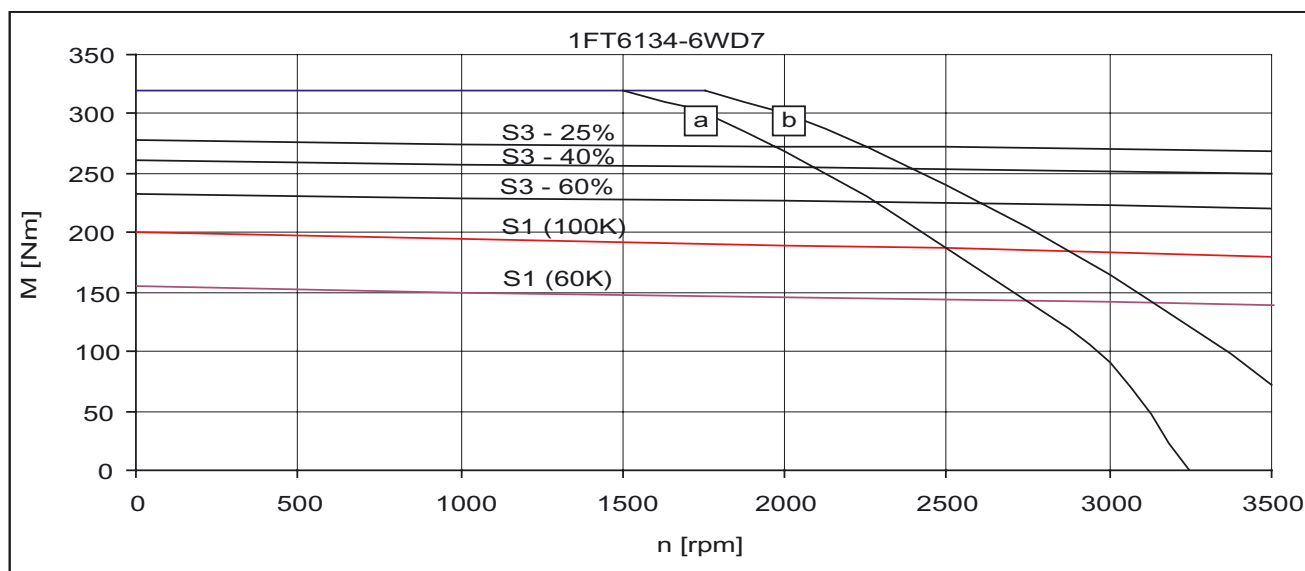


Fig. 3-98 Speed-torque diagram 1FT6134-6WD7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-63 1FT6136, water cooled

1FT6136					
Technical data	Code	Units	-6WB7□	-6WD7□	
Engineering data					
Rated speed	n_N	rpm	1500	2500	
Number of poles	2p		6	6	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	230	220	
Rated current (100K)	I_N	A	90	149 ¹⁾	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	200	200	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	240	240	
Stall current (60K)	$I_{0(60\text{ K})}$	A	75	129	
Stall current (100K)	$I_{0(100\text{ K})}$	A	92	158	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	—	—	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	664	664	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2500	
Optimum power	P_{opt}	kW	36.1	57.6	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	3600	3600	
Maximum torque	M_{max}	Nm	390	390	
Maximum current	I_{max}	A	198	339	
Physical constants					
Torque constant	k_T	Nm/A	2.61	1.52	
Voltage constant	k_E	V/1000 rpm	176	103	
Winding resistance at 20 °C	R_{ph}	Ohm	0.077	0.026	
Rotating field inductance	L_D	mH	2.8	0.95	
Electrical time constant	T_{el}	ms	36	37	
Shaft torsional stiffness	c_t	Nm/rad	217000	217000	
Mechanical time constant	T_{mech}	ms	2.3	2.2	
Thermal time constant	T_{th}	min	6	6	
Weight with brake	m	kg	—	—	
Weight without brake	m	kg	120	120	

1) Rated point only valid for MASTERDRIVES MC

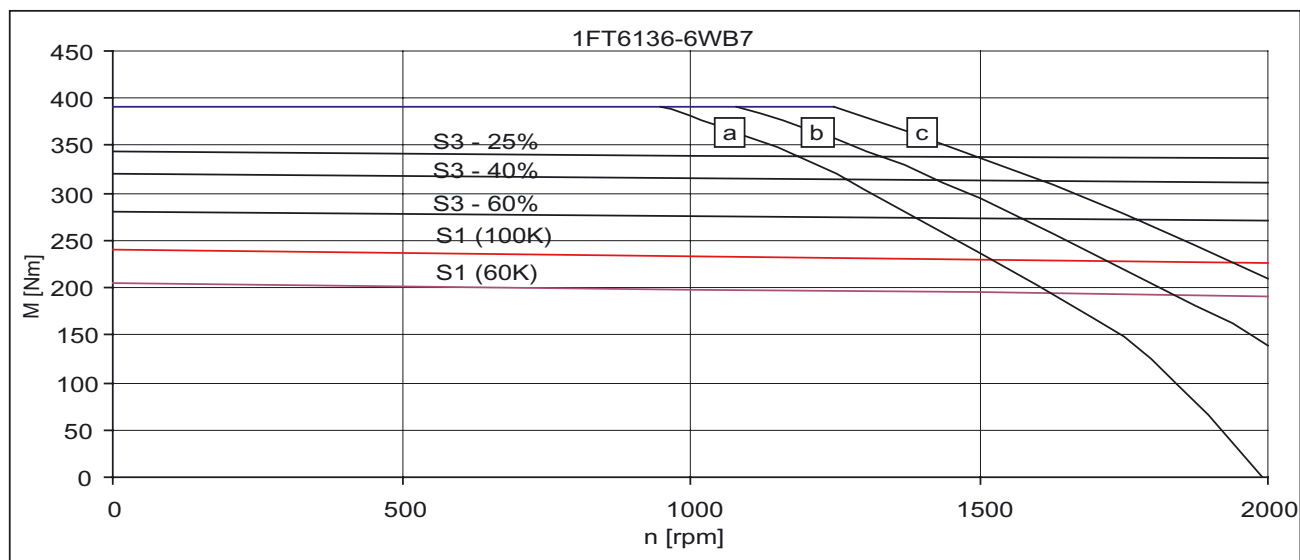


Fig. 3-99 Speed-torque diagram 1FT6136-6WB7□

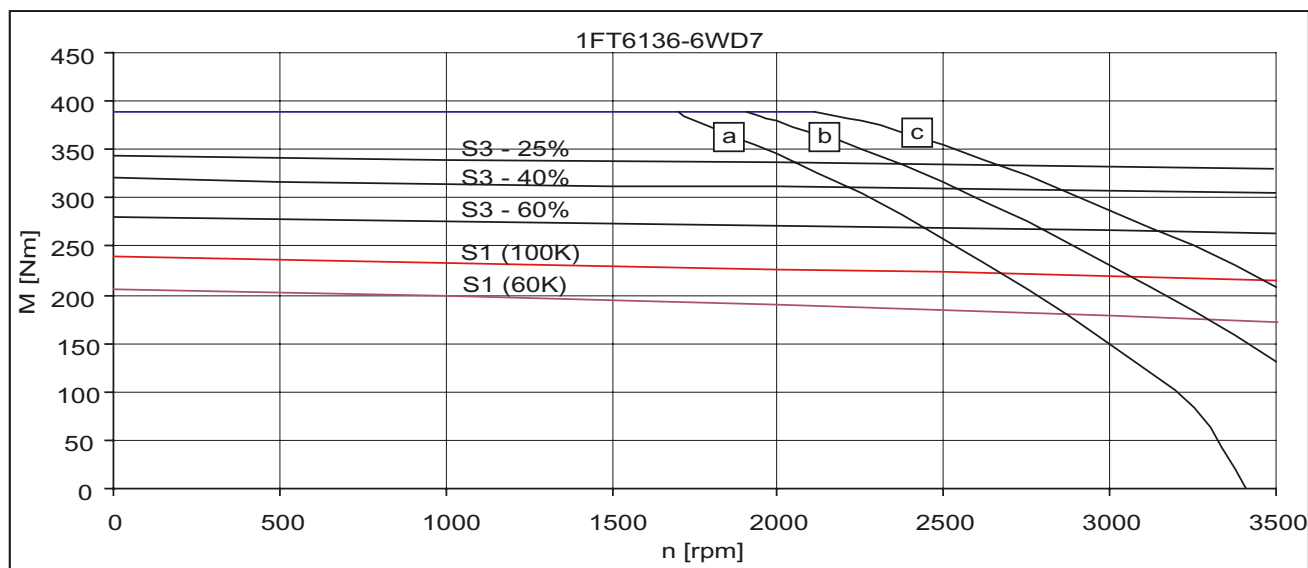


Fig. 3-100 Speed-torque diagram 1FT6136-6WD7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] SIMODRIVE 611 (UE), $V_{DC \text{ link}} = 540 \text{ V (DC)}$ and MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-64 1FT6138, water cooled

1FT6138					
Technical data	Code	Units	-6WB7□	-6WD7□	
Engineering data					
Rated speed	n_N	rpm	1500	2500 ¹⁾	
Number of poles	2p		6	6	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	290	275 ¹⁾	
Rated current (100K)	I_N	A	112	162 ^{1) 2)}	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	232	232	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	300	300	
Stall current (60K)	$I_{0(60\text{ K})}$	A	87	129	
Stall current (100K)	$I_{0(100\text{ K})}$	A	112	167	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	—	—	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	845	845	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2500 ¹⁾	
Optimum power	P_{opt}	kW	45.5	72 ¹⁾	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	3600	3600	
Maximum torque	M_{max}	Nm	500	500	
Maximum current	I_{max}	A	263 ²⁾	395 ²⁾	
Physical constants					
Torque constant	k_T	Nm/A	2.68	1.80	
Voltage constant	k_E	V/1000 rpm	168	112	
Winding resistance at 20 °C	R_{ph}	Ohm	0.052	0.023	
Rotating field inductance	L_D	mH	2	0.87	
Electrical time constant	T_{el}	ms	38	38	
Shaft torsional stiffness	c_t	Nm/rad	192000	192000	
Mechanical time constant	T_{mech}	ms	1.8	1.8	
Thermal time constant	T_{th}	min	6	6	
Weight with brake	m	kg	—	—	
Weight without brake	m	kg	137	137	

1) Rated point only valid for MASTERDRIVES MC

2) Observe the maximum and rated current of the drive converter

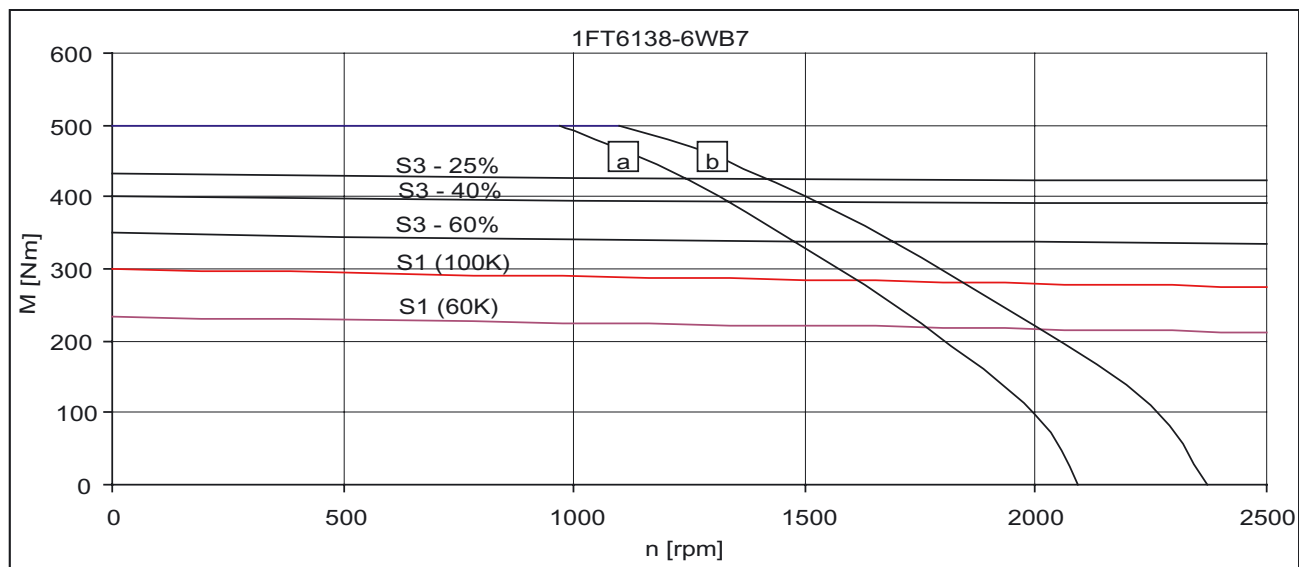


Fig. 3-101 Speed-torque diagram 1FT6138-6WB7□

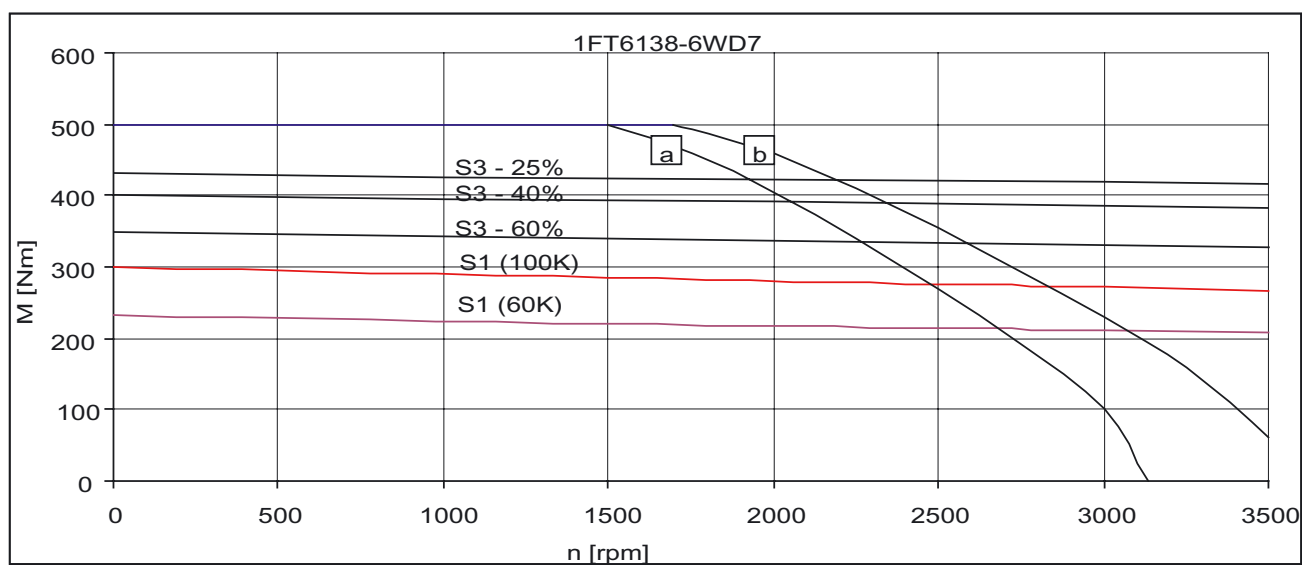


Fig. 3-102 Speed-torque diagram 1FT6138-6WD7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 \text{ V}_{rms}$
- [c] SIMODRIVE 611 (ER), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{Mot} = 425 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-65 1FT6163, water cooled

1FT6163					
Technical data	Code	Units	-8WB7□	-8WD7□	
Engineering data					
Rated speed	n_N	rpm	1500	2500 ¹⁾	
Number of poles	2p		8	8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	450 ¹⁾	450 ¹⁾	
Rated current (100K)	I_N	A	160	240 ¹⁾	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	430	430	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	450	450	
Stall current (60K)	$I_{0(60\text{ K})}$	A	150	224	
Stall current (100K)	$I_{0(100\text{ K})}$	A	160	240	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	—	—	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	2300	2300	
Optimum operating point					
Optimum speed	n_{opt}	rpm	1500	2500 ¹⁾	
Optimum power	P_{opt}	kW	71	118 ¹⁾	
Limiting data					
Max. permissible speed (mech.)	n_{max}	rpm	3100	3100	
Maximum torque	M_{max}	Nm	900	900	
Maximum current	I_{max}	A	372	558	
Physical constants					
Torque constant	k_T	Nm/A	2.81	1.88	
Voltage constant	k_E	V/1000 rpm	186	124	
Winding resistance at 20 °C	R_{ph}	Ohm	0.026	0.012	
Rotating field inductance	L_D	mH	0.81	0.36	
Electrical time constant	T_{el}	ms	31	30	
Shaft torsional stiffness	c_t	Nm/rad	472000	472000	
Mechanical time constant	T_{mech}	ms	2.3	2.4	
Thermal time constant	T_{th}	min	8	8	
Weight with brake	m	kg	—	—	
Weight without brake	m	kg	170	170	

1) Rated point only valid for MASTERDRIVES MC (AFE)

