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SIMODRIVE 611/MASTERDRIVES MC
Synchronous Servomotors 1FT6

SIEMENS

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SIMODRIVE 611 MASTERDRIVES MC

Synchronous Servomotors 1FT6

Planning Guide

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Designation of the documentation

Printing history

Brief details of this edition and previous editions are listed below.

The status of each edition is shown by the code in the "Remarks" column.

Status code in the "Remarks" column:

A New documentation

B Unrevised reprint with new Order No.

C Revised edition with new status

Edition	Order No. for 1FT6	Remarks
02.04	6SN1197-0AD02-0BP0	A

This Manual is part of the documentation on CD-ROM (**DOCONCD**)

Edition	Order No.	Remarks
03.04	6FC5 298-7CA00-0BG0	C

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The controller may support functions that are not described in this documentation. The customer is not, however, entitled to these functions in the event of the system being replaced or serviced.

We have checked the contents of this document to ensure that they coincide with the described hardware and software. Since deviations cannot be precluded entirely, we cannot guarantee complete conformance. However, the data in this manual are reviewed regularly and any necessary changes included in subsequent editions. We welcome suggestions for improvement.

We reserve the right to make technical changes.

Foreword

Information on the documentation

This document is part of the Technical Customer Documentation which has been developed for SIMODRIVE and SIMOVERT MASTERDRIVES drive converter systems. All of the documents are available individually. You can obtain the complete list of documentation encompassing all Advertising Brochures, Catalogs, Overviews, Short Descriptions, Operating Instructions and Technical Descriptions with Order No., ordering address and price from your local Siemens office.

For reasons of transparency, this document does not include detailed information about all of the product types. Further, it cannot take into account every conceivable installation, operation or service/maintenance situation.

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 obligation 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

The complete Planning Guide for 1FK and 1FT motors can be ordered as hard copy.

Table Foreword–1-1 Planning Guide with General Section and 1FK and 1FT motors

Title	Order number (MLFB)	Language
1FK and 1FT synchronous servomotors for SIMODRIVE and SIMOVERT MASTERDRIVES MC	6SN1197–0AC20–0AP0	German
1FK and 1FT synchronous servomotors for SIMODRIVE and SIMOVERT MASTERDRIVES MC	6SN1197–0AC20–0BP0	English

The General Section and the individual motor series are also separately available.

Table Foreword–1-2 Planning Guide, individual sections

Title	Order number (MLFB)	Language
Synchronous servomotors, general section for SIMODRIVE and SIMOVERT MASTERDRIVES MC	6SN1197–0AD07–0AP0	German
Synchronous servomotors, motor section 1FK7 for SIMODRIVE and SIMOVERT MASTERDRIVES MC	6SN1197–0AD06–0AP0	German
Synchronous servomotors, motor section 1FK6 for SIMODRIVE and SIMOVERT MASTERDRIVES MC	6SN1197–0AD05–0AP0	German
Synchronous servomotors, motor section 1FT6 for SIMODRIVE and SIMOVERT MASTERDRIVES MC	6SN1197–0AD02–0AP0	German
Synchronous servomotors, motor section 1FT5	6SN1197–0AD01–0AP0	German

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Please send any questions regarding the documentation (suggestions, corrections) by fax to the following number:

+49 (9131) 98-2176

Fax form: Refer to the reply form at the end of this Manual

Engineering software for the SIMOVERT MASTERDRIVES drive units

The PATH Plus engineering software provides a user-friendly engineering software.

Using this program, SIMOVERT MASTERDRIVES Vector Control and Motion Control frequency drive inverters can be separately and quickly engineered.

PATH plus is a powerful engineering tool that supports the user in all of the engineering steps – from the supply to the motor.

Order No. for the full version of PATH Plus: 6SW1710-0JA00-2FC0

Start-up software for SIMODRIVE

Additional start-up software is available to commission three-phase induction motors connected to the SIMODRIVE drive converter system.

Order No. [MLFB] for software	6SN1153-2AX10-□AB□5
Order No. [MLFB] for documentation	6SN1197-0AA30-0□B□

NCSD Configurator

You simply tell the configurator the requirements placed on your SINUMERIK/SIMODRIVE System and under which conditions you wish to operate the system. The configurator implements these tasks and provides you with the complete control and drive configuration optimized for your particular application. In addition, the tool will recommend which accessories should be used in order to ensure a safe, reliable connection between the various components.

For more detailed information and how to download the tool, refer to the Siemens Intranet: www.siemens.de/intranet/mc or Internet: www.siemens.de/motioncontrol

Enter in the index, "NCSD Configurator"!

Definition of qualified personnel

For the purpose of this document and product labels, a qualified person is a person who is familiar with the installation, mounting, start-up and operation of the equipment and hazards involved. He or she must have the following qualifications:

- Trained and authorized to energize, de-energize, ground and tag circuits and equipment in accordance with established safety procedures.
- Trained in the proper care and use of protective equipment in accordance with established safety procedures.
- Trained in rendering first aid.

Explanation of symbols

The following danger and warning concept is used in this document:



Danger

This symbol indicates that death, severe personal injury, or substantial property damage **will** result if proper precautions are not taken.



Warning

This symbol indicates that death, severe personal injury, or substantial property damage **may** result if proper precautions are not taken.



Caution

This symbol indicates that minor personal injury or property damage **may** result if proper precautions are not taken.

Caution

The warning note (without a warning triangle) means that material damage **can** occur if proper precautions are not taken.

Notice

This warning note indicates that an undesirable result or an undesirable status **can** occur if the appropriate information is not observed.

Note

In the sense of this document there is a possible advantage/benefit if the note text is observed.

Danger and warning information



Danger

- It is not permissible to commission the equipment until it has been clearly identified that the machine, in which the described components are to be installed, is in full compliance with the specifications in Directive 98/37/EC.
 - Only appropriately qualified and trained personnel may commission SIMODRIVE and SIMOVERT MASTERDRIVES drive units and the AC motors.
 - This personnel must take into account the technical customer documentation belonging to the product and be knowledgeable and observe the specified information and instructions on the hazard and warning labels.
 - When electrical equipment and motors are operated, the associated electrical circuits are at hazardous voltage levels.
 - When the machine or system is operated, hazardous axis movements can occur.
 - All of the work carried-out in 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 for operation on low-ohmic grounded line supplies (TN line supplies). For additional information, refer to the appropriate documentation of the drive converter systems.
-



Warning

- The successful and safe operation of this equipment and motors is dependent on proper 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 information and instructions on hazards and warnings in the technical customer documentation supplied, the applicable national, local and machine/system specific regulations and requirements must be carefully taken into consideration.
-



Caution

- The motors can have surface temperatures of over +100° C.
 - This is the reason that it is not permissible that temperature-sensitive parts and components – e.g. cables or electrical components – are in contact with the motor or fastened to the motor.
 - When connecting and routing connecting cables, the following must be carefully observed:
 - they may not be damaged
 - they may not be strained, and
 - they may not be able to be touched by rotating components.
-

Caution

- Motors should be connected-up according to the circuit diagram supplied. 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 to a voltage test in compliance with EN 50178 as part of the routine test. 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 AC motors fulfill, in the operational state and in dry operating areas, the Low-Voltage Directive 73/23/EEC.
 - SIMODRIVE and SIMOVERT MASTERDRIVES drive units with AC motors fulfill, in the configurations which are specified in the associated EC Declaration of Conformity, the EMC Directive 89/336/EEC.
-

ESDS information and instructions



Caution

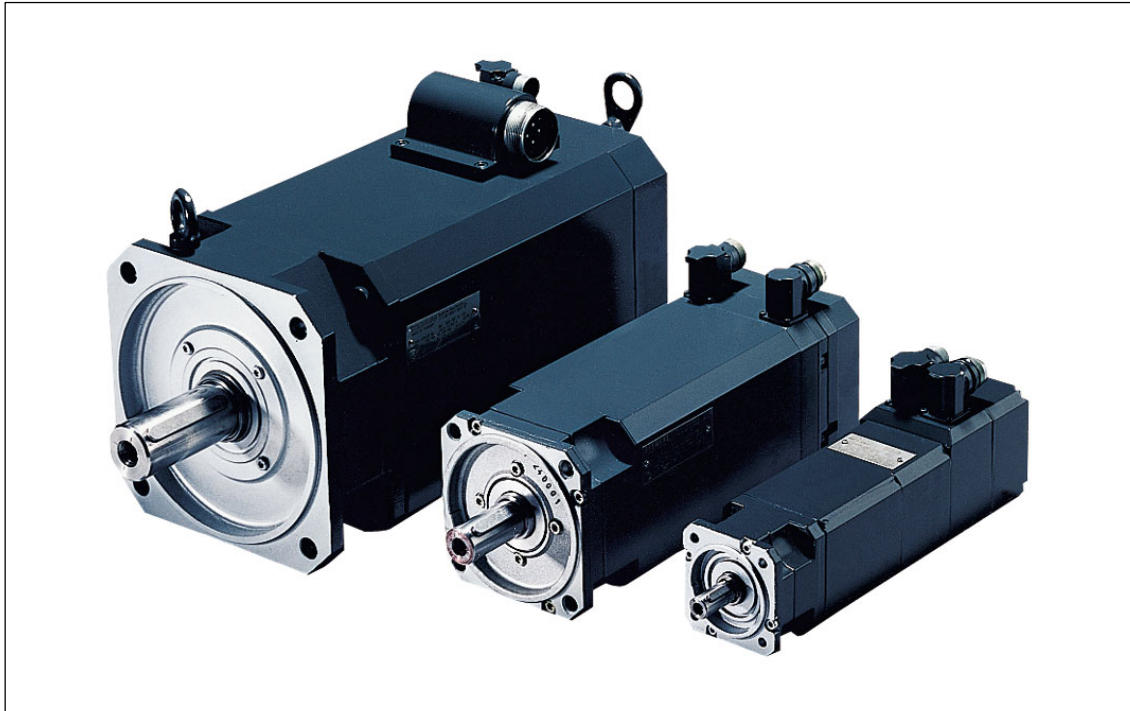
ElectroStatic Discharge Sensitive devices (ESDS) are individual components, integrated circuits or modules which could be damaged as a result of electrostatic fields or electrostatic discharge.

Handling ESDS boards:

- The human body, working area and packaging should be well grounded when handling ESDS components!
 - Electronic components may only be touched by people in ESDS areas with conductive flooring if
 - they are grounded through an ESDS wrist strap and
 - they are wearing ESDS shoes or ESDS shoe grounding strips.
 - Electronic boards should only be touched when absolutely necessary.
 - Electronic boards may not come into contact with synthetic materials and clothing manufactured out of man-made fibers.
 - Electronic boards may only be placed down 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 to screen > 10 cm).
 - Measuring work may only be carried out on the electronic boards if
 - the measuring device is grounded (e.g. via the protective conductor) or
 - for floating measuring equipment, the probe is briefly discharged before making measurements (e.g. a bare control housing is touched).
-

[illegible]

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Motor Description

1

1.1 Applications and features

Applications

The 1FT6 series was developed for applications on machine tools and production machines with the highest requirements placed on the smooth running characteristics and surface quality. In conjunction with the SIMODRIVE and SIMOVERT MASTERDRIVES MC drive converter systems, these motors are, among other things, admirably suited for feed and main drives on lathes and milling machines, machining centers, for grinding and special-purpose machines and for woodworking.

They can be directly mounted onto feed spindles and onto gearboxes with toothed wheels or toothed belts.

Features

Depending on the shaft height, the 1FT6 series has stall torques of between 0.4 and 700 Nm and rated speeds from 1500 to 6000 RPM. A high overload capability is available over the complete speed control range. The motors are optimized for a low torque ripple.

Standards, regulations

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

1.2 Technical design, 1FT6 motor

Table 1-1 Design features of the standard design

Technical features	Design
Machine type	Permanent-magnet synchronous servomotor
Type of construction (acc. to EN60034-7; IEC 60034-7)	IM B5 (IM V1, IM V3) for shaft heights 28 to 132 IM B35 (IM V15, IM V36) for shaft heights 132 to 160 (options, refer to Table 1-2)
Degree of protection (acc. to EN60034-5; IEC 60034-5)	IP 64; core types IP 65 (options, refer to Table 1-2)
Cooling (acc. to EN60034-6; IEC 60034-6)	Non-ventilated ²⁾ Forced cooling ^{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, (option, refer to Table 1-2)
Radial eccentricity, concentricity and axial eccentricity (acc. to DIN 42955; IEC 60072-1)	Tolerance N (normal) (options, refer to Table 1-2)
Vibration severity (acc. to EN 60034-14; IEC 60034-14)	Level N (normal) (options, refer to Table 1-2)
Max. sound pressure level (acc. to EN 21680) + 3 dB	Shaft heights 28 to 100: 72 dB(A) up to n = 2000 RPM Shaft heights 132 to 160: 73 dB(A) up to n = 2000 RPM
Bearings	Roller bearings with permanent grease lubrication (lubricated for the bearing lifetime) Bearing lifetime: 20000 h SH 36, 48: Locating bearing on the NDE SH 28, 63 up to 160: Locating bearing on the DE
Winding insulation (acc. to EN 60034-1; IEC 60034-1)	Temperature rise class F for a winding temperature rise of $\Delta T = 100 \text{ K}$ for an ambient temperature of $40 \text{ }^{\circ}\text{C}$.
Installation altitude (acc. to EN and IEC 60034-1)	$\leq 1000 \text{ m}$ above sea level, otherwise de-rating ²⁾ 2,000 m Factor 0.94 2500 m Factor 0.9
Magnetic material	Rare earth material
Electr. connection	Power connection via a terminal box or connector Encoder signal via connector
Integrated speed encoder	Optical encoders: - Incremental encoders sin/cos 1Vpp (I-2048) - Absolute value encoders EnDat (A-2048 and A-512) ¹⁾ - Resolver, two-pole/multi-pole For more detailed information, refer to the Chapter Encoders.
Rating plate	A second rating plate is provided for all motors

1) When using the absolute value encoder and non-ventilated or forced ventilation, the rated torque is reduced by 10 % (refer to the Table, Technical data)

2) De-rating for temperatures $> 40 \text{ }^{\circ}\text{C}$ and/or installation altitudes $> 1000 \text{ m}$ refer to the Planning Guide "General Part for Synchronous Servomotors"

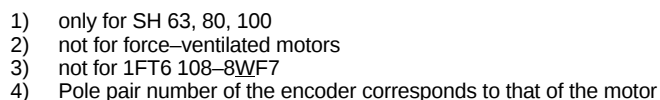
3) Not suitable for conductive dust. Forced ventilation cannot be used in the presence of flammable, corrosive, electrically conductive or explosive dust.

1.3 Technical design, options, supplements

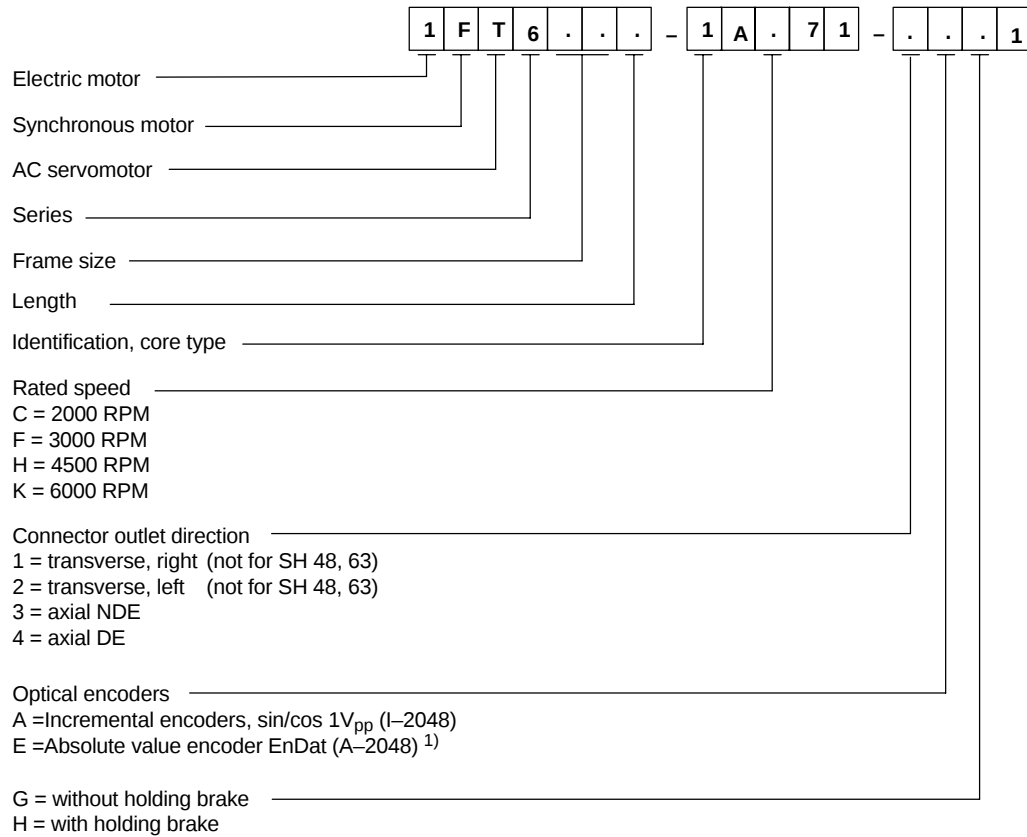
Table 1-2 Options

Technical features	Design
Type of construction (acc. to EN60034–7; IEC 60034–7)	IM B14 for shaft heights 63 to 100
Degree of protection (acc. to EN 60034–5; IEC 60034–5)	IP65, IP67, IP68 Information: Shaft height 28 only available in degree of protection IP64 or IP67. IP67 and IP68 with sealing air connection. Force-ventilated motors only available in degree of protection IP64 and IP65 available (fan IP54).
Shaft end (acc. to EN and IEC 60034–14)	Cylindrical; with keyway and key; Tolerance zone k6 H=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)	Level R (not 1FT6108–8WF7)
Integrated/mounted components	Mounted planetary gear for SH 28 to 132 (geared motors only available with vibration severity level N)
Cable outlet for terminal boxes	Outlet direction can be selected in 90° steps

**Order designation (standard types) SH 28 to SH 132
(non-ventilated, forced-ventilated and water cooling)**



Order designation (core types)



1.4 Order designation

Order designation for SH 132, water cooling and SH 160, force ventilated and water-cooled

	1	F	T	6	.	.	.	-	.	.	.	7	6	-	.	.	.	.
--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Electric motor _____

Synchronous motor _____

AC servomotor _____

Series _____

Number of poles _____

Type of cooling _____
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 _____
A = Incremental encoders, sin/cos 1 Vpp (I-2048)
E = Absolute value encoders EnDat (A-2048)
S = Resolvers, multi-pole
T = Resolvers, 2-pole

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

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

1) specified degree of protection, only applies for water cooling;
for air cooling, restriction due to the mounted fan with IP54

1.5 Technical data

Core types are designated with gray. **100 K** values are specified in the table.

Table 1-3 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]	Connec- tor size 2)	Cross- section ³⁾ [mm ²]	Cable type 4) 5) 6FX□002– 6)	Terminal box 2)
Non-ventilated										
1500	27.0	24.5	22.05	102–8AB7□	8.7	8.4	1.5	4 x 1.5	5□A21–1□□0	gk130
1500	50.0	41.0	36.9	105–8AB7□	16.0	14.5	1.5	4 x 2.5	5□A31–1□□0	gk130
1500	70.0	61.0	54.9	108–8AB7□	22.3	20.5	1.5	4 x 4	5□A41–1□□0	gk130
1500	75.0	62.0	55.8	132–6AB7□	21.6	19	1.5	4 x 4	5□A41–1□□0	gk230
1500	95.0	75.0	67.5	134–6AB7□	27.0	24	1.5	4 x 4	5□A41–1□□0	gk230
1500	115.0	88.0	79.2	136–6AB7□	34.0	27	1.5	4 x 10	5□A61–1□□0	gk230
Force ventilation										
1500	65.0	59.0	53.1	105–8SB7□	21.9	21.7	1.5	4 x 4	5□A41–1□□0	gk130
1500	90.0	83.0	74.7	108–8SB7□	30.0	31	1.5	4 x 10	5□A61–1□□0	gk130
1500	110.0	102.0	91.8	132–6SB7□	36.0	36	3	4 x 16	5□A23–1□□0	gk230
1500	140.0	130.0	117.0	134–6SB7□	44.0	45	3	4 x 16	5□A23–1□□0	gk230
1500	175.0	160.0	144.0	136–6SB7□	55.0	55	3	4 x 16	5□A23–1□□0	gk420
1500	425	385	347	163–8SB7□ ⁸⁾	151	136	—	—	—	gk630
1500	600	540	486	168–8SB7□ ⁸⁾	194	174	—	—	—	gk630
Water-cooling										
1500	119.0	116.0	116.0	108–8WB7□	43.0	43	3	4 x 16	5□A23–1□□0	gk230
1500	155	150	150	132–6WB7□ ⁸⁾	58	58	—	—	—	gk630
1500	200	190	190	134–6WB7□ ⁸⁾	73	67	—	—	—	gk630
1500	240	230	230	136–6WB7□ ⁸⁾	92	90	—	—	—	gk630
1500	300	290	290	138–6WB7□ ⁸⁾	112	112	—	—	—	gk630
1500	450	450	450	163–8WB7□ ⁸⁾	160	160	—	—	—	gk630
1500	700	690	690	168–8WB7□ ⁸⁾	225	221	—	—	—	gk630

Number
of poles

without brake cable:
with brake cable:

with overall shield
with overall shield
Lengths⁷⁾
(examples)

C
D

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

Cables are not included in the scope of supply of the motors and must be separately ordered.

- 1) With absolute value 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 1-19
- 4) The shock hazard protection of the power cables depends on the size of the selected power module (refer to the Planning Guide, Drive Converter)
- 5) Motor with terminal box, power and signal cable, refer to Catalog, Chapter "MOTION-CONNECT connection system"
- 6) 6FX8002 = MOTION-CONNECT 800;
6FX5002 = MOTION-CONNECT 500;
Technical data, refer to Catalog, Chapter "MOTION-CONNECT connection system"
- 7) Cables can be supplied in units of one meter;
Length code, refer to the Planning Guide "General Part for Synchronous Servomotors"
- 8) For the 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.

1.5 Technical data

Table 1-4 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]	Connec- tor size 2)	Cross- section ³⁾ [mm ²]	Cable type 4) 5) 6FX□002– ⁶⁾	Terminal box 2)
Non-ventilated										
2000	4.0	3.7	3.3	061–6AC7□	1.9	1.9	1	4 x 1.5	5□A01–1□□0	—
2000	6.0	5.2	4.6	062–6AC7□	2.7	2.6	1	4 x 1.5	5□A01–1□□0	—
2000	9.5	8.0	7.2	064–6AC7□	4.2	3.8	1	4 x 1.5	5□A01–1□□0	—
2000	8.0	7.5	6.7	081–8AC7□	3.9	4.1	1.5	4 x 1.5	5□A21–1□□0	—
2000	13.0	11.4	10.0	082–8AC7□	6.6	6.6	1.5	4 x 1.5	5□A21–1□□0	—
2000	20.0	16.9	15.2	084–8AC7□	8.8	8.3	1.5	4 x 1.5	5□A21–1□□0	—
2000	27.0	22.5	20.2	086–8AC7□	11.3	10.9	1.5	4 x 1.5	5□A21–1□□0	—
2000	27.0	23.0	20.7	102–□AC7□	12.1	11	1.5	4 x 1.5	5□A21–1□□0	gk130
2000	50.0	38.0	34.2	105–□AC7□	21.4	17.6	1.5	4 x 4	5□A41–1□□0	gk130
2000	70.0	55.0	49.5	108–8AC7□	29.0	24.5	1.5	4 x 10	5□A61–1□□0	gk130
2000	75.0	55.0	49.5	132–6AC7□	29.0	23	1.5	4 x 10	5□A61–1□□0	gk230
2000	95.0	65.0	58.5	134–6AC7□	36.0	27	1.5	4 x 10	5□A61–1□□0	gk230
2000	115.0	74.0	66.6	136–6AC7□	42.0	30	3	4 x 16	5□A23–1□□0	gk230
Force ventilation										
2000	65.0	56.0	50.4	105–8SC7□	30.0	28	1.5	4 x 10	5□A61–1□□0	gk230
2000	90.0	80.0	72.0	108–8SC7□	41.0	40	3	4 x 16	5□A23–1□□0	gk230
2000	110.0	98.0	88.2	132–6SC7□	47.0	46	3	4 x 16	5□A23–1□□0	gk420
2000	140.0	125.0	112.5	134–6SC7□	58.0	57	3	4 x 16	5□A23–1□□0	gk420
2000	175.0	155.0	139.5	136–6SC7□	77.0	72	3	4 x 25	5DA33–1□□0	gk420
Water-cooling										
2000	85.0	82.0	82.0	105–8WC7□	58.0	60	3	4 x 16	5□A23–1□□0	gk230
2000	119.0	115.0	115.0	108–8WC7□	57.0	57	3	4 x 16	5□A23–1□□0	gk230

1
8Core type
Number of poleswithout brake cable:
with brake cable:with overall shield
with overall shieldC
DLengths⁷⁾
(examples)5 m AF
10 m BA
15 m BF
18 m BJ
25 m CF

Cables are not included in the scope of supply of the motors and must be separately ordered.

- 1) With absolute value 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 1-19
- 4) The shock hazard protection of the power cables depends on the size of the selected power module (refer to the Planning Guide, Drive Converter)
- 5) Motor with terminal box, power and signal cable, refer to Catalog, Chapter "MOTION-CONNECT connection system"
- 6) 6FX8002 = MOTION-CONNECT 800;
6FX5002 = MOTION-CONNECT 500;
Technical data, refer to Catalog, Chapter "MOTION-CONNECT connection system"
- 7) Cables can be supplied in units of one meter;
Length code, refer to the Planning Guide "General Part for Synchronous Servomotors"

Table 1-5 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]	Con- tor size 2)	Cross- section ³⁾ [mm ²]	Cable type 4) 5) 6FX□002– ⁶⁾	Terminal box ²⁾
Force ventilation										
2500	425	340	306	163–8SD7□ ⁸⁾	226	185	—	—	—	gk630
Water-cooling										
2500	155	135	135	132–6WD7□ ⁸⁾	92	82	—	—	—	gk630
2500	200	185	185	134–6WD7□ ⁸⁾	122	115	—	—	—	gk630
2500	240	220	220	136–6WD7□ ⁸⁾	158	149	—	—	—	gk630
2500	300	275	275	138–6WD7□ ⁸⁾	167	162	—	—	—	gk630
2500	425	340	340	163–8WD7□ ⁸⁾	240	240	—	—	—	gk630

|
Number of poles

Cables are not included in the scope of supply of the motors and must be separately ordered.

- 1) With absolute value 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 1-19
- 4) The shock hazard protection of the power cables depends on the size of the selected power module (refer to the Planning Guide, Drive Converter)
- 5) Motor with terminal box, power and signal cable, refer to Catalog, Chapter "MOTION-CONNECT connection system"
- 6) 6FX8002 = MOTION-CONNECT 800;
6FX5002 = MOTION-CONNECT 500;
Technical data, refer to Catalog, Chapter "MOTION-CONNECT connection system"
- 7) Cables can be supplied in units of one meter;
Length code, refer to the Planning Guide "General Part for Synchronous Servomotors"
- 8) For the 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.

1.5 Technical data

Table 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]	Connec- tor size 2)	Cross- section ³⁾ [mm ²]	Cable type 4) 5) 6FX□002– ⁶⁾	Terminal box ²⁾
Non-ventilated										
3000	2.6	2.15	2.0	041–4AF7□	1.9	1.7	1	4 x 1.5	5□A01–1□□0	—
3000	5.0	4.3	4.1	044–□AF7□	3.0	2.9	1	4 x 1.5	5□A01–1□□0	—
3000	4.0	3.5	3.3	061–6AF7□	2.7	2.6	1	4 x 1.5	5□A01–1□□0	—
3000	6.0	4.7	4.5	062–□AF7□	4.1	3.4	1	4 x 1.5	5□A01–1□□0	—
3000	9.5	7.0	6.7	064–□AF7□	6.1	4.9	1	4 x 1.5	5□A01–1□□0	—
3000	8.0	6.9	6.6	081–8AF7□	5.8	5.6	1.5	4 x 1.5	5□A21–1□□0	—
3000	13.0	10.3	9.8	082–□AF7□	9.6	8.7	1.5	4 x 1.5	5□A21–1□□0	—
3000	20.0	14.7	14.0	084–□AF7□	13.2	11	1.5	4 x 1.5	5□A21–1□□0	—
3000	27.0	18.5	17.6	086–□AF7□	16.4	13	1.5	4 x 2.5	5□A31–1□□0	—
3000	27.0	19.5	18.5	102–8AF7□	16.9	13.2	1.5	4 x 2.5	5□A31–1□□0	gk130
3000	50.0	31.0	29.0	105–8AF7□	32.0	22.5	1.5	4 x 10	5□A61–1□□0	gk130
3000	70.0	37.0	33.3	108–8AF7□	41.0	25	3	4 x 16	5□A23–1□□0	gk230
3000	75.0	36.0	34.2	132–6AF7□	43.0	23	3	4 x 16	5□A23–1□□0	gk230
Force ventilation										
3000	26.0	22.0	21.0	084–8SF7□	18.2	17	1.5	4 x 2.5	5□A31–1□□0	—
3000	35.0	31.0	29.0	086–8SF7□	25.0	24.5	1.5	4 x 4	5□A41–1□□0	—
3000	65.0	50.0	48.0	105–8SF7□	42.0	35	3	4 x 16	5□A23–1□□0	gk230
3000	90.0	70.0	63.0	108–8SF7□	62.0	53	3	4 x 16	5□A23–1□□0	gk420
3000	110.0	90.0	81.0	132–6SF7□	69.0	62	3	4 x 25	5DA33–1□□0	gk420
3000	140.0	110.0	99.0	134–6SF7□	83.0	72	3	4 x 35	5DA43–1□□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□A01–1□□0	—
3000	16.2	16.1	16.1	064–6WF7□	10.3	10.3	1	4 x 1.5	5□A01–1□□0	—
3000	35.0	35.0	35.0	084–8WF7□	24.5	27	1.5	4 x 4	5□A41–1□□0	—
3000	47.0	46.0	46.0	086–8WF7□	34.0	37	1.5	4 x 10	5□A61–1□□0	—
3000	85.0	78.0	78.0	105–8WF7□	83.0	82	3	4 x 35	5DA43–1□□0	gk420
3000	119.0	109.0	109.0	108–8WF7□	86.0	81	3	4 x 35	5DA43–1□□0	gk420

1 Core type
4, 6, 8 No. of poles

without brake cable:
with brake cable:

with overall shield
with overall shield

Lengths⁷⁾
(examples)

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

Cables are not included in the scope of supply of the motors and must be separately ordered. **Footnotes, refer to the next page.**

Table 1-6 Technical data 1FT6, rated speed 4500 RPM

n_N [RPM]	M_0 [Nm]	M_N [Nm]	$M_N^{1)}$ [Nm]	Motor type 1FT6–	I_0 [A]	I_N [A]	Con- ector size 2)	Cross- section ³⁾ [mm ²]	Cable type 4) 5) 6FX□002– ⁶⁾	Terminal box ²⁾
Non-ventilated										
4500	4.0	2.9	2.6	061–6AH7□	4.0	3.4	1	4 x 1.5	5□A01–1□□0	—
4500	6.0	3.6	3.2	062–□AH7□	5.7	3.9	1	4 x 1.5	5□A01–1□□0	—
4500	9.5	4.8	4.3	064–□AH7□	9.0	5.5	1	4 x 1.5	5□A01–1□□0	—
4500	8.0	5.8	5.2	081–8AH7□	8.6	7.3	1.5	4 x 1.5	5□A21–1□□0	—
4500	13.0	8.5	7.7	082–□AH7□	14.8	11	1.5	4 x 1.5	5□A21–1□□0	—
4500	20.0	10.5	9.5	084–□AH7□	19.8	12.5	1.5	4 x 4	5□A41–1□□0	—
4500	27.0	12.0	10.8	086–□AH7□	23.3	12.6	1.5	4 x 4	5□A41–1□□0	—
4500	27.0	12.0	10.8	102–8AH7□	24.1	12	1.5	4 x 4	5□A41–1□□0	gk130
Force ventilation										
4500	26.0	20.0	18.0	084–8SH7□	26.0	24.5	1.5	4 x 4	5□A41–1□□0	—
4500	35.0	27.0	24.3	086–8SH7□	38.0	32	3	4 x 16	5□A23–1□□0	—
4500	65.0	40.0	36.0	105–8SH7□	59.0	41	3	4 x 16	5□A23–1□□0	gk420
Water-cooling										
4500	10.2	10.0	10.0	062–6WH7□	9.7	9.6	1	4 x 1.5	5□A01–1□□0	—
4500	16.2	16.0	16.0	064–6WH7□	15.4	15.2	1	4 x 2.5	5□A11–1□□0	—
4500	35.0	35.0	35.0	084–8WH7□	37.0	39	1.5	4 x 10	5□A61–1□□0	—
4500	47.0	45.0	45.0	086–8WH7□	52.0	53	3	4 x 16	5□A23–1□□0	—

1 Core type
6, 8 No. of poles

without brake cable:
with brake cable:

with overall shield
with overall shield

C
D

Lengths⁷⁾
(examples)

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

Cables are not included in the scope of supply of the motors and must be separately ordered.

- 1) With absolute value 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 1-19
- 4) The shock hazard protection of the power cables depends on the size of the selected power module (refer to the Planning Guide, Drive Converter)
- 5) Motor with terminal box, power and signal cable, refer to Catalog, Chapter "MOTION-CONNECT connection system"
- 6) 6FX8002 = MOTION-CONNECT 800;
6FX5002 = MOTION-CONNECT 500;
Technical data, refer to Catalog, Chapter "MOTION-CONNECT connection system"
- 7) Cables can be supplied in units of one meter;
Length code, refer to the Planning Guide "General Part for Synchronous Servomotors"

1.5 Technical data

Table 1-7 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]	Connec- tor size 2)	Cross- section ³⁾ [mm ²]	Cable type 4) 5) 6FX□002– ⁶⁾	Terminal box ²⁾
Non-ventilated										
6000	0.4	0.3	0.22	021–6AK71	1.25	1.1	1	4 x 1.5	5□A01–1□□0	—
6000	0.8	0.5	0.37	024–6AK71	1.25	0.9	1	4 x 1.5	5□A01–1□□0	—
6000	1.0	0.75	0.6	031–4AK71	1.4	1.2	1	4 x 1.5	5□A01–1□□0	—
6000	2.0	1.4	1.2	034–□AK71	2.6	2.1	1	4 x 1.5	5□A01–1□□0	—
6000	2.6	1.7	1.4	041–4AK71	3.0	2.4	1	4 x 1.5	5□A01–1□□0	—
6000	5.0	3.0	2.6	044–4AK71	5.9	4.1	1	4 x 1.5	5□A01–1□□0	—
6000	4.0	2.1	1.8	061–6AK7□	5.0	3.1	1	4 x 1.5	5□A01–1□□0	—
6000	6.0	2.1	1.8	062–6AK7□	7.6	3.2	1	4 x 1.5	5□A01–1□□0	—
6000	9.5	2.1	1.8	064–6AK7□	12.0	3.5	1	4 x 1.5	5□A01–1□□0	—
6000	8.0	4.6	3.9	081–8AK7□	11.1	7.7	1.5	4 x 1.5	5□A21–1□□0	—
6000	13.0	5.5	4.7	082–8AK7□	17.3	9.1	1.5	4 x 2.5	5□A31–1□□0	—
6000	20.0	6.5	5.5	084–□AK7□	24.1	9.2	1.5	4 x 4	5□A41–1□□0	—
Force ventilation										
6000	26.0	17.0	14.5	084–8SK7□	35.0	25.5	1.5	4 x 10	5□A61–1□□0	—
6000	35.0	22.0	18.7	086–8SK7□	44.0	29.0	3	4 x 16	5□A23–1□□0	—
Water-cooling										
6000	10.2	9.8	9.8	062–6WK7□	12.9	12.7	1	4 x 1.5	5□A01–1□□0	—
6000	16.2	15.8	15.8	064–6WK7□	20.5	20	1	4 x 2.5	5□A11–1□□0	—
6000	35.0	34.0	34.0	084–8WK7□	47.0	51	3	4 x 16	5□A23–1□□0	—
6000	47.0	44.0	44.0	086–8WK7□	59.0	58	3	4 x 16	5□A23–1□□0	—

1 Core type
4, 8 No. of poles

without brake cable:
with brake cable:

with overall shield
with overall shield

C
D

Lengths⁷⁾
(examples)

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

Cables are not included in the scope of supply of the motors and must be separately ordered.

- 1) With absolute value 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 1-19
- 4) The shock hazard protection of the power cables depends on the size of the selected power module (refer to the Planning Guide, Drive Converter)
- 5) Motor with terminal box, power and signal cable, refer to Catalog, Chapter "MOTION-CONNECT connection system"
- 6) 6FX8002 = MOTION-CONNECT 800;
6FX5002 = MOTION-CONNECT 500;
Technical data, refer to Catalog, Chapter "MOTION-CONNECT connection system"
- 7) Cables can be supplied in units of one meter;
Length code, refer to the Planning Guide "General Part for Synchronous Servomotors"

1.6 Armature short-circuit braking

For a definition, refer to the Planning Guide "General Part for Synchronous Servomotors".

Braking resistors

The correct dimensioning ensures an optimum braking time. The braking torques that are obtained are also listed in the tables. Data is valid for braking from the rated speed. If the drive is braked from another speed, then the braking time **cannot** be proportionally reduced. However, longer braking times cannot occur.

The quantities list in the following table are calculated for nominal values according to the data sheet. The natural variance in 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 Planning Guide "General Part for Synchronous Servomotors".

Non-ventilated

Table 1-8 Resistor braking for the 1FT6 series, shaft heights 28 to 48, non-ventilated

Motor type	External brake resistor R _{opt} [Ω]	Average braking torque M _{br rms} [Nm]		Max. braking torque M _{br max} [Nm]	RMS braking current I _{br rms} [A]	
		without external brake resistor	with external brake resistor		without external brake resistor	with external brake resistor
SH 28, SH 36, SH 48, non-ventilated						
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

1.6 Armature short-circuit braking

Table 1-9 Resistor braking for the 1FT6 series, shaft heights 63 to 80, non-ventilated

Motor type	External brake resistor R _{opt} [Ω]	Average braking torque M _{br rms} [Nm]		Max. braking torque M _{br max} [Nm]	RMS braking current I _{br rms} [A]	
		without external brake resistor	with external brake resistor		without external brake resistor	with external brake resistor
SH 63 non-ventilated						
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
SH 80 non-ventilated						
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

1.6 Armature short-circuit braking

Table 1-10 Resistor braking for the 1FT6 series, shaft heights 100 to 132, non-ventilated

Motor type	External brake resistor R _{opt} [Ω]	Average braking torque M _{br rms} [Nm]		Max. braking torque M _{br max} [Nm]	RMS braking current I _{br rms} [A]	
		without external brake resistor	with external brake resistor		without external brake resistor	with external brake resistor
SH 100 non-ventilated						
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
SH 132 non-ventilated						
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 according to M_0 (100 K) a series braking resistor must be used in order to prevent partial de-magnetization.
When utilized according to M_0 (60 K), the additional braking resistor is not required.

1.6 Armature short-circuit braking

Force ventilation

Table 1-11 Resistor braking for the 1FT6 series, force-ventilated

Motor type	External brake resistor R _{opt} [Ω]	Average braking torque M _{br rms} [Nm]		Max. braking torque M _{br max} [Nm]	RMS braking current I _{br rms} [A]	
		without external brake resistor	with external brake resistor		without external brake resistor	with external brake 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
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 according to M_0 (100 K) a series braking resistor must be used in order to prevent partial de-magnetization. When utilized according to M_0 (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.

1.6 Armature short-circuit braking

Water-cooling

Table 1-12 Resistor braking for the 1FT6 series, water cooling

Motor type	External brake resistor R _{opt} [Ω]	Average braking torque M _{br rms} [Nm]		Max. braking torque M _{br max} [Nm]	RMS braking current I _{br rms} [A]	
		without external brake resistor	with external brake resistor		without external brake resistor	with external brake resistor
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
1FT6163–8WD7□	0.25 ²⁾	–	380	490	–	390
1FT6168–8WB7□	0.27 ²⁾	–	530	680	–	340

- 1) When utilized according to M_0 (100 K) a series braking resistor must be used in order to prevent partial de-magnetization. When utilized according to M_0 (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.

1.7 Cooling

Cooling types

The different cooling types are defined in the Planning Guide "General Part for Synchronous Servomotors".

1.7.1 Force ventilation

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

The degrees of protection IP64, IP65, IP67 and IP68 cannot be fulfilled.

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.

Force ventilation, SH 80 and SH 100

Airflow direction from NDE to DE

If the airflow direction is reversed, the torque yield is reduced by approx. 20 %.

Mechanical changes to the motors with respect to the non-ventilated design:

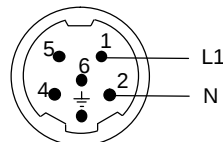
- The power connector is 12 mm higher.
- A sheet metal jacket is shifted over the motor enclosure from the non-drive end; an axial fan is mounted in this jacket. There is a cut-out in the sheet metal jacket at the connector positions. This means that the motor is only partially cooled by the air flow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

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

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



Force ventilated, SH 132

Air flow direction from ND to NDE.

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

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

Force ventilated, SH 160

Air flow direction from ND to NDE.

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

Connection: Through the 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 1-13 Minimum clearance to parts and components mounted by the customer

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

1.7 Cooling

1.7.2 Water-cooling

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

The motor rated torques, specified in the data sheets apply for water-cooled operational and a water intake temperature of < 30 °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 non-ventilated operations apply.

Note

It is not possible to retrofit 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 100 µm.

Cooling circuit

Notice

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

Table 1-14 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
1FT6082	0.4	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 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 1-15.

Table 1-15 Materials used in the motor cooling circuit

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

Cooling medium and anti-corrosion protection

Notice

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

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

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 Table 1-16).

Observe the specifications of the anti-corrosion agent manufacturer regarding the ratios 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 gravity:	ρ [kg/m ³]
Specific thermal capacitance:	c_p [J/(kg K)]
Intake temperature:	t_v [°C]
Flow quantity:	v [l/min]

The inquiry must be made in the manufacturer's plant (Hotline).

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

1.7 Cooling

Note

Different anti-corrosion agents should not be mixed.

Table 1-16 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
CINCINATI 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 similar products with the same quality from other manufacturers can be used. Our recommendation should only be considered as such and not as a specification. 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: $T_{\text{cooling}} \leq T_{\text{ambient}} - 2^{\circ} \text{C}$

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 powers to be dissipated

The values specified in Table 1-17 refer to a cooling-medium temperature of 30 °C and maximum speed in S1 duty.

Table 1-17 Cooling powers to be dissipated

Motor type	Cooling power to be dissipated [W]
1FT6062-6WF7□	600
1FT6062-6WH7□	650
1FT6062-6WK7□	700
1FT6064-6WF7□	800
1FT6064-6WH7□	850
1FT6064-6WK7□	900
1FT6084-8WF7□	1500
1FT6084-8WH7□	1600
1FT6084-8WK7□	1700
1FT6086-8WF7□	1800
1FT6086-8WH7□	2000
1FT6086-8WK7□	2400
1FT6105-8WC7□	2000
1FT6105-8WF7□	2100
1FT6108-8WB7□	1900
1FT6108-8WC7□	2100
1FT6108-8WF7□	2100
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

1.7 Cooling

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.

Cooling system manufacturer, refer to the Catalog.

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.

1.8 Electrical connections



Warning

The motors may not be connected to the line supply.

1.8.1 Connector assignment

Connector assignment, motor connectors and signal connectors at the motor

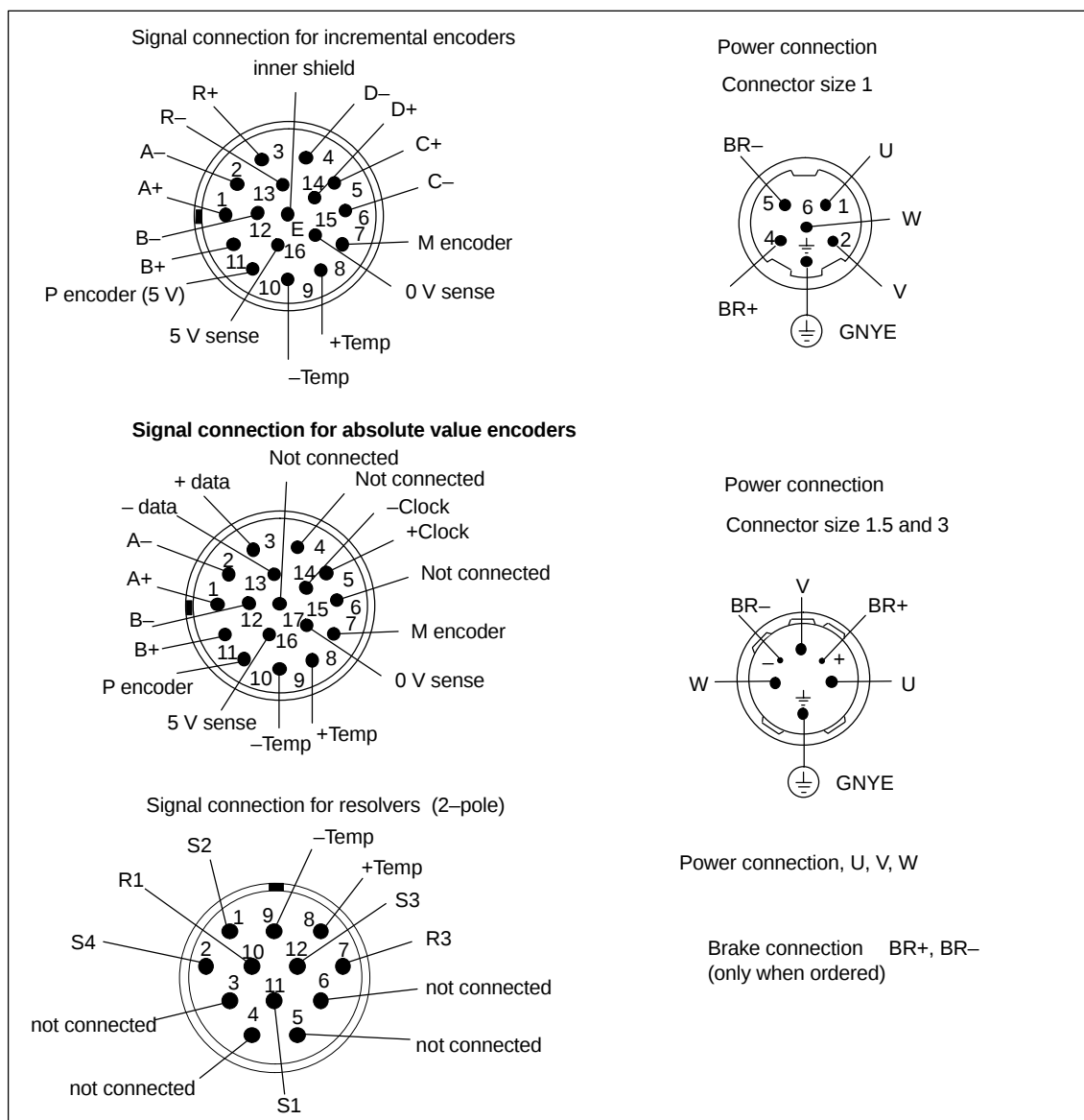


Fig. 1-1 Connector assignment: Power, brake, encoder, temperature sensor

1.8.2 Connection, terminal box

- The terminal assignment in the terminal box must be implemented according to Fig. 1-2.
- The protective conductor must be connected.
- Cable lugs acc. to DIN 46234 must be used.
- An optional brake should be connected according to Fig. 1-2.

Notice

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

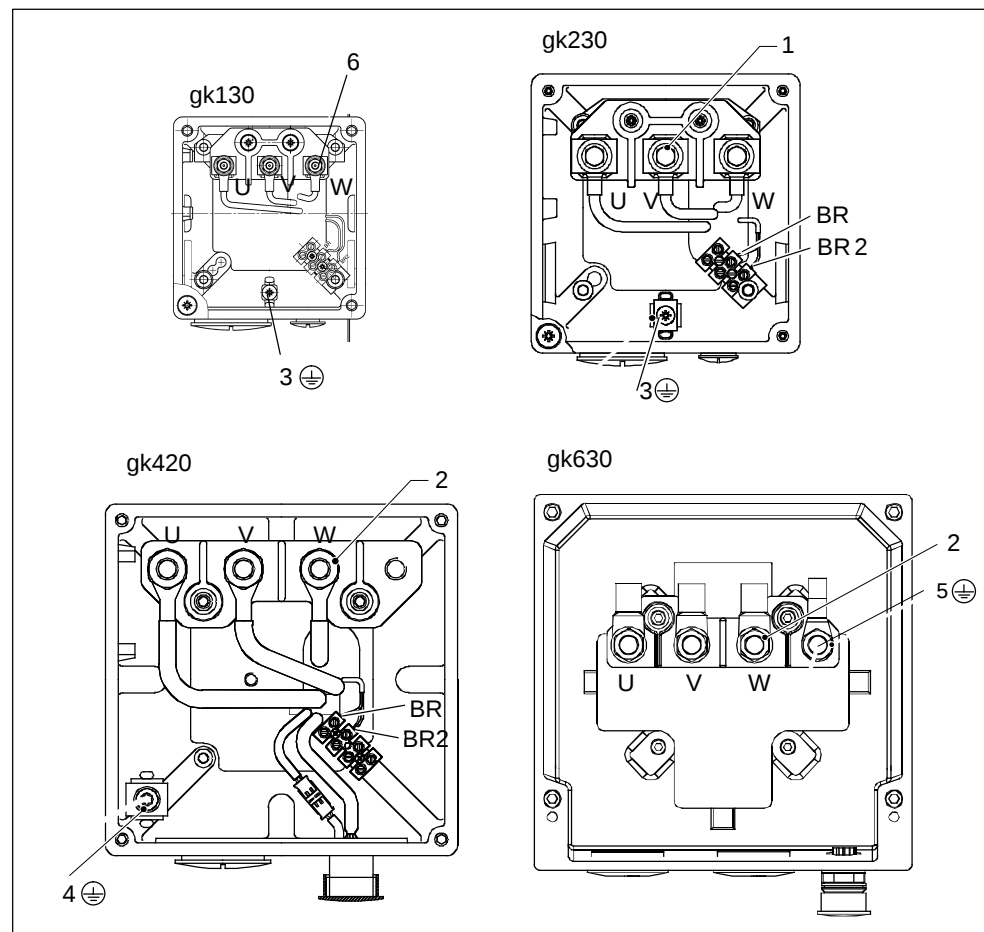


Fig. 1-2 Terminal assignment in the terminal boxes

Table 1-18 Description, refer to Fig. 1-2

No.	Description	No.	Description
1	M5 connecting studs	5	M10 grounding studs
2	M10 connecting studs	6	M4 connecting studs
3	M4 grounding stud	BR	Brake connection
4	M6 grounding stud		

Table 1-19 Connections for the terminal box

Terminal box type	Cable entry	Max. cable outer diameter ³⁾ [mm]	Max. current [A] ¹⁾	Power connection	Max. cross-section per phase	Ground connection	Brake connection ²⁾
gk130	1 x Pg29	30	36	3 x M4	1 x 6 mm ²	M4	1.5 mm ²
gk230	1 x Pg29	30	66	3 x M5	1 x 16 mm ²	M4	1.5 mm ²
gk420	1 x Pg36	37	104	4 x M10	1 x 35 mm ²	M6	1.5 mm ²
gk630	2 x M32 x 1.5	25	112	3 x M10	2 x 16 mm ²	M10	—
gk630	2 x M40 x 1.5	32	176	3 x M10	2 x 35 mm ²	M10	—
gk630	2 x M50 x 1.5	41	209	3 x M10	2 x 50 mm ²	M10	—

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

2) BR/BR2 (terminal strip, only for versions with brake)

3) Dependent on the seal used

1.9 Drive-out coupling

The KTR company offers the pinion wheels of the Rotex GS couplings with various shore hardnesses. The values specified in Table 1-20 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 1-20. Please contact the coupling manufacturer for detailed design information. Ordering address, refer to the Planning Guide "General Section" or Internet www.ktr.com.

Table 1-20 Assignment of the drive-out couplings to the motors

Shaft height of the 1FT6 motors	d_w [mm] ¹⁾	Rotex GS Size	98 Sh A GS		T_R [Nm] ⁴⁾
			T_{KN} [Nm] ²⁾	T_{Kmax} [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.



[illegible]

Technical Data and Characteristics

2

2.1 Speed–torque diagrams

Note

Refer to the Planning Guide "General Section for Synchronous Servomotors" for a description of the shift of the voltage limiting characteristics.

The specified thermal S3 limiting characteristics are referred to $\Delta T = 100\text{ K}$ for a 1 min duty cycle.

2.1 Speed–torque diagrams

2.1.1 1FT6 series, non–ventilated

Table 2-1 1FT6021 non–ventilated

1FT6021				
Technical data	Code	Units	–6AK71	
Engineering data				
Rated speed	n_N	RPM	6000	
Number of poles	$2p$		6	
Rated torque (100K)	M_N (100K)	Nm	0.3	
Rated current (100K)	I_N (100K)	A	1.1	
Standstill torque (60K)	M_0 (60K)	Nm	0.33	
Standstill torque (100K)	M_0 (100K)	Nm	0.40	
Standstill current (60K)	I_0 (60K)	A	1.0	
Standstill current (100K)	I_0 (100K)	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. perm. 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	

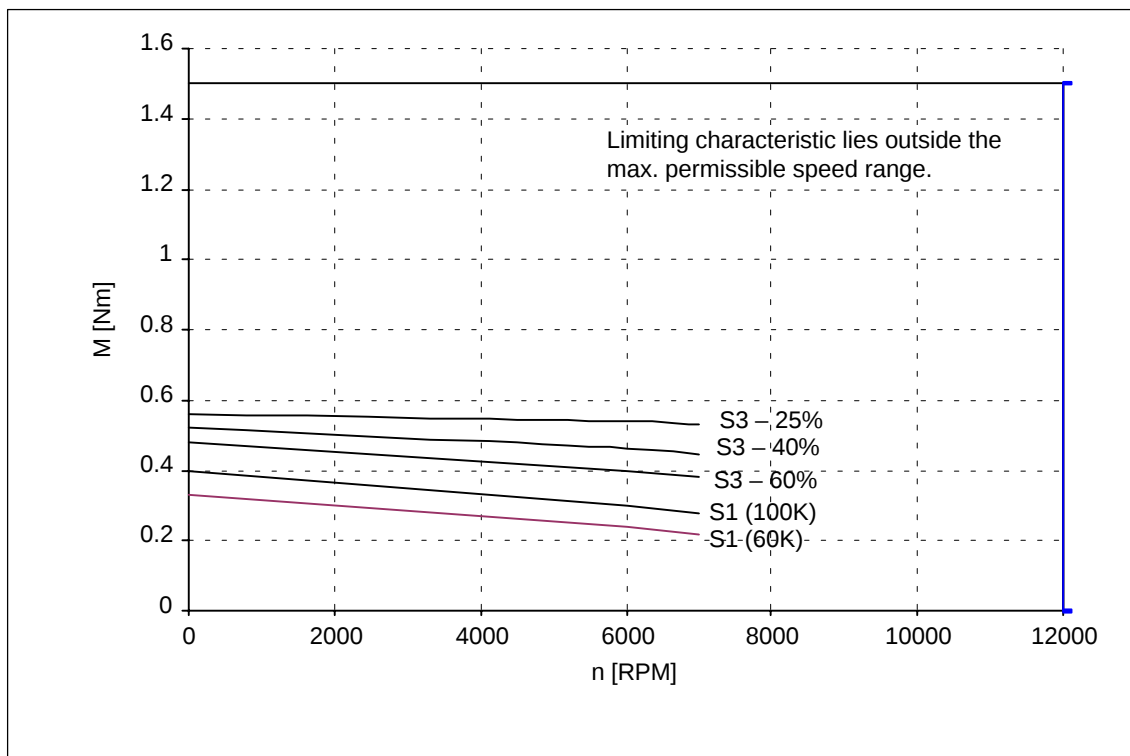


Fig. 2-1 Speed–torque diagram 1FT6021

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

2.1 Speed–torque diagrams

Table 2-2 1FT6024 non-ventilated

1FT6024				
Technical data	Code	Units	–6AK71	
Engineering data				
Rated speed	n_N	RPM	6000	
Number of poles	2p		6	
Rated torque (100K)	M_N (100K)	Nm	0.5	
Rated current (100K)	I_N (100K)	A	0.9	
Standstill torque (60K)	M_0 (60K)	Nm	0.66	
Standstill torque (100K)	M_0 (100K)	Nm	0.8	
Standstill current (60K)	I_0 (60K)	A	1.0	
Standstill current (100K)	I_0 (100K)	A	1.25	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	0.41	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	0.34	
Optimum operating point				
Optimum speed	n_{opt}	RPM	6000	
Optimum power	P_{opt}	kW	0.31	
Limiting data				
Max. perm. 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	

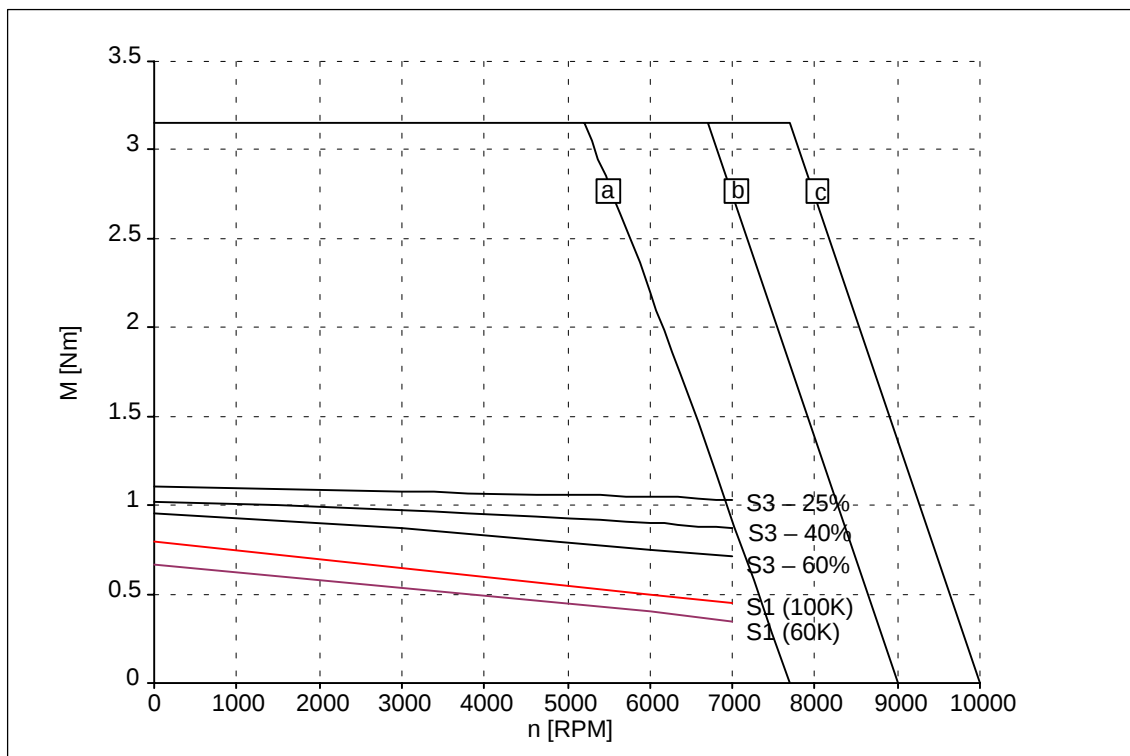


Fig. 2-2 Speed–torque diagram 1FT6024

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

2.1 Speed–torque diagrams

Table 2-3 1FT6031 non-ventilated

1FT6031				
Technical data	Code	Units	–4AK71	
Engineering data				
Rated speed	n_N	RPM	6000	
Number of poles	2p		4	
Rated torque (100K)	M_N (100K)	Nm	0.75	
Rated current (100K)	I_N (100K)	A	1.2	
Standstill torque (60K)	M_0 (60K)	Nm	0.83	
Standstill torque (100K)	M_0 (100K)	Nm	1.0	
Standstill current (60K)	I_0 (60K)	A	1.1	
Standstill current (100K)	I_0 (100K)	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. perm. 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	25	
Weight with brake	m	kg	3.5	
Weight without brake	m	kg	3.1	