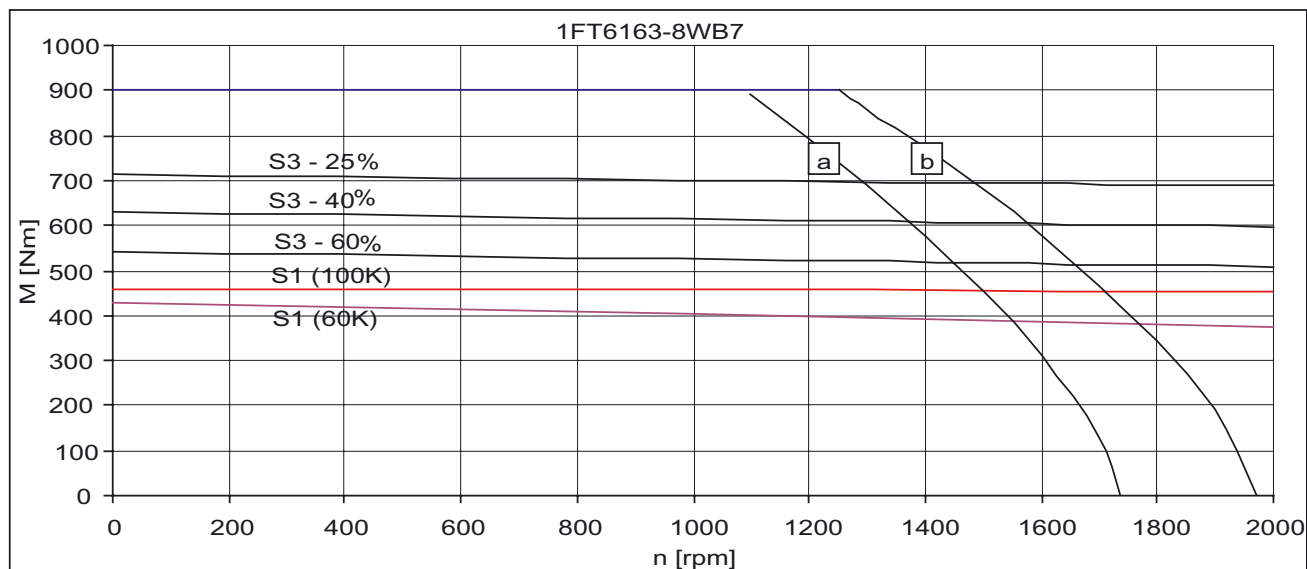


Fig. 3-103 Speed-torque diagram 1FT6163-8WB7□

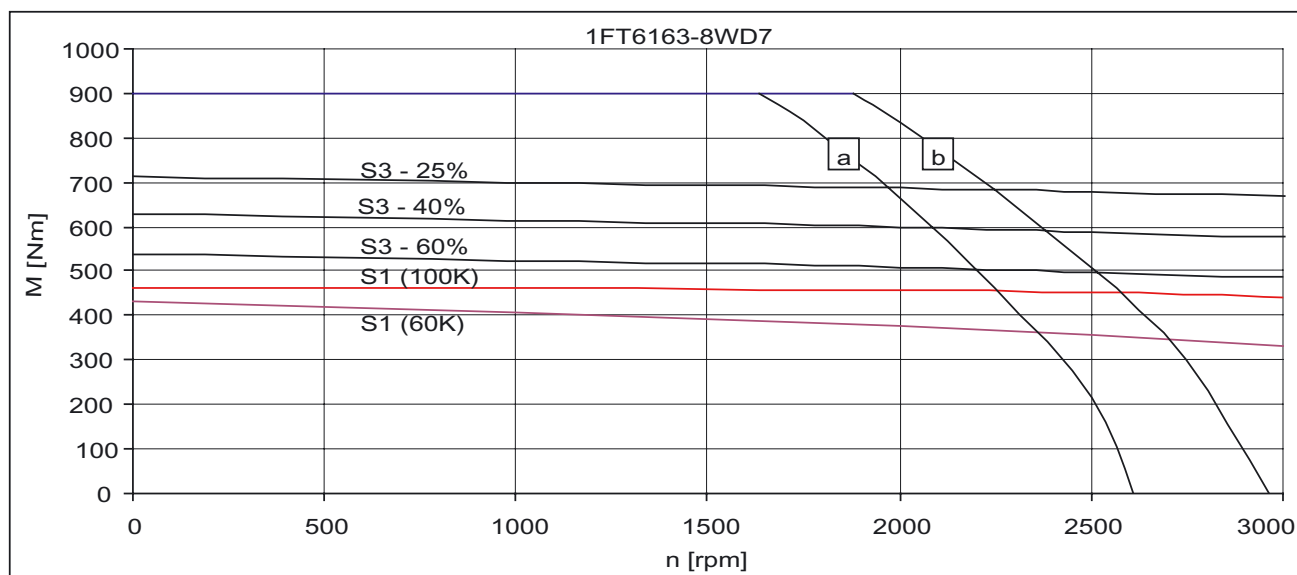


Fig. 3-104 Speed-torque diagram 1FT6163-8WD7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540 \text{ V (DC)}$, $V_{Mot} = 340 \text{ V}_{rms}$
- [b] MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600 \text{ V (DC)}$, $V_{mot} = 380 \text{ V}_{rms}$

Speed-torque diagrams

Table 3-66 1FT6168, water cooled

1FT6168				
Technical data	Code	Units	-8WB7□	
Engineering data				
Rated speed	n_N	rpm	1500 ¹⁾	
Number of poles	2p		8	
Rated torque (100 K)	$M_{N(100\text{ K})}$	Nm	690 ¹⁾	
Rated current (100K)	I_N	A	221 ¹⁾	
Stall torque (60K)	$M_{0(60\text{ K})}$	Nm	600	
Stall torque (100K)	$M_{0(100\text{ K})}$	Nm	700	
Stall current (60K)	$I_{0(60\text{ K})}$	A	193	
Stall current (100K)	$I_{0(100\text{ K})}$	A	225	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm^2	—	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	3100	
Optimum operating point				
Optimum speed	n_{opt}	rpm	1500 ¹⁾	
Optimum power	P_{opt}	kW	108 ¹⁾	
Limiting data				
Max. permissible speed (mech.)	n_{max}	rpm	3100	
Maximum torque	M_{max}	Nm	1200	
Maximum current	I_{max}	A	479	
Physical constants				
Torque constant	k_T	Nm/A	3.11	
Voltage constant	k_E	V/1000 rpm	203	
Winding resistance at 20 °C	R_{ph}	Ohm	0.02	
Rotating field inductance	L_D	mH	0.69	
Electrical time constant	T_{el}	ms	35	
Shaft torsional stiffness	c_t	Nm/rad	432000	
Mechanical time constant	T_{mech}	ms	1.9	
Thermal time constant	T_{th}	min	8	
Weight with brake	m	kg	—	
Weight without brake	m	kg	210	

1) Rated point only valid for MASTERDRIVES MC (AFE)

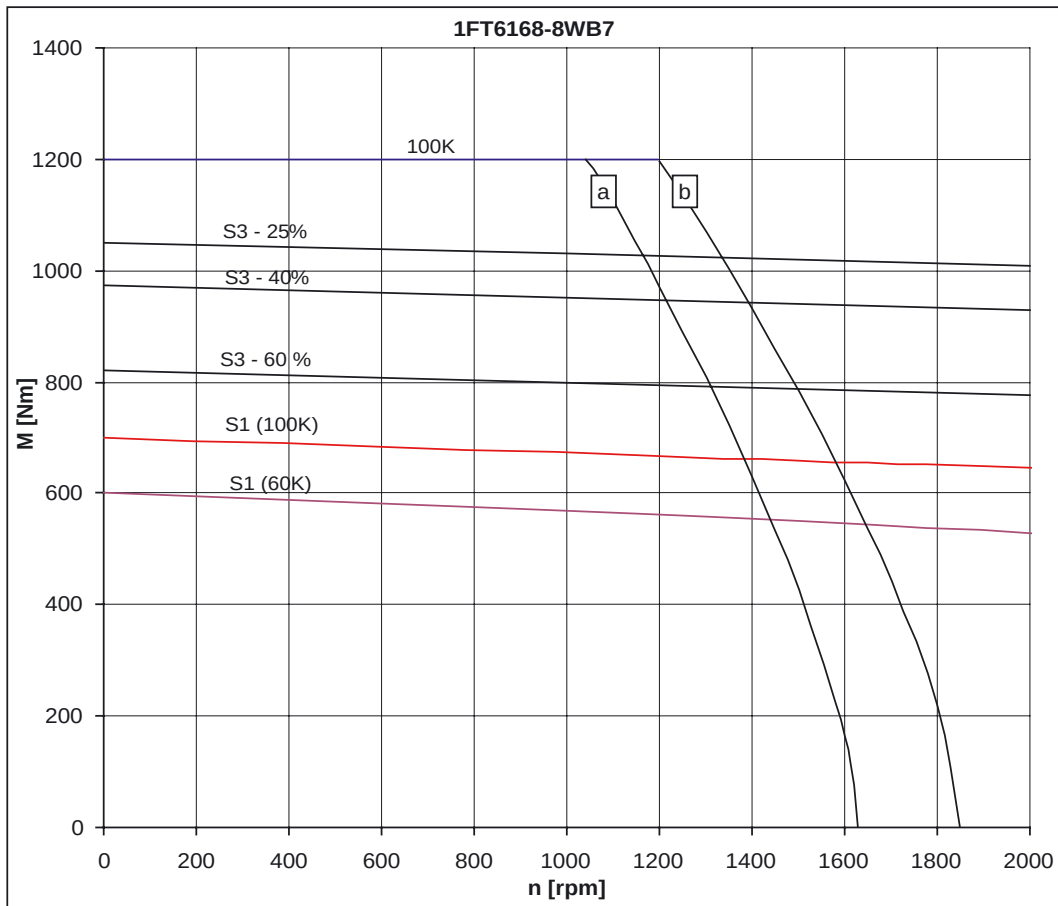


Fig. 3-105 Speed-torque diagram 1FT6168-8WB7□

- [a] MASTERDRIVES MC, $V_{DC \text{ link}} = 540$ V (DC), $V_{Mot} = 340$ V_{rms}
- [b] MASTERDRIVES MC (AFE), $V_{DC \text{ link}} = 600$ V (DC), $V_{mot} = 380$ V_{rms}

3.2 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

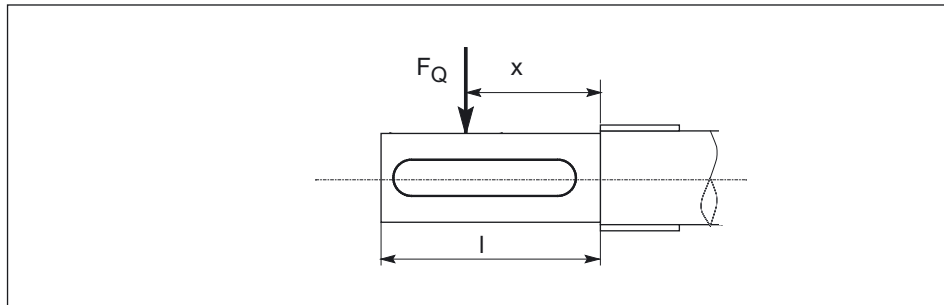


Fig. 3-106 Force application point at the drive shaft end

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 belt pre-tension force F_R

$$F_R [\text{N}] = 2 \cdot M_0 \cdot c / d_R$$

$$F_R = F_{Q\text{per}}$$

Table 3-67 Explanation of the formula abbreviations

Formula abbreviations	Units	Description
F_R	N	Belt pre-tension
M_0	Nm	Motor stall torque
c	—	Pre-tensioning factor; the pre-tensioning factor is an empirical value from the belt manufacturer. It can be assumed as follows: for toothed belts: $c = 1.5$ to 2.2 for flat belts $c = 2.2$ to 3.0
d_R	m	Effective diameter of the belt pulley

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

Cantilever force 1FT6021, 1FT6024

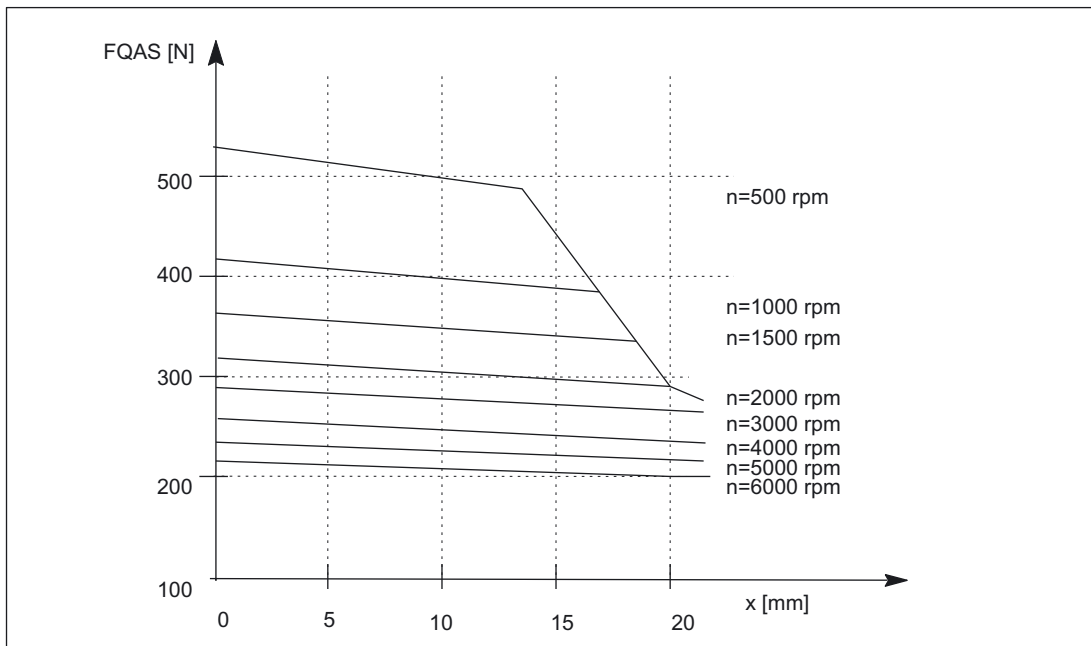


Fig. 3-107 Cantilever force F_Q at a distance x from the shaft shoulder for a steady-state bearing lifetime of 20,000 h