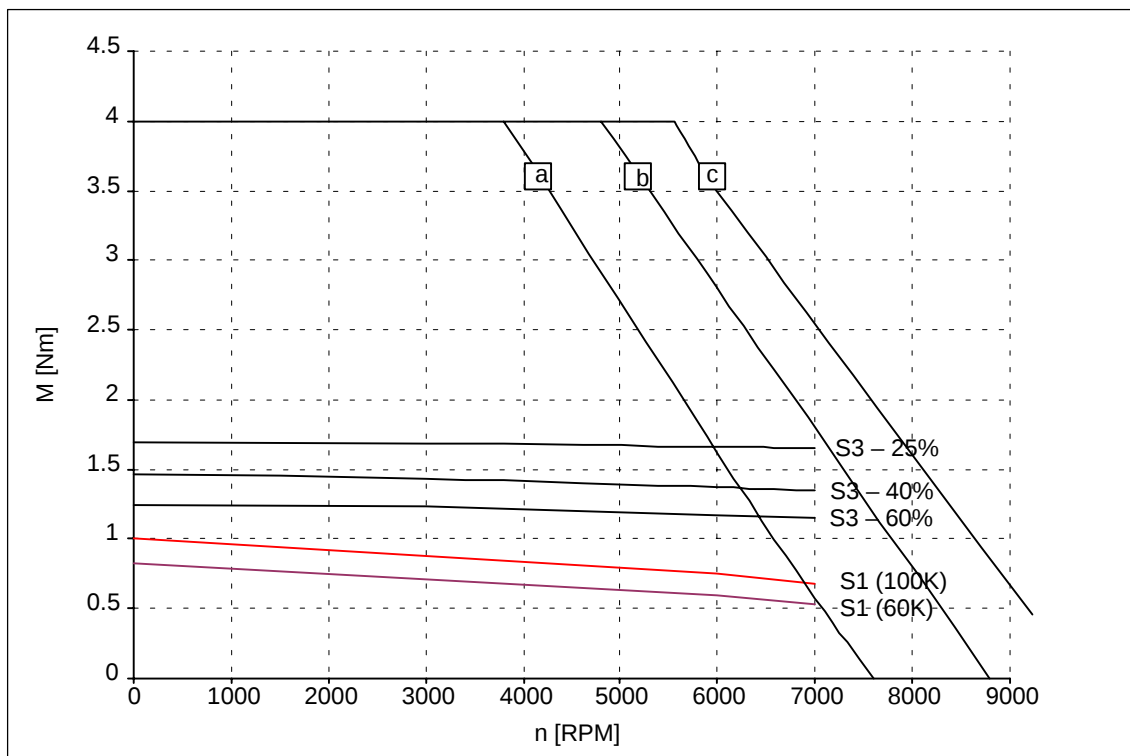


Fig. 2-3 Speed–torque diagram 1FT6031

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

2.1 Speed–torque diagrams

Table 2-4 1FT6034 non-ventilated

1FT6034				
Technical data	Code	Units	–4AK71	
Engineering data				
Rated speed	n_N	RPM	6000	
Number of poles	2p		4	
Rated torque (100K)	M_N (100K)	Nm	1.4	
Rated current (100K)	I_N (100K)	A	2.1	
Standstill torque (60K)	M_0 (60K)	Nm	1.65	
Standstill torque (100K)	M_0 (100K)	Nm	2	
Standstill current (60K)	I_0 (60K)	A	2.1	
Standstill current (100K)	I_0 (100K)	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. perm. 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	30	
Weight with brake	m	kg	4.8	
Weight without brake	m	kg	4.4	

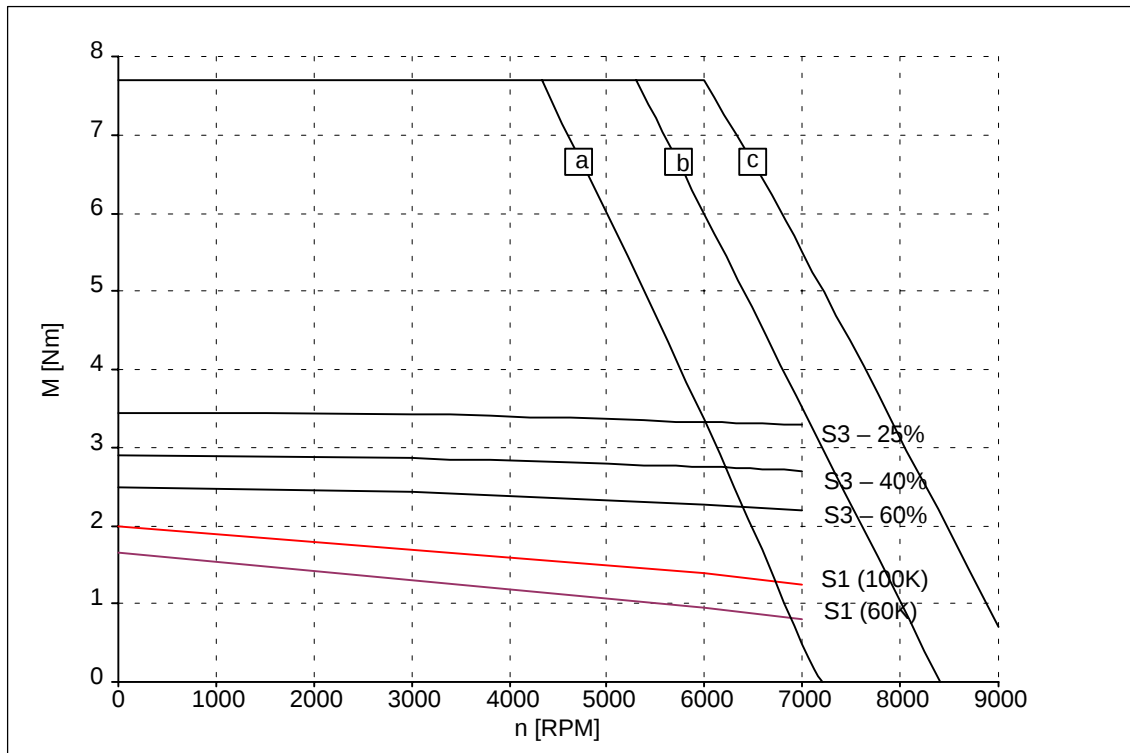


Fig. 2-4 Speed–torque diagram 1FT6034

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

2.1 Speed–torque diagrams

Table 2-5 1FT6041 non-ventilated

1FT6041					
Technical data	Code	Units	–4AF71	–4AK71	
Engineering data					
Rated speed	n_N	RPM	3000	6000	
Number of poles	$2p$		4	4	
Rated torque (100K)	M_N (100K)	Nm	2.15	1.7	
Rated current (100K)	I_N (100K)	A	1.7	2.4	
Standstill torque (60K)	M_0 (60K)	Nm	2.15	2.15	
Standstill torque (100K)	M_0 (100K)	Nm	2.6	2.6	
Standstill current (60K)	I_0 (60K)	A	1.5	2.5	
Standstill current (100K)	I_0 (100K)	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. perm. 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	

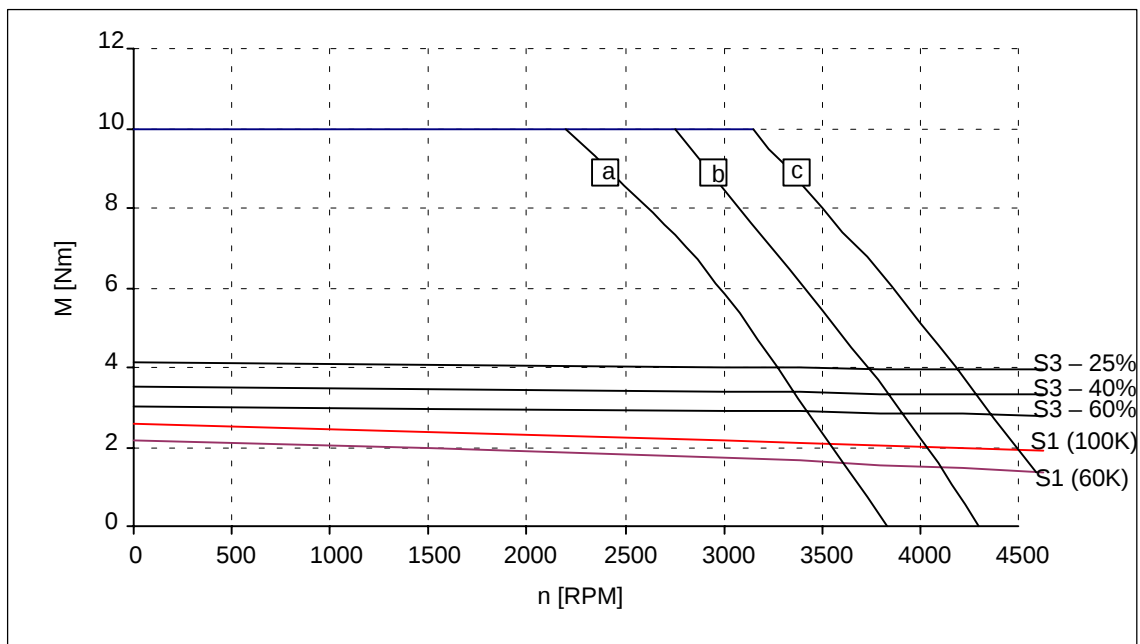


Fig. 2-5 Speed-torque diagram 1FT6041-4AF71

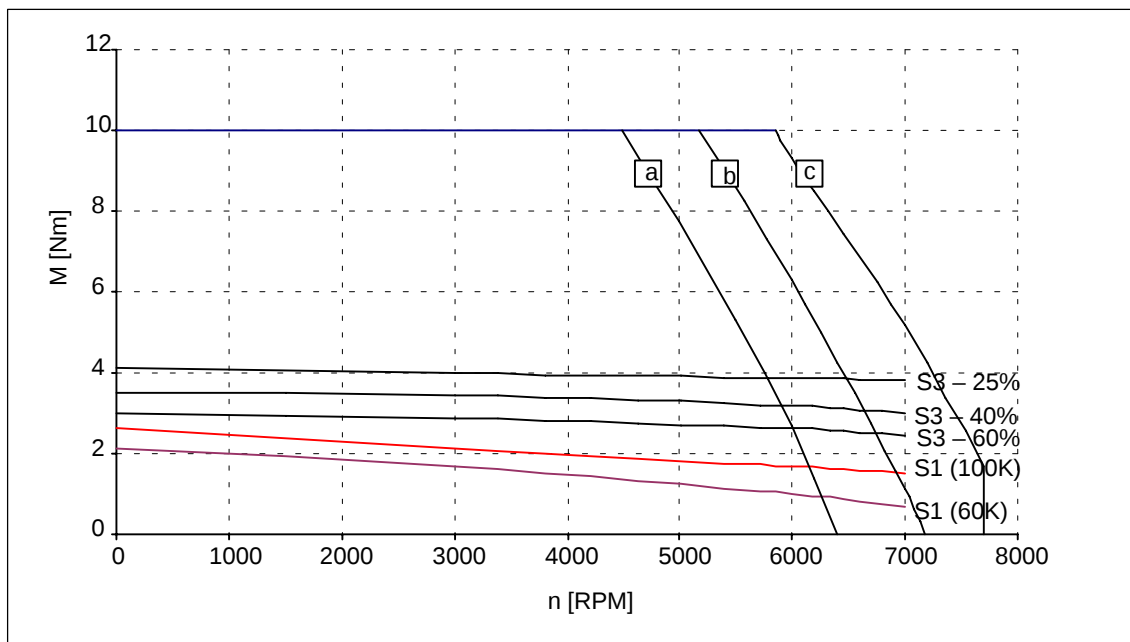


Fig. 2-6 Speed-torque diagram 1FT6041-4AK71

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

2.1 Speed–torque diagrams

Table 2-6 1FT6044 non-ventilated

1FT6044					
Technical data	Code	Units	–□AF71	–4AK71	
Engineering data					
Rated speed	n_N	RPM	3000	6000	
Number of poles	$2p$		4	4	
Rated torque (100K)	M_N (100K)	Nm	4.3	3.0	
Rated current (100K)	I_N (100K)	A	2.9	4.1	
Standstill torque (60K)	M_0 (60K)	Nm	4.2	4.2	
Standstill torque (100K)	M_0 (100K)	Nm	5.0	5.0	
Standstill current (60K)	I_0 (60K)	A	2.4	4.8	
Standstill current (100K)	I_0 (100K)	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. perm. 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	

2.1 Speed-torque diagrams

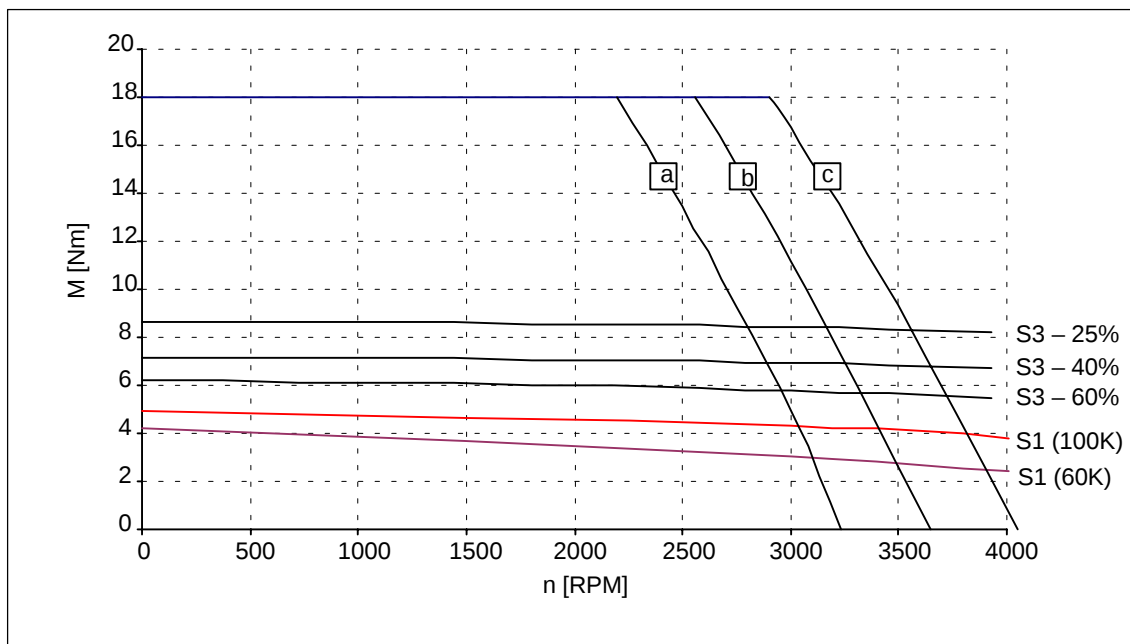


Fig. 2-7 Speed-torque diagram 1FT6044-□AF71

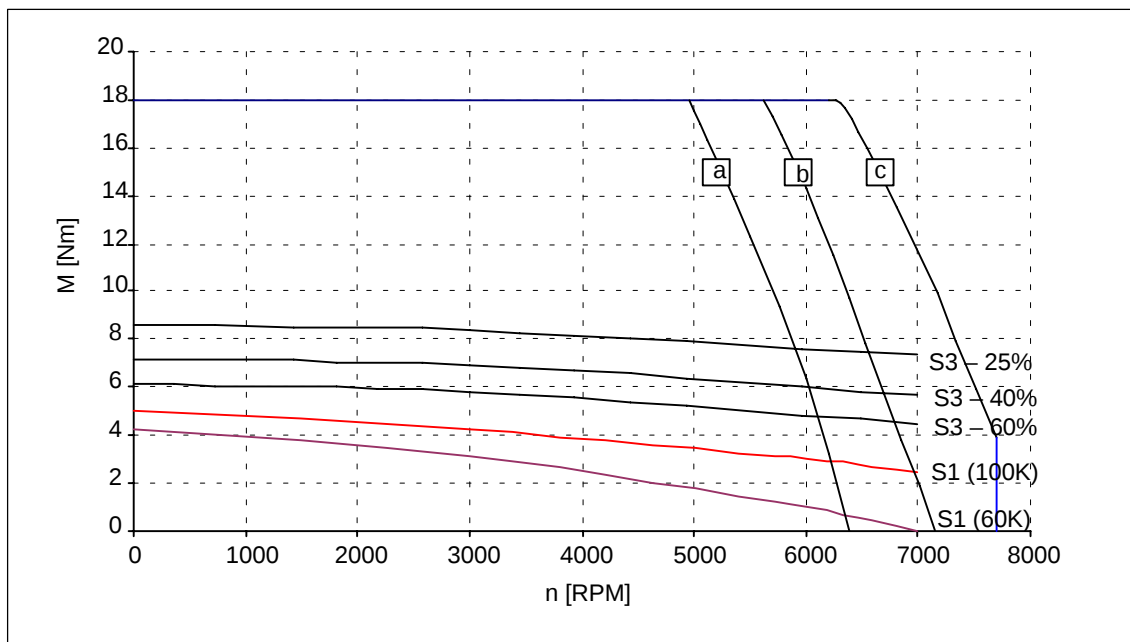


Fig. 2-8 Speed-torque diagram 1FT6044-4AK71

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

2.1 Speed–torque diagrams

Table 2-7 1FT6061 non-ventilated

1FT6061					
Technical data	Code	Units	–6AC7□	–6AF7□	
Engineering data					
Rated speed	n_N	RPM	2000	3000	
Number of poles	2p		6	6	
Rated torque (100K)	M_N (100K)	Nm	3.7	3.5	
Rated current (100K)	I_N (100K)	A	1.9	2.6	
Standstill torque (60K)	M_0 (60K)	Nm	3.3	3.3	
Standstill torque (100K)	M_0 (100K)	Nm	4.0	4.0	
Standstill current (60K)	I_0 (60K)	A	1.6	2.2	
Standstill current (100K)	I_0 (100K)	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. perm. 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	

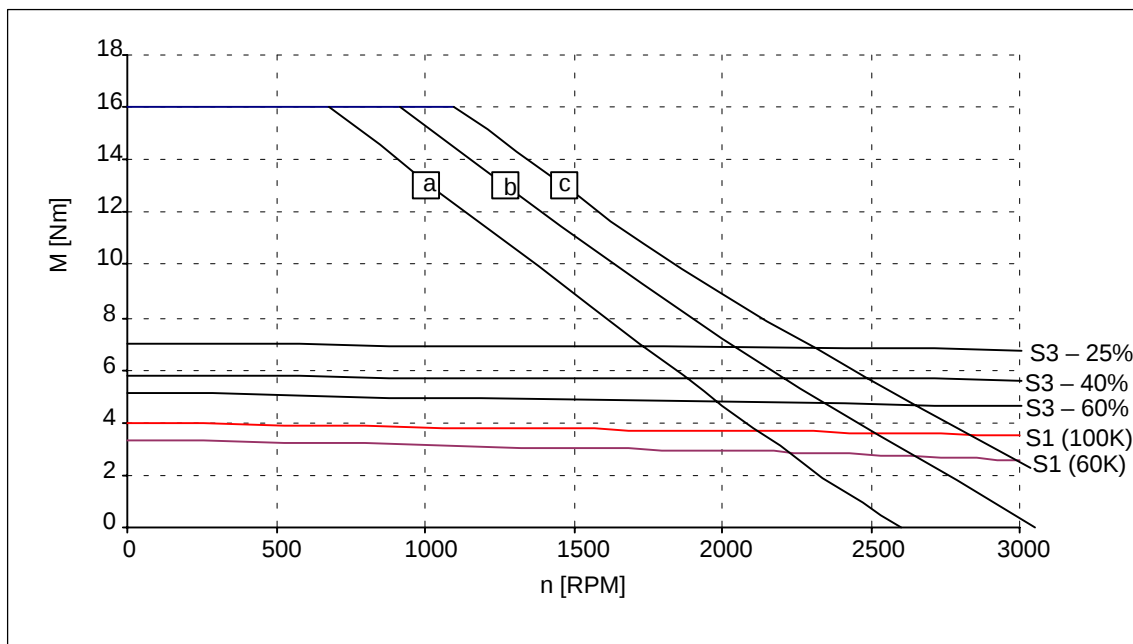


Fig. 2-9 Speed–torque diagram 1FT6061-6AC7

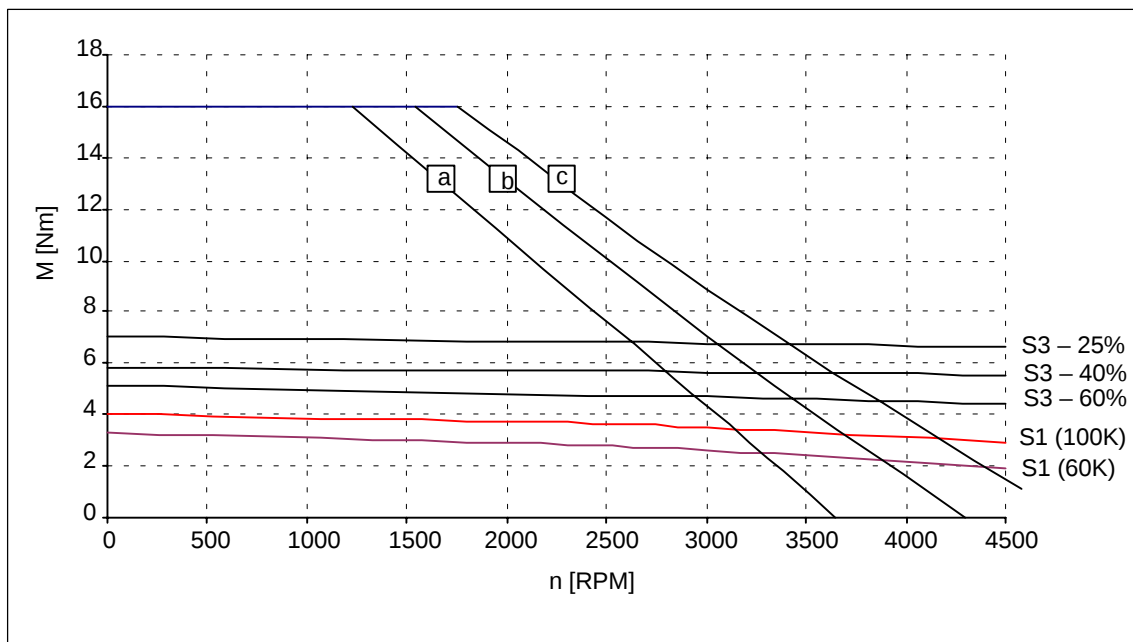


Fig. 2-10 Speed–torque diagram 1FT6061-6AF7

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

2.1 Speed–torque diagrams

Table 2-8 1FT6061 non-ventilated

1FT6061					
Technical data	Code	Units	–6AH7□	–6AK7□	
Engineering data					
Rated speed	n_N	RPM	4500	6000	
Number of poles	2p		6	6	
Rated torque (100K)	M_N (100K)	Nm	2.9	2.1	
Rated current (100K)	I_N (100K)	A	3.4	3.1	
Standstill torque (60K)	M_0 (60K)	Nm	3.3	3.3	
Standstill torque (100K)	M_0 (100K)	Nm	4	4	
Standstill current (60K)	I_0 (60K)	A	3.3	4	
Standstill current (100K)	I_0 (100K)	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	5000	
Optimum power	P_{opt}	kW	1.37	1.38	
Limiting data					
Max. perm. 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	

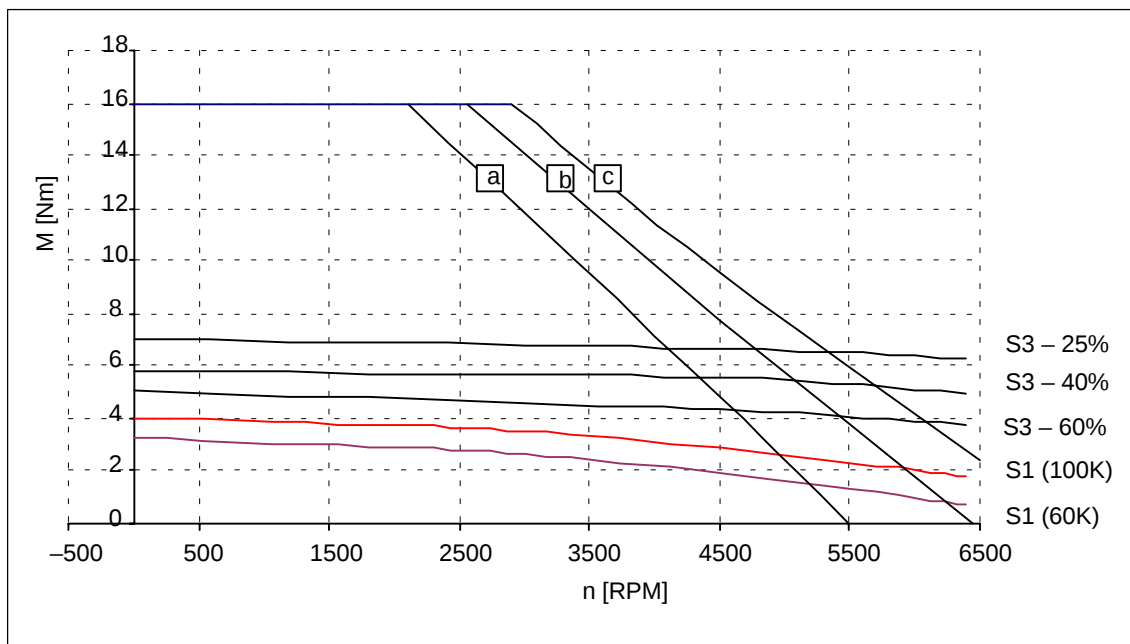


Fig. 2-11 Speed–torque diagram 1FT6061-6AH7

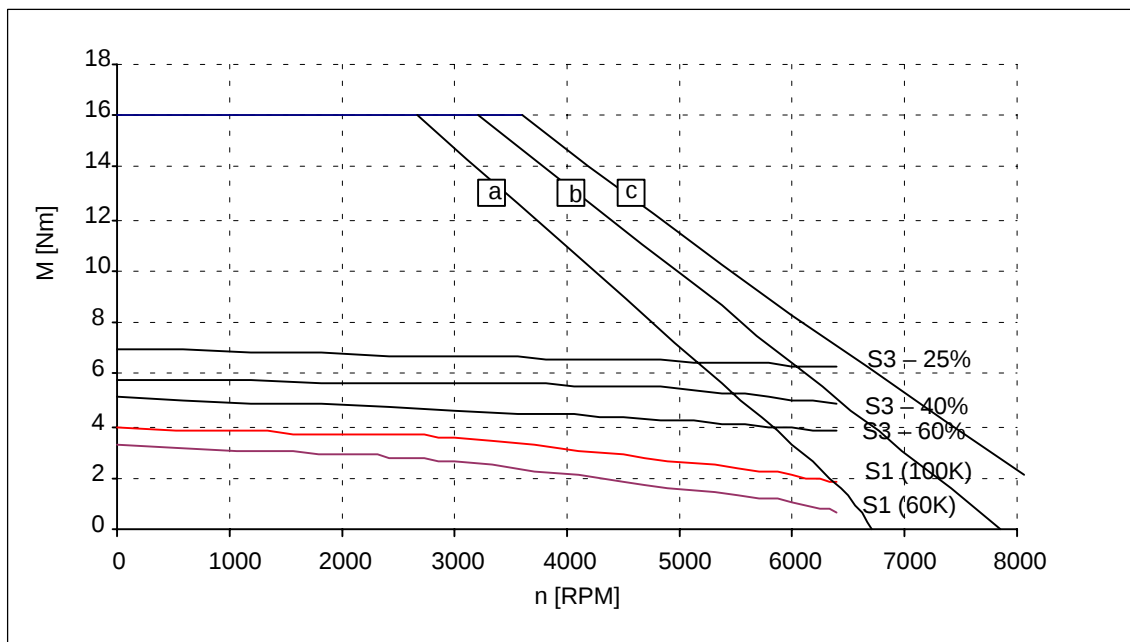


Fig. 2-12 Speed–torque diagram 1FT6061-6AK7

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

2.1 Speed–torque diagrams

Table 2-9 1FT6062 non-ventilated

1FT6062					
Technical data	Code	Units	–6AC7□	–6AF7□	
Engineering data					
Rated speed	n_N	RPM	2000	3000	
Number of poles	2p		6	6	
Rated torque (100K)	M_N (100K)	Nm	5.2	4.7	
Rated current (100K)	I_N (100K)	A	2.6	3.4	
Standstill torque (60K)	M_0 (60K)	Nm	5	5	
Standstill torque (100K)	M_0 (100K)	Nm	6	6	
Standstill current (60K)	I_0 (60K)	A	2.2	3.3	
Standstill current (100K)	I_0 (100K)	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. perm. 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	