Cantilever force 1FT6031, 1FT6034

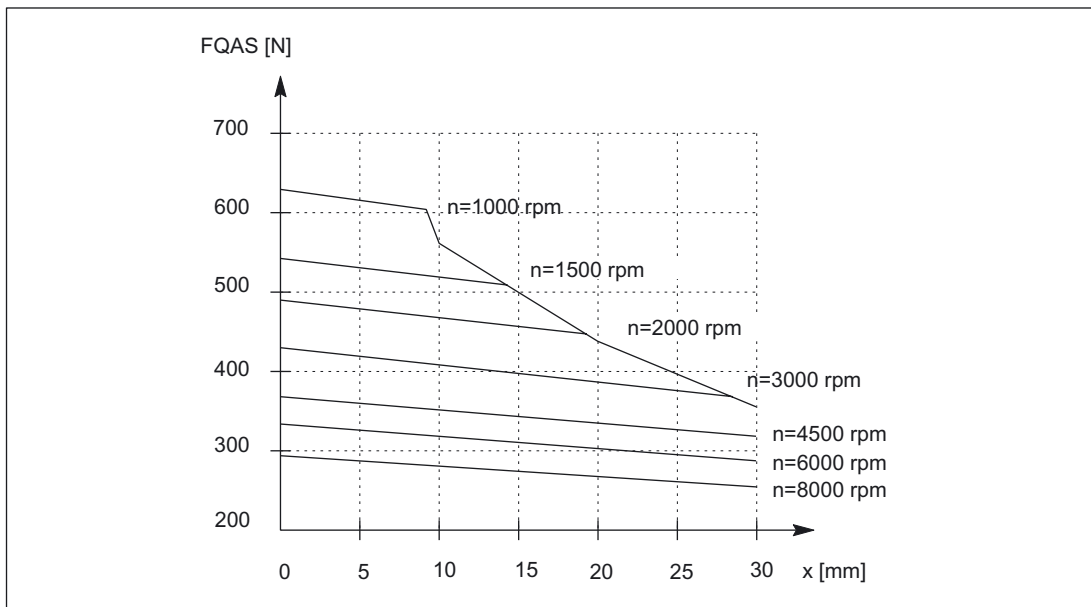


Fig. 3-108 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h

Cantilever force 1FT6041, 1FT6044

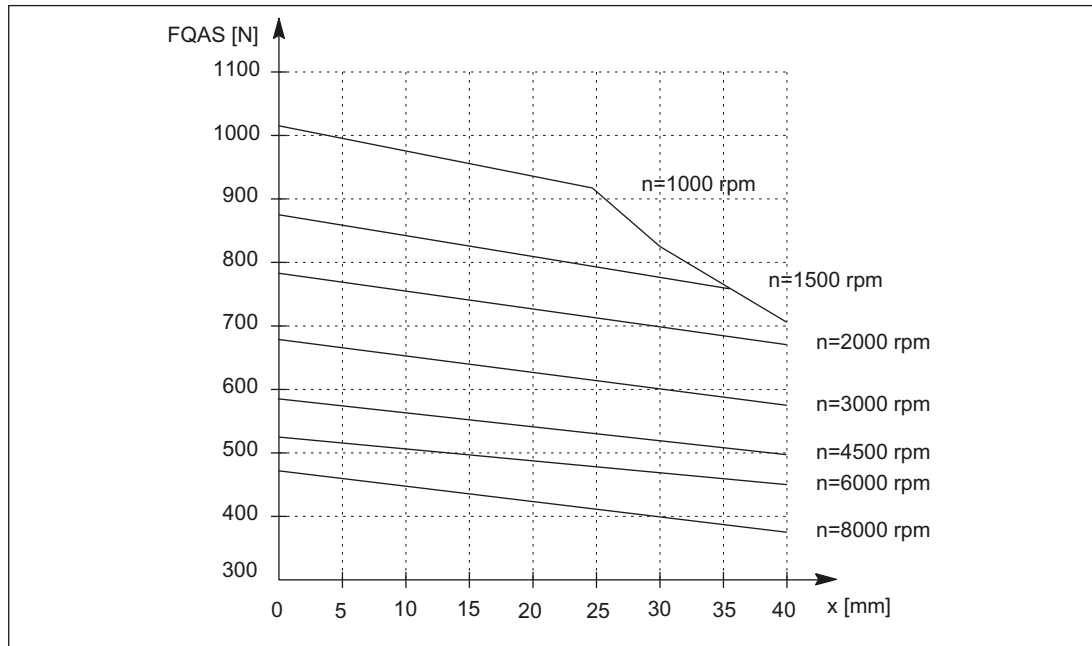


Fig. 3-109 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h

Cantilever force 1FT6061, 1FT6062, 1FT6064

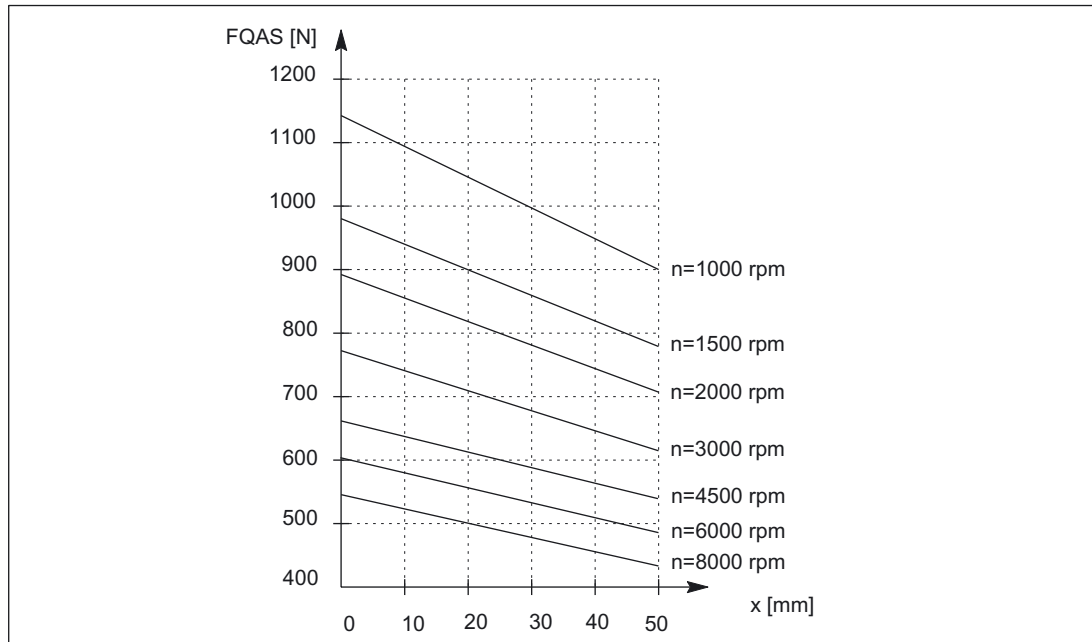


Fig. 3-110 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h

Cantilever force 1FT6081, 1FT6082, 1FT6084, 1FT6086

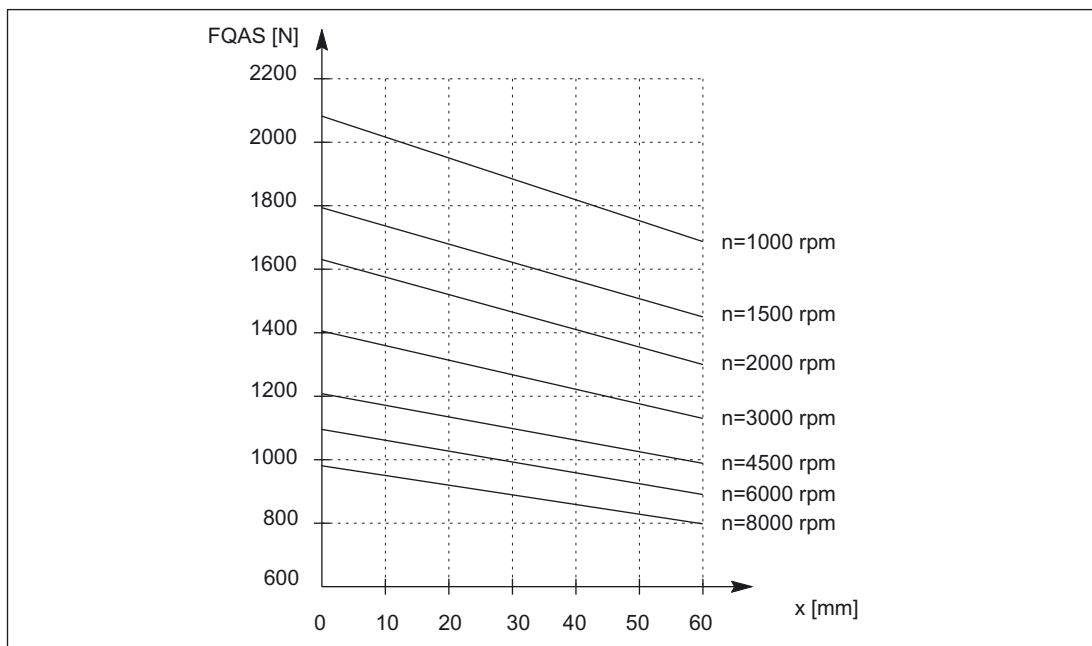


Fig. 3-111 Cantilever force FQ at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h

Cantilever force 1FT6102, 1FT6105, 1FT6108

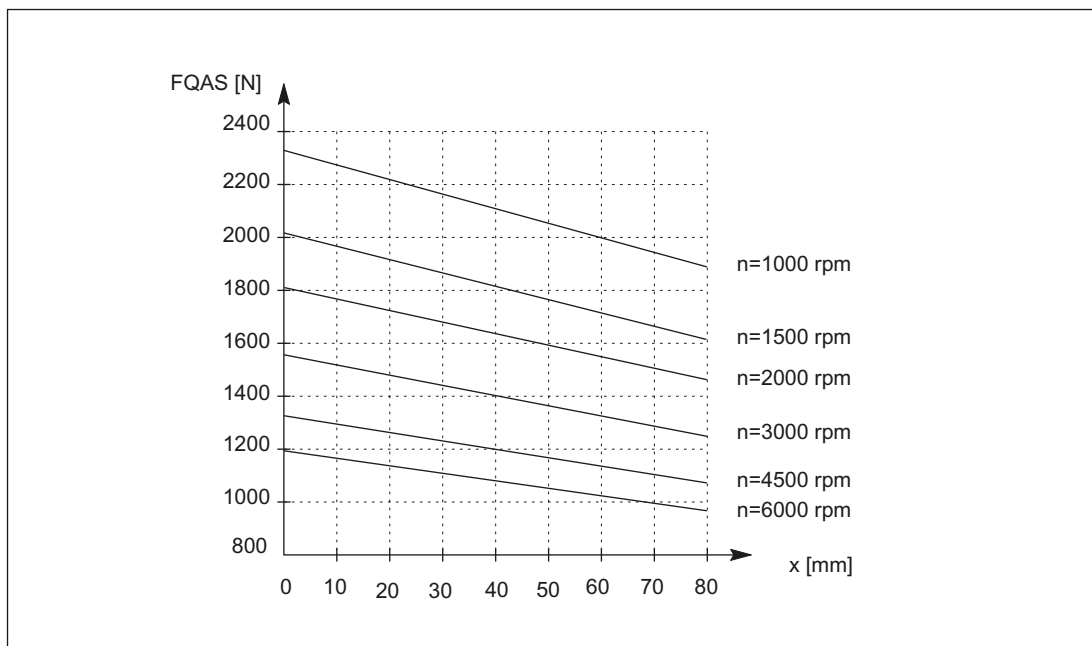


Fig. 3-112 Cantilever force FQ at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h

Cantilever force 1FT6132, 1FT6134, 1FT6136, 1FT6138

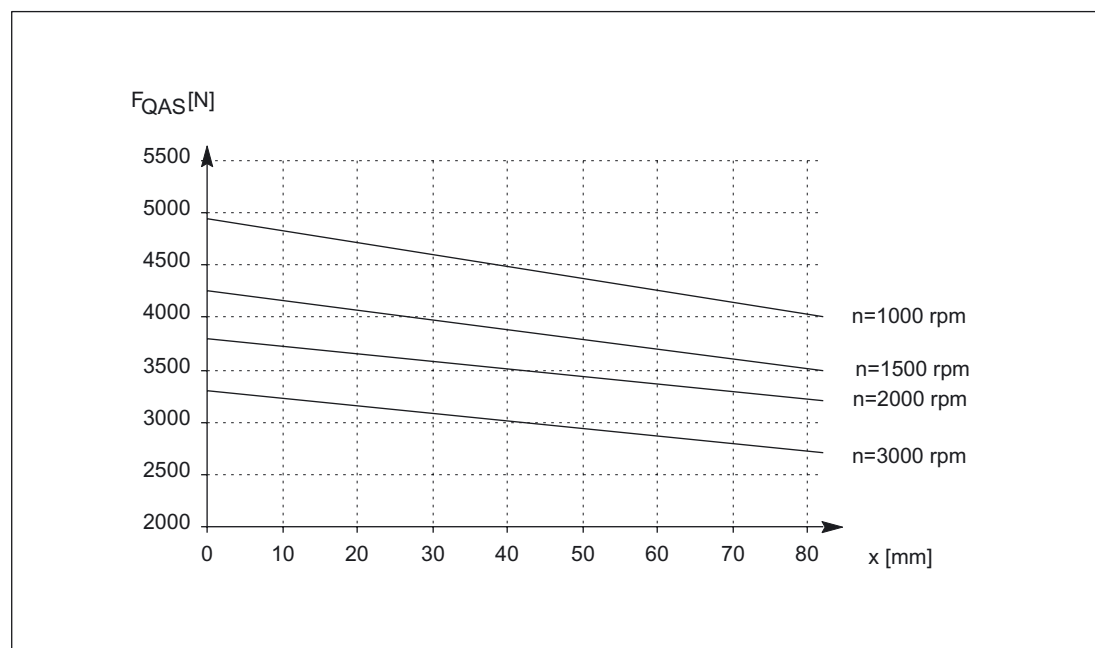


Fig. 3-113 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h

Cantilever force 1FT6163, 1FT6168

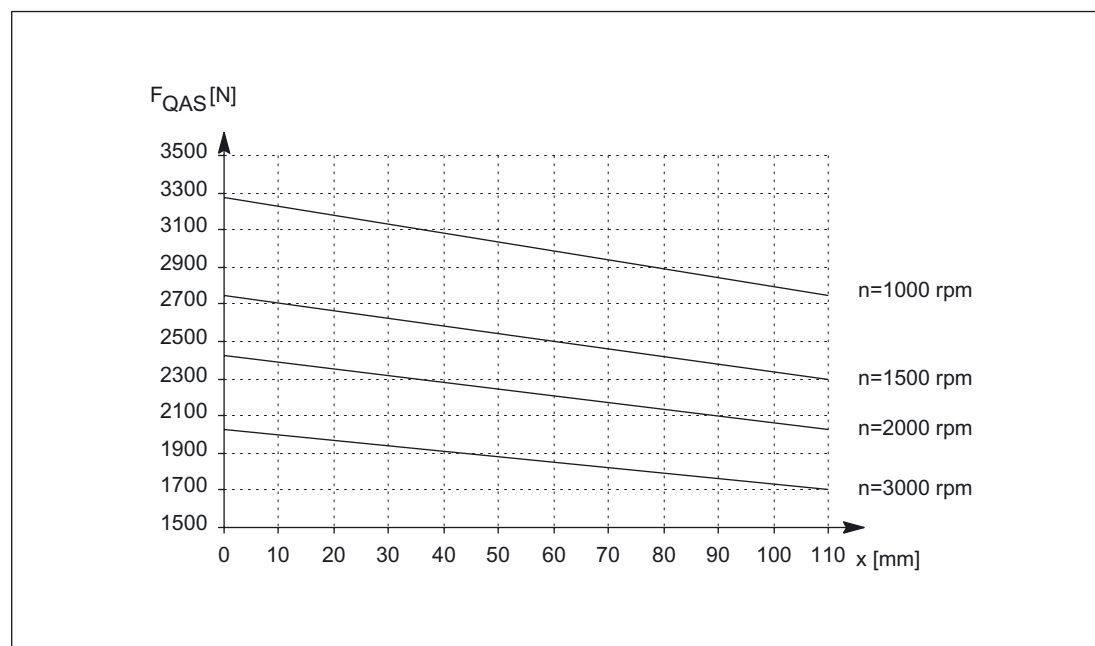


Fig. 3-114 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h

3.3 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 Output coupling

The KTR company offers the pinion wheels of its Rotex GS couplings with various shore hardnesses. The values specified in Table correspond to pinion wheels recommended by KTR with a Shore hardness of 98 or 95 Sh A GS.

They must be optimally harmonized with the mounted mechanical system. A coupling pre-selection is provided in Table. Please contact the coupling manufacturer for detailed design information. Ordering address, refer to the Configuration Manual "General Section" or Internet www.ktr.com.

Table 4-1 Assignment of the output couplings to the motors

Shaft height of the 1FT6 motor	d_w [mm] ¹⁾	Rotex GS Size	98 Sh A GS		TR [Nm] ⁴⁾
			TKN [Nm] ²⁾	TKmax [Nm] ³⁾	
1FT602	9	9	5	10	2,6
1FT603	14	14	12,5	25	8,1
1FT6041	19	19	17	34	32
1FT6044	19	24	60	120	39
1FT606x-6A	24	24	60	120	43
1FT6062-6W	24	24	60	120	43
1FT6064-6W	24	28	60	120	91
1FT608x-8A	32	28	160	320	102
1FT608x-8S	32	28	160	320	102
1FT6084-8W	32	28	160	320	102
1FT6086-8W	32	38	325	650	113
1FT6102..5	38	38	325	650	122
1FT6108	38	42	450	900	—
1FT613x-6A	48	42	450	900	—
1FT613x-6S	48	42	450	900	—
1FT6132..4-6W	48	48	525	1050	—
1FT6136..8-6W	48	55	685	1370	—
1FT6163	55	65	940 ⁵⁾	1880 ⁵⁾	—
1FT6168	55	75	1920 ⁵⁾	3840 ⁵⁾	—

1) d_w = diameter, motor shaft end

2) T_{KN} = rated coupling torque

3) T_{Kmax} = maximum coupling torque

4) T_R = friction-locked torque (torque that can be transmitted using a clamping hub at d_w)

5) Values for 95 Sh A GS



Warning

The accelerating torque may not exceed the friction-locked torque of the coupling!

Notice

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

4.2 Holding brake (option)

For a description of the function, refer to the Configuration Manual "General Section for Synchronous Motors".

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 4-2 Technical data of the holding brakes used for 1FT6 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]
1FT602□	EBD 0.11 B	1	0.3	20	10	9
1FT603□	EBD 0.15 B	2	0.4	30	15	27
1FT604□	EBD 0.4 BA	5	0.8	50	20	125
1FT606□	EBD 1.5 B	15	0.8	130	30	320
1FT6081	EBD 1.2 B	15	0.8	150	35	750
1FT6082	EBD 1.2 B	15	0.8	150	35	750
1FT6084	EBD 3.5 BN	28	0.9	180	35	1600
1FT6086	EBD 3.5 BN	28	0.9	180	35	1600
1FT610□	EBD 4 B	70	1.4	220	50	2100
1FT613□ ²⁾	EBD 8 B	140	1.7	300	90	9800

1) Standardized acc. to VDE 0580 with varistor circuit

2) Not for water cooling

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 ventilation or water cooling, the brake holding torque can be less than the motor stall torque.



Caution

For several motor versions (air cooling and water cooling) the brake holding torque is less than the rated motor torque.

4.3 Thermal motor protection

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

Table 4-3 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 height 28 to 48 to $2 \cdot I_{0\ 60\ K}$ and speed $\neq 0$

from shaft height 63 up to $4 \cdot I_{0\ 60\ K}$ and speed $\neq 0$

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.

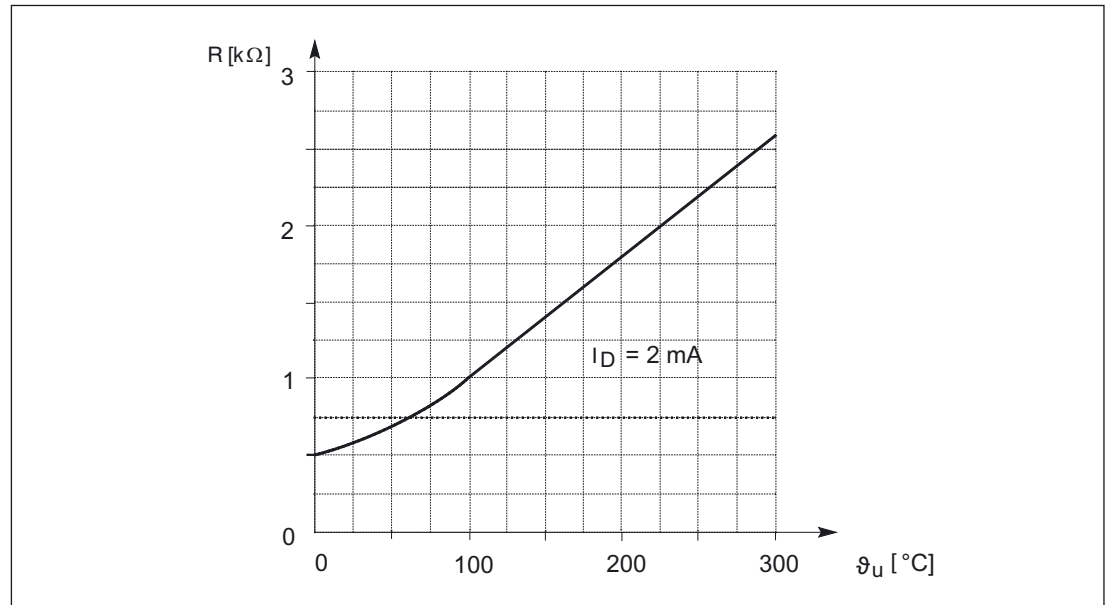


Fig. 4-1

Resistance characteristic of the KTY 84 as a function of the temperature

4.4 Encoder

4.4.1 Encoder overview

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

Table 4-4 Overview of the encoders used

Motor types	Incremental encoders sin/cos 1 Vpp (for low shaft heights) (I-2048)	Incremental encoders sin/cos 1 Vpp (I-2048)	Absolute encoder EnDat (A-2048)	Absolute encoder EnDat (A-512)	Resolver 2-pole or multi-pole
Order No. (MLFB) 14th position	A	A	E	H	S, T
1FT6 02□	X			X	X
1FT6 03□		X	X		X
1FT6 04□		X	X		X
1FT6 06□		X	X		X
1FT6 08□		X	X		X
1FT6 10□		X	X		X
1FT6 13□		X	X		X
1FT6 16□		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.

4.4.2 Incremental encoder

Function:

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

Table 4-5 Technical data, sin/cos 1Vpp incremental encoder

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

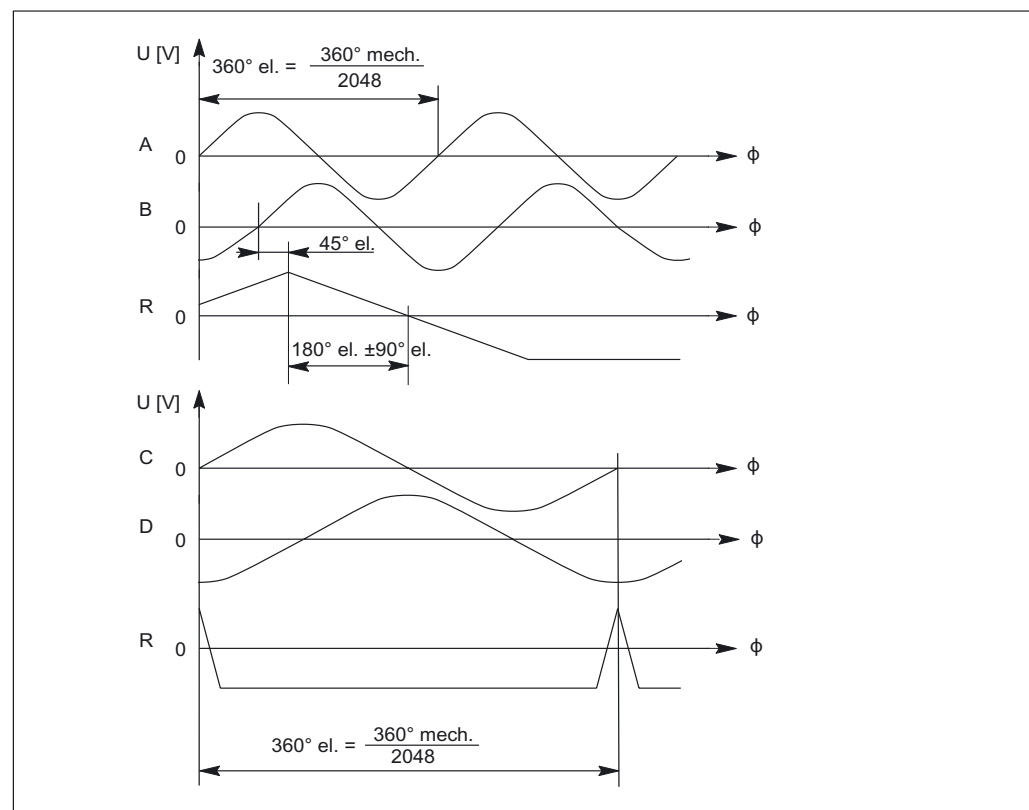
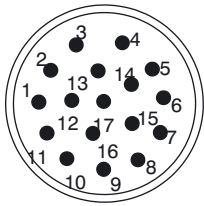


Fig. 4-2 Signal sequence and assignment for a positive direction of rotation

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

Table 4-6 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 4-7 Prefabricated cable

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

4.4.3 Resolver

Notice

The max. operating frequency of 432 Hz must be observed with SIMODRIVE 611 universal.
Encoder frequency = 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 4-8 Technical data, resolvers

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

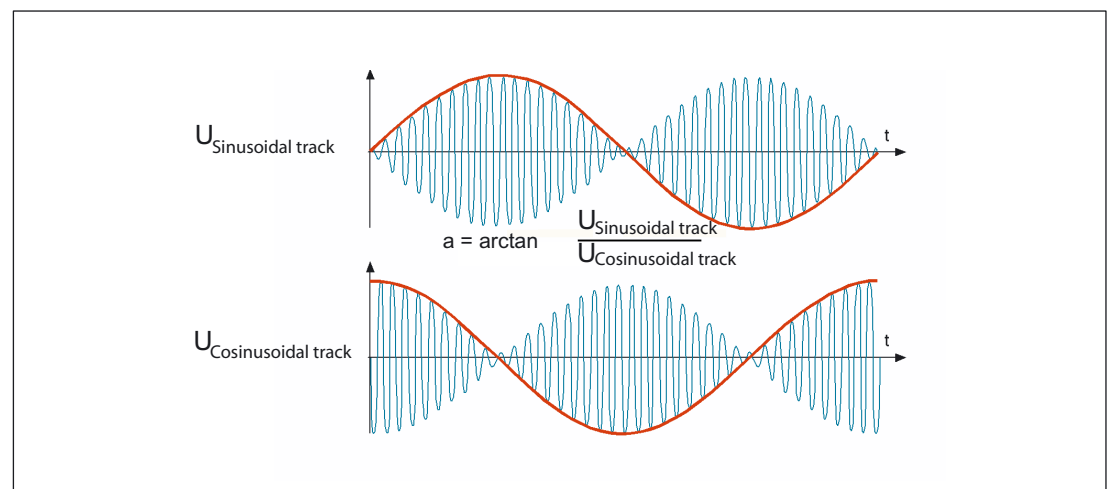
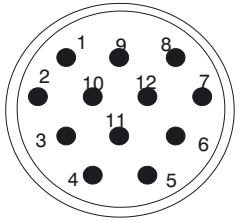


Fig. 4-3 Resolver output signals

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

Table 4-9 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 4-10 Prefabricated cable

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

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

4.4.4 Absolute encoder

Function:

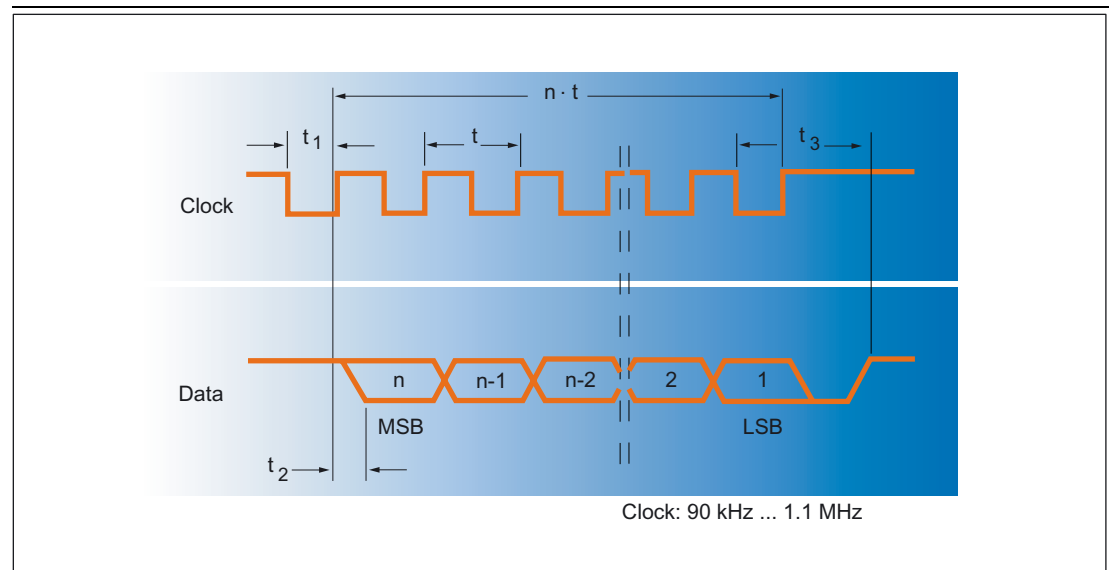
- Angular measuring system to impress current
- Speed actual value sensing
- Absolute measuring system for the position control loop

Table 4-11 Technical data, absolute encoder

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

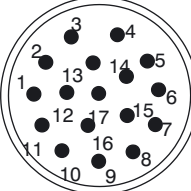
Note

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%.



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

Table 4-12 Connection assignment, 17-pin flange-mounted socket

PIN No.	Signal	
1	A+	 When viewing the plug-in side (pins)
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 4-13 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: 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"

Planetary Gearbox

5.1 Selecting/dimension gearboxes and important quantities

5.1.1 Overview

- If the gearbox oil is in contact with the motor flange, then a minimum IP67 degree of protection 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 play, torsional stiffness, radial and axial forces.
 - Worm gearboxes are only conditionally suitable for reversing operation for servo applications

5.1.2 Dimensioning for S3 duty for natural cooling

When dimensioning, you can use the motor characteristic without reduction. Please note the permissible maximum torque and the permissible gearbox input speed.

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

The motor and gearbox are assigned as follows:

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

$M_{\text{max, gear}}$	Max. permissible torque output
$M_{0(100K)}$	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 (f_2) 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.

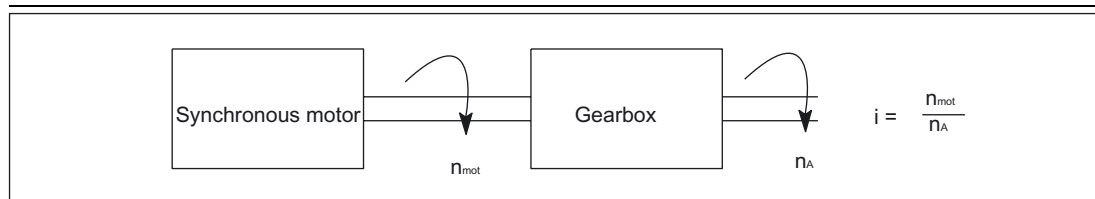


Fig. 5-1 Dimensioning the gearbox

The load torque and the required traversing velocity define the gearbox drive-out torque, the drive-out speed and therefore the drive-out 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	$\pi/3$ 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 $R_{ph.}$ (list)
M_{out}	Gearbox drive-out torque [Nm]
i	Gearbox ratio ($i > 1$)
η_G	Gearbox efficiency
P_{mot}	Motor power [W]
P_{out}	Gearbox drive-out power [W]
M_{mot}	Motor torque [Nm]

5.1.4 Starting characteristics

When commissioning, an increased current drain can be expected due to the lubricating behavior (inadequate distribution of grease or oil) and due to the running-in behavior of the shaft sealing rings.

5.1.5 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 rpm I_{max} 51.5 A	26
4 • M_{1N} 15.5 Nm I_N 11.8 A n_{1N} 3000 rpm n_2 187 rpm	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 • gearbox 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	

Fig. 5-2 Rating plate data (example: 1FK7; 1FT6 is similar)

- | | |
|---|--|
| 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, quantity of gearbox oil ***) |
| 6) Designation, encoder type | 20) Geared motor weight m [kg] |
| 7) Designation, gearbox type | 21) Barcode |
| 8) Designation, gearbox ratio;
[exact ratio] | 22) Geared motor version |
| 9) Designation, geared motor mounting position | 23) Encoder version |
| 10) Standards and regulations | 24) Rated torque output, gearbox output M_{2N} [Nm]
(duty type) *) |
| 11) Stall current I_0 [A] | 25) Output speed n_2 [RPM] Gearbox output **) |
| 12) Rated motor current I_N [A] | 26) Max. current I_{max} [A] |
| 13) Induced voltage V_{iN} [V] | 27) Order options |
| 14) Maximum speed n_{1max} [RPM] of the motor
(gearbox drive) | 28) SIEMENS motor type/designation |
| *) $M_{2N} = f(M_{1N})$ | **) $n_{1N} \leq n_{1max} \Rightarrow \left[n_2 = \frac{n_{1N}}{i} \right]$ |
| ***) Only for gearbox types SP 210 and SP 240 and
helical/angled gearboxes | $n_{1N} > n_{1max} \Rightarrow \left[n_2 = \frac{n_{1max}}{i} \right]$ |

5.2 Series SP+

5.2.1 Features

5.2.1.1 Overview

1FT6 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. In the case of high operating frequencies, an allowance of f_2 must be taken into account.

The frictional losses of the gearbox must always be taken into account in planning.

The gearboxes are only available in non-balanced design.

5.2.1.2 Benefits

- High efficiency: $> 97\%$ single-stage
 $> 94\%$ 2-stage
- Minimum torsional backlash: ≤ 4 arcmin single-stage
 ≤ 6 arcmin 2-stage
- Power transmission from the central sun wheel to planetary wheels.
- No shaft deflections in the planetary wheel 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 gearbox exactly coaxial with the motor.
- The gearboxes are sealed (seal between the gearbox and motor) and filled with oil at the factory. They are lubricated for life and sealed. Gearboxes of frame sizes SP060S to SP180S are suitable for all mounting positions.
- For gearboxes, sizes SP210 and SP240 the quantity of oil in the gearbox depends on the mounting position. The mounting position has to be specified when ordering.
- Gearbox degree of protection IP65 (IP64 for frame sizes SP210 and SP240).
- Small dimensions.
- Low weight.

5.2.1.3 Integration

1FT602 and 1FT613 naturally-cooled motors can be supplied ex factory (SIEMENS) complete with flange-mounted planetary gearbox.

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).

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

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.).

1FT6 synchronous motors should be selected as follows:

- With plain motor shaft end
- Radial eccentricity tolerance N
- Vibration severity grade N
- IP65 degree of protection (for 1FT602: IP64)

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

Motor Natural cooling	Planetary gearbox 1-stage			Available gearbox ratio $i =$				Max. perm. motorspeed S3-60%	Max. perm. output torque S3-60%	Max. perm. radial output- shaft load ³⁾	Max. perm. axial outputshaft load ³⁾
Type	Type	Tor- sional back- lash arcmin	Gear unit 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}) 10^{-4} kgm^2
1FT6021 1FT6024 1FT6031 1FT6034	SP 060S-MF1	= 4	1.9	– ✓ ✓ ✓	– ✓ ✓ ✓	– ✓ ✓ ✓	✓ ✓ ✓ –	6000	40 (32 for $i = 10$)	2700	2400
1FT6034 1FT6041 1FT6044	SP 075S-MF1	= 4	3.9	– ✓ ✓	– ✓ ✓	– ✓ ✓	✓ ✓ ✓	6000	110 (90 for $i = 10$)	4000	3350
1FT6061 1FT6062 1FT6064	SP 100S-MF1	= 3	7.7	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	4500	300 (225 for $i = 10$)	6300	5650
1FT6081 1FT6082 1FT6084 1FT6086	SP 140S-MF1	= 3	17.2	✓ ✓ ✓ ✓	✓ ✓ ✓ ✓	✓ ✓ ✓ ✓	✓ ✓ ✓ –	4000	600 (480 for $i = 10$)	9450	9870
1FT6086 1FT6102 1FT6105 1FT6108	SP 180S-MF1	= 3	34	– ✓ ✓ ✓	– ✓ ✓ ✓	– ✓ ✓ ✓	✓ ✓ – –	3500	1100 (880 for $i = 10$)	14700	14150
1FT6105 1FT6108 1FT6132 1FT6134 1FT6136	SP 210-MF1 ²⁾	= 4	53	– – ✓ ✓ ✓	– – ✓ ✓ ✓	– – ✓ ✓ ✓	✓ ✓ – – –	2500	1900 (1520 for $i = 10$)	18000	22500
1FT6134 1FT6136	SP 240-MF1 ²⁾	= 4	80	– –	– –	– –	✓ ✓	2200	2720	27000	27800

Order codes

- Gearbox shaft with key
- Gearbox shaft without key

J02 J03 J05 J09
J22 J23 J25 J29

Ordering data

1FT6...-A.71-.. 1-Z

J ■ ■

G
H

Order No. of the motor with identifier "-Z" and
order code for mounting the planetary gearbox assigned to the motor
Prerequisite when mounting planetary gearboxes:
Plain motor shaft end/radial eccentricity tolerance N and vibration severity grade N/IP65
degree of protection ¹⁾

1) IP64 degree of protection with 1FT602.: 1FT602..-6AK71-.. 0-Z J..

G
H

2) For these versions, the quantity of oil in the gearbox 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.71-.. 1-Z J.. + M1 ■

G
H

H mounting position IM V1
G mounting position IM V3

3) Referred to the center of the drive shaft.

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

Planetary gearbox with 1FT6 motor, natural cooling										
Single-stage Type	Gear ratio	Motor speed Output torque		Gearbox moments of inertia (referred to the drive)						
		Continuous duty S1 ¹⁾		1FT602.	1FT603.	1FT604.	1FT606.	1FT608.	1FT610.	1FT613.
		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	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	–	0.69	0.94	–	–	–	–
	5	2900	75	–	0.58	0.83	–	–	–	–
	7	3100	75	–	0.48	0.73	–	–	–	–
	10	3100	52	–	0.42	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	45.08	–
	5	1500	750	–	–	–	–	36.37	36.37	–
	7	2300	750	–	–	–	–	28.57	28.57	–
	10	2300	750	–	–	–	–	24.40	24.40	–
SP 210-MF1	4	1200	1000	–	–	–	–	–	75.80	75.80
	5	1200	1000	–	–	–	–	–	63.50	63.50
	7	1700	1000	–	–	–	–	–	52.90	52.90
	10	1700	1000	–	–	–	–	–	47.10	47.10
SP 240-MF1	4	1000	1700	–	–	–	–	–	–	146.30
	5	1000	1700	–	–	–	–	–	–	119.90
	7	1500	1700	–	–	–	–	–	–	96.40
	10	1500	1700	–	–	–	–	–	–	83.10

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).

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

Motor Natural cooling	Planetary gearbox 2-stage			Available gearbox ratio $i =$					Max. perm. motor- speed S3-60%	Max. perm. output torque S3-60%	Max. perm. radial output load ³⁾	Max. perm. axial output- shaft load ³⁾
	Type	Tor- sional back- arcmin	Gear unit weight approx. kg	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
1FT6021 1FT6024	SP 060S-MF2	= 6	2	✓	✓	✓	✓	✓	6000	40	2700	2400
1FT6031				✓	✓	✓	—	—				
1FT6024 1FT6031 1FT6034	SP 075S-MF2	= 6	3.6	—	—	—	—	✓	6000	110	4000	3350
1FT6041				✓	✓	—	—	—				
1FT6034 1FT6041 1FT6044	SP 100S-MF2	= 5	7.9	—	—	—	✓	✓	4500	300	6300	5650
1FT6061 1FT6062 1FT6064				✓	✓	✓	✓	—				
1FT6044 1FT6061 1FT6062 1FT6064	SP 140S-MF2	= 5	17	—	—	—	✓	✓	4000	600	9450	9870
1FT6081 1FT6082 1FT6084				—	—	—	✓	✓				
1FT6081 1FT6082 1FT6084	SP 180S-MF2	= 5	36.4	—	—	—	✓	✓	4000	1100	14700	14150
1FT6102				—	—	—	✓	✓				
1FT6082 1FT6105	SP 210-MF2 ²⁾	= 6	50	—	—	—	—	✓	3500	1900	18000	22500
1FT6084 1FT6086				✓	—	—	—	—				
1FT6084 1FT6086	SP 240-MF2 ²⁾	= 6	70	—	—	—	✓	✓	3500	3400	27000	27800
1FT6102 1FT6105 1FT6108				—	—	—	✓	✓				
1FT6132 1FT6134 1FT6136				✓	✓	—	—	—				
				✓	—	—	—	—				

Order codes

- Gearbox shaft with key
- Gearbox shaft without key

J12

J13

J15

J16

J17

J32

J33

J35

J36

J37

Ordering data

1FT6...-A.71-.. 1-Z

J ■ ■

G

H

Order No. of the motor with identifier "-Z" and

order code for mounting the planetary gearbox assigned to the motor

Prerequisite when mounting planetary gearboxes:

Plain motor shaft end/radial eccentricity tolerance N and vibration severity grade N/IP65

degree of protection¹⁾

1) IP64 degree of protection with 1FT602.: 1FT602..6AK71-.. 0-Z J..

G

H

2) For these versions, the quantity of oil in the gearbox 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-.. 1-Z J.. + M1 ■

G

H

H mounting position IM V1
G mounting position IM V3

3) Referred to the center of the drive shaft.

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

Planetary gearbox with 1FT6 motor, natural cooling										
2-stage Type	Gear ratio	Motor speed	Output torque	Gearbox moments of inertia (referred to the drive)						
		Continuous duty S1 ¹⁾		1FT602.	1FT603.	1FT604.	1FT606.	1FT608.	1FT610.	1FT613.
		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	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	–	0.72	0.96	2.60	–	–	–
	20	3100	180	–	0.60	0.84	2.48	–	–	–
	28	3100	180	–	0.49	0.73	2.36	–	–	–
	40	3100	180	–	0.43	0.67	2.31	–	–	–
	50	3500	175	–	0.43	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	–	–	–	–	47.30	48.40	53.00
	20	1900	1700	–	–	–	–	43.10	44.20	48.80
	28	1900	1700	–	–	–	–	37.50	38.60	43.20
	40	2100	1700	–	–	–	–	32.40	33.60	38.10
	50	2100	1700	–	–	–	–	29.50	30.60	35.10

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).

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.