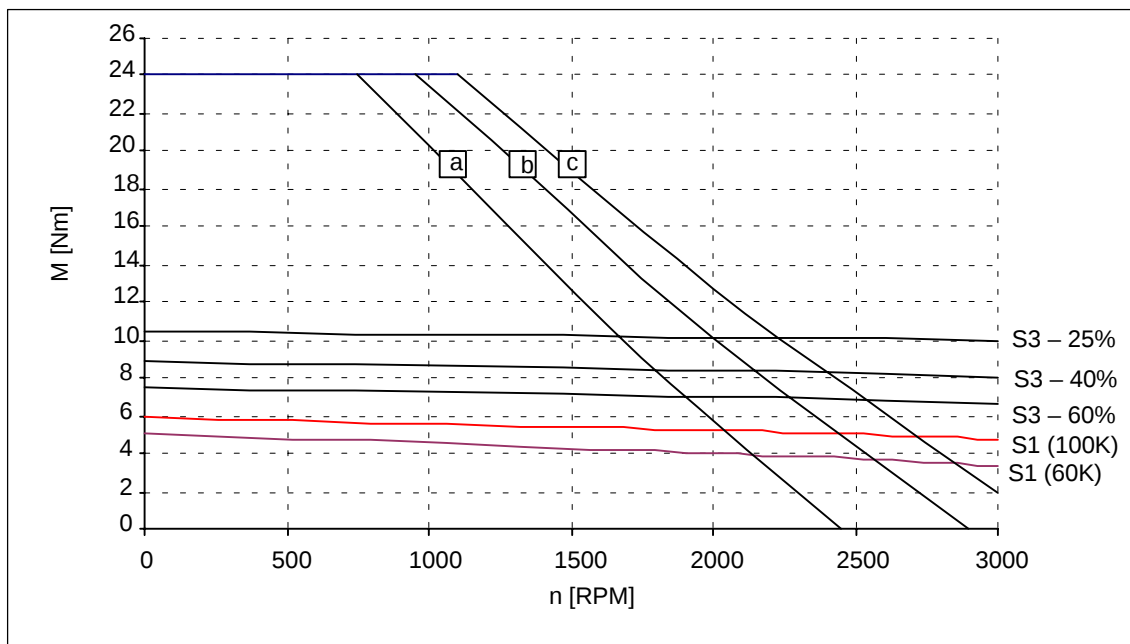


Fig. 2-13 Speed–torque diagram 1FT6062-6AC7

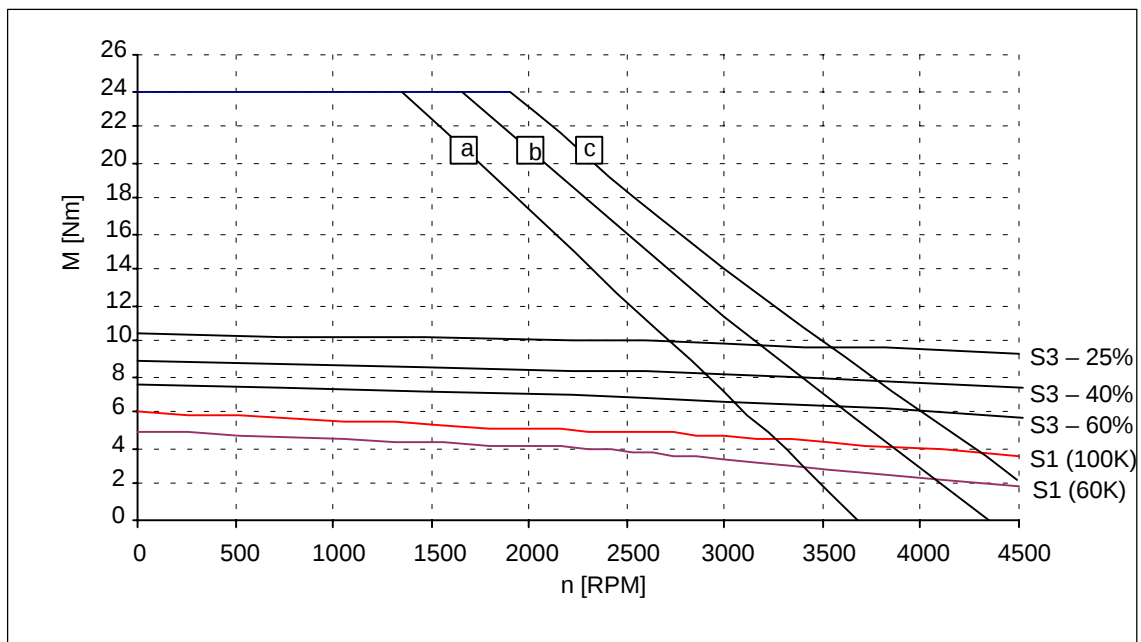


Fig. 2-14 Speed–torque diagram 1FT6062-6AF7

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

2.1 Speed–torque diagrams

Table 2-10 1FT6062 non-ventilated

1FT6062					
Technical data	Code	Units	–6AH7□	–6AK7□	
Engineering data					
Rated speed	n_N	RPM	4500	6000	
Number of poles	2p		6	6	
Rated torque (100K)	M_N (100K)	Nm	3.6	2.1	
Rated current (100K)	I_N (100K)	A	3.9	3.2	
Standstill torque (60K)	M_0 (60K)	Nm	5	5	
Standstill torque (100K)	M_0 (100K)	Nm	6	6	
Standstill current (60K)	I_0 (60K)	A	4.7	6.2	
Standstill current (100K)	I_0 (100K)	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. perm. 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	

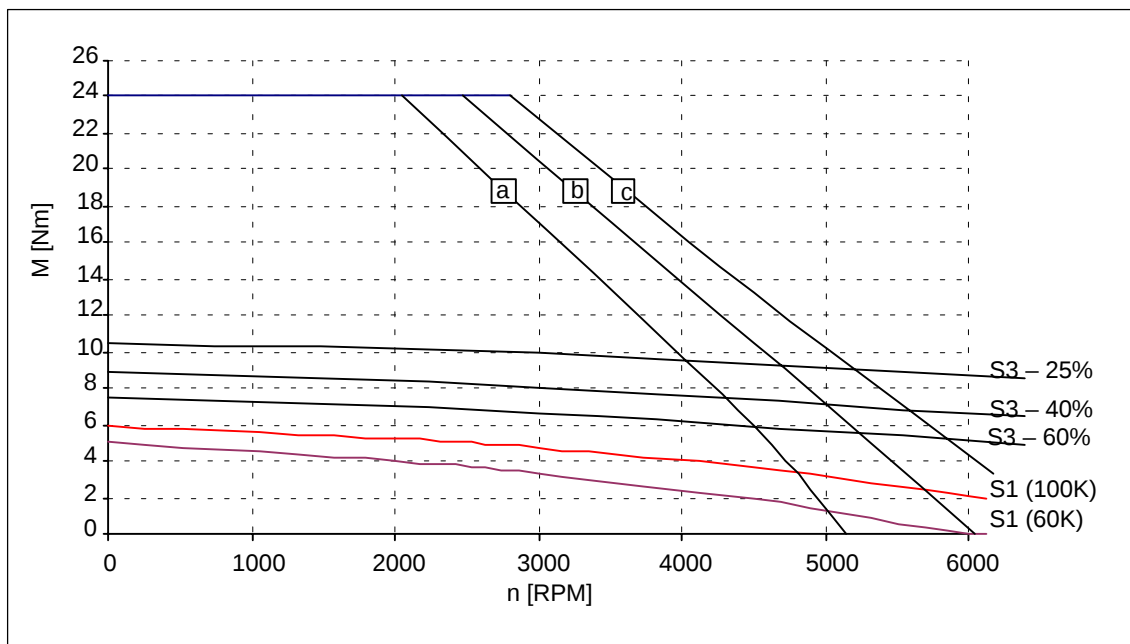


Fig. 2-15 Speed–torque diagram 1FT6062-6AH7□

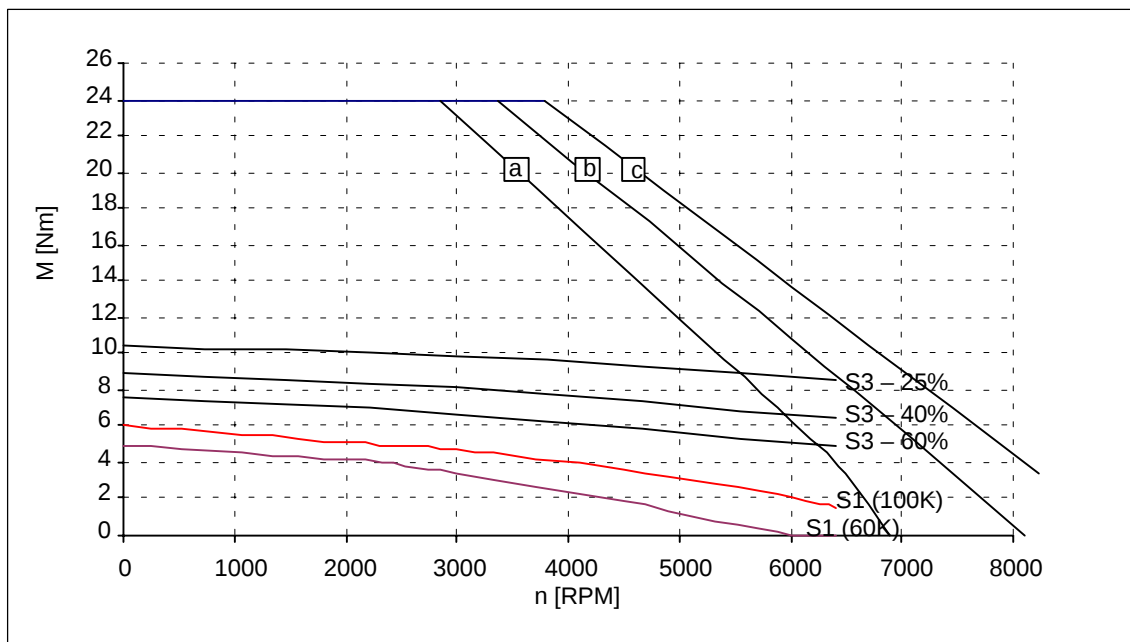


Fig. 2-16 Speed–torque diagram 1FT6062-6AK7□

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

2.1 Speed–torque diagrams

Table 2-11 1FT6064 non-ventilated

1FT6064					
Technical data	Code	Units	–6AC7□	–6AF7□	
Engineering data					
Rated speed	n_N	RPM	2000	3000	
Number of poles	2p		6	6	
Rated torque (100K)	M_N (100K)	Nm	8.0	7.0	
Rated current (100K)	I_N (100K)	A	3.8	4.9	
Standstill torque (60K)	M_0 (60K)	Nm	7.9	7.9	
Standstill torque (100K)	M_0 (100K)	Nm	9.5	9.5	
Standstill current (60K)	I_0 (60K)	A	3.4	4.9	
Standstill current (100K)	I_0 (100K)	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. perm. 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	

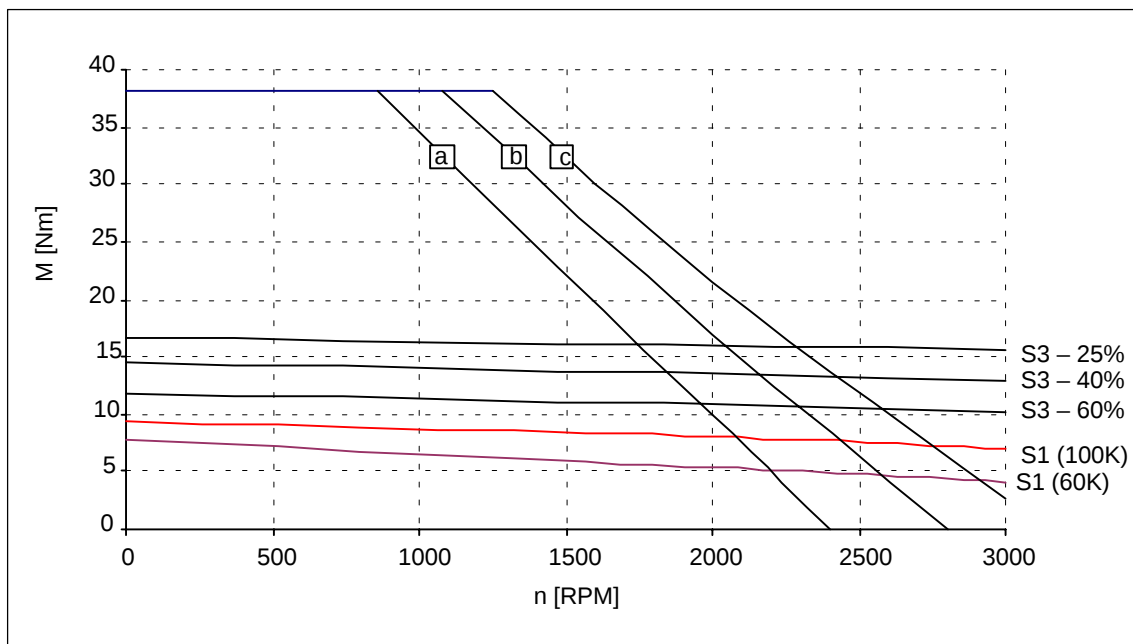


Fig. 2-17 Speed–torque diagram 1FT6064-6AC7

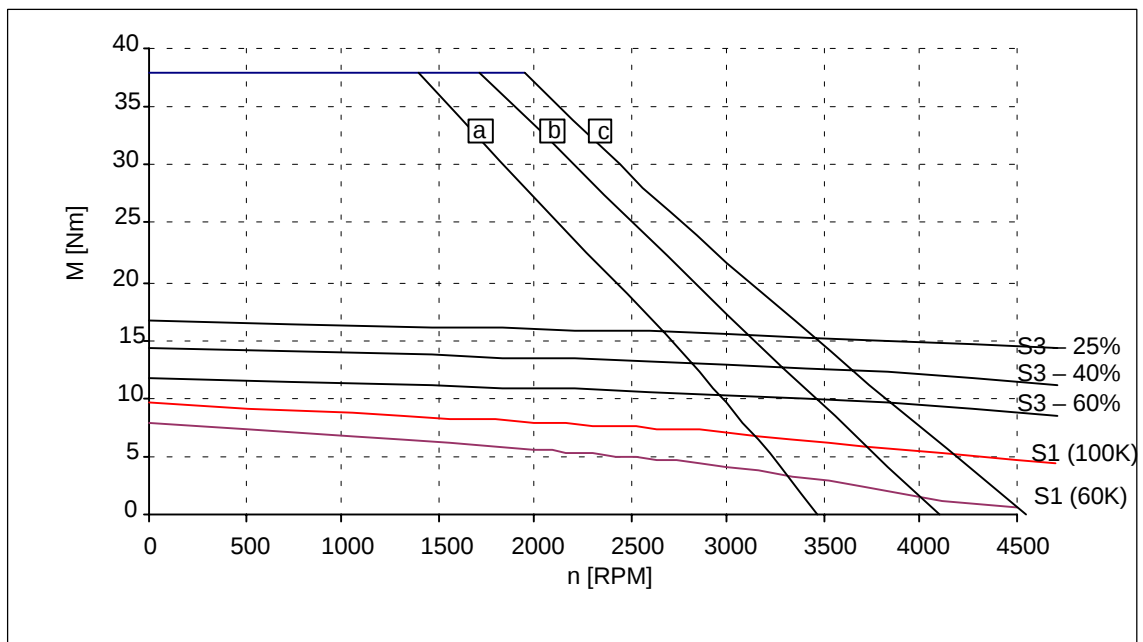


Fig. 2-18 Speed–torque diagram 1FT6064-6AF7

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

2.1 Speed–torque diagrams

Table 2-12 1FT6064 non-ventilated

1FT6064					
Technical data	Code	Units	–6AH7□	–6AK7□	
Engineering data					
Rated speed	n_N	RPM	4500	6000	
Number of poles	2p		6	6	
Rated torque (100K)	M_N (100K)	Nm	4.8	2.1	
Rated current (100K)	I_N (100K)	A	5.5	3.5	
Standstill torque (60K)	M_0 (60K)	Nm	7.9	7.9	
Standstill torque (100K)	M_0 (100K)	Nm	9.5	9.5	
Standstill current (60K)	I_0 (60K)	A	7.3	9.8	
Standstill current (100K)	I_0 (100K)	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. perm. 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	35	35	
Weight with brake	m	kg	13	13	
Weight without brake	m	kg	12.5	12.5	

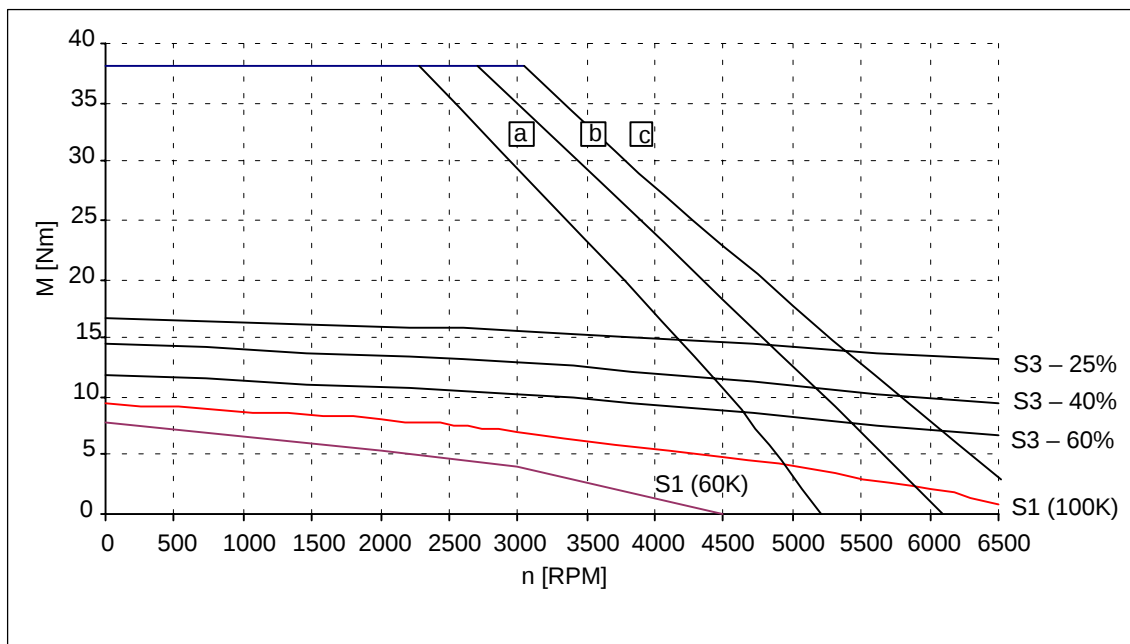


Fig. 2-19 Speed–torque diagram 1FT6064–6AH7□

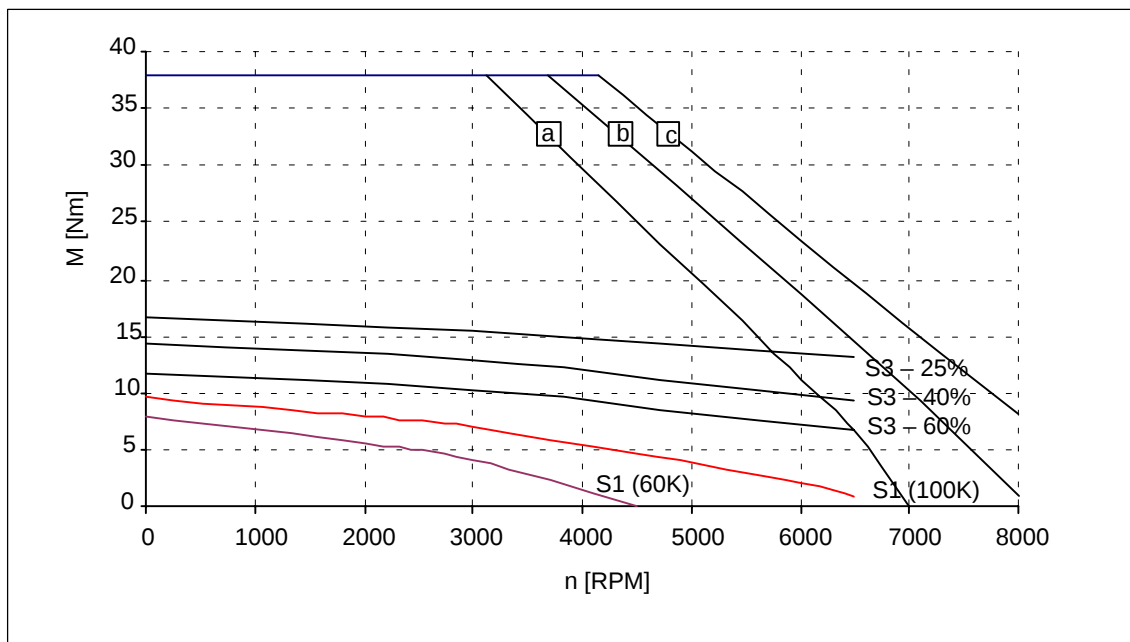


Fig. 2-20 Speed–torque diagram 1FT6064–6AK7□

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

2.1 Speed–torque diagrams

Table 2-13 1FT6081 non-ventilated

1FT6081						
Technical data	Code	Units	–8AC7□	–8AF7□		
Engineering data						
Rated speed	n_N	RPM	2000	3000		
Number of poles	2p		8	8		
Rated torque (100K)	M_N (100K)	Nm	7.5	6.9		
Rated current (100K)	I_N (100K)	A	4.1	5.6		
Standstill torque (60K)	M_0 (60K)	Nm	6.6	6.6		
Standstill torque (100K)	M_0 (100K)	Nm	8.0	8.0		
Standstill current (60K)	I_0 (60K)	A	3.1	4.7		
Standstill current (100K)	I_0 (100K)	A	3.9	5.8		
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	24.8	24.8		
Moment of inertia (without brake)	J_{mot}	10^{-4} 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. perm. 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	30	30		
Weight with brake	m	kg	14	14		
Weight without brake	m	kg	12.5	12.5		

2.1 Speed-torque diagrams

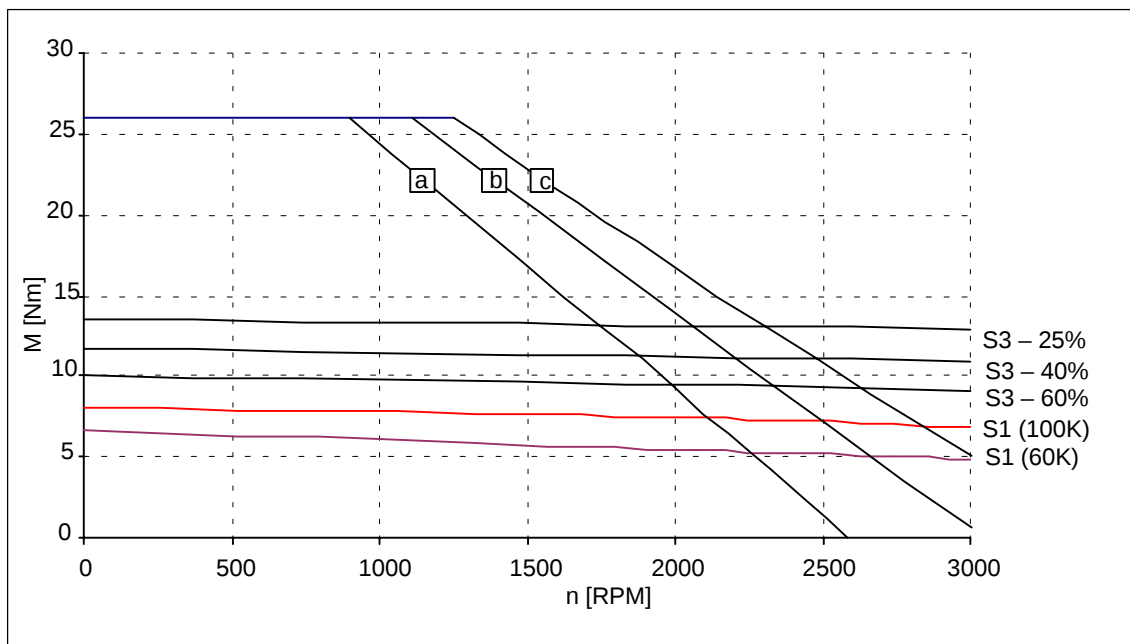


Fig. 2-21 Speed-torque diagram 1FT6081-8AC7

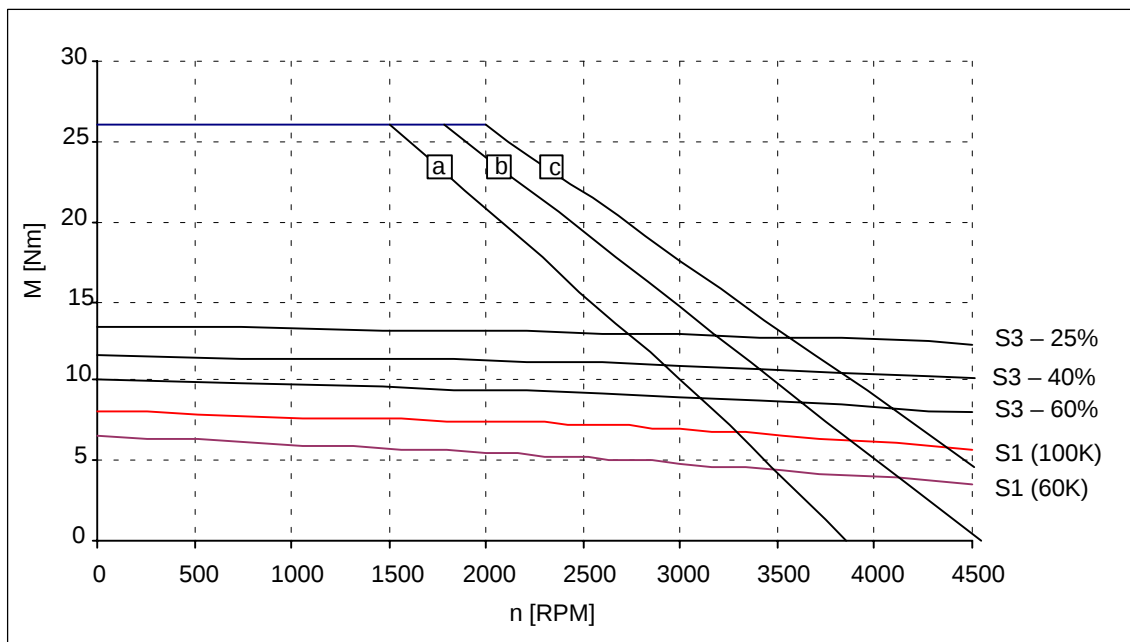


Fig. 2-22 Speed-torque diagram 1FT6081-8AF7

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

2.1 Speed–torque diagrams

Table 2-14 1FT6081 non-ventilated

1FT6081					
Technical data	Code	Units	–8AH7□	–8AK7□	
Engineering data					
Rated speed	n_N	RPM	4500	6000	
Number of poles	2p		8	8	
Rated torque (100K)	M_N (100K)	Nm	5.8	4.6	
Rated current (100K)	I_N (100K)	A	7.3	7.7	
Standstill torque (60K)	M_0 (60K)	Nm	6.6	6.6	
Standstill torque (100K)	M_0 (100K)	Nm	8.0	8.0	
Standstill current (60K)	I_0 (60K)	A	7.0	8.9	
Standstill current (100K)	I_0 (100K)	A	8.6	11.1	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	24.8	24.8	
Moment of inertia (without brake)	J_{mot}	10^{-4} 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. perm. 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	30	30	
Weight with brake	m	kg	14	14	
Weight without brake	m	kg	12.5	12.5	

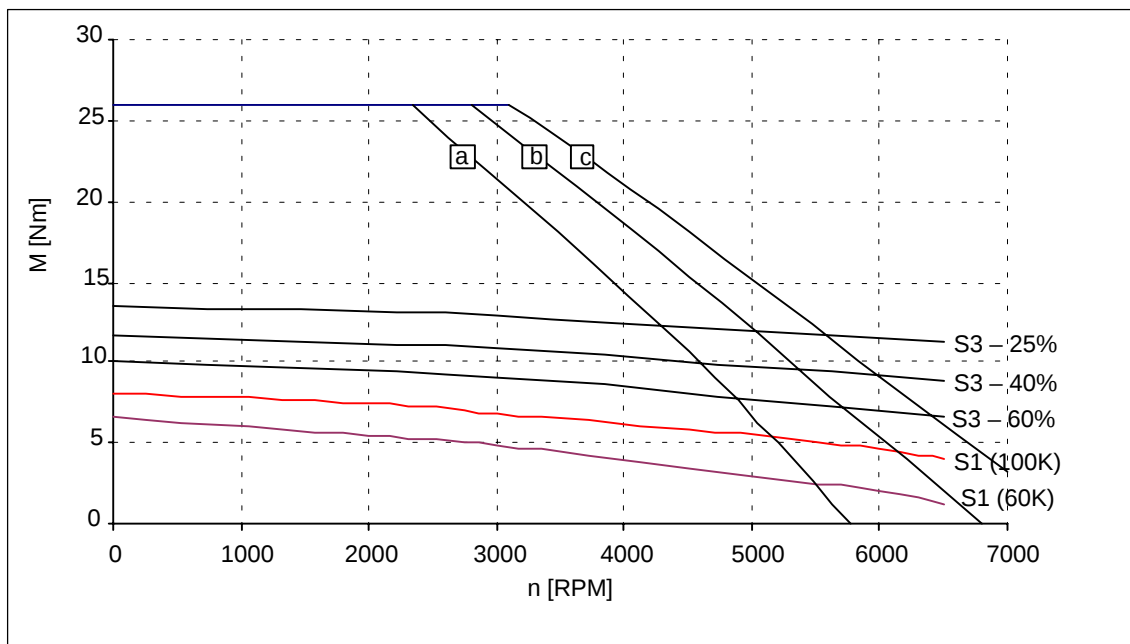


Fig. 2-23 Speed–torque diagram 1FT6081-8AH7

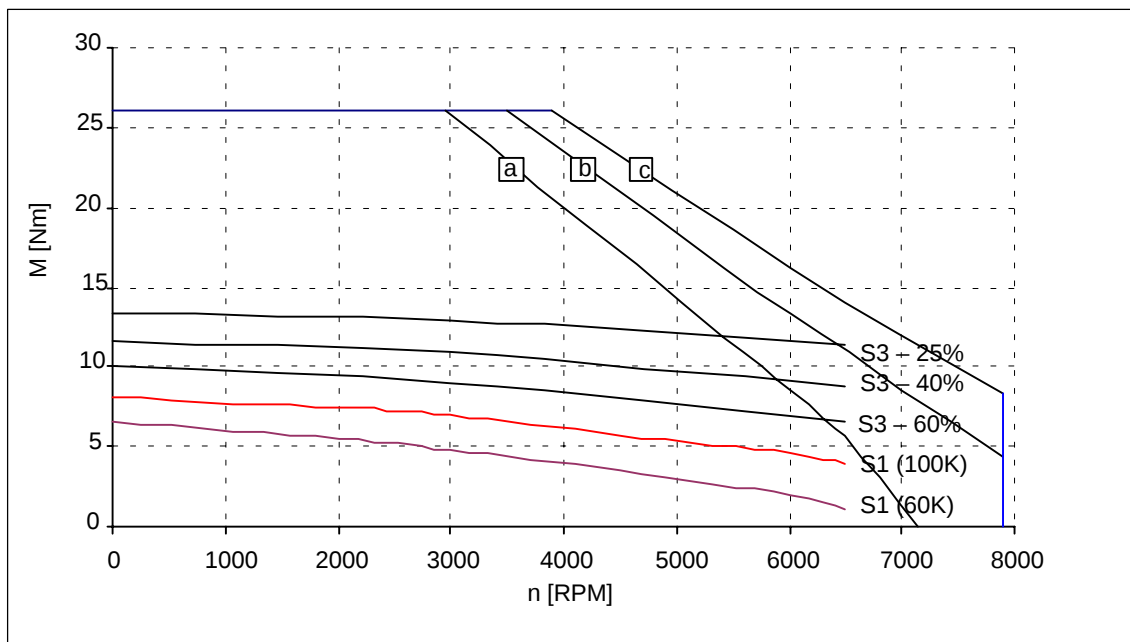


Fig. 2-24 Speed–torque diagram 1FT6081-8AK7

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

2.1 Speed–torque diagrams

Table 2-15 1FT6082 non-ventilated

1FT6082					
Technical data	Code	Units	–8AC7□	–□AF7□	
Engineering data					
Rated speed	n_N	RPM	2000	3000	
Number of poles	2p		8	8	
Rated torque (100K)	M_N (100K)	Nm	11.4	10.3	
Rated current (100K)	I_N (100K)	A	6.6	8.7	
Standstill torque (60K)	M_0 (60K)	Nm	10.8	10.8	
Standstill torque (100K)	M_0 (100K)	Nm	13	13	
Standstill current (60K)	I_0 (60K)	A	5.4	7.8	
Standstill current (100K)	I_0 (100K)	A	6.6	9.6	
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	2000	3000	
Optimum power	P_{opt}	kW	2.39	3.24	
Limiting data					
Max. perm. 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	35	35	
Weight with brake	m	kg	16.5	16.5	
Weight without brake	m	kg	15	15	