6.1 Naturally cooled 1FT6 motors

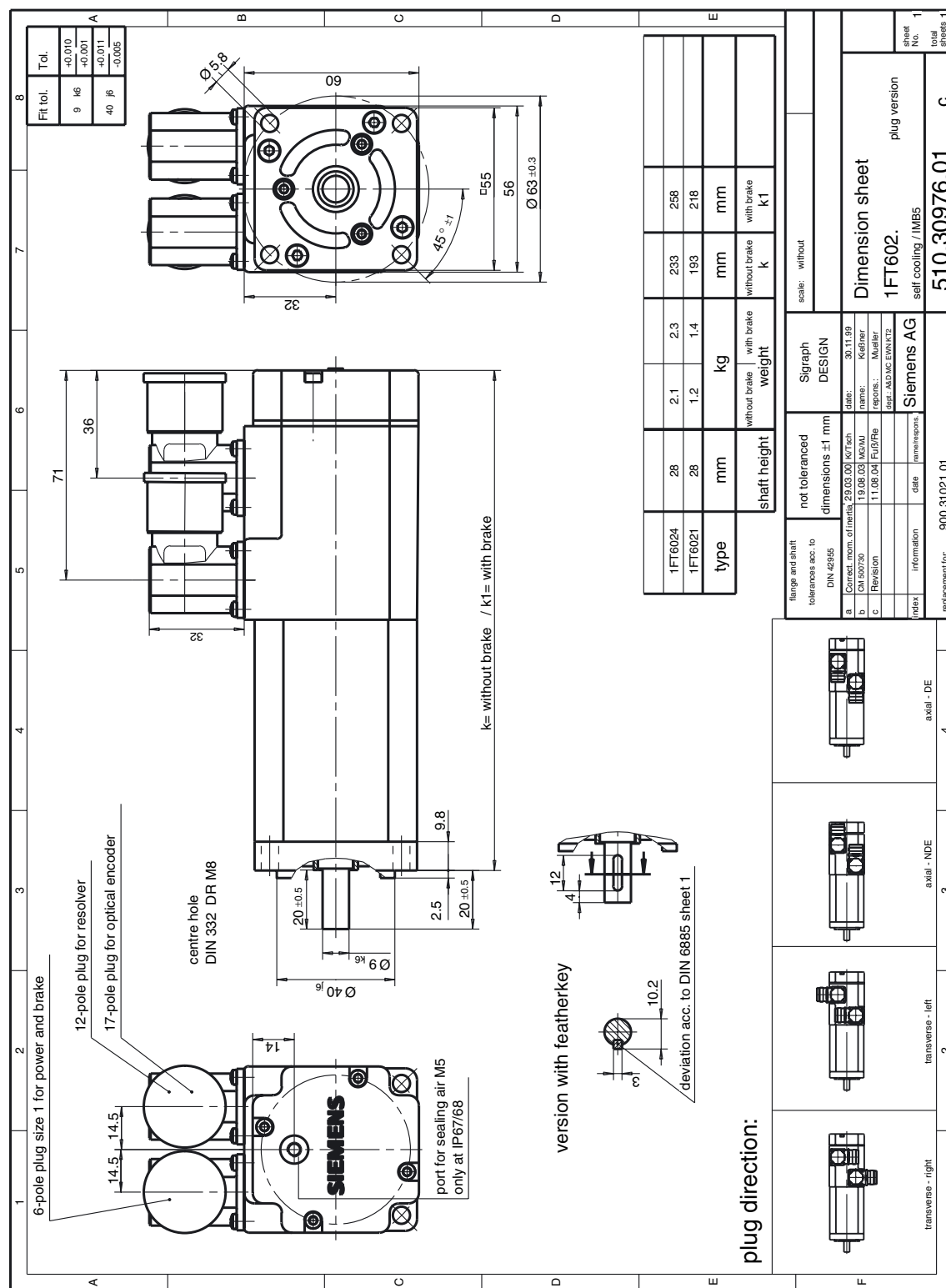


Fig. 6-1 1FT602□ naturally cooled with connector, Size 1

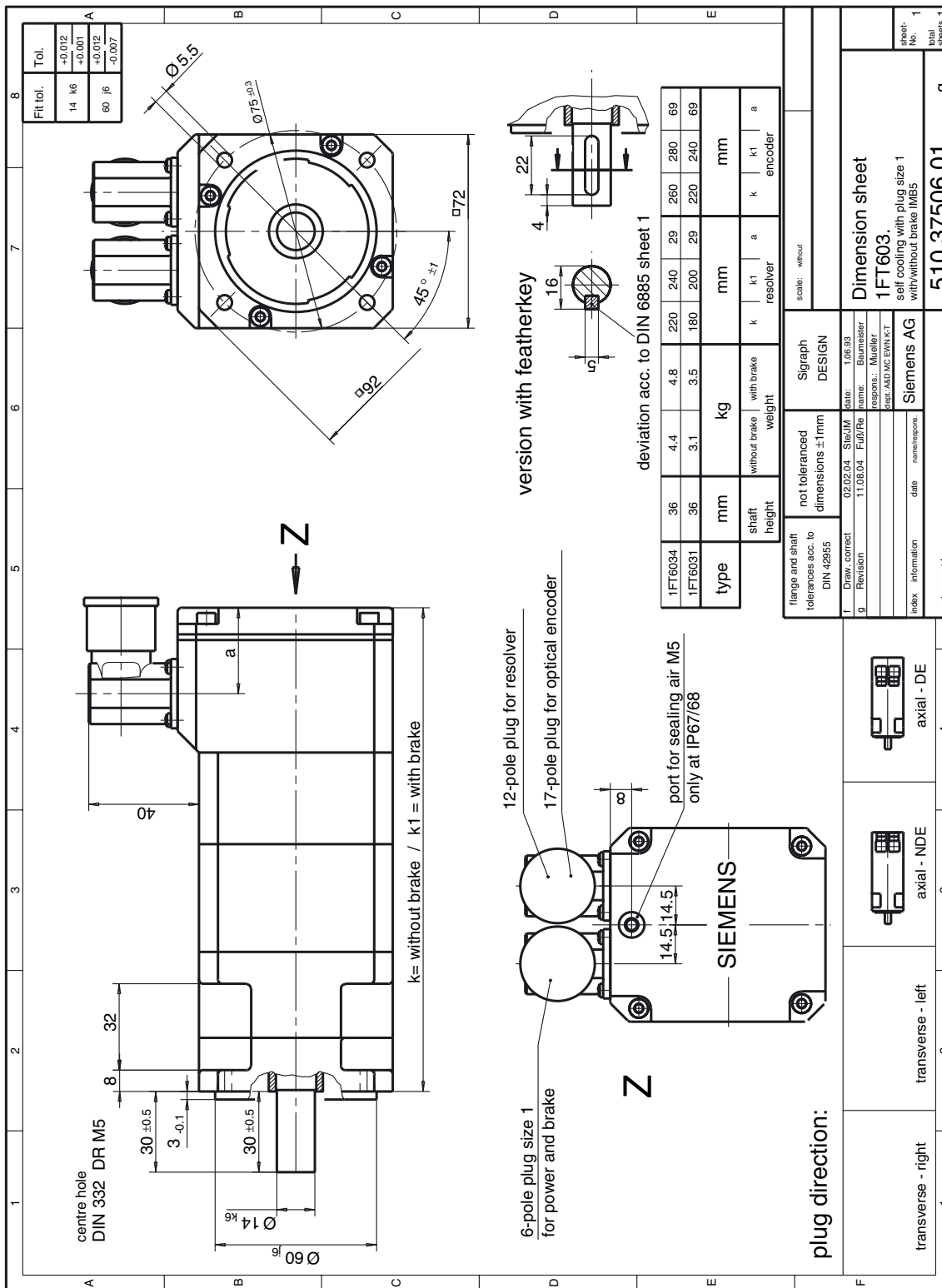
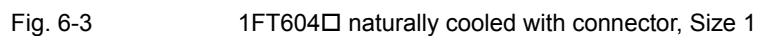


Fig. 6-2 1FT603□ naturally cooled with connector, Size 1



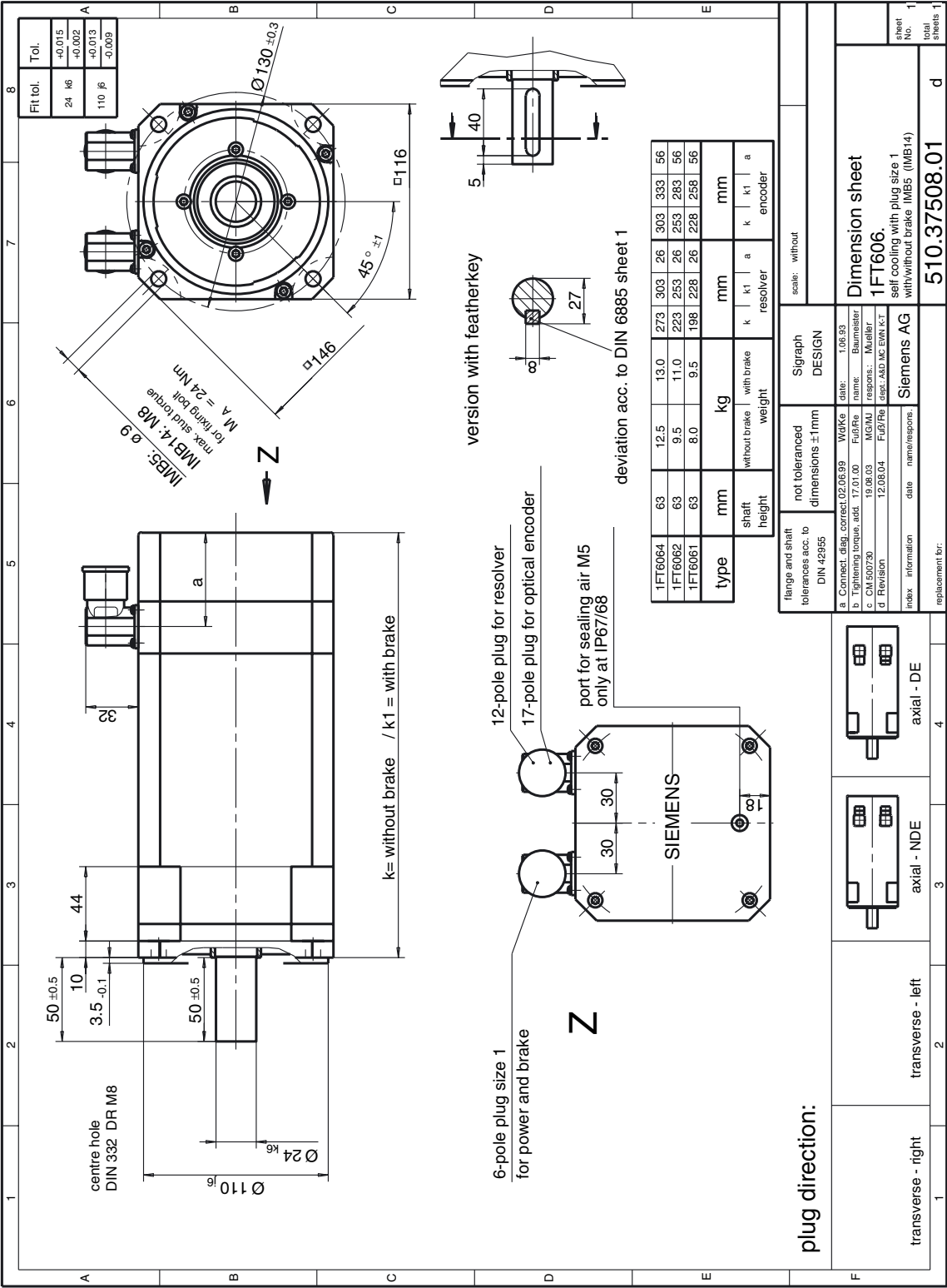


Fig. 6-4 1FT606□ naturally cooled with connector, Size 1

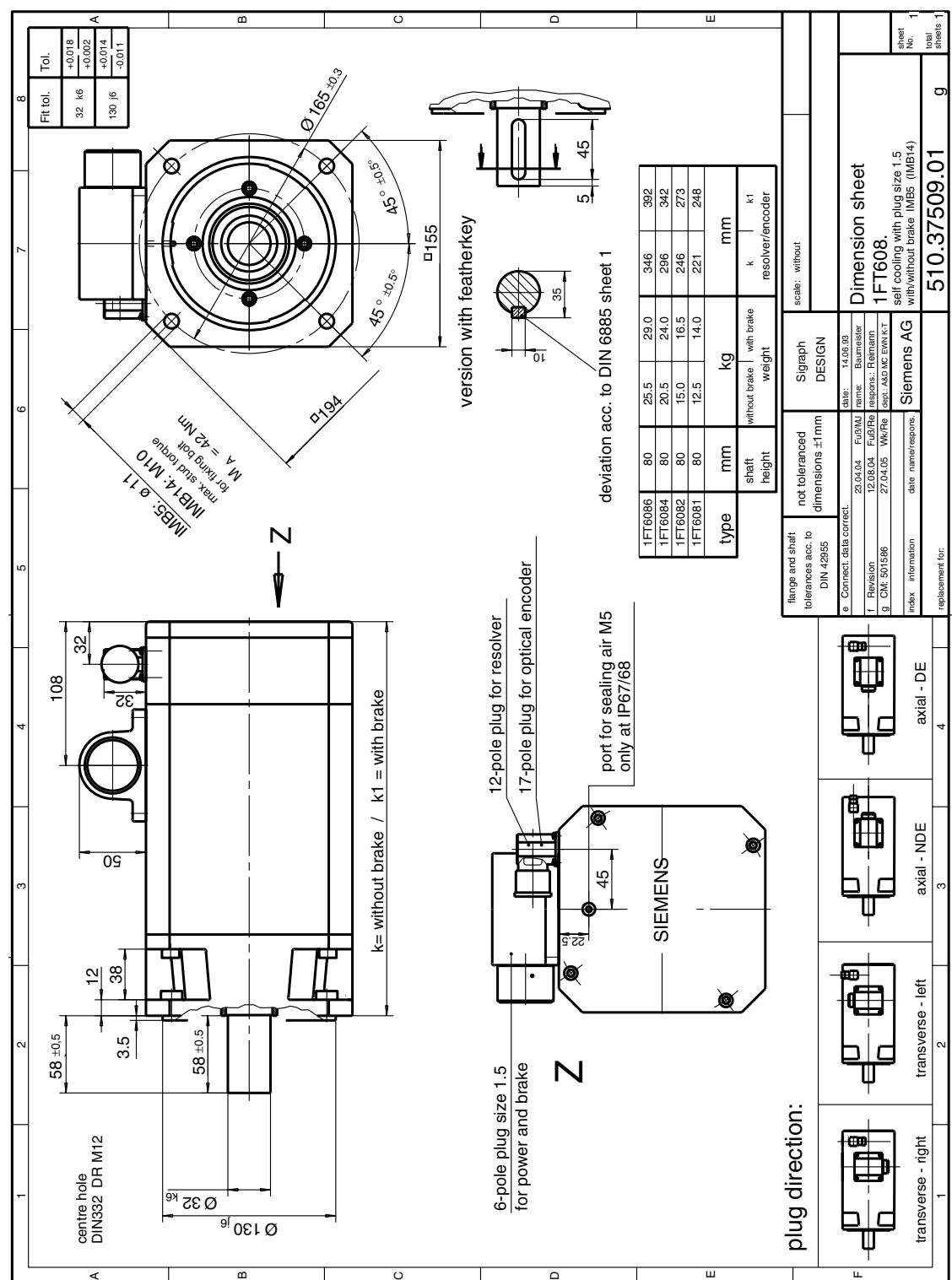
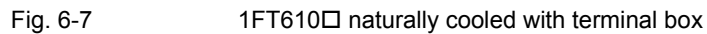
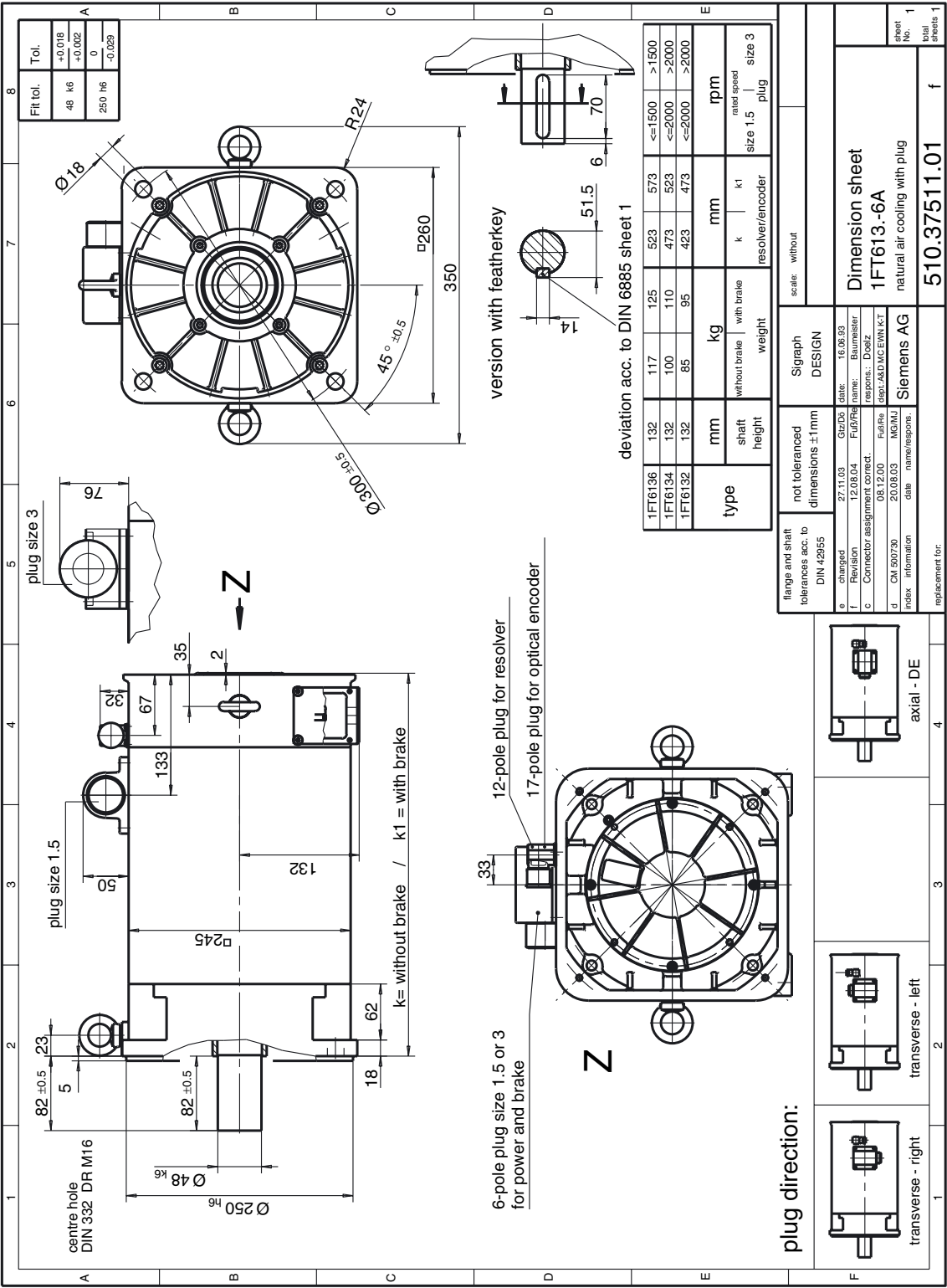


Fig. 6-5 1FT608□ naturally cooled with connector, Size 1.5







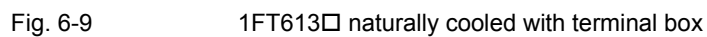


Fig. 6-10 1FT608□ force ventilated with connector, Size 1.5/3

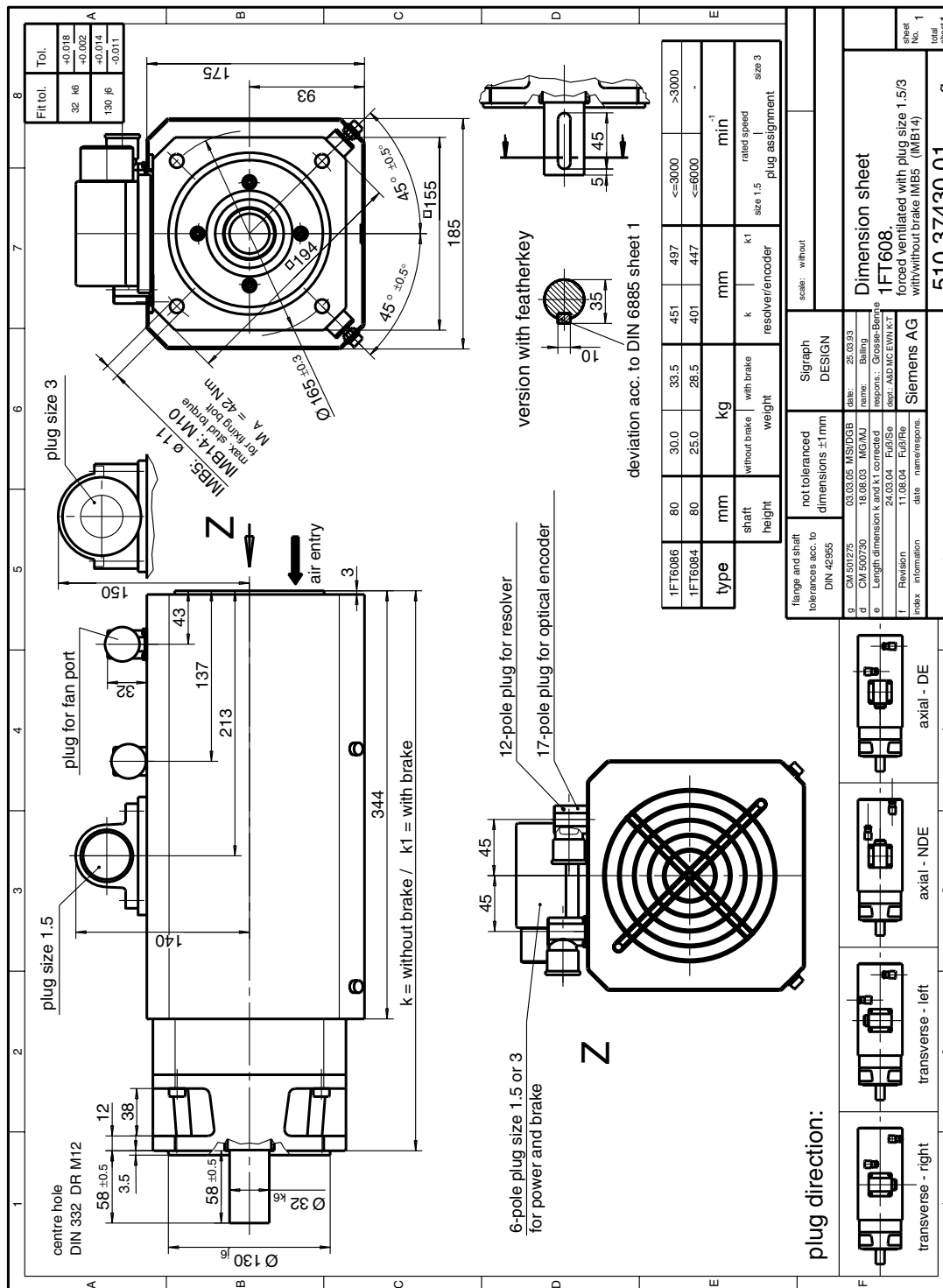


Fig. 6-10 1FT608□ force ventilated with connector, Size 1.5/3

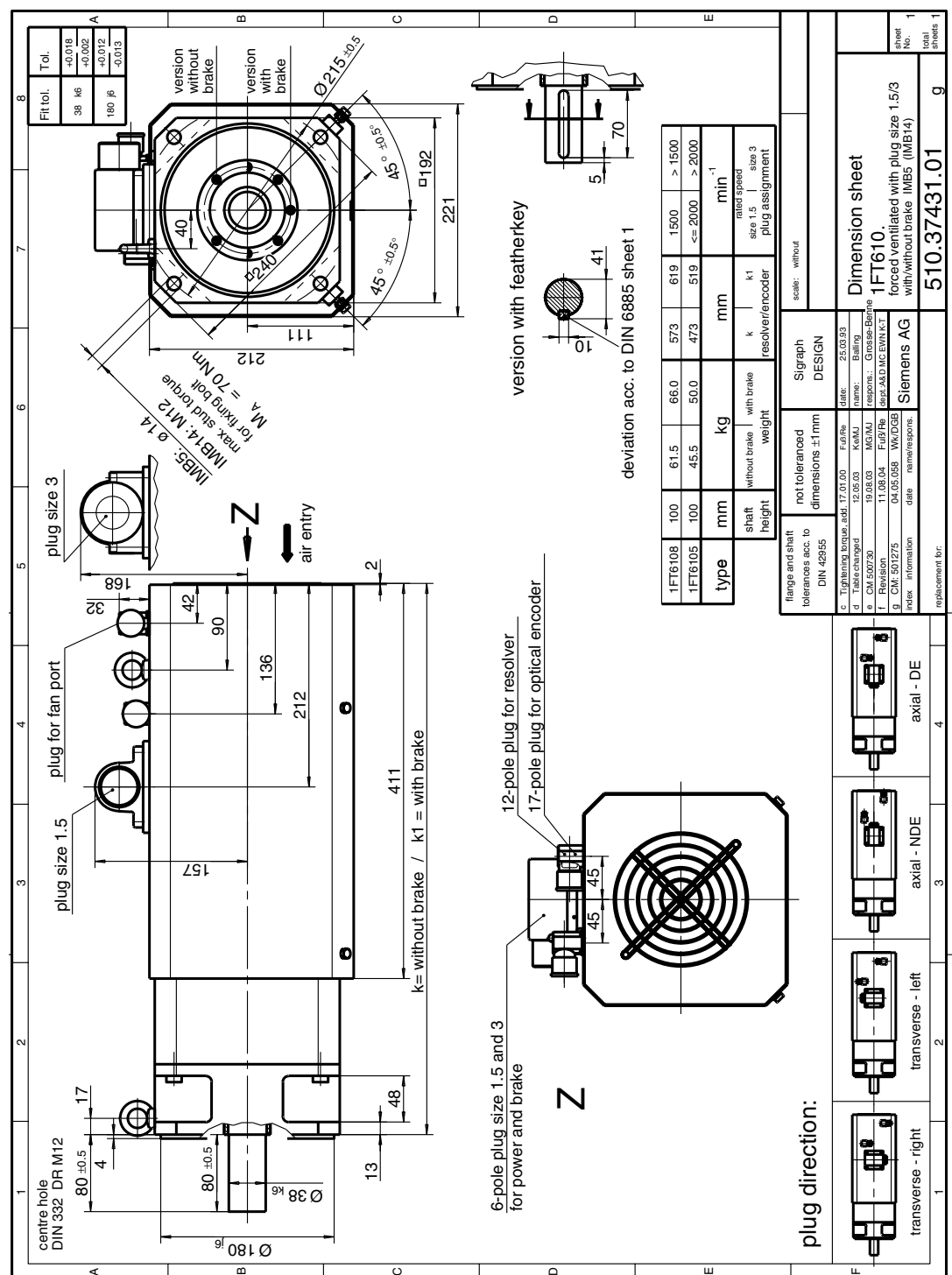


Fig. 6-11 1FT610 force ventilated with connector, Size 1.5/3

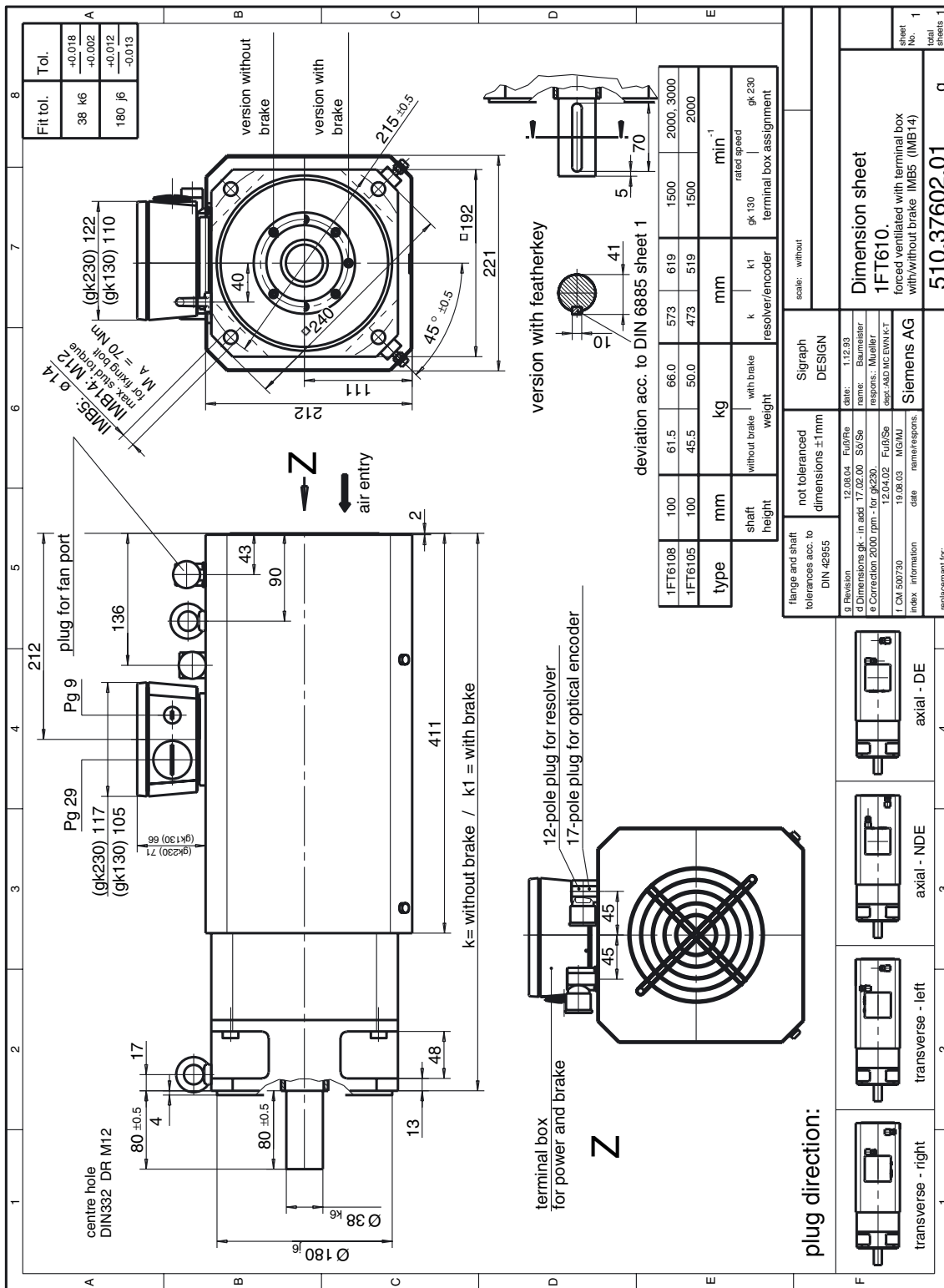
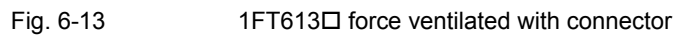
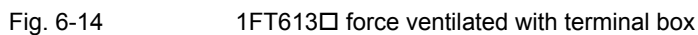