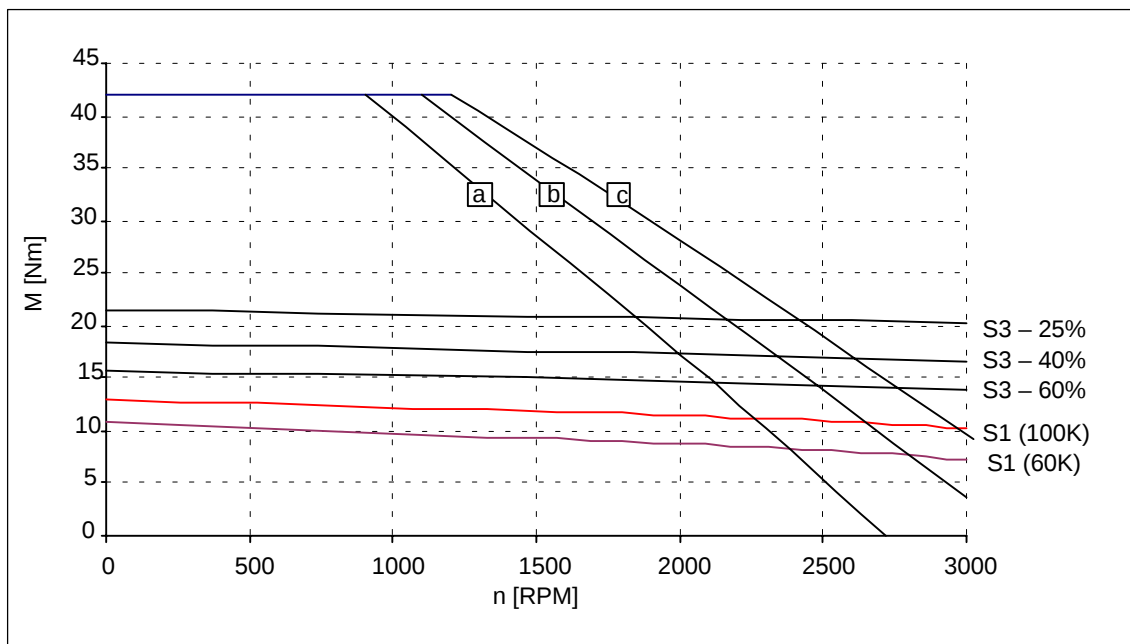


Fig. 2-25 Speed–torque diagram 1FT6082-8AC7□

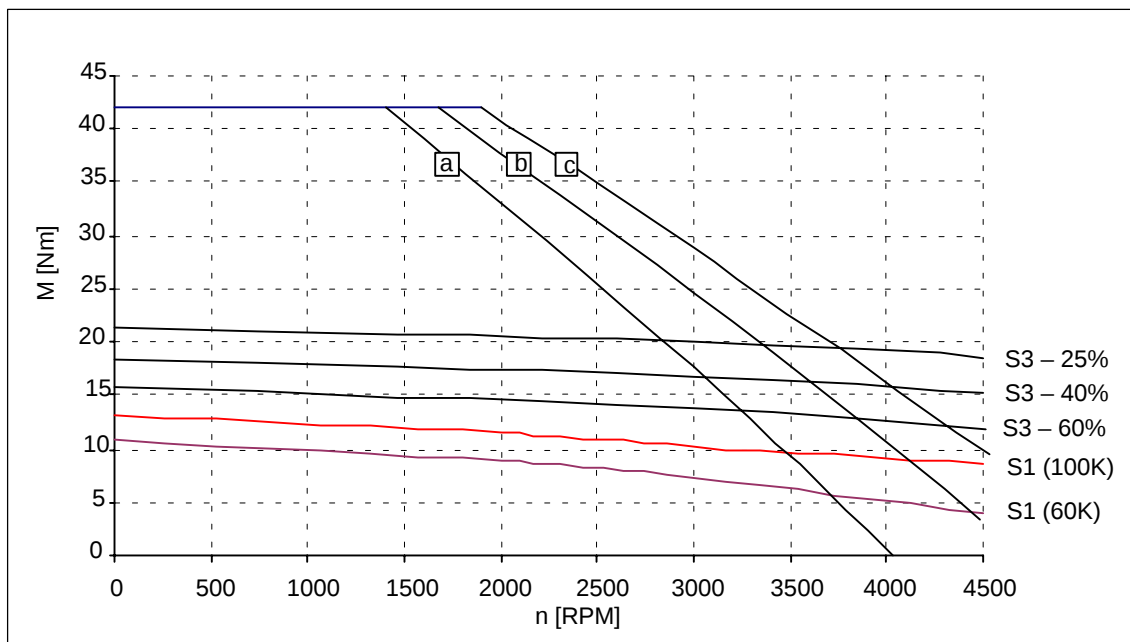


Fig. 2-26 Speed–torque diagram 1FT6082-8AF7□

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

2.1 Speed–torque diagrams

Table 2-16 1FT6082 non-ventilated

1FT6082					
Technical data	Code	Units	–8AH7□	–8AK7□	
Engineering data					
Rated speed	n_N	RPM	4500	6000	
Number of poles	2p		8	8	
Rated torque (100K)	M_N (100K)	Nm	8.5	5.5	
Rated current (100K)	I_N (100K)	A	11	9.1	
Standstill torque (60K)	M_0 (60K)	Nm	10.8	10.8	
Standstill torque (100K)	M_0 (100K)	Nm	13	13.0	
Standstill current (60K)	I_0 (60K)	A	12.0	14.0	
Standstill current (100K)	I_0 (100K)	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. perm. 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	35	35	
Weight with brake	m	kg	16.5	16.5	
Weight without brake	m	kg	15	15	

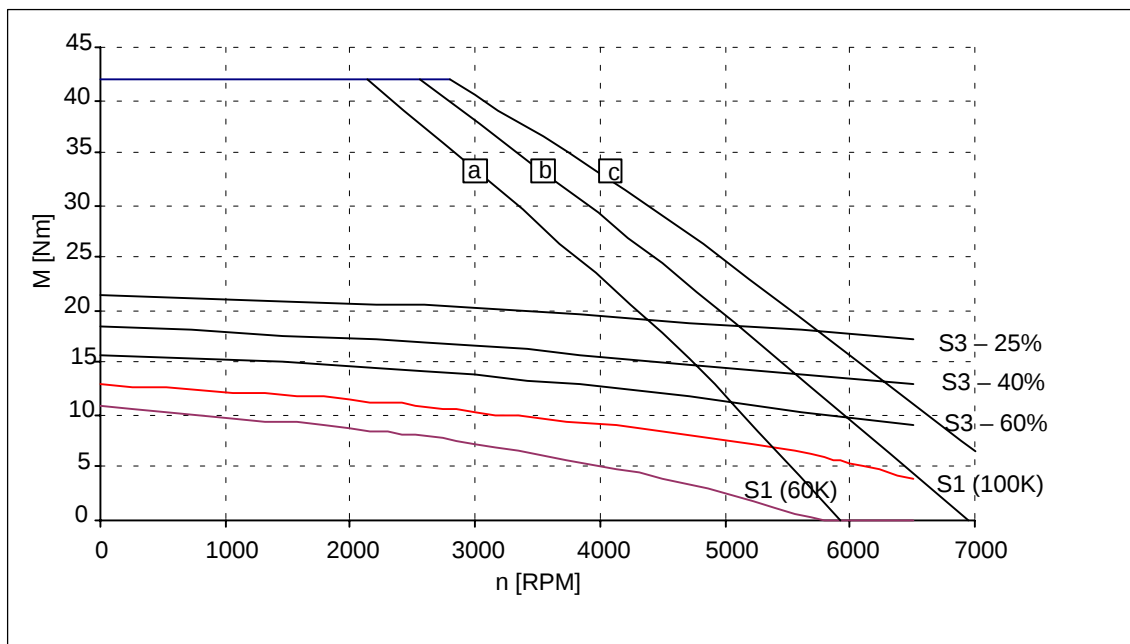


Fig. 2-27 Speed–torque diagram 1FT6082–8AH7□

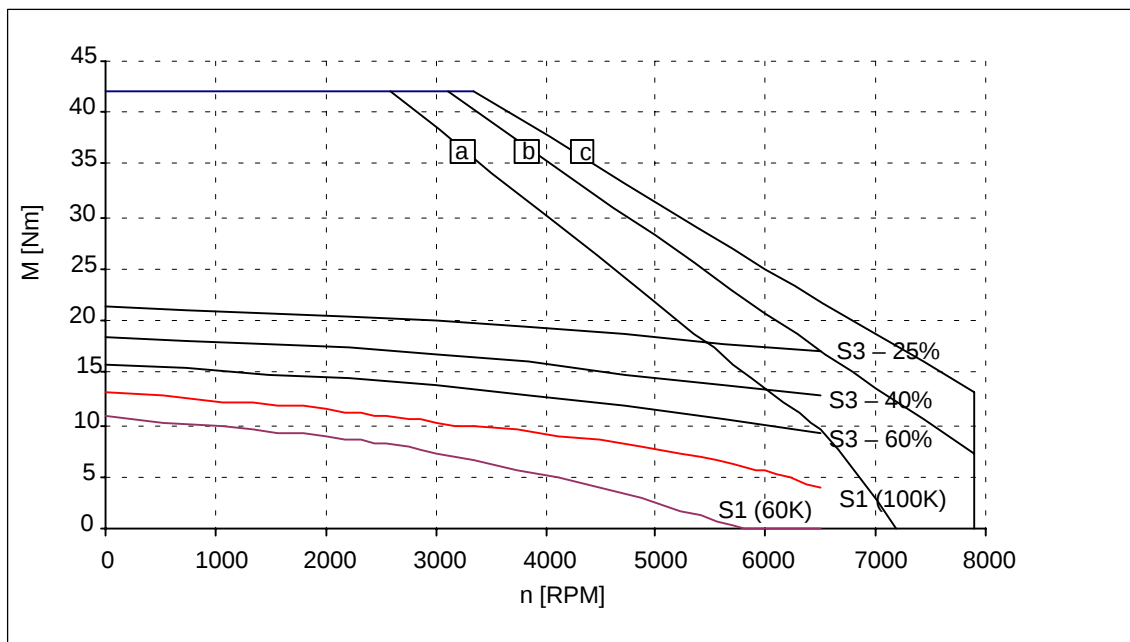


Fig. 2-28 Speed–torque diagram 1FT6082–8AK7□

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

2.1 Speed–torque diagrams

Table 2-17 1FT6084 non-ventilated

1FT6084						
Technical data	Code	Units	–8AC7□	–□AF7□		
Engineering data						
Rated speed	n_N	RPM	2000	3000		
Number of poles	2p		8	8		
Rated torque (100K)	M_N (100K)	Nm	16.9	14.7		
Rated current (100K)	I_N (100K)	A	8.3	11		
Standstill torque (60K)	M_0 (60K)	Nm	16.6	16.6		
Standstill torque (100K)	M_0 (100K)	Nm	20	20		
Standstill current (60K)	I_0 (60K)	A	7.2	10.7		
Standstill current (100K)	I_0 (100K)	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. perm. 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	42	42		
Weight with brake	m	kg	24	24		
Weight without brake	m	kg	20.5	20.5		

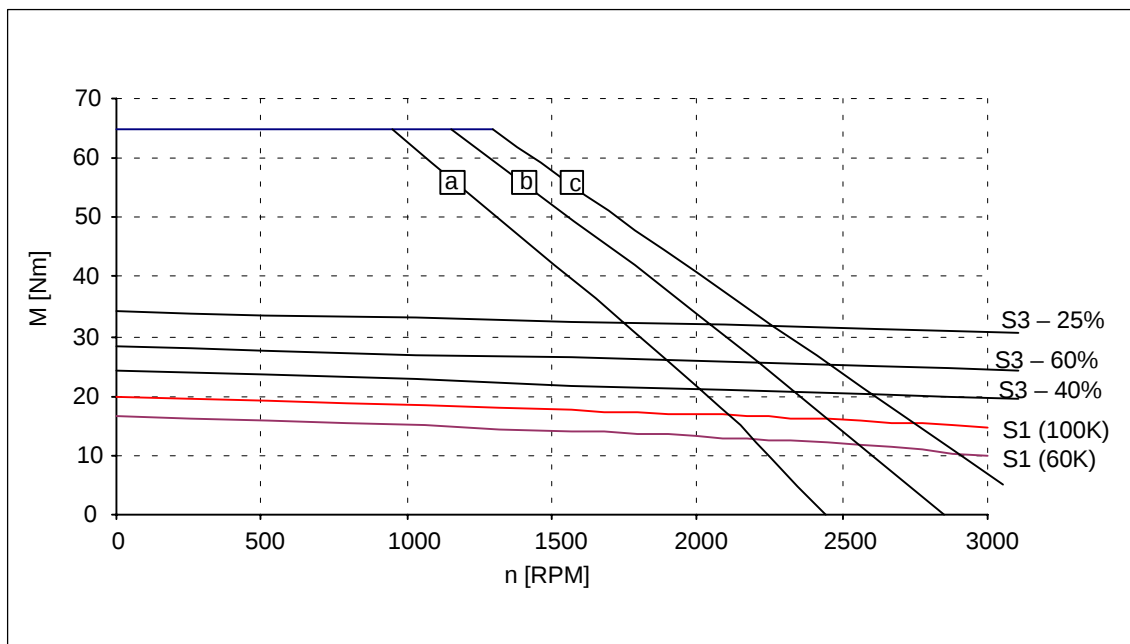


Fig. 2-29 Speed–torque diagram 1FT6084–8AC7□

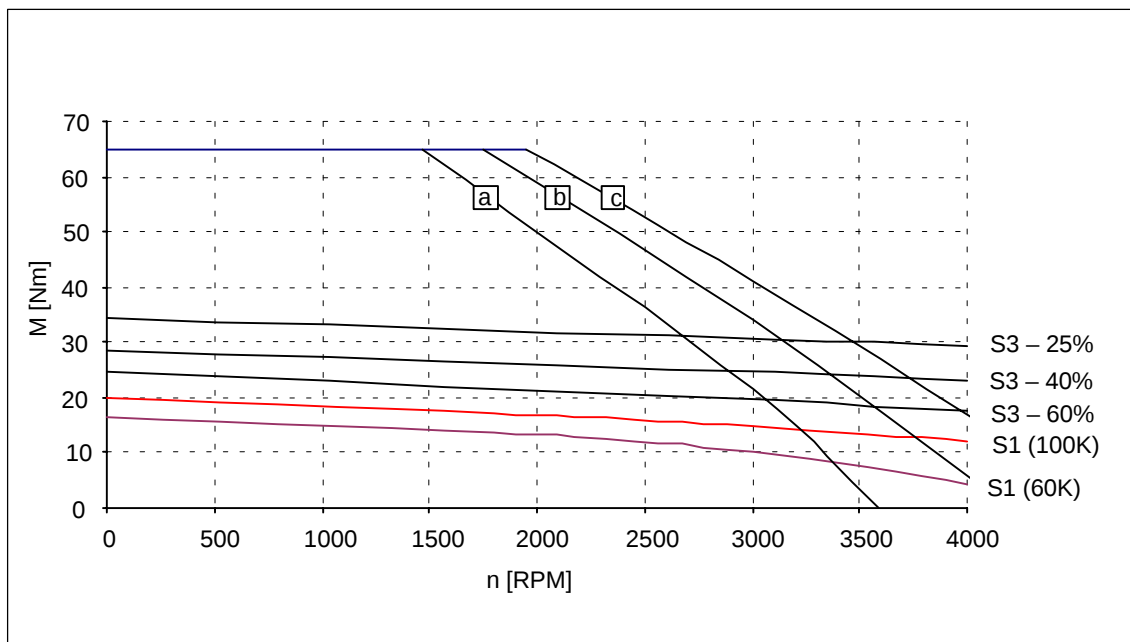


Fig. 2-30 Speed–torque diagram 1FT6084–□AF7□

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

2.1 Speed–torque diagrams

Table 2-18 1FT6084 non-ventilated

1FT6084					
Technical data	Code	Units	–□AH7□	–□AK7□	
Engineering data					
Rated speed	n_N	RPM	4500	6000	
Number of poles	2p		8	8	
Rated torque (100K)	M_N (100K)	Nm	10.5	6.5	
Rated current (100K)	I_N (100K)	A	12.5	9.2	
Standstill torque (60K)	M_0 (60K)	Nm	16.6	16.6	
Standstill torque (100K)	M_0 (100K)	Nm	20	20	
Standstill current (60K)	I_0 (60K)	A	16.2	19.5	
Standstill current (100K)	I_0 (100K)	A	19.8	24.1	
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	4000	4000	
Optimum power	P_{opt}	kW	5.03	5.03	
Limiting data					
Max. perm. 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	42	42	
Weight with brake	m	kg	24	24	
Weight without brake	m	kg	20.5	20.5	

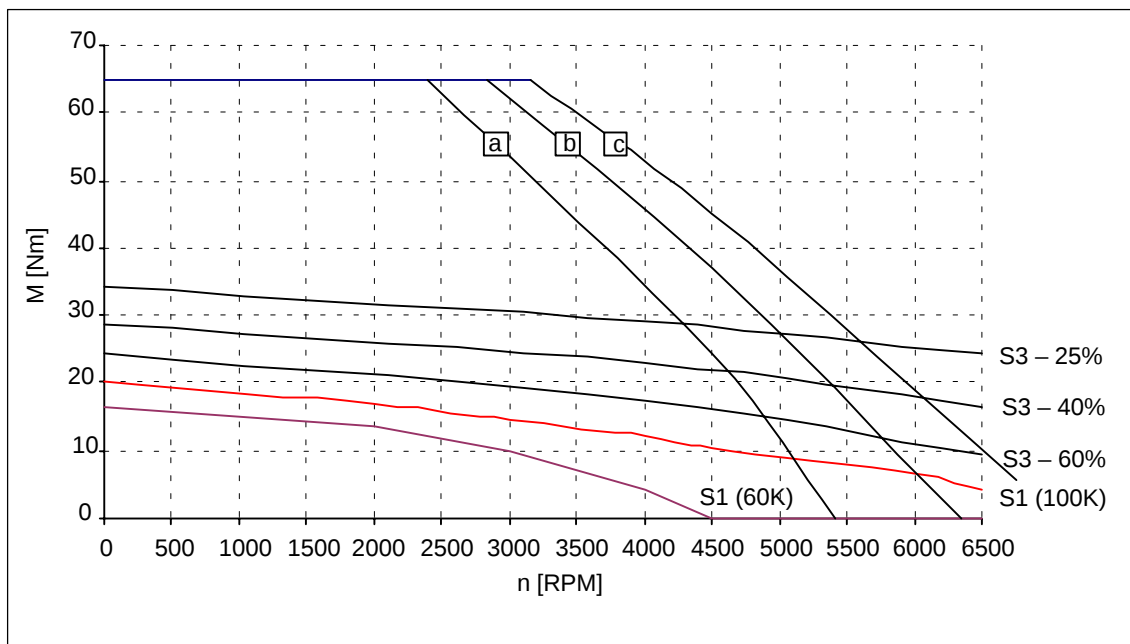


Fig. 2-31 Speed–torque diagram 1FT6084–□AH7□

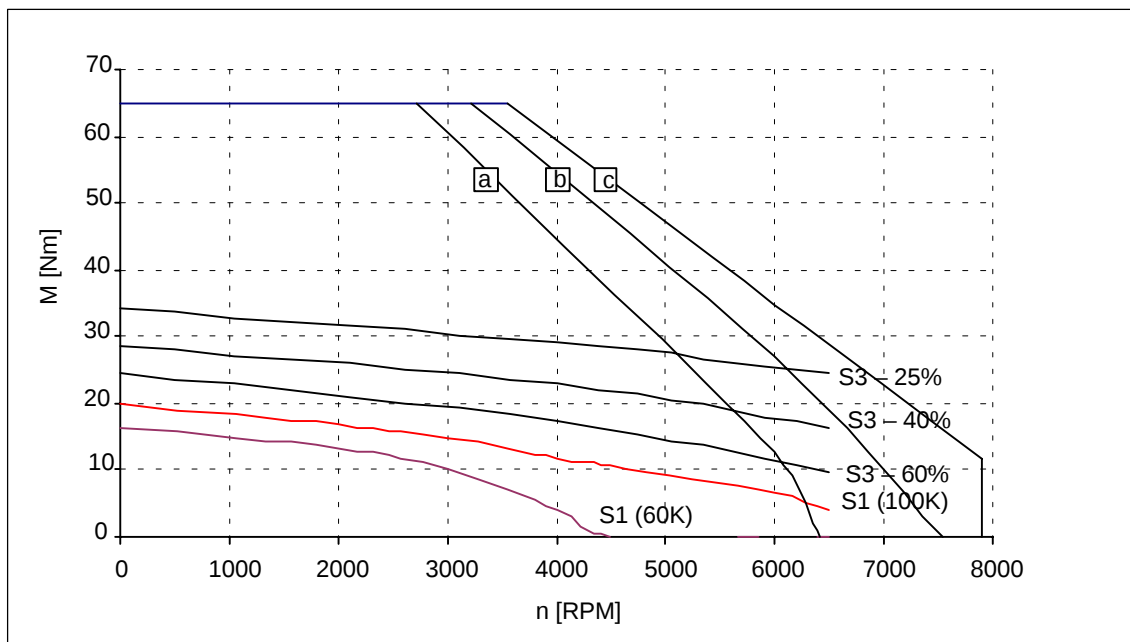


Fig. 2-32 Speed–torque diagram 1FT6084–□AK7□

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

2.1 Speed–torque diagrams

Table 2-19 1FT6086 non-ventilated

1FT6086				
Technical data	Code	Units	–8AC7□	
Engineering data				
Rated speed	n_N	RPM	2000	
Number of poles	2p		8	
Rated torque (100K)	M_N (100K)	Nm	22.5	
Rated current (100K)	I_N (100K)	A	10.9	
Standstill torque (60K)	M_0 (60K)	Nm	22.4	
Standstill torque (100K)	M_0 (100K)	Nm	27	
Standstill current (60K)	I_0 (60K)	A	9.2	
Standstill current (100K)	I_0 (100K)	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. perm. 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	50	
Weight with brake	m	kg	29	
Weight without brake	m	kg	25.5	

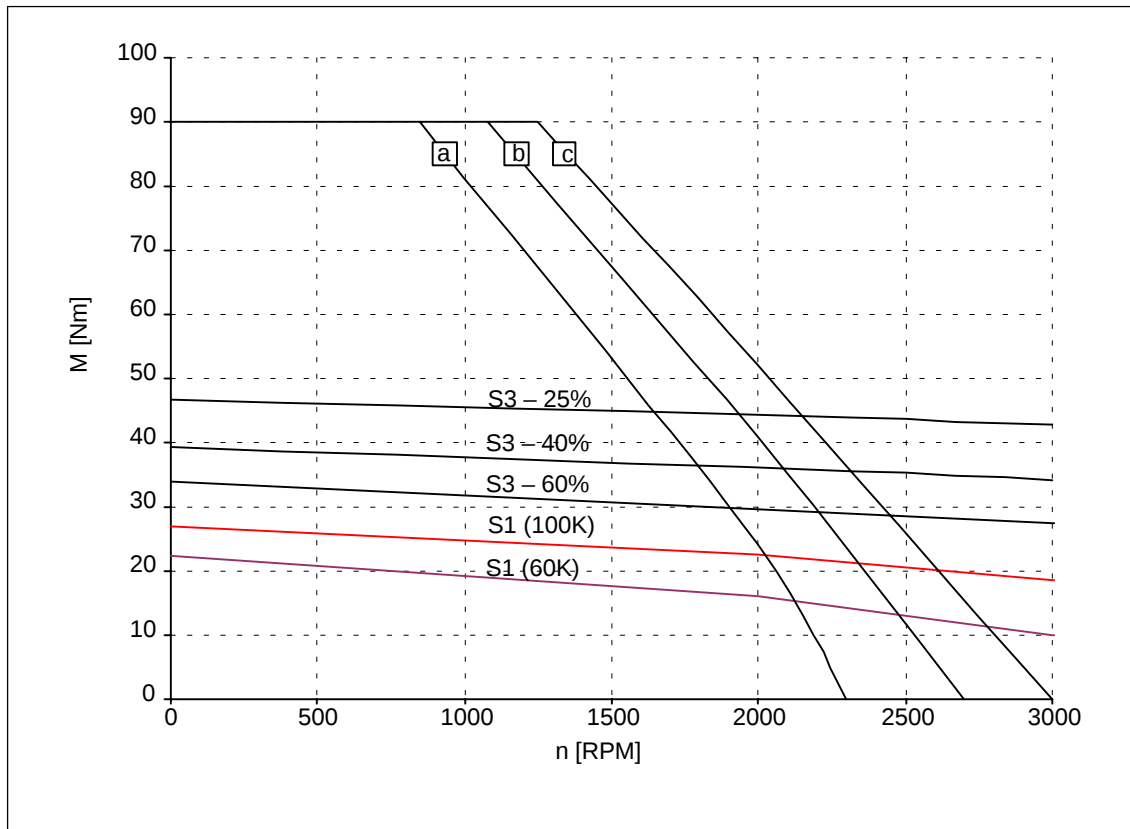


Fig. 2-33 Speed–torque diagram 1FT6086–8AC7

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

2.1 Speed–torque diagrams

Table 2-20 1FT6086 non-ventilated

1FT6086					
Technical data	Code	Units	–□AF7□	–□AH7□	
Engineering data					
Rated speed	n_N	RPM	3000	4500	
Number of poles	2p		8	8	
Rated torque (100K)	M_N (100K)	Nm	18.5	12	
Rated current (100K)	I_N (100K)	A	13	12.6	
Standstill torque (60K)	M_0 (60K)	Nm	22.4	22.4	
Standstill torque (100K)	M_0 (100K)	Nm	27	27	
Standstill current (60K)	I_0 (60K)	A	13.3	18.9	
Standstill current (100K)	I_0 (100K)	A	16.4	23.3	
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	3000	3000	
Optimum power	P_{opt}	kW	5.81	5.81	
Limiting data					
Max. perm. 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	50	50	
Weight with brake	m	kg	29	29	
Weight without brake	m	kg	25.5	25.5	