Fig. 6-12

1FT610 force ventilated with terminal box





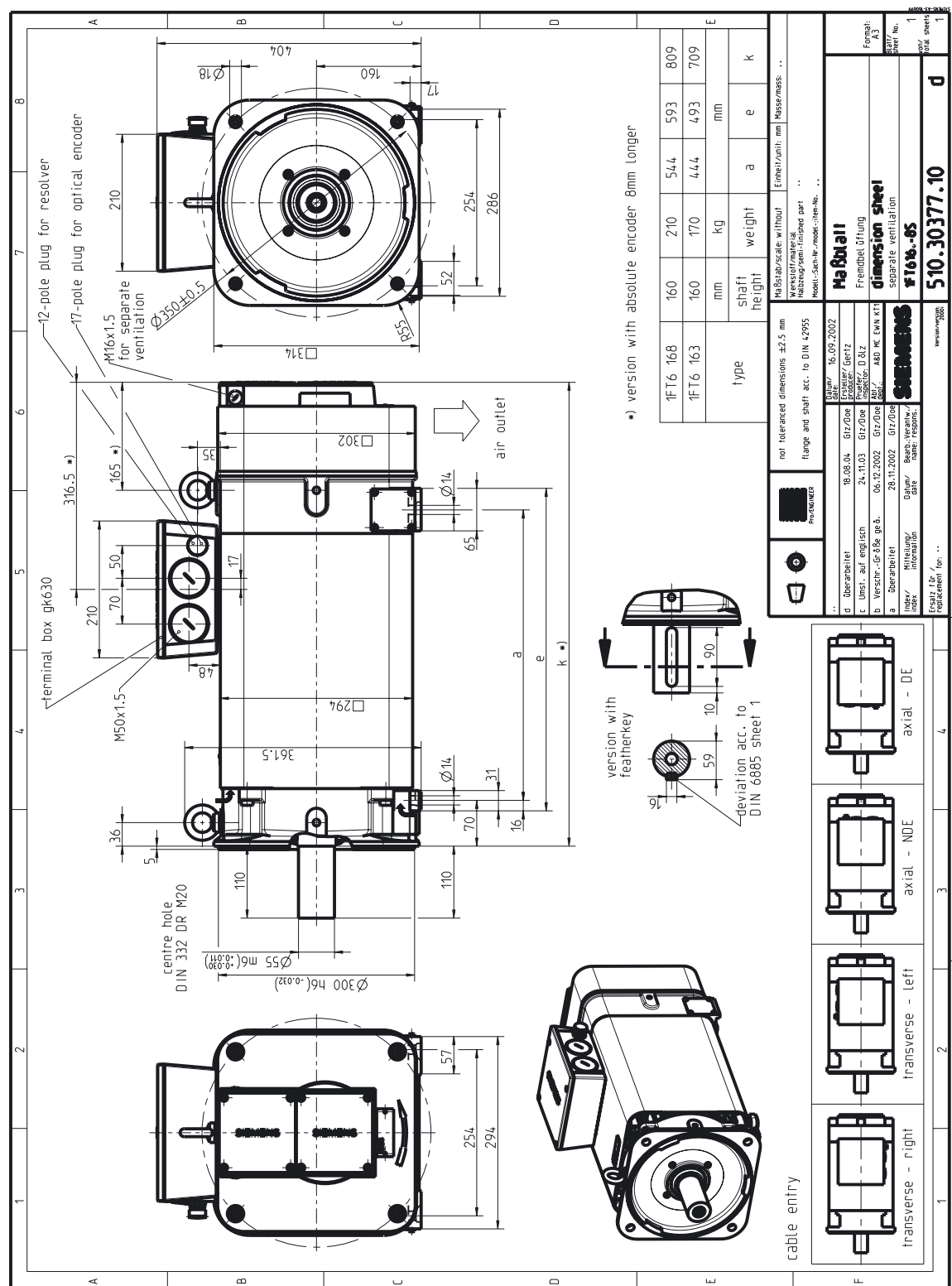


Fig. 6-15 1FT616 force ventilated with terminal box

Fig. 6-16 1FT606□ water-cooled with connector, Size 1

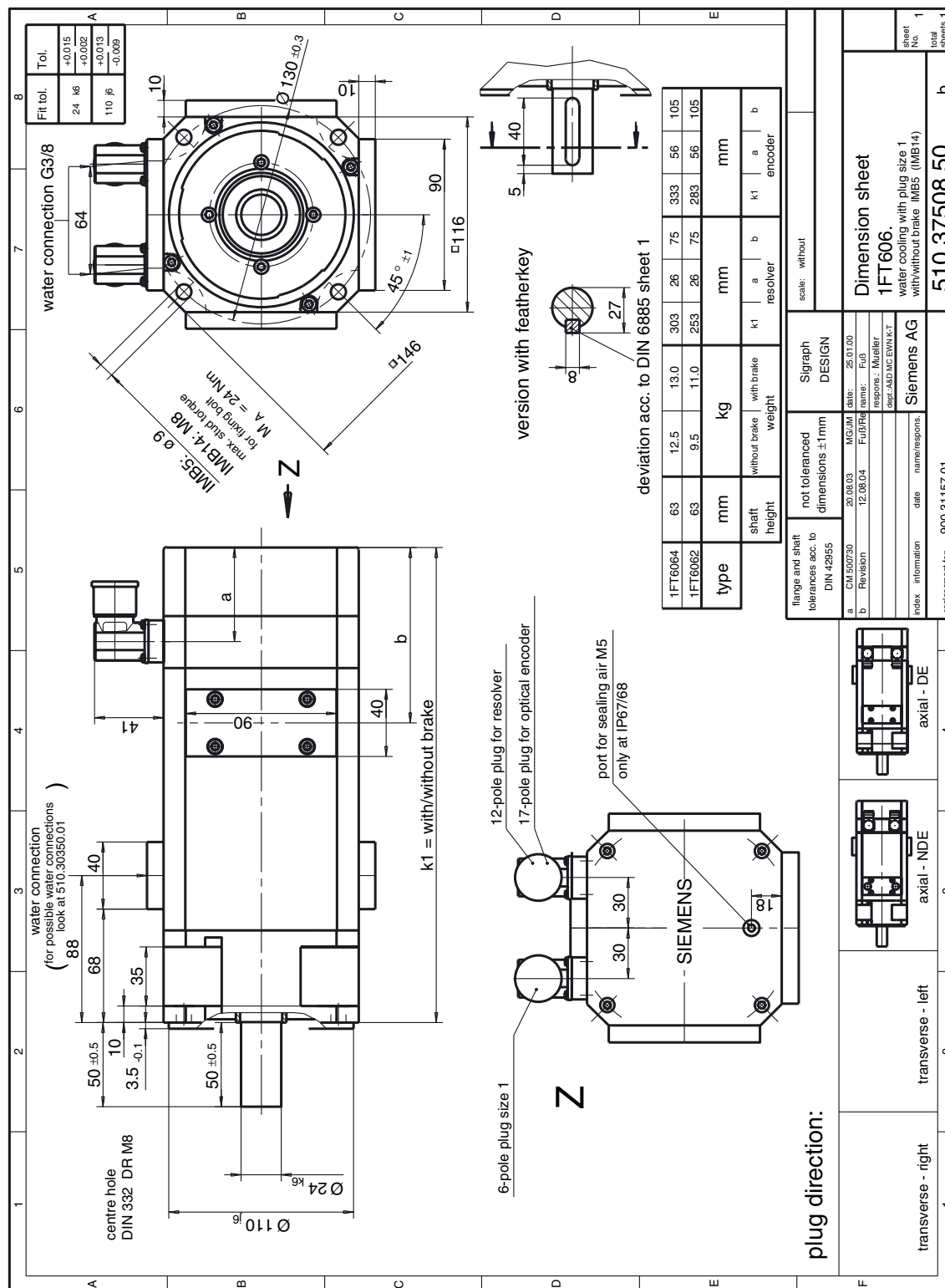


Fig. 6-16 1FT606□ water-cooled with connector, Size 1





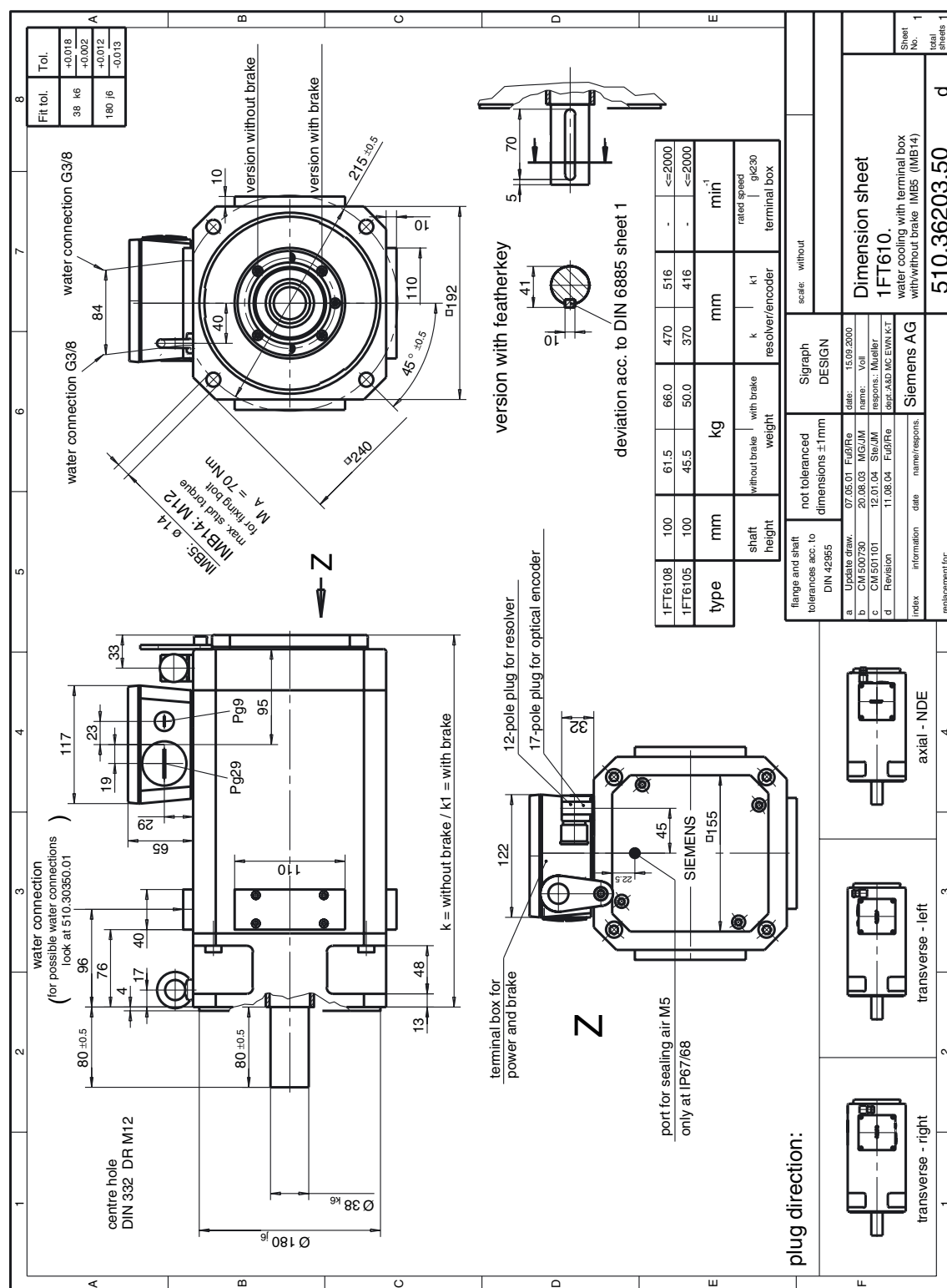


Fig. 6-19

1FT610□ water-cooled with terminal box, rated speed = 2000 RPM

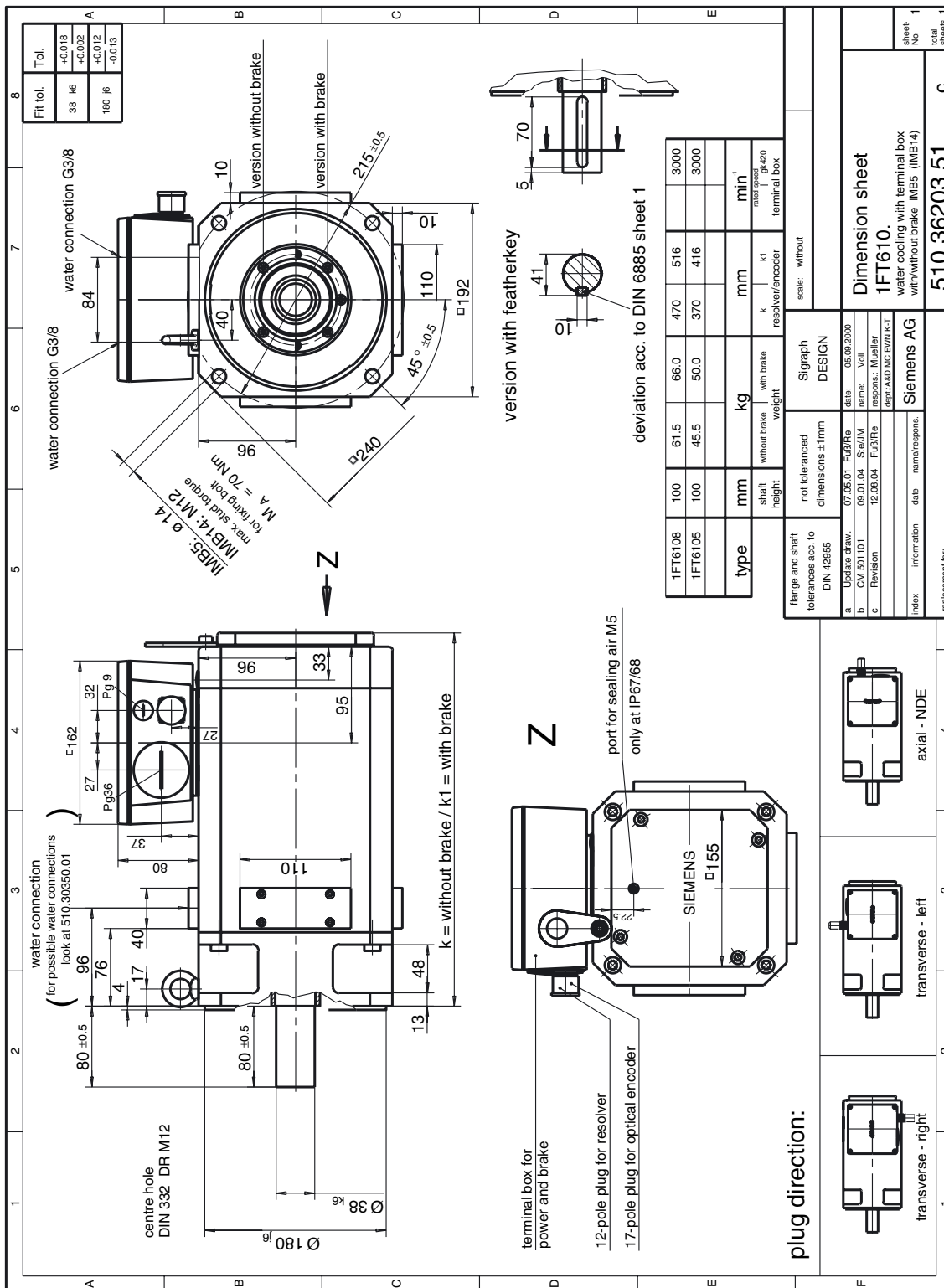


Fig. 6-20

1FT610□ water-cooled with terminal box, rated speed = 3000 RPM

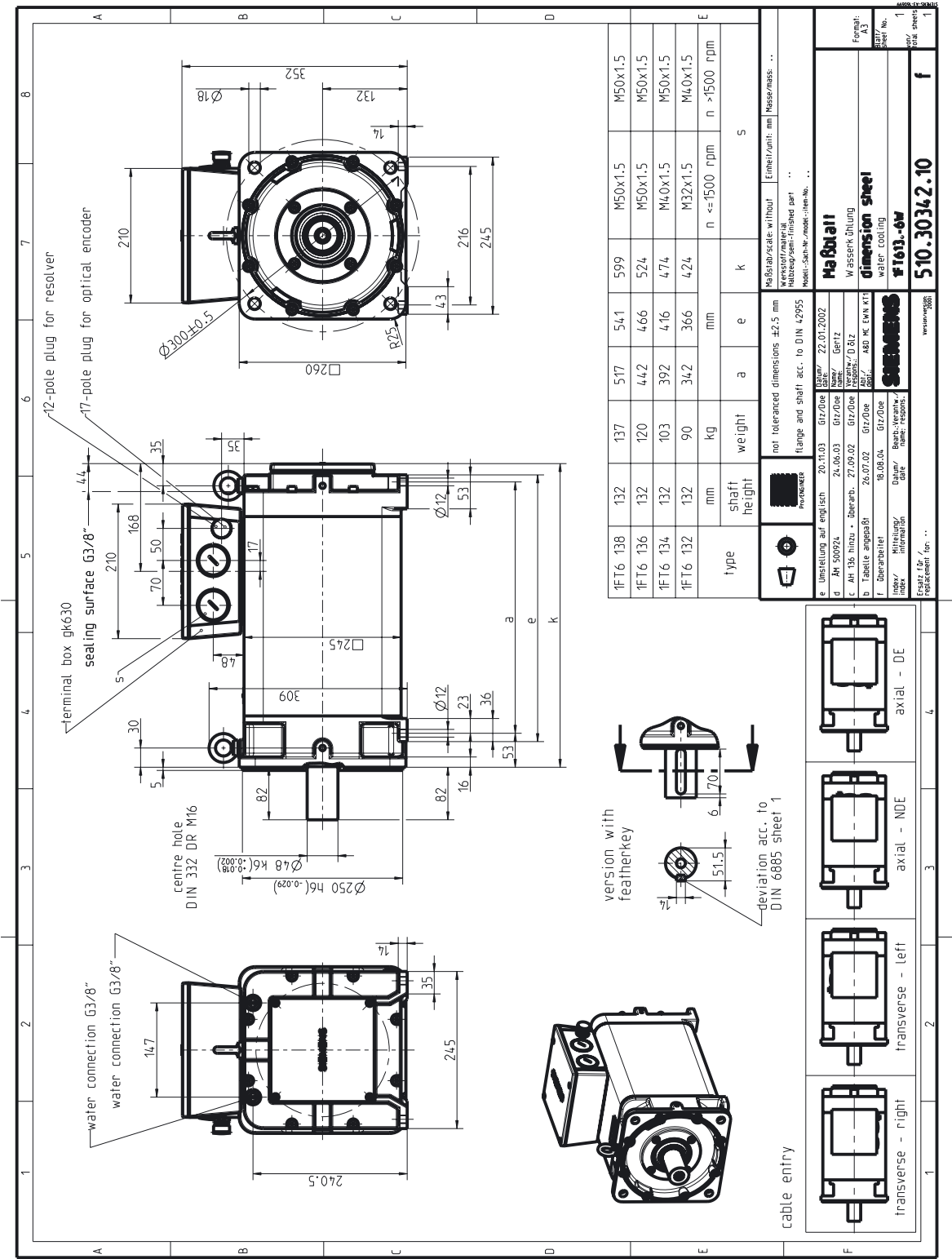


Fig. 6-21 1FT613□ water-cooled with terminal box

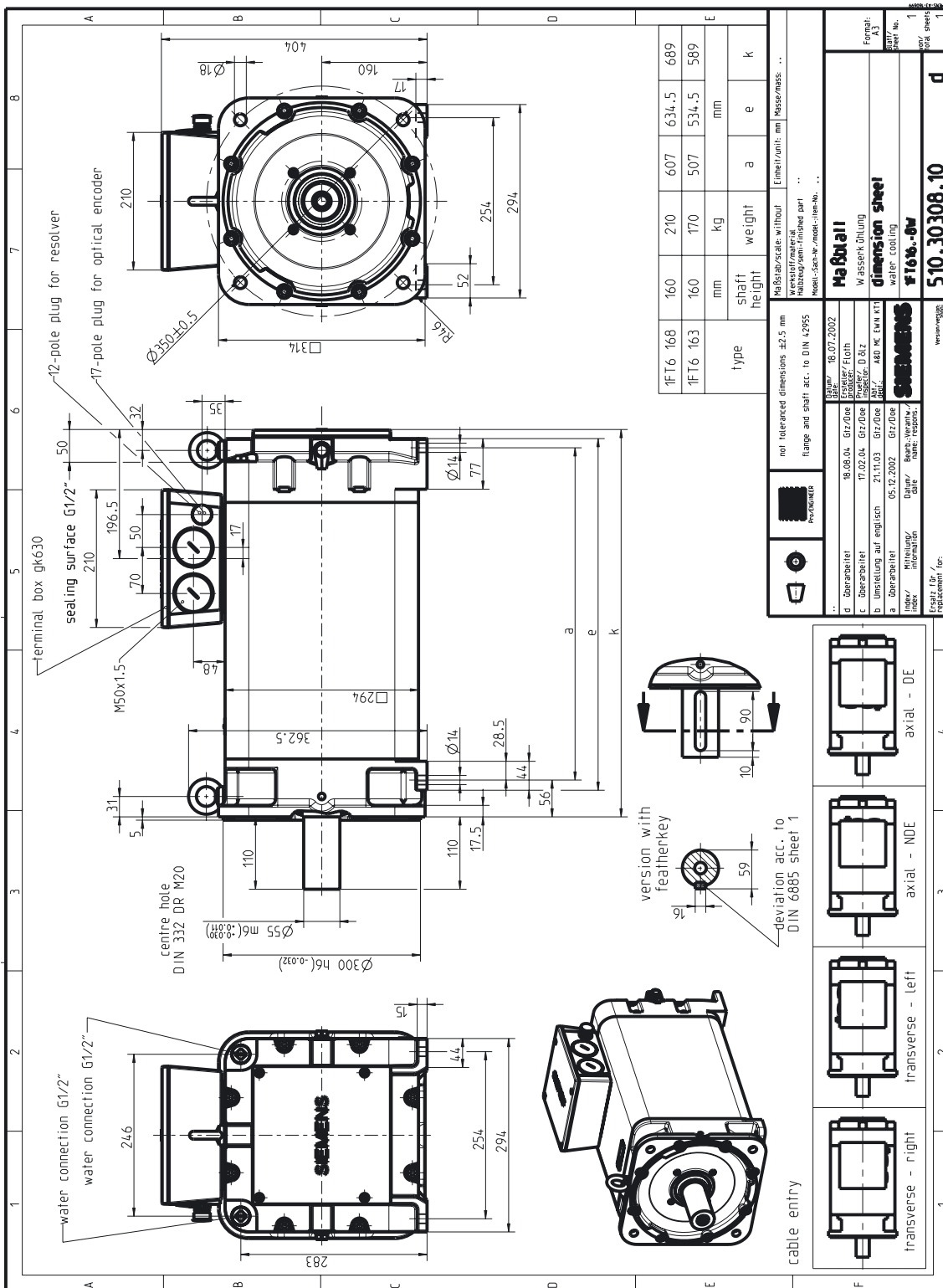


Fig. 6-22 1FT616□ water-cooled with terminal box

6.4 Cooling water connections for shaft height 60 to 100

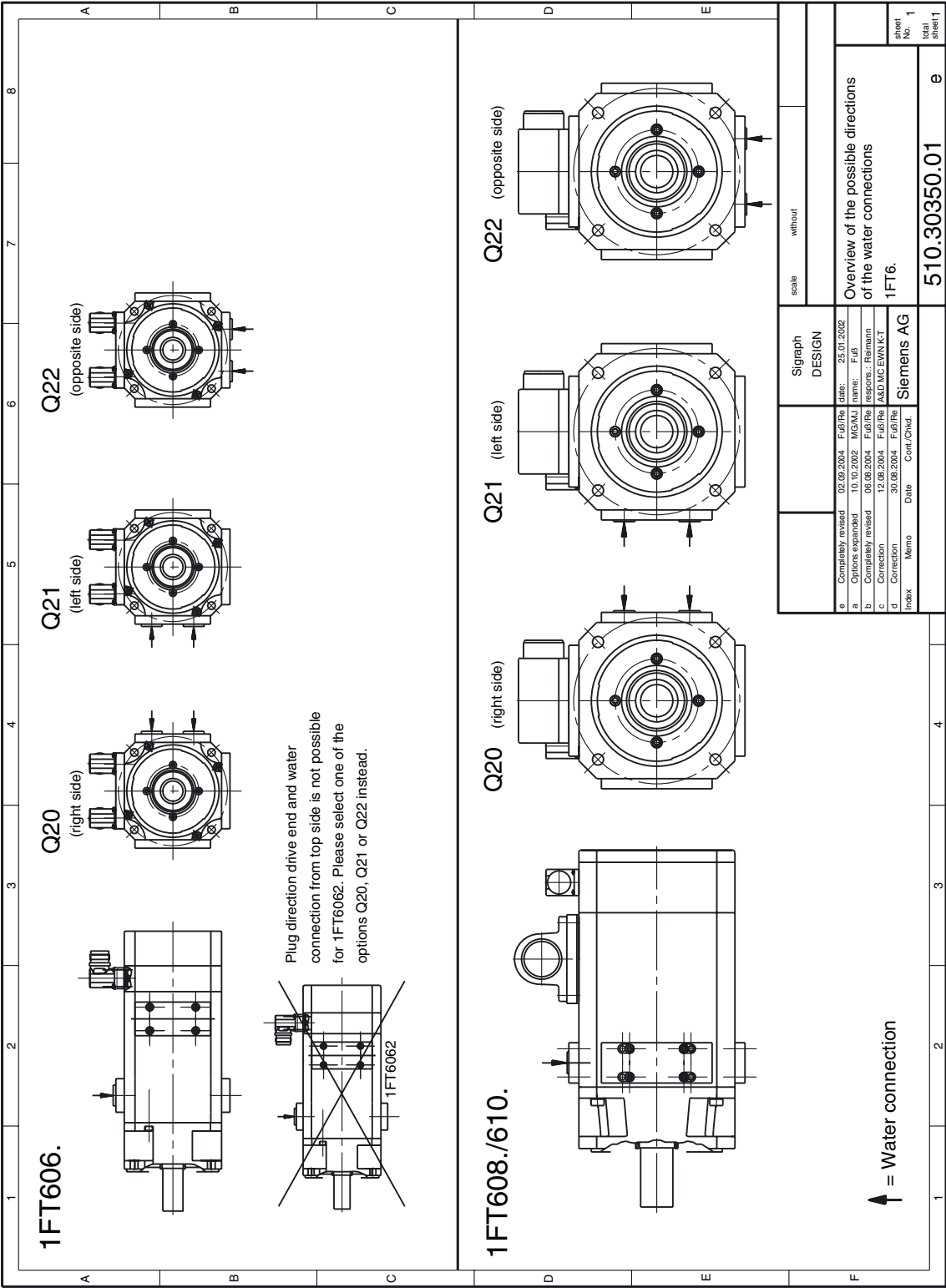


Fig. 6-23 1FT6 cooling water connections for shaft height 60 to 100
Cooling water connections for shaft heights 132 and 160, refer to the appropriate motor dim. drawing.