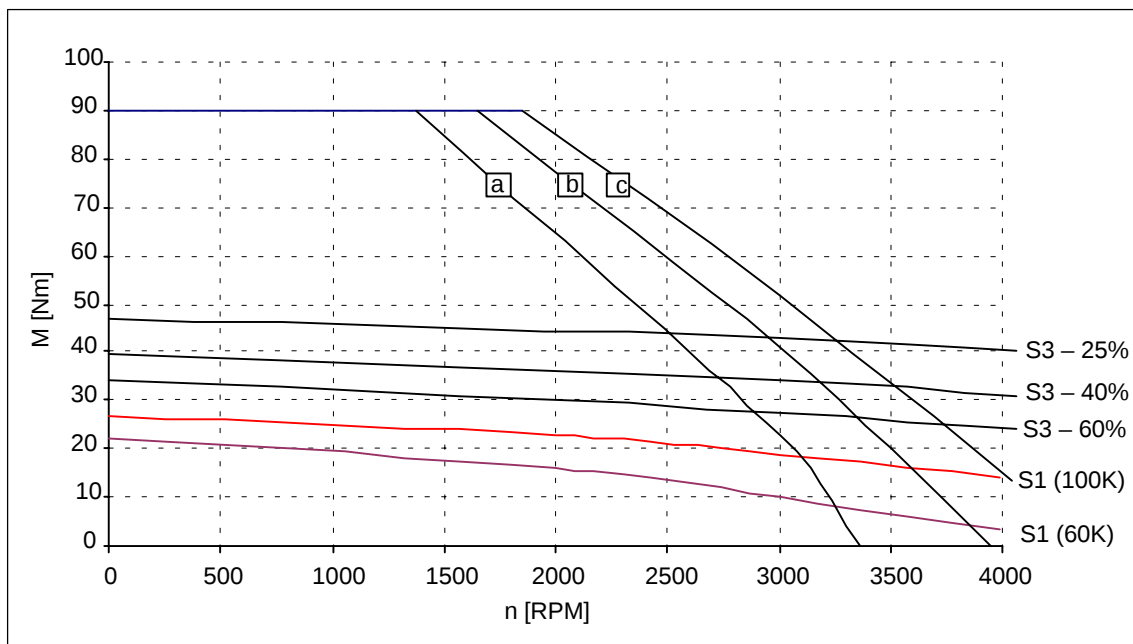


Fig. 2-34 Speed–torque diagram 1FT6086–□AF7□

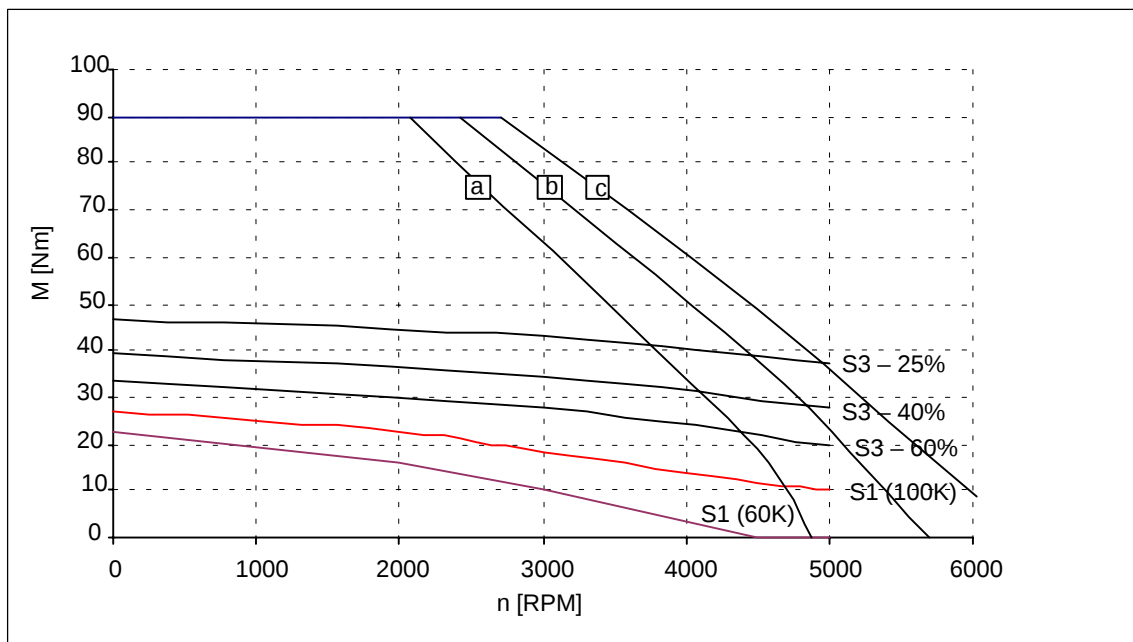


Fig. 2-35 Speed–torque diagram 1FT6086–□AH7□

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

2.1 Speed–torque diagrams

Table 2-21 1FT6102 non-ventilated

1FT6102					
Technical data	Code	Units	–8AB7□	–□AC7□	
Engineering data					
Rated speed	n_N	RPM	1500	2000	
Number of poles	2p		8	8	
Rated torque (100K)	M_N (100K)	Nm	24.5	23	
Rated current (100K)	I_N (100K)	A	8.4	11	
Standstill torque (60K)	M_0 (60K)	Nm	22.4	22.4	
Standstill torque (100K)	M_0 (100K)	Nm	27	27	
Standstill current (60K)	I_0 (60K)	A	7.0	9.8	
Standstill current (100K)	I_0 (100K)	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. perm. 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	45	45	
Weight with brake	m	kg	32	32	
Weight without brake	m	kg	27.5	27.5	

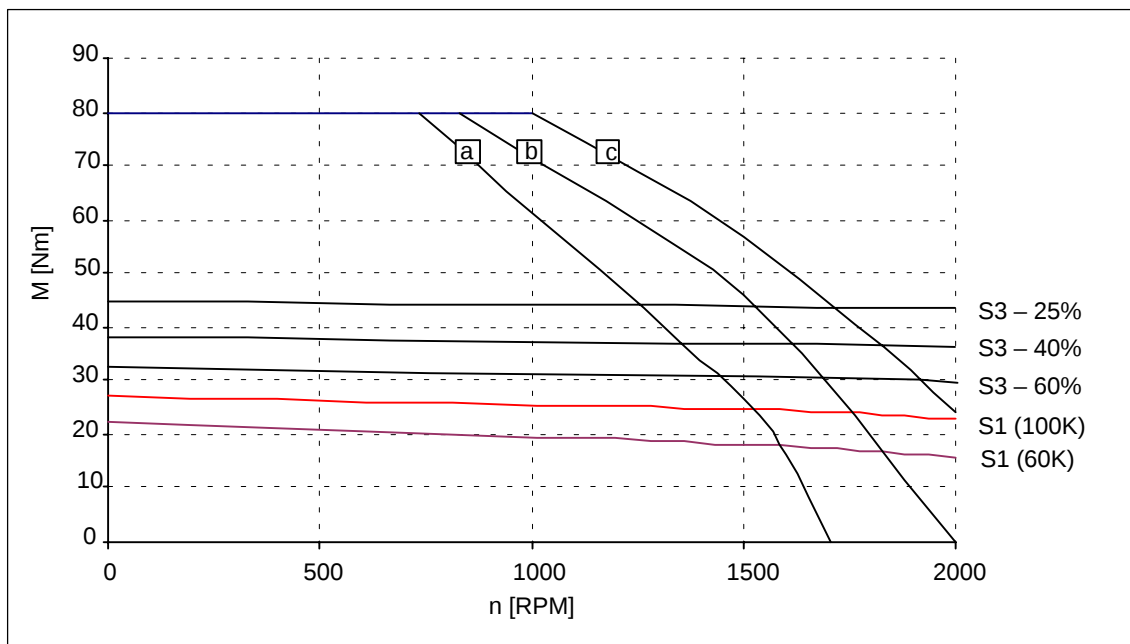


Fig. 2-36 Speed–torque diagram 1FT6102-8AB7

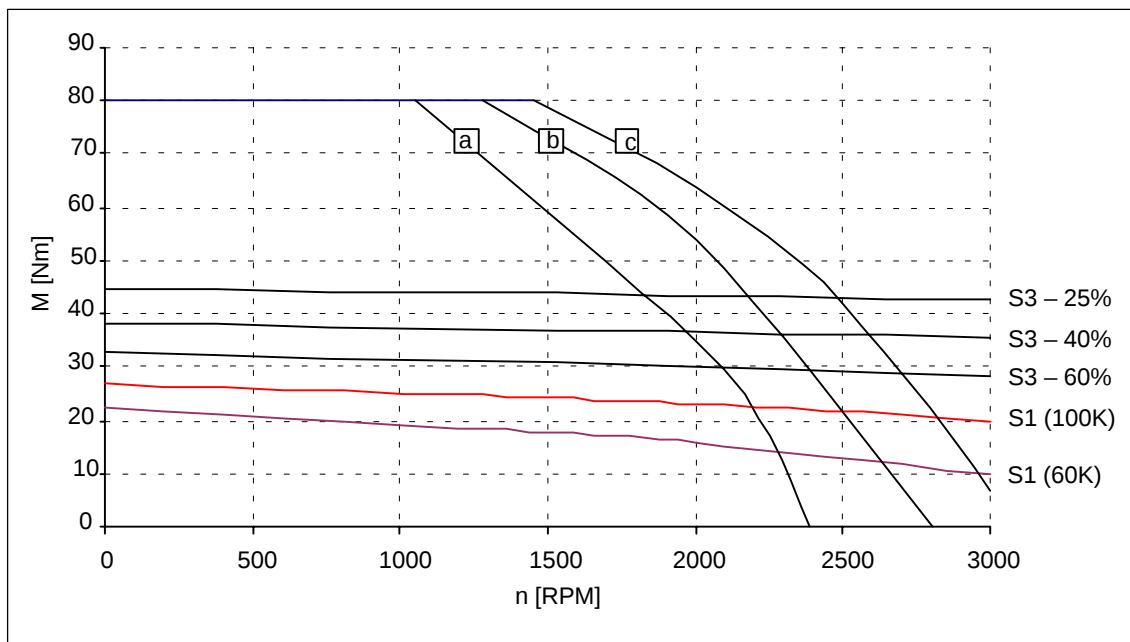


Fig. 2-37 Speed–torque diagram 1FT6102-8AC7

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

2.1 Speed–torque diagrams

Table 2-22 1FT6102 non-ventilated

1FT6102					
Technical data	Code	Units	–8AF7□	–8AH7□	
Engineering data					
Rated speed	n_N	RPM	3000	4500	
Number of poles	2p		8	8	
Rated torque (100K)	M_N (100K)	Nm	19.5	12	
Rated current (100K)	I_N (100K)	A	13.2	12	
Standstill torque (60K)	M_0 (60K)	Nm	22.4	22.4	
Standstill torque (100K)	M_0 (100K)	Nm	27	27	
Standstill current (60K)	I_0 (60K)	A	13.7	19.7	
Standstill current (100K)	I_0 (100K)	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	3000	
Optimum power	P_{opt}	kW	6.13	6.13	
Limiting data					
Max. perm. 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	45	45	
Weight with brake	m	kg	32	32	
Weight without brake	m	kg	27.5	27.5	

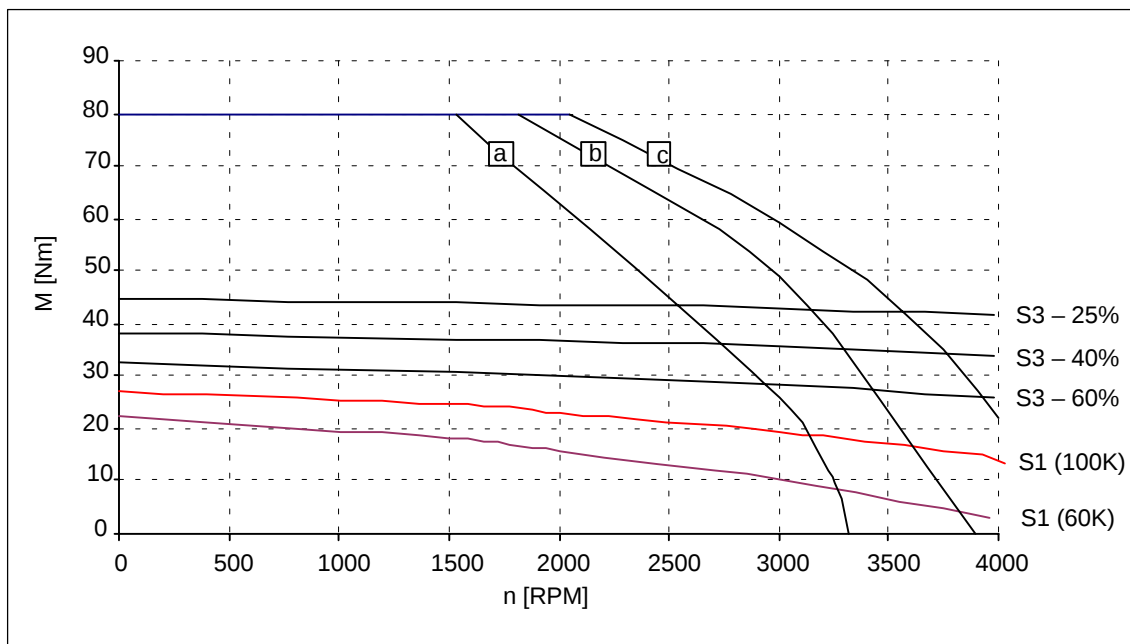


Fig. 2-38 Speed–torque diagram 1FT6102-8AF7□

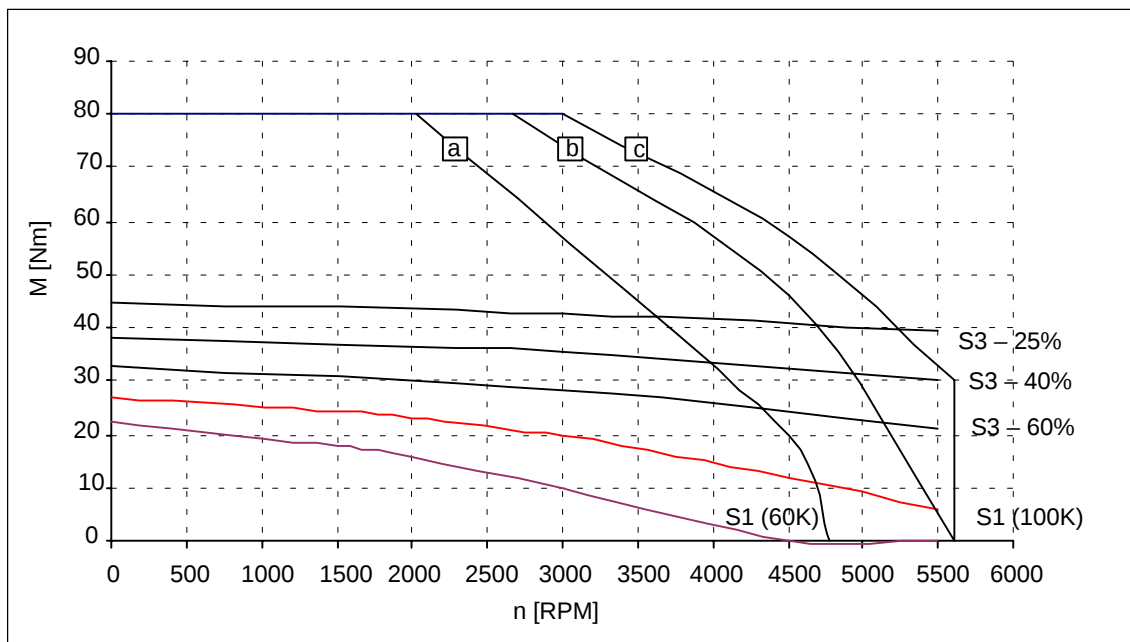


Fig. 2-39 Speed–torque diagram 1FT6102-8AH7□

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

2.1 Speed–torque diagrams

Table 2-23 1FT6105 non-ventilated

1FT6105					
Technical data	Code	Units	–8AB7□	–□AC7□	
Engineering data					
Rated speed	n_N	RPM	1500	2000	
Number of poles	2p		8	8	
Rated torque (100K)	M_N (100K)	Nm	41	38	
Rated current (100K)	I_N (100K)	A	14.5	17.6	
Standstill torque (60K)	M_0 (60K)	Nm	42	42	
Standstill torque (100K)	M_0 (100K)	Nm	50	50	
Standstill current (60K)	I_0 (60K)	A	13.1	17.6	
Standstill current (100K)	I_0 (100K)	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. perm. 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	50	50	
Weight with brake	m	kg	44	44	
Weight without brake	m	kg	39.5	39.5	

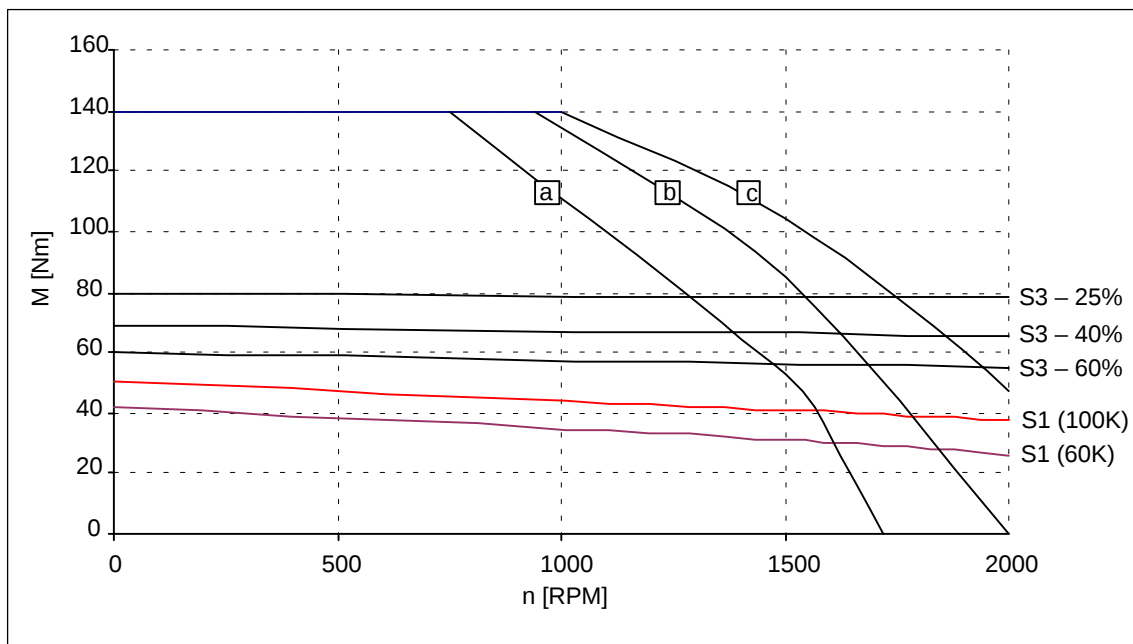


Fig. 2-40 Speed-torque diagram 1FT6105-8AB7

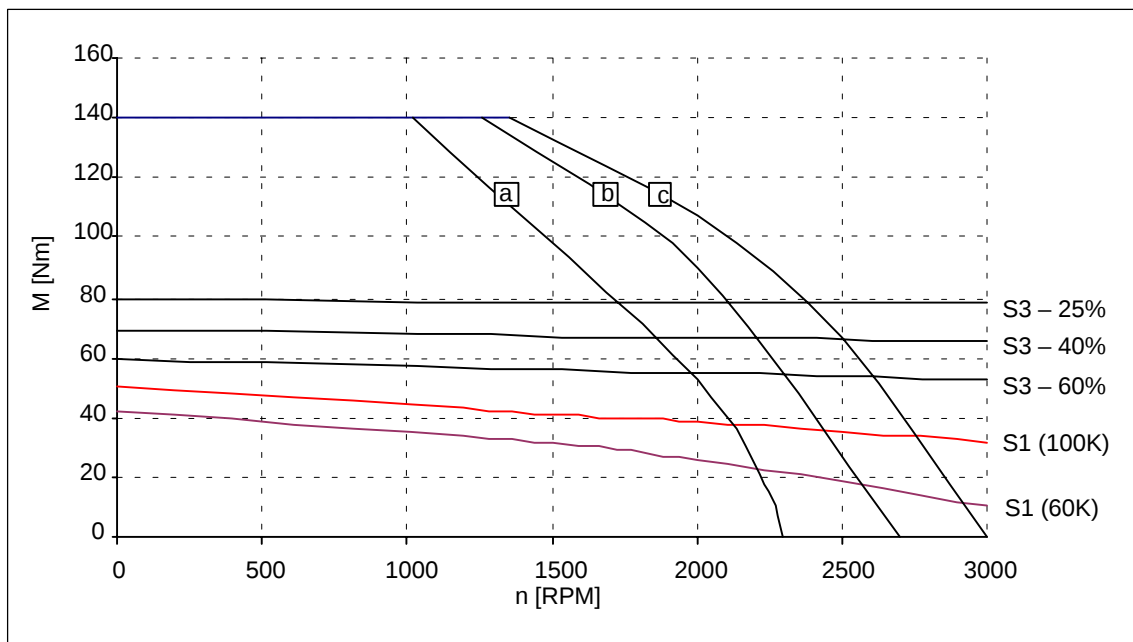


Fig. 2-41 Speed-torque diagram 1FT6105-8AC7

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

2.1 Speed–torque diagrams

Table 2-24 1FT6105 non-ventilated

1FT6105				
Technical data	Code	Units	–8AF7□	
Engineering data				
Rated speed	n_N	RPM	3000	
Number of poles	2p		8	
Rated torque (100K)	M_N (100K)	Nm	31	
Rated current (100K)	I_N (100K)	A	22.5	
Standstill torque (60K)	M_0 (60K)	Nm	42	
Standstill torque (100K)	M_0 (100K)	Nm	50	
Standstill current (60K)	I_0 (60K)	A	26	
Standstill current (100K)	I_0 (100K)	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. perm. 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	50	
Weight with brake	m	kg	44	
Weight without brake	m	kg	39.5	

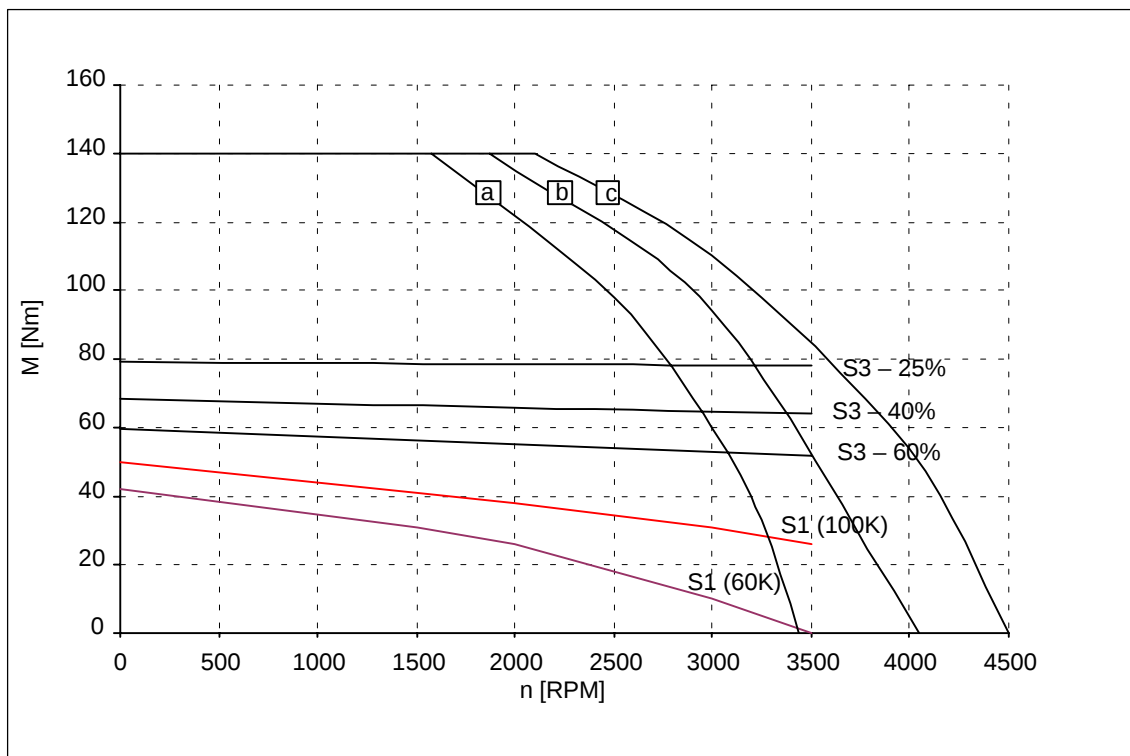


Fig. 2-42 Speed–torque diagram 1FT6105–8AF7

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

2.1 Speed–torque diagrams

Table 2-25 1FT6108 non-ventilated

1FT6108					
Technical data	Code	Units	–8AB7□	–8AC7□	
Engineering data					
Rated speed	n_N	RPM	1500	2000	
Number of poles	2p		8	8	
Rated torque (100K)	M_N (100K)	Nm	61	55	
Rated current (100K)	I_N (100K)	A	20.5	24.5	
Standstill torque (60K)	M_0 (60K)	Nm	58	58	
Standstill torque (100K)	M_0 (100K)	Nm	70	70	
Standstill current (60K)	I_0 (60K)	A	18.1	23.5	
Standstill current (100K)	I_0 (100K)	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. perm. 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	60	60	
Weight with brake	m	kg	60	60	
Weight without brake	m	kg	55.5	55.5	

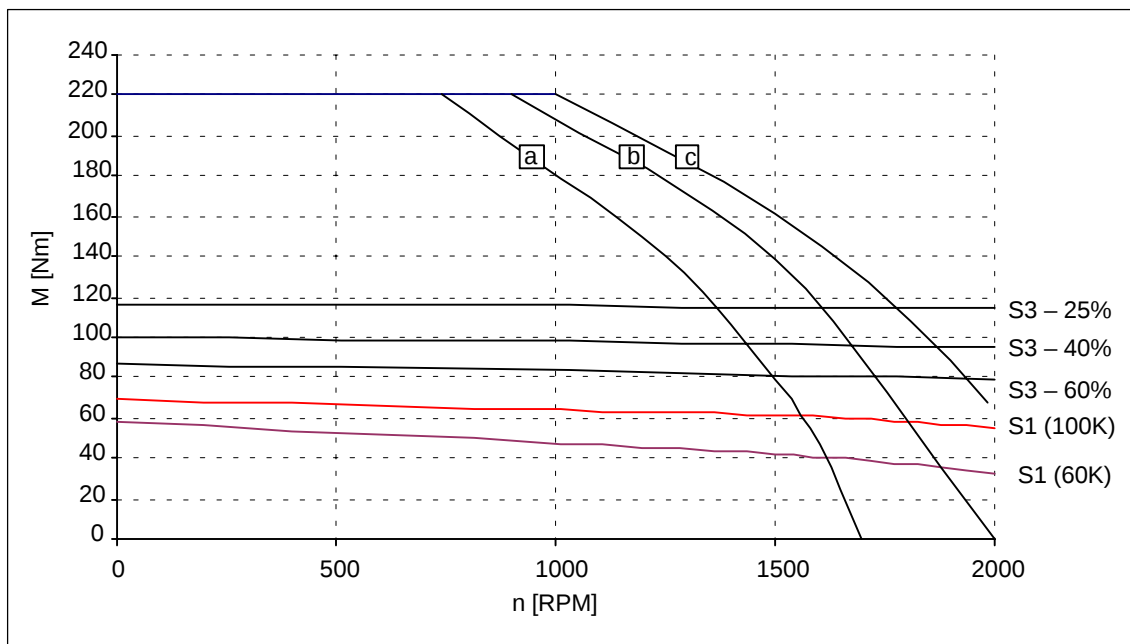


Fig. 2-43 Speed–torque diagram 1FT6108-8AB7

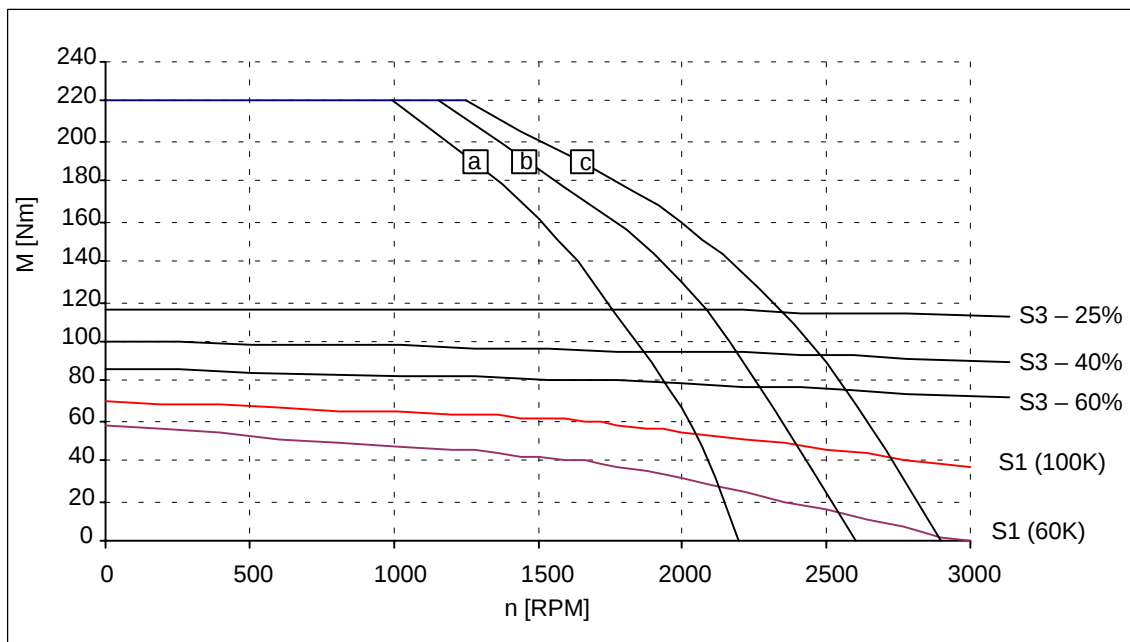


Fig. 2-44 Speed–torque diagram 1FT6108-8AC7

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

2.1 Speed–torque diagrams

Table 2-26 1FT6108 non-ventilated

1FT6108				
Technical data	Code	Units	–8AF7□	
Engineering data				
Rated speed	n_N	RPM	3000	
Number of poles	$2p$		8	
Rated torque (100K)	M_N (100K)	Nm	37	
Rated current (100K)	I_N (100K)	A	25	
Standstill torque (60K)	M_0 (60K)	Nm	58	
Standstill torque (100K)	M_0 (100K)	Nm	70	
Standstill current (60K)	I_0 (60K)	A	33	
Standstill current (100K)	I_0 (100K)	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. perm. 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	258000	
Mechanical time constant	T_{mech}	ms	1.8	
Thermal time constant	T_{th}	min	60	
Weight with brake	m	kg	60	
Weight without brake	m	kg	55.5	

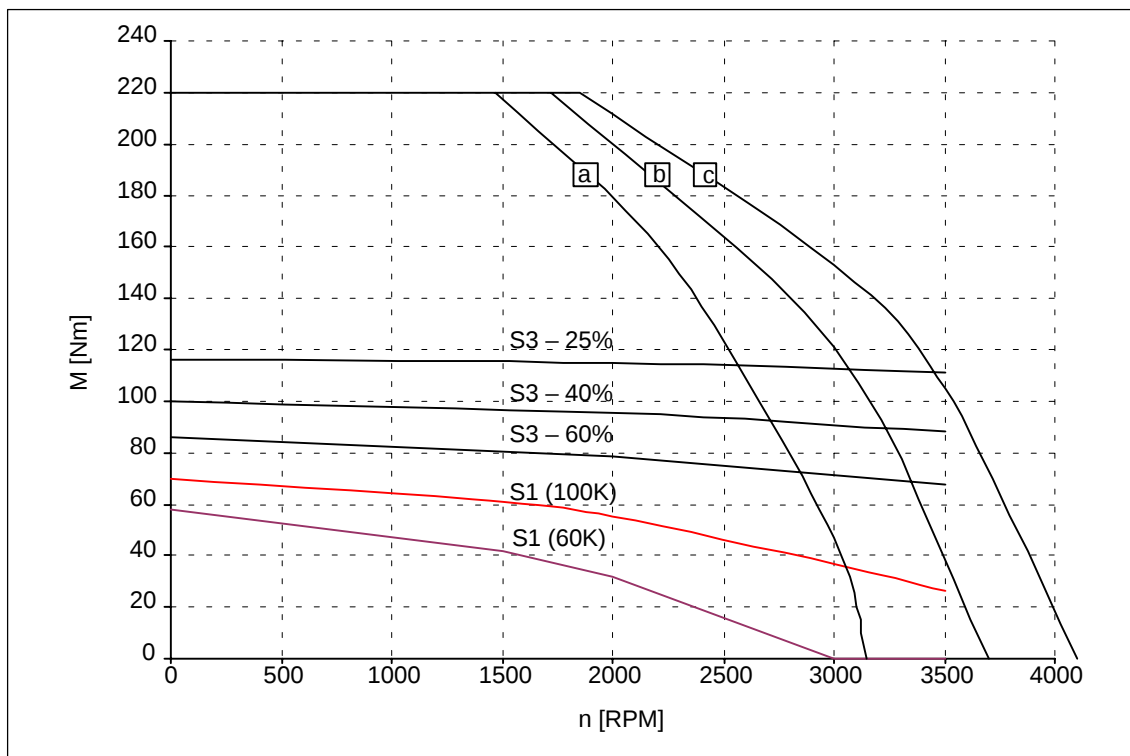


Fig. 2-45 Speed–torque diagram 1FT6108–8AF7

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

2.1 Speed–torque diagrams

Table 2-27 1FT6132 non-ventilated

1FT6132					
Technical data	Code	Units	–6AB71	–6AC71	
Engineering data					
Rated speed	n_N	RPM	1500	2000	
Number of poles	$2p$		6	6	
Rated torque (100K)	M_N (100K)	Nm	62	55	
Rated current (100K)	I_N (100K)	A	19	23	
Standstill torque (60K)	M_0 (60K)	Nm	62	62	
Standstill torque (100K)	M_0 (100K)	Nm	75	75	
Standstill current (60K)	I_0 (60K)	A	17.4	23.1	
Standstill current (100K)	I_0 (100K)	A	21.6	29	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	508	508	
Moment of inertia (without brake)	J_{mot}	10^{-4} 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. perm. 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	80	80	
Weight with brake	m	kg	95	95	
Weight without brake	m	kg	85.0	85.0	

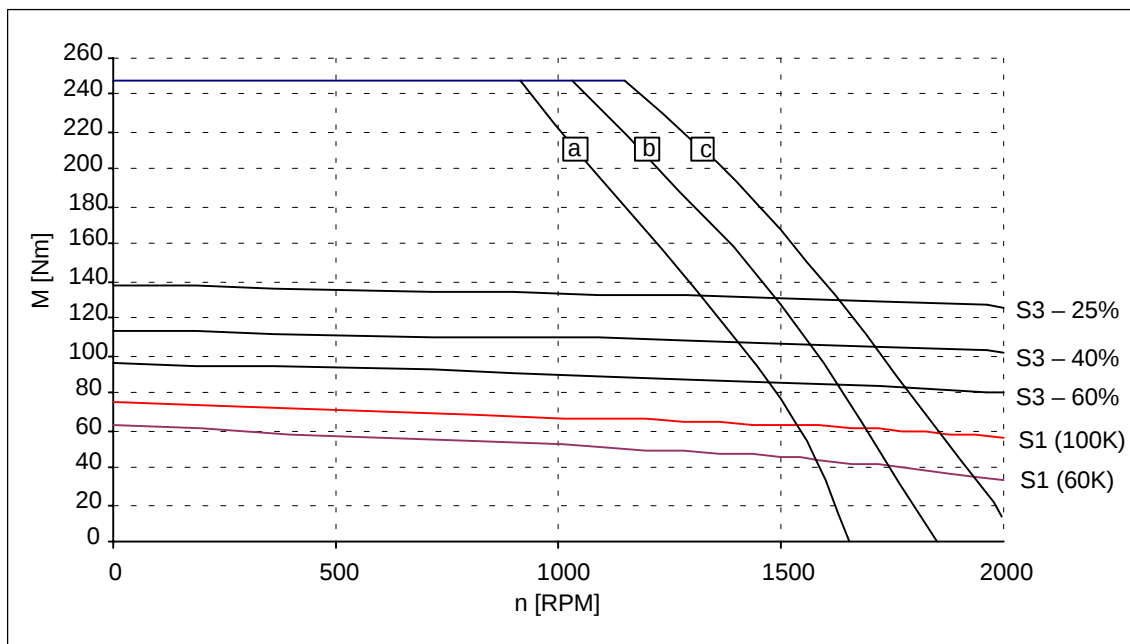


Fig. 2-46 Speed–torque diagram 1FT6132–6AB71

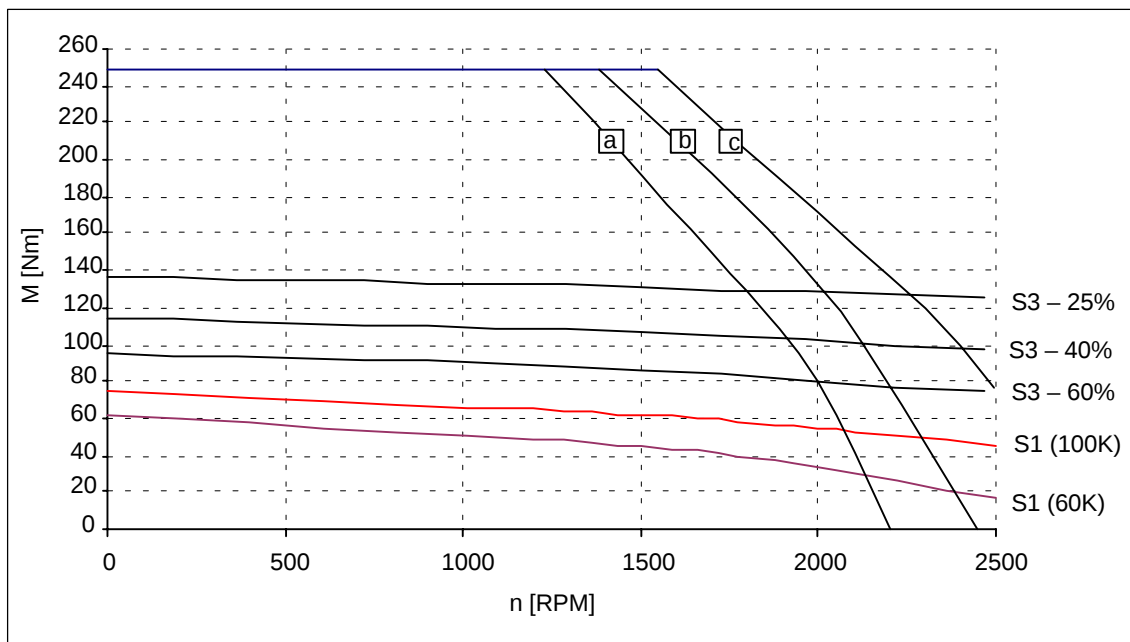


Fig. 2-47 Speed–torque diagram 1FT6132–6AC71

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

2.1 Speed–torque diagrams

Table 2-28 1FT6132 non-ventilated

1FT6132				
Technical data	Code	Units	–6AF71	
Engineering data				
Rated speed	n_N	RPM	3000	
Number of poles	2p		6	
Rated torque (100K)	M_N (100K)	Nm	36	
Rated current (100K)	I_N (100K)	A	23	
Standstill torque (60K)	M_0 (60K)	Nm	62	
Standstill torque (100K)	M_0 (100K)	Nm	75	
Standstill current (60K)	I_0 (60K)	A	35	
Standstill current (100K)	I_0 (100K)	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. perm. 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	80	
Weight with brake	m	kg	95	
Weight without brake	m	kg	85.0	

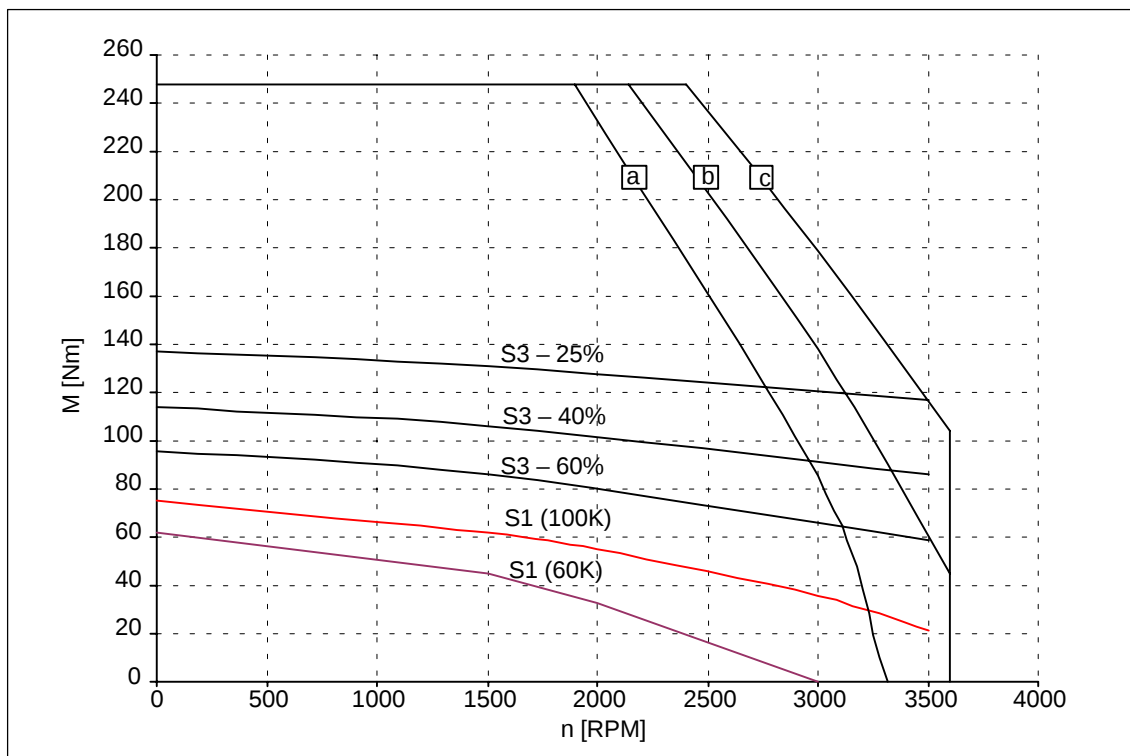


Fig. 2-48 Speed–torque diagram 1FT6132–6AF71

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

2.1 Speed–torque diagrams

Table 2-29 1FT6134 non-ventilated

1FT6134					
Technical data	Code	Units	–6AB71	–6AC71	
Engineering data					
Rated speed	n_N	RPM	1500	2000	
Number of poles	$2p$		6	6	
Rated torque (100K)	M_N (100K)	Nm	75	65	
Rated current (100K)	I_N (100K)	A	24	27	
Standstill torque (60K)	M_0 (60K)	Nm	79	79	
Standstill torque (100K)	M_0 (100K)	Nm	95	95	
Standstill current (60K)	I_0 (60K)	A	21,7	30	
Standstill current (100K)	I_0 (100K)	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. perm. 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	85	85	
Weight with brake	m	kg	110	110	
Weight without brake	m	kg	100	100	

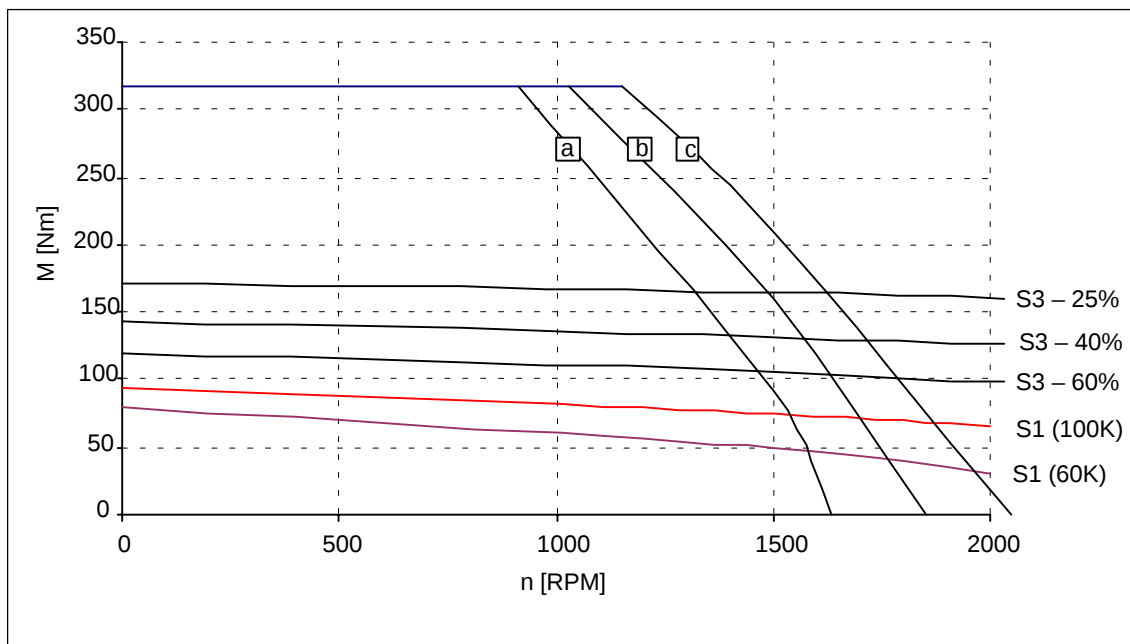


Fig. 2-49 Speed–torque diagram 1FT6134–6AB71

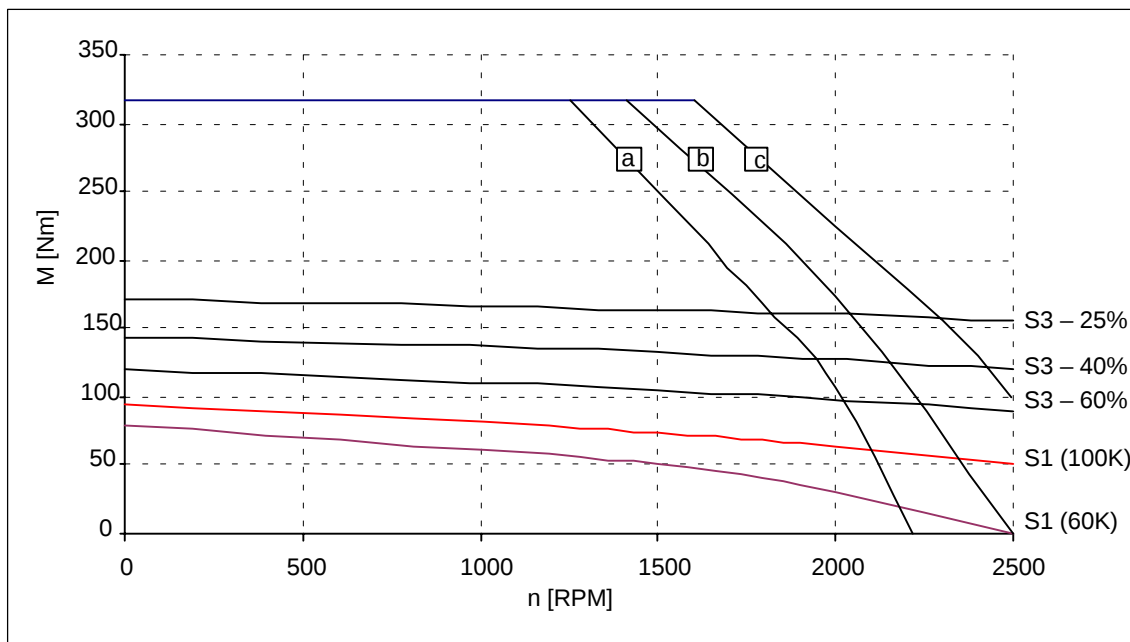


Fig. 2-50 Speed–torque diagram 1FT6134–6AC71

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

2.1 Speed–torque diagrams

Table 2-30 1FT6136 non-ventilated

1FT6136					
Technical data	Code	Units	–6AB71	–6AC7□	
Engineering data					
Rated speed	n_N	RPM	1500	2000	
Number of poles	2p		6	6	
Rated torque (100K)	M_N (100K)	Nm	88	74	
Rated current (100K)	I_N (100K)	A	27	30	
Standstill torque (60K)	M_0 (60K)	Nm	95	95	
Standstill torque (100K)	M_0 (100K)	Nm	115	115	
Standstill current (60K)	I_0 (60K)	A	27	34	
Standstill current (100K)	I_0 (100K)	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. perm. 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	4.4	2.8	
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	90	90	
Weight with brake	m	kg	125	125	
Weight without brake	m	kg	117	117	

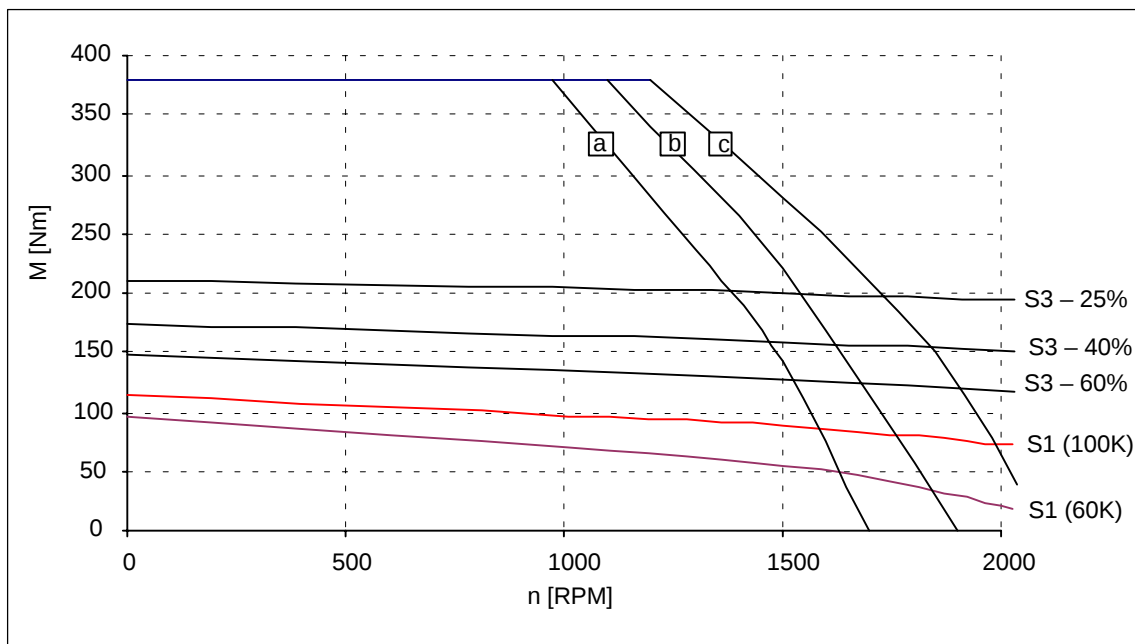


Fig. 2-51 Speed–torque diagram 1FT6136-6AB71

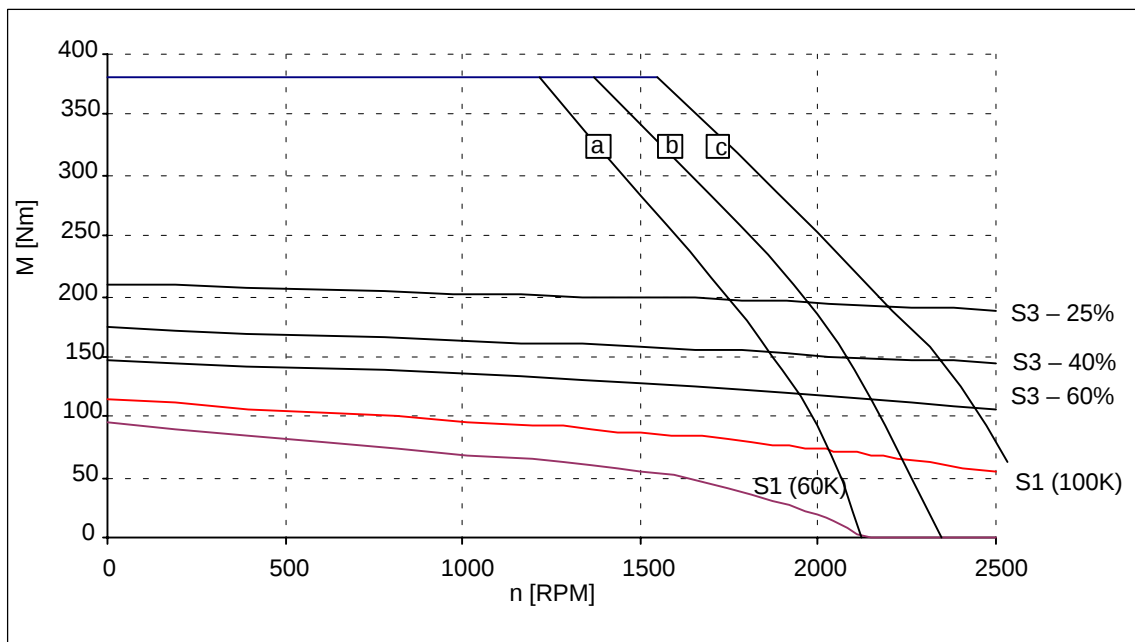


Fig. 2-52 Speed–torque diagram 1FT6136-6AC7□

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

2.1 Speed–torque diagrams

2.1.2 1FT6 series, force ventilated

Table 2-31 1FT6084 force ventilated

1FT6084				
Technical data	Code	Units	–8SF7□	
Engineering data				
Rated speed	n_N	RPM	3000	
Number of poles	2p		8	
Rated torque (100K)	M_N (100K)	Nm	22.0	
Rated current (100K)	I_N (100K)	A	17.0	
Standstill torque (60K)	M_0 (60K)	Nm	21.6	
Standstill torque (100K)	M_0 (100K)	Nm	26.0	
Standstill current (60K)	I_0 (60K)	A	14.8	
Standstill current (100K)	I_0 (100K)	A	18.2	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	61.1	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	48.0	
Optimum operating point				
Optimum speed	n_{opt}	RPM	3000	
Optimum power	P_{opt}	kW	6.91	
Limiting data				
Max. perm. 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	

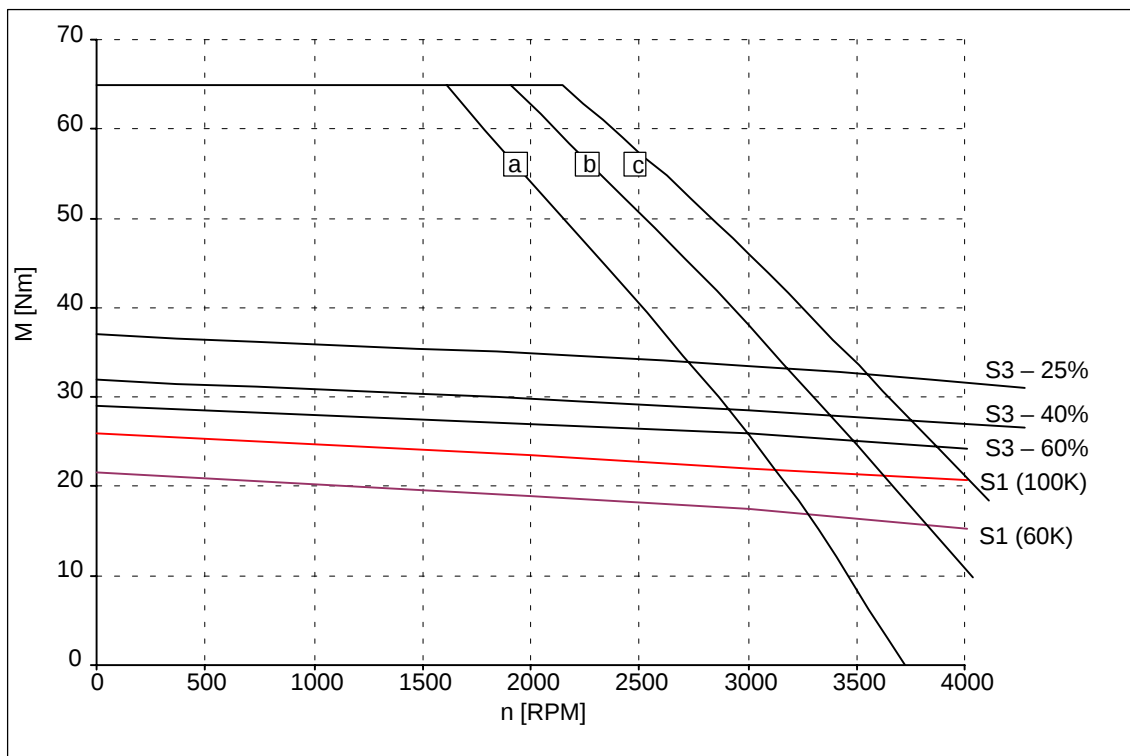


Fig. 2-53 Speed–torque diagram 1FT6084–8SF7

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

2.1 Speed–torque diagrams

Table 2-32 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 (100K)	M_N (100K)	Nm	20.0	17.0	
Rated current (100K)	I_N (100K)	A	24.5	25.5	
Standstill torque (60K)	M_0 (60K)	Nm	21.6	21.6	
Standstill torque (100K)	M_0 (100K)	Nm	26.0	26.0	
Standstill current (60K)	I_0 (60K)	A	21.0	29.0	
Standstill current (100K)	I_0 (100K)	A	26.0	35.0	
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	48.0	48.0	
Optimum operating point					
Optimum speed	n_{opt}	RPM	4500	6000	
Optimum power	P_{opt}	kW	9.42	10.68	
Limiting data					
Max. perm. 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	

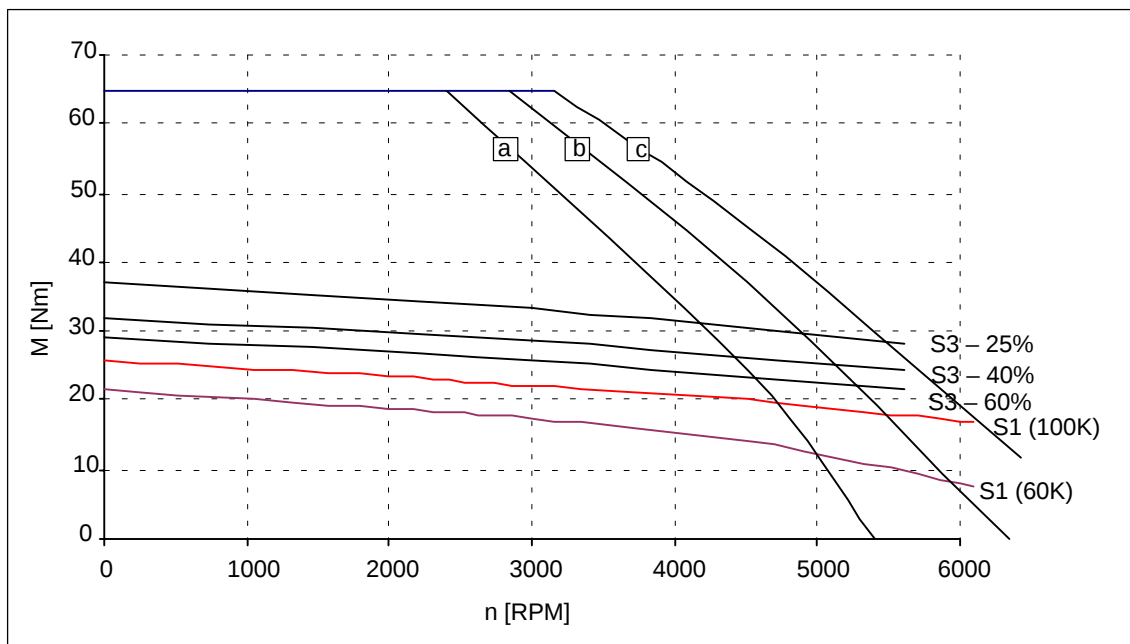


Fig. 2-54 Speed–torque diagram 1FT6084–8SH7□

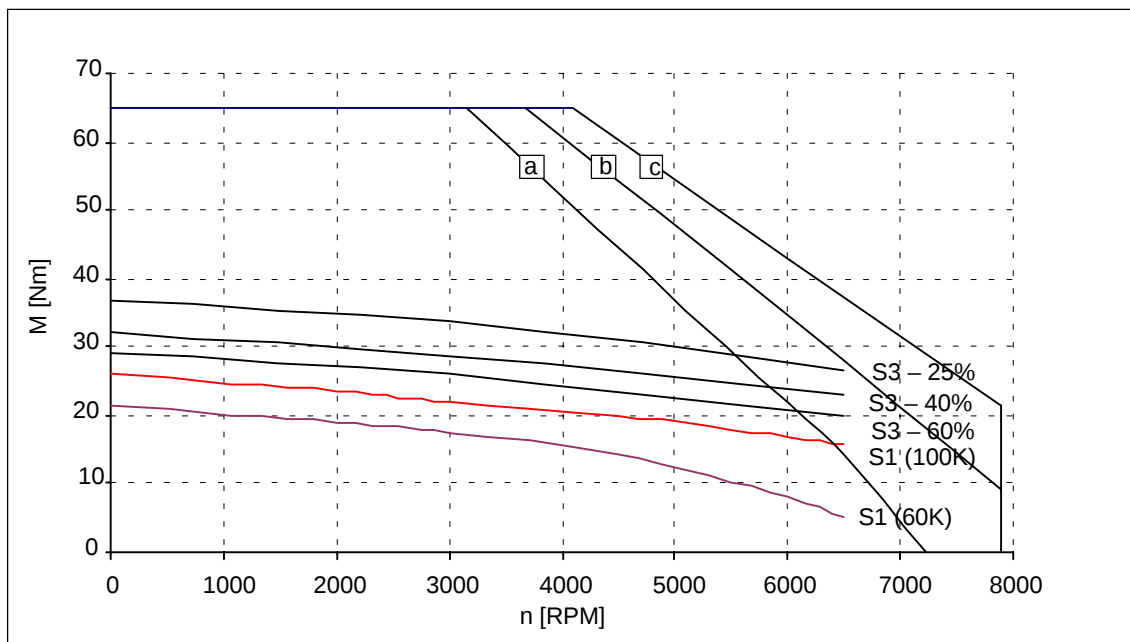


Fig. 2-55 Speed–torque diagram 1FT6084–8SK7□

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

2.1 Speed–torque diagrams

Table 2-33 1FT6086 force ventilated

1FT6086				
Technical data	Code	Units	–8SF7□	
Engineering data				
Rated speed	n_N	RPM	3000	
Number of poles	2p		8	
Rated torque (100K)	M_N (100K)	Nm	31.0	
Rated current (100K)	I_N (100K)	A	24.5	
Standstill torque (60K)	M_0 (60K)	Nm	29.0	
Standstill torque (100K)	M_0 (100K)	Nm	35.0	
Standstill current (60K)	I_0 (60K)	A	20.3	
Standstill current (100K)	I_0 (100K)	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. perm. 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	