6.5 1FT6 motors with planetary gearbox series SP+

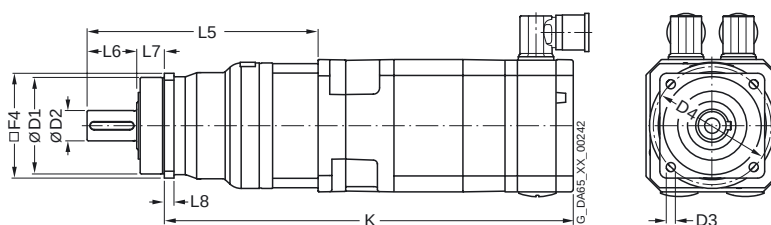
6.5.1 Dimension drawings 1FT6 with planetary gearbox SP+, single-stage

For motors			Dimensions in mm (inches)										Resolver		Incremental encoders sin/cos 1 V _{pp} /absolute encoders	
Shaft height	Type	F4	Planetary gearbox Type	D1	D2	D3	D4	L5	L6	L7	L8	without brake C	with brake C	without brake C	with brake C	
1FT6 with SP+ planetary gearbox, single-stage, IM B5 type, natural cooling, with connector, without/with brake																
28	1FT6021	62 (2.44)	SP060S-MF1	60 (2.36)	16 (0.63)	5.5 (0.22)	68 (2.68)	138 (5.44)	28 (1.10)	20 (0.79)	6 (0.24)	283 (11.15)	308 (12.14)	283 (11.15)	308 (12.14)	
	1FT6024	62 (2.44)	SP060S-MF1	60 (2.36)	16 (0.63)	5.5 (0.22)	68 (2.68)	138 (5.44)	28 (1.10)	20 (0.79)	6 (0.24)	323 (12.73)	348 (13.71)	323 (12.73)	348 (13.71)	
36	1FT6031	62 (2.44)	SP060S-MF1	60 (2.36)	16 (0.63)	5.5 (0.22)	68 (2.68)	142 (5.59)	28 (1.10)	20 (0.79)	6 (0.24)	274 (10.80)	294 (11.58)	314 (12.37)	334 (13.16)	
	1FT6034	62 (2.44)	SP060S-MF1	60 (2.36)	16 (0.63)	5.5 (0.22)	68 (2.68)	142 (5.59)	28 (1.10)	20 (0.79)	6 (0.24)	314 (12.37)	334 (13.16)	354 (13.95)	374 (14.74)	
	1FT6034	76 (2.99)	SP075S-MF1	70 (2.76)	22 (0.87)	6.6 (0.26)	85 (3.35)	164 (6.46)	36 (1.42)	20 (0.79)	7 (0.28)	328 (12.92)	348 (13.71)	368 (14.50)	388 (15.29)	
48	1FT6041	76 (2.99)	SP075S-MF1	70 (2.76)	22 (0.87)	6.6 (0.26)	85 (3.35)	168 (6.62)	36 (1.42)	20 (0.79)	7 (0.28)	297 (11.70)	332 (13.08)	340 (13.40)	375 (14.78)	
	1FT6044	76 (2.99)	SP075S-MF1	70 (2.76)	22 (0.87)	6.6 (0.26)	85 (3.35)	168 (6.62)	36 (1.42)	20 (0.79)	7 (0.28)	347 (13.67)	382 (15.05)	390 (15.37)	425 (16.75)	
63	1FT6061	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)	327 (12.88)	357 (14.07)	357 (14.07)	387 (15.25)	
	1FT6062	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)	352 (13.87)	382 (15.05)	382 (15.05)	412 (16.23)	
	1FT6064	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)	402 (15.84)	432 (17.02)	432 (17.02)	462 (18.20)	
80	1FT6081	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)	392 (15.44)	419 (16.51)	392 (15.44)	419 (16.51)	
	1FT6082	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)	417 (16.43)	444 (17.49)	417 (16.43)	444 (17.49)	
	1FT6084	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)	467 (18.40)	513 (20.21)	467 (18.40)	513 (20.21)	
	1FT6086	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)	517 (20.37)	563 (22.18)	517 (20.37)	563 (22.18)	
	1FT6086	182 (7.17)	SP180S-MF1	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)	544 (21.43)	590 (23.25)	544 (21.43)	590 (23.25)	

1FT602.
1FT603.
1FT604.
1FT606.
1FT608.

Technical drawing of the 1FT6 motor with planetary gearbox. The drawing shows a side view and a front view. Dimensions are labeled: F4 (shaft height), D1 (shaft diameter), D2 (flange diameter), D3 (flange outer diameter), D4 (flange outer diameter), L5 (motor length), L6 (flange thickness), L7 (flange thickness), L8 (flange thickness), K (motor length), D3 (flange outer diameter). The drawing is labeled G. DA65_XX_00242.

1FT602.
1FT603.
1FT604.
1FT606.
1FT608.



1FT6 motors with planetary gearbox series SP+

For motor			Dimensions in mm (inches)										Resolver		Incremental encoders sin/cos 1 V _{pp} /absolute encoders	
Shaft height	Type	F4	Planetary gearbox Type	D1	D2	D3	D4	L5	L6	L7	L8	without brake C	with brake C	without brake C	with brake C	
1FT6 with SP+ planetary gearbox, single-stage, IM B5 type, natural cooling, with connector, without/with brake																
100	1FT6102	182 (7.17)	SP180S-MF1	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)	493 (19.42)	539 (21.24)	493 (19.42)	539 (21.24)	
	1FT6105	182 (7.17)	SP180S-MF1	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)	568 (22.38)	614 (24.19)	568 (22.38)	614 (24.19)	
	1FT6105	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)	577 (22.73)	623 (24.55)	577 (22.73)	623 (24.55)	
	1FT6108	182 (7.17)	SP180S-MF1	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)	668 (26.32)	714 (28.13)	668 (26.32)	714 (28.13)	
	1FT6108	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)	677 (26.67)	723 (28.49)	677 (26.67)	723 (28.49)	
132	1FT6132	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)	630 (24.82)	680 (26.79)	630 (24.82)	680 (26.79)	
	1FT6134	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)	680 (26.79)	730 (28.76)	680 (26.79)	730 (28.76)	
	1FT6134	242 (9.53)	SP240- MF1	200 (7.88)	85 (3.35)	17 (0.67)	290 (11.43)	436 (17.18)	130 (5.12)	40 (1.58)	20 (0.79)	739 (29.12)	789 (31.09)	739 (29.12)	789 (31.09)	
	1FT6136	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)	730 (28.76)	780 (30.73)	730 (28.76)	780 (30.73)	
	1FT6136	242 (9.53)	SP240- MF1	200 (7.88)	85 (3.35)	17 (0.67)	290 (11.43)	436 (17.18)	130 (5.12)	40 (1.58)	20 (0.79)	789 (31.09)	839 (33.06)	789 (31.09)	839 (33.06)	

1FT610.
1FT613.

Technical drawing of the 1FT6 motor with planetary gearbox. The drawing shows a side view with dimensions L5, L6, L7, L8, K, D1, D2, D3, and D4. A detail view of the connector is shown on the right with dimension D3. The drawing is labeled G DA65_XX_00242.

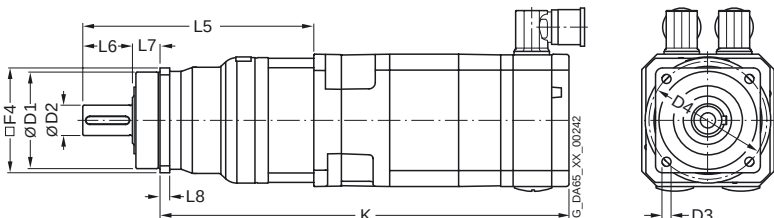
6.5.2 Dimension drawings 1FT6 with planetary gearbox SP+, 2-stage

For motor		Dimensions in mm (inches)										Resolver		Incremental encoders sin/cos 1 V _{pp} /absolute encoders	
Shaft height	Type	F4	Planetary gearboxes Type	D1	D2	D3	D4	L5	L6	L7	L8	without brake C	with brake C	without brake C	with brake C
1FT6 with SP+ planetary gearbox, 2-stage, IM B5 type, natural cooling, with connector, without/with brake															
63	1FT6061	101 (3.98)	SP100S - MF2	90 (3.55)	32 (1.26)	9 (0.35)	120 (4.73)	252 (9.93)	58 (2.29)	30 (1.18)	10 (0.39)	362 (14.26)	392 (15.44)	392 (15.44)	422 (16.63)
	1FT6061	141 (5.56)	SP140S - MF2	130 (5.12)	40 (1.58)	11 (0.43)	165 (6.50)	305 (12.02)	82 (3.23)	30 (1.18)	12 (0.47)	391 (15.41)	421 (16.59)	421 (16.59)	451 (17.77)
	1FT6061	182 (7.17)	SP180S - MF2	160 (6.30)	55 (2.17)	13.5 (0.53)	215 (8.47)	346 (13.63)	82 (3.23)	30 (1.18)	15 (0.59)	432 (17.02)	462 (18.20)	462 (18.20)	492 (19.38)
	1FT6062	101 (3.98)	SP100S - MF2	90 (3.55)	32 (1.26)	9 (0.35)	120 (4.73)	252 (9.93)	58 (2.29)	30 (1.18)	10 (0.39)	387 (15.25)	417 (16.43)	417 (16.43)	447 (17.61)
	1FT6062	141 (5.56)	SP140S - MF2	130 (5.12)	40 (1.58)	11 (0.43)	165 (6.50)	305 (12.02)	82 (3.23)	30 (1.18)	12 (0.47)	416 (16.39)	446 (17.57)	446 (17.57)	476 (18.75)
	1FT6064	101 (3.98)	SP100S - MF2	90 (3.55)	32 (1.26)	9 (0.35)	120 (4.73)	252 (9.93)	58 (2.29)	30 (1.18)	10 (0.39)	437 (17.22)	467 (18.40)	467 (18.40)	497 (19.58)
	1FT6064	141 (5.56)	SP140S - MF2	130 (5.12)	40 (1.58)	11 (0.43)	165 (6.50)	305 (12.02)	82 (3.23)	30 (1.18)	12 (0.47)	466 (18.36)	496 (19.54)	496 (19.54)	526 (20.72)
	1FT6064	182 (7.17)	SP180S - MF2	160 (6.30)	55 (2.17)	13.5 (0.53)	215 (8.47)	346 (13.63)	82 (3.23)	30 (1.18)	15 (0.59)	507 (19.98)	537 (21.16)	537 (21.16)	567 (22.34)
80	1FT6081	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)	441 (17.38)	468 (18.44)	441 (17.38)	468 (18.44)
	1FT6081	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)	464 (18.28)	491 (19.35)	464 (18.28)	491 (19.35)
	1FT6081	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)	475 (18.72)	502 (19.78)	475 (18.72)	502 (19.78)
	1FT6082	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)	466 (18.36)	493 (19.42)	466 (18.36)	493 (19.42)
	1FT6082	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)	489 (19.27)	516 (20.33)	489 (19.27)	516 (20.33)
	1FT6082	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)	500 (19.70)	527 (20.76)	500 (19.70)	527 (20.76)
	1FT6084	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)	516 (20.33)	562 (22.14)	516 (20.33)	562 (22.14)
	1FT6084	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)	539 (21.24)	585 (23.05)	539 (21.24)	585 (23.05)
	1FT6084	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)	580 (22.85)	626 (24.66)	580 (22.85)	626 (24.66)
	1FT6086	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)	566 (22.30)	612 (24.11)	566 (22.30)	612 (24.11)
	1FT6086	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)	589 (23.21)	635 (25.02)	589 (23.21)	635 (25.02)
1FT606. 1FT608.															

1FT6 motors with planetary gearbox series SP+

For motor			Dimensions in mm (inches)										Resolver		Incremental encoders sin/cos 1 V _{pp} /absolute encoders	
Shaft height	Type	F4	Planetary gearboxes Type	D1	D2	D3	D4	L5	L6	L7	L8	without brake C	with brake C	without brake C	with brake C	
1FT6 with SP+ planetary gearbox, 2-stage, IM B5 type, natural cooling, with connector, without/with brake																
100	1FT6102	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)	538 (21.20)	584 (23.01)	538 (21.20)	584 (23.01)	
	1FT6102	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)	579 (22.81)	625 (24.63)	579 (22.81)	625 (24.63)	
	1FT6105	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)	624 (24.59)	670 (26.40)	624 (24.59)	670 (26.40)	
	1FT6105	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)	654 (25.77)	700 (27.58)	654 (25.77)	700 (27.58)	
	1FT6108	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)	754 (29.71)	800 (31.52)	754 (29.71)	800 (31.52)	
132	1FT6132	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)	170 (6.70)	677 (26.67)	727 (28.64)	677 (26.67)	727 (28.64)	
	1FT6134	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)	757 (29.83)	807 (31.80)	757 (29.83)	807 (31.80)	
	1FT6136	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)	807 (31.80)	857 (33.77)	807 (31.80)	857 (33.77)	

1FT610.
1FT613.



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

/PJAL/	Configuration Manual, Synchronous Motors SIMODRIVE 611, SIMOVERT MASTERDRIVES MC Synchronous Motors General Section
/PFK7S/	Configuration Manual, Synchronous Motors SINAMICS S120 1FK7 Synchronous Motors
/PFT6S/	Configuration Manual, Synchronous Motors SINAMICS S120 1FT6 Synchronous Motors
/APH7S/	Configuration Manual, Asynchronous Motors SINAMICS S120 Servo Control/Vector Control Induction Motors 1PH7
/PMH2/	Configuration Manual, Hollow-Shaft Measuring System SINAMICS S120, SIMODRIVE 611, SIMOVERT MASTERDRIVES, SIMAG H2 Hollow-Shaft Measuring System
/PFK7/	Configuration Manual, Synchronous Motors SIMODRIVE 611, SIMOVERT MASTERDRIVES 1FK7 Synchronous Motors
/PFT6/	Configuration Manual, Synchronous Motors SIMODRIVE 611, SIMOVERT MASTERDRIVES 1FT6 Synchronous Motors
/PFK6/	Configuration Manual, Synchronous Motors SIMODRIVE 611, SIMOVERT MASTERDRIVES 1FK6 Synchronous Motors
/PFS6/	Configuration Manual, Synchronous Motors SIMOVERT MASTERDRIVES 1FS6 Synchronous Motors, Explosion-Protected
/PFU/	Configuration Manual, Synchronous Motors SINAMICS S120, SIMOVERT MASTERDRIVES, MICROMASTER SIEMOSYN Synchronous Motors 1FU8
/ASAL/	Configuration Manual, Asynchronous Motors SIMODRIVE 611, SIMOVERT MASTERDRIVES Induction Motors General Section

/APH2/	Configuration Manual, Asynchronous Motors SIMODRIVE 611 1PH2 Induction Motors
/APH4/	Configuration Manual, Asynchronous Motors SIMODRIVE 611 1PH4 Induction Motors
/APH7/	Configuration Manual, Asynchronous Motors SIMODRIVE 611 1PH7 Induction Motors
/PPM/	Configuration Manual, Hollow-Shaft Motors SIMODRIVE 611 Hollow-Shaft Motors for Main Spindle Drives 1PM6 and 1PM4
/PJFE/	Configuration Manual, Synchronous Build-in Motors SIMODRIVE 611 Synchronous Motors for Main Spindle Drives 1FE1 Synchronous Build-in Motors
/PJTM/	Configuration Manual, Build-in Torque Motors SIMODRIVE 611 Build-in Torque Motors 1FW6
/PJLM/	Configuration Manual, Linear Motors SIMODRIVE 611 Linear Motors 1FN1 and 1FN3
/PMS/	Configuration Manual, ECO Motor Spindle SIMODRIVE 611 ECO Motor Spindle 2SP1
/APL6/	Configuration Manual, Asynchronous Motors SIMOVERT MASTERDRIVES Induction Motors 1PL6
/APH7M/	Configuration Manual, Asynchronous Motors SIMOVERT MASTERDRIVES VC/MC Induction Motors 1PH7
/PKTM/	Configuration Manual, Complete Torque Motors SIMOVERT MASTERDRIVES Complete Torque Motors 1FW3

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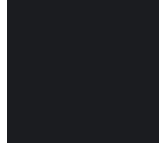
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