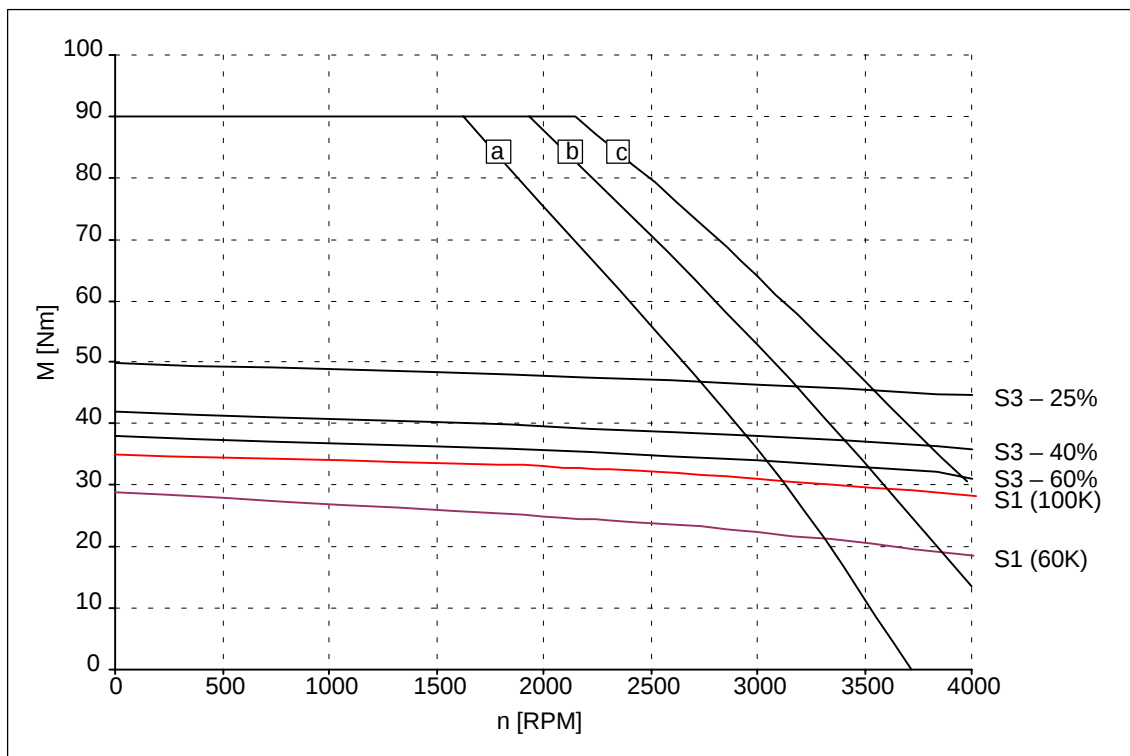


Fig. 2-56 Speed–torque diagram 1FT6086–8SF7□

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

2.1 Speed–torque diagrams

Table 2-34 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 (100K)	M_N (100K)	Nm	27.0	22.0	
Rated current (100K)	I_N (100K)	A	32.0	29.0	
Standstill torque (60K)	M_0 (60K)	Nm	29.0	29.0	
Standstill torque (100K)	M_0 (100K)	Nm	35.0	35.0	
Standstill current (60K)	I_0 (60K)	A	31.0	35.0	
Standstill current (100K)	I_0 (100K)	A	38.0	44.0	
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	5800	
Optimum power	P_{opt}	kW	12,7	14.0	
Limiting data					
Max. perm. 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	

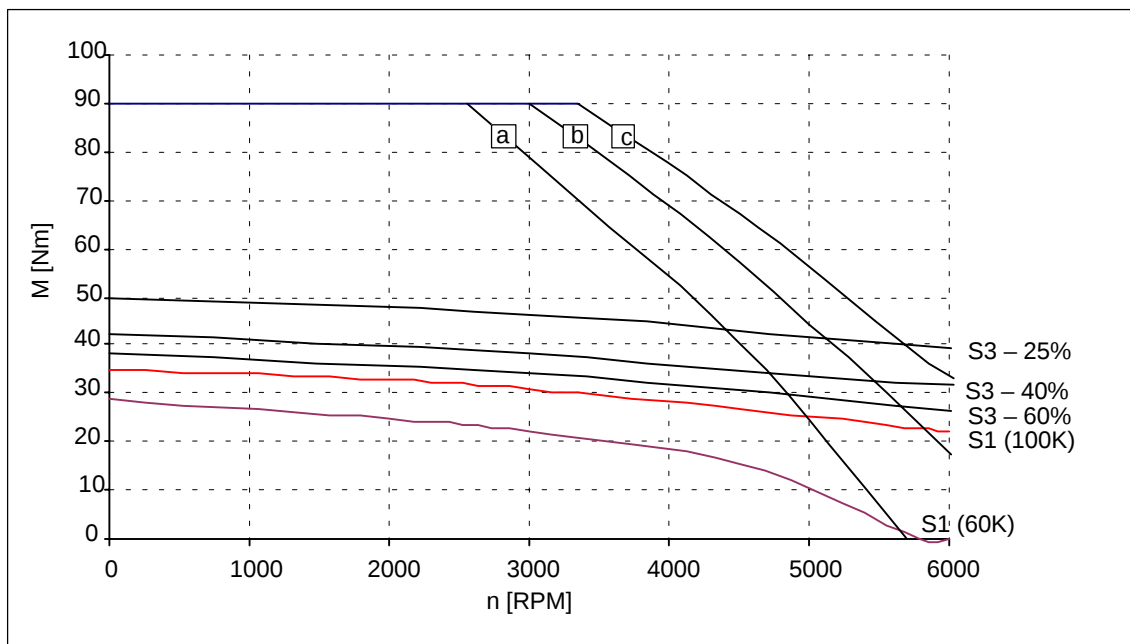


Fig. 2-57 Speed–torque diagram 1FT6086-8SH7□

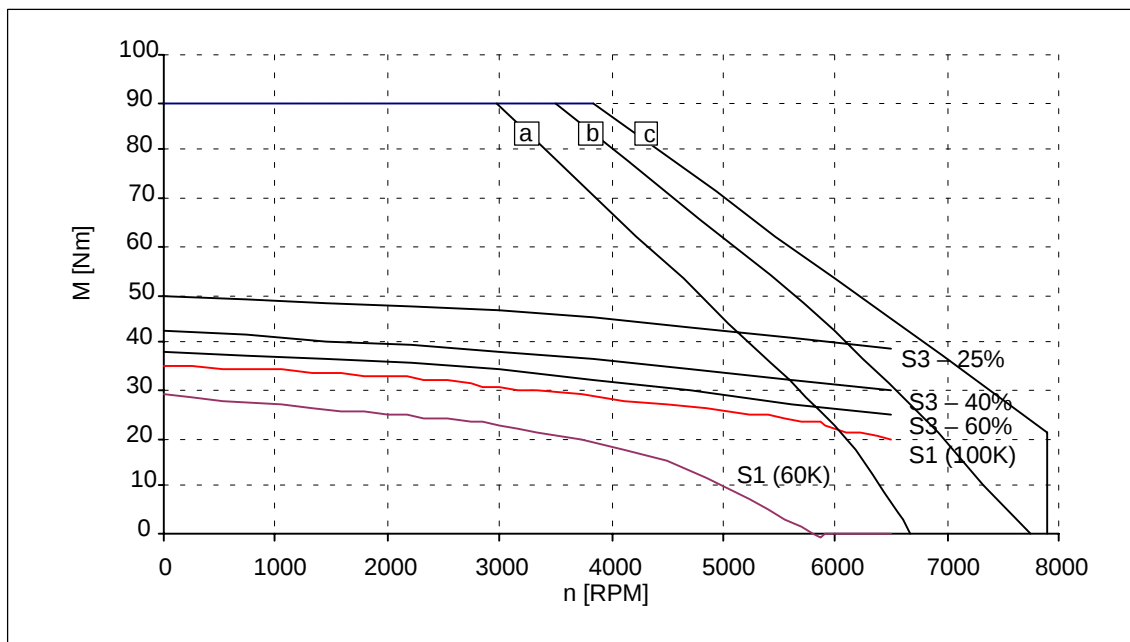


Fig. 2-58 Speed–torque diagram 1FT6086-8SK7□

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

2.1 Speed–torque diagrams

Table 2-35 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 (100K)	M_N (100K)	Nm	59.0	56.0	
Rated current (100K)	I_N (100K)	A	21.7	28.0	
Standstill torque (60K)	M_0 (60K)	Nm	54.0	54.0	
Standstill torque (100K)	M_0 (100K)	Nm	65.0	65.0	
Standstill current (60K)	I_0 (60K)	A	17.8	24.2	
Standstill current (100K)	I_0 (100K)	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. perm. 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	

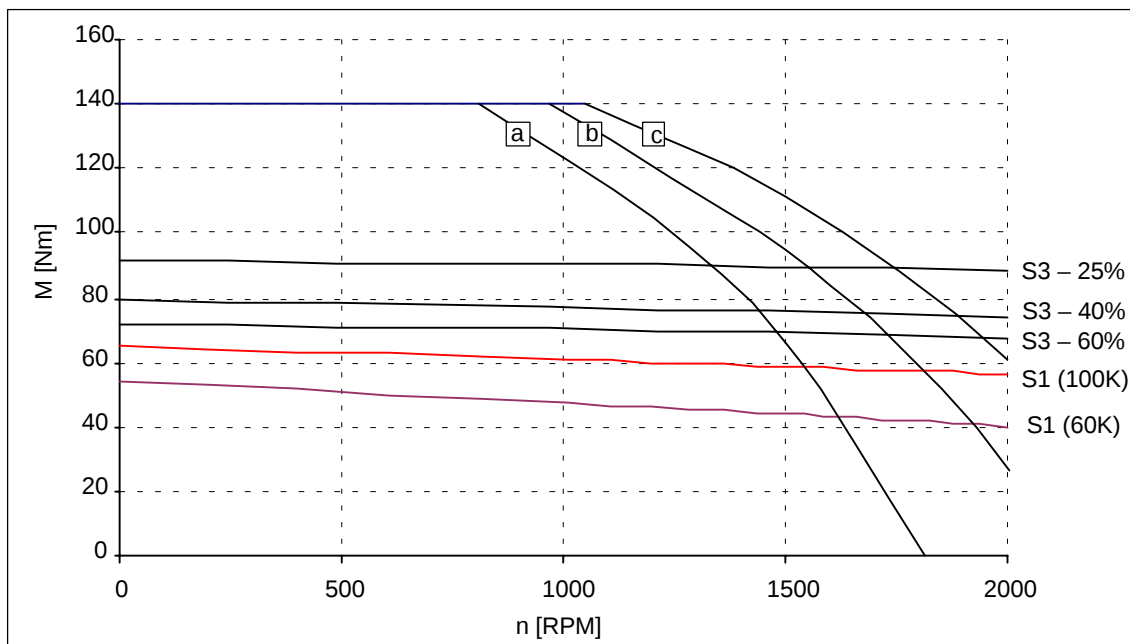


Fig. 2-59 Speed–torque diagram 1FT6105-8SB7

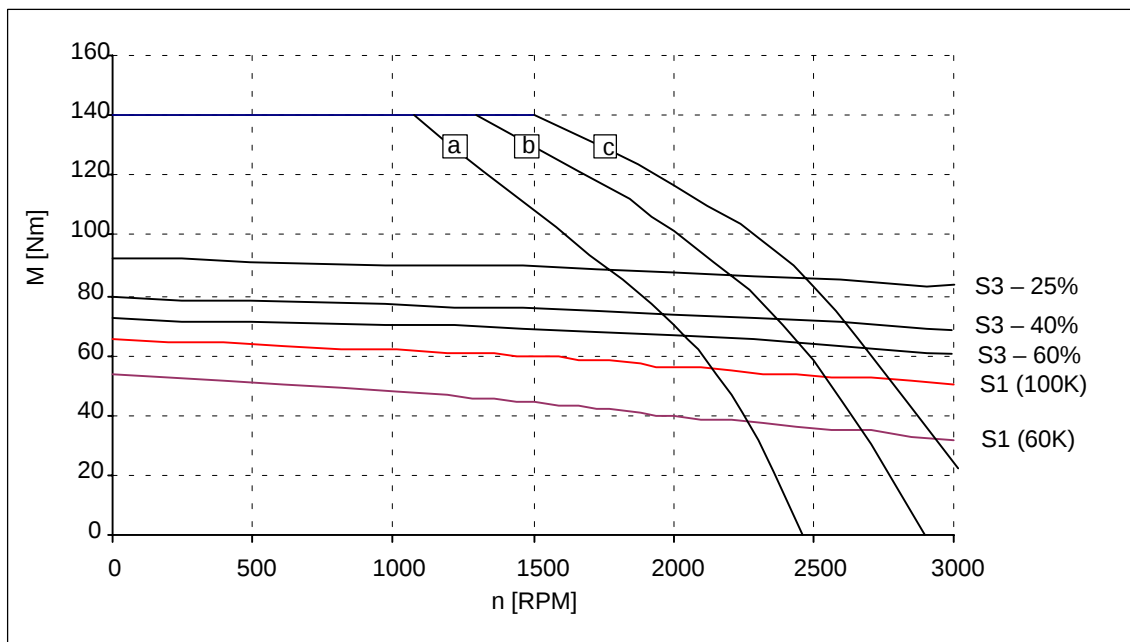


Fig. 2-60 Speed–torque diagram 1FT6105-8SC7

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

2.1 Speed–torque diagrams

Table 2-36 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 (100K)	M_N (100K)	Nm	50.0	40.0	
Rated current (100K)	I_N (100K)	A	35.0	41.0	
Standstill torque (60K)	M_0 (60K)	Nm	54.0	54.0	
Standstill torque (100K)	M_0 (100K)	Nm	65.0	65.0	
Standstill current (60K)	I_0 (60K)	A	34.0	48.0	
Standstill current (100K)	I_0 (100K)	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. perm. 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	

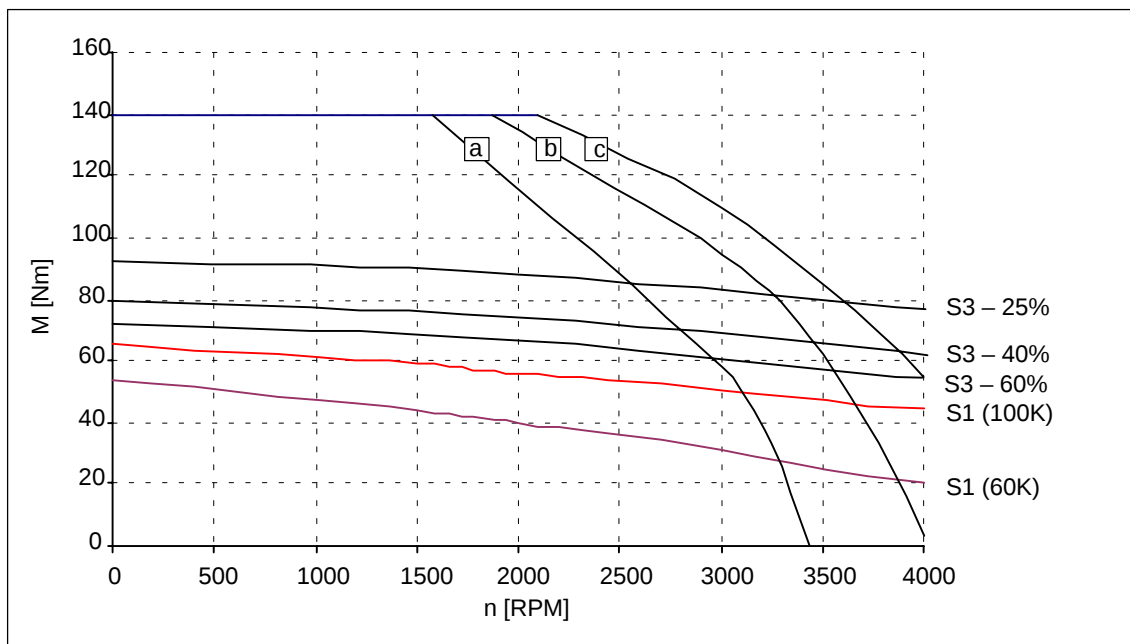


Fig. 2-61 Speed–torque diagram 1FT6105–8SF7□

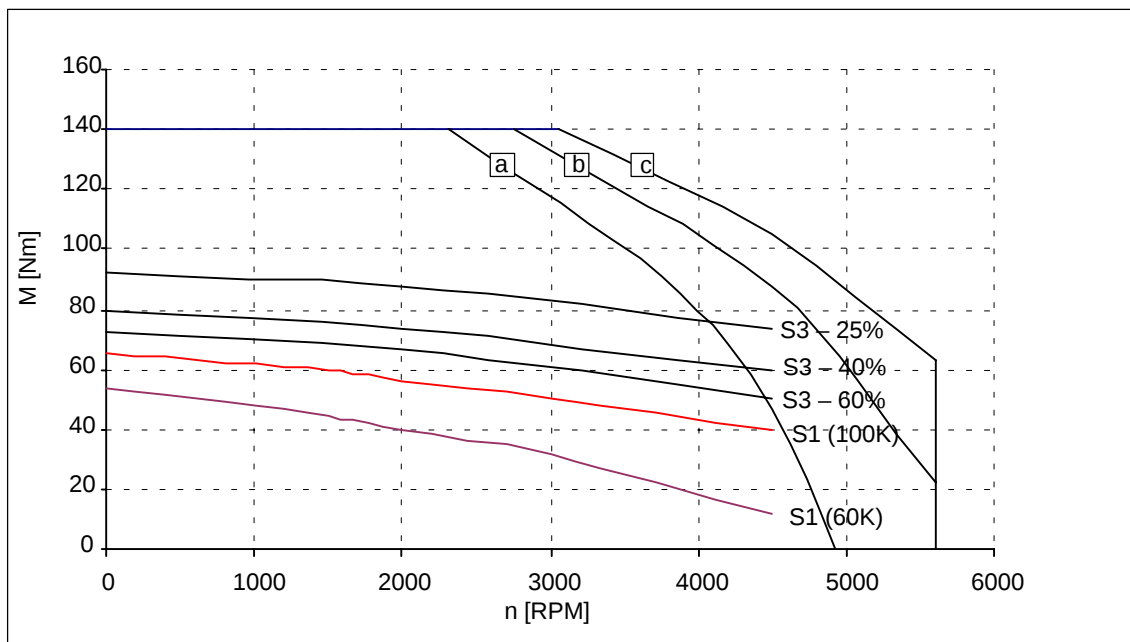


Fig. 2-62 Speed–torque diagram 1FT6105–8SH7□

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

2.1 Speed–torque diagrams

Table 2-37 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 (100K)	M_N (100K)	Nm	83	80	
Rated current (100K)	I_N (100K)	A	31	40	
Standstill torque (60K)	M_0 (60K)	Nm	75	75	
Standstill torque (100K)	M_0 (100K)	Nm	90	90	
Standstill current (60K)	I_0 (60K)	A	25	34	
Standstill current (100K)	I_0 (100K)	A	31	41	
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	13.0	16.8	
Limiting data					
Max. perm. 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	195	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	

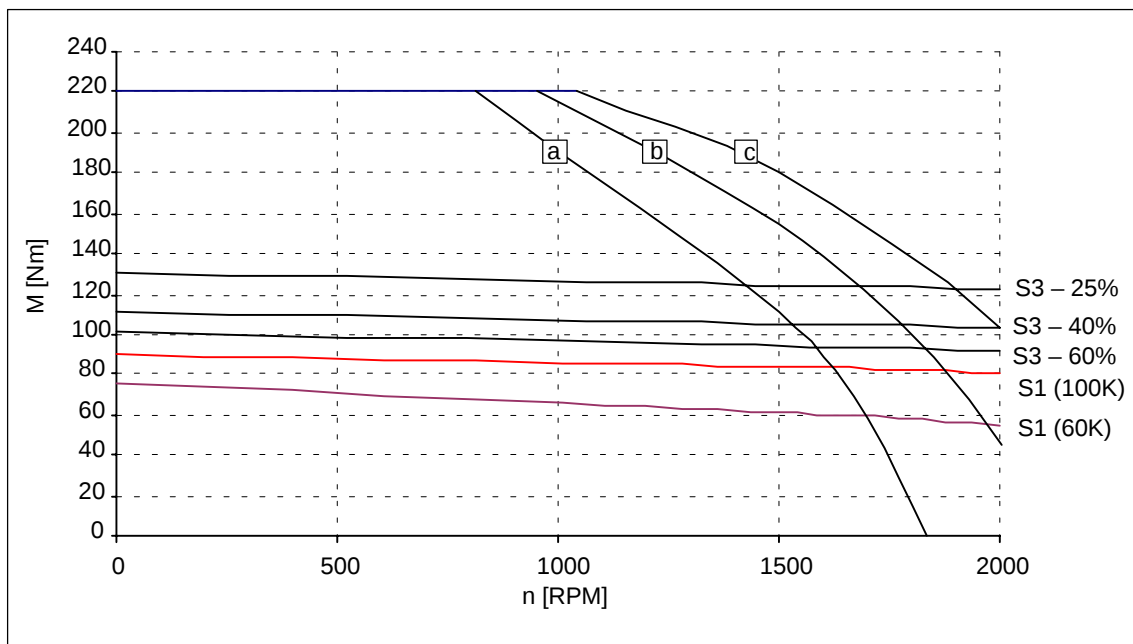


Fig. 2-63 Speed-torque diagram 1FT6108-8SB7

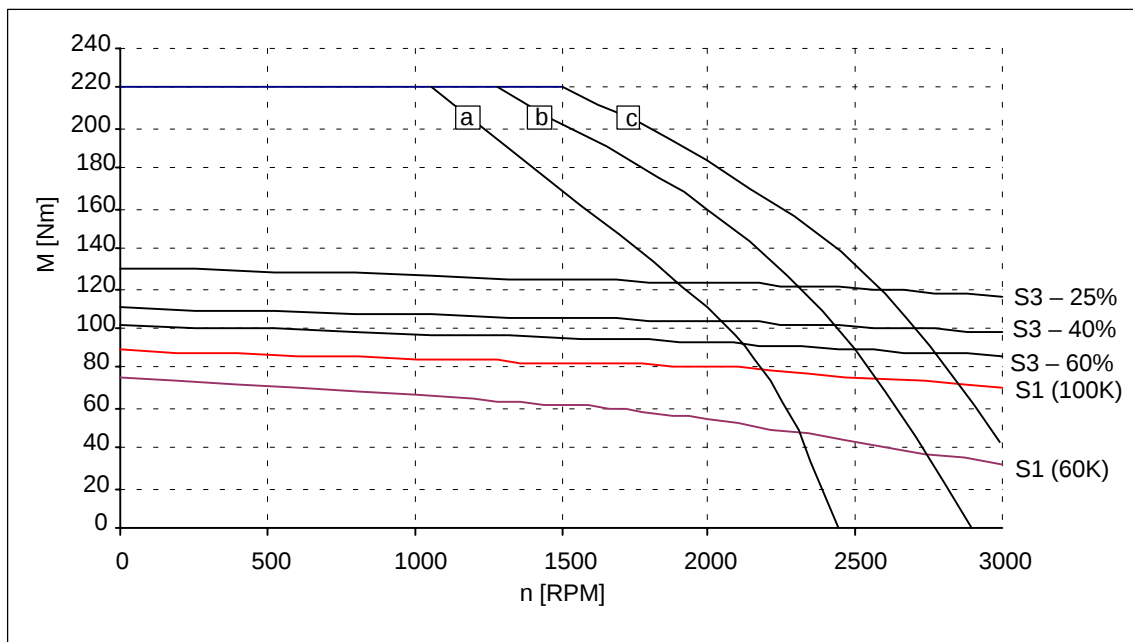


Fig. 2-64 Speed-torque diagram 1FT6108-8SC7

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

2.1 Speed–torque diagrams

Table 2-38 1FT6108 force ventilated

1FT6108				
Technical data	Code	Units	–8SF7□	
Engineering data				
Rated speed	n_N	RPM	3000	
Number of poles	$2p$		8	
Rated torque (100K)	M_N (100K)	Nm	70	
Rated current (100K)	I_N (100K)	A	53	
Standstill torque (60K)	M_0 (60K)	Nm	75	
Standstill torque (100K)	M_0 (100K)	Nm	90	
Standstill current (60K)	I_0 (60K)	A	51	
Standstill current (100K)	I_0 (100K)	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. perm. 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	

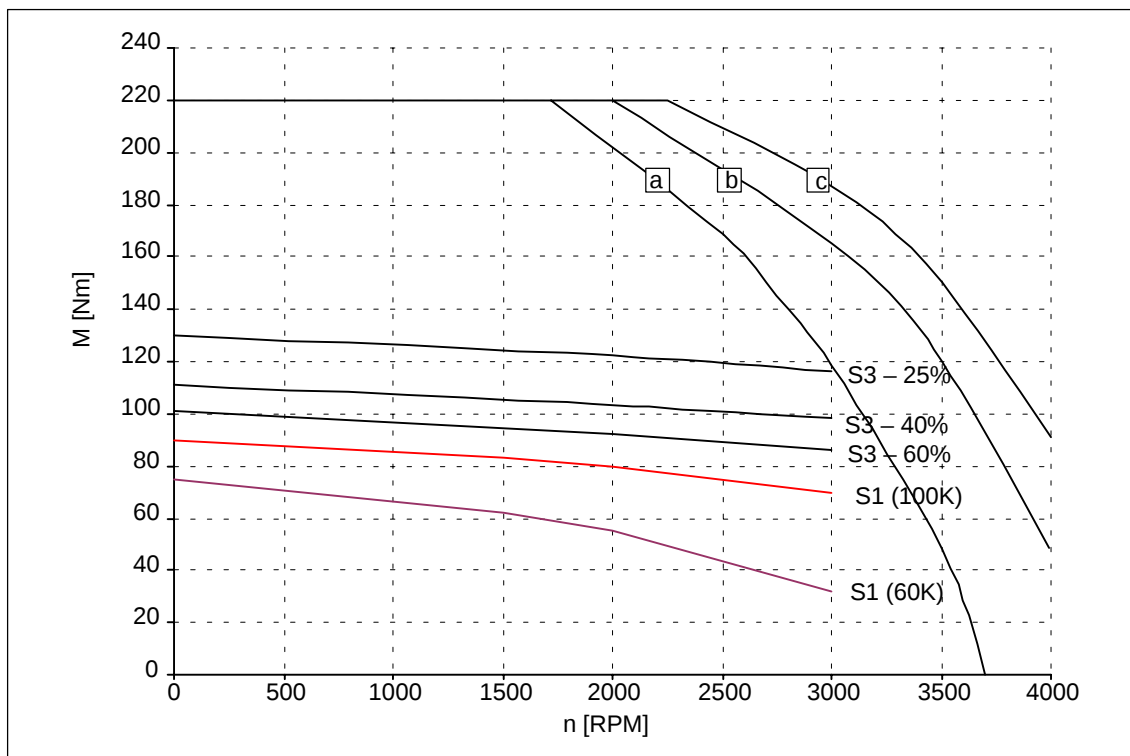


Fig. 2-65 Speed–torque diagram 1FT6108–8SF7□

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

2.1 Speed–torque diagrams

Table 2-39 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 (100K)	M_N (100K)	Nm	102	98	
Rated current (100K)	I_N (100K)	A	36	46	
Standstill torque (60K)	M_0 (60K)	Nm	91	91	
Standstill torque (100K)	M_0 (100K)	Nm	110	110	
Standstill current (60K)	I_0 (60K)	A	29	38	
Standstill current (100K)	I_0 (100K)	A	36	47	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	508	508	
Moment of inertia (without brake)	J_{mot}	10^{-4} 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. perm. 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	5,7	3.3	
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	

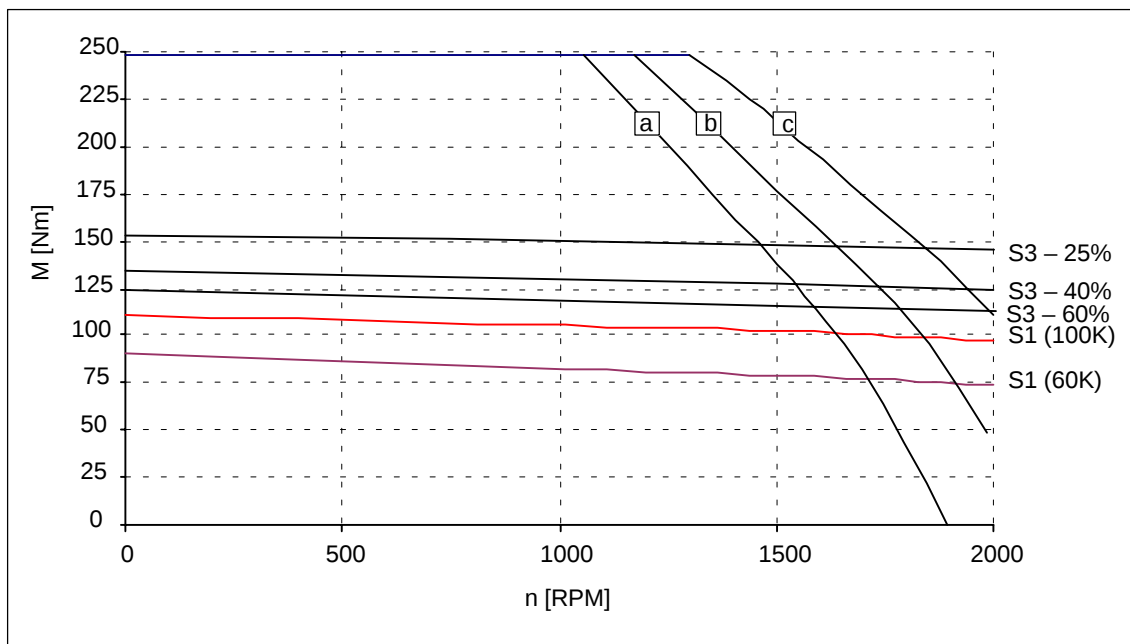


Fig. 2-66 Speed–torque diagram 1FT6132–6SB71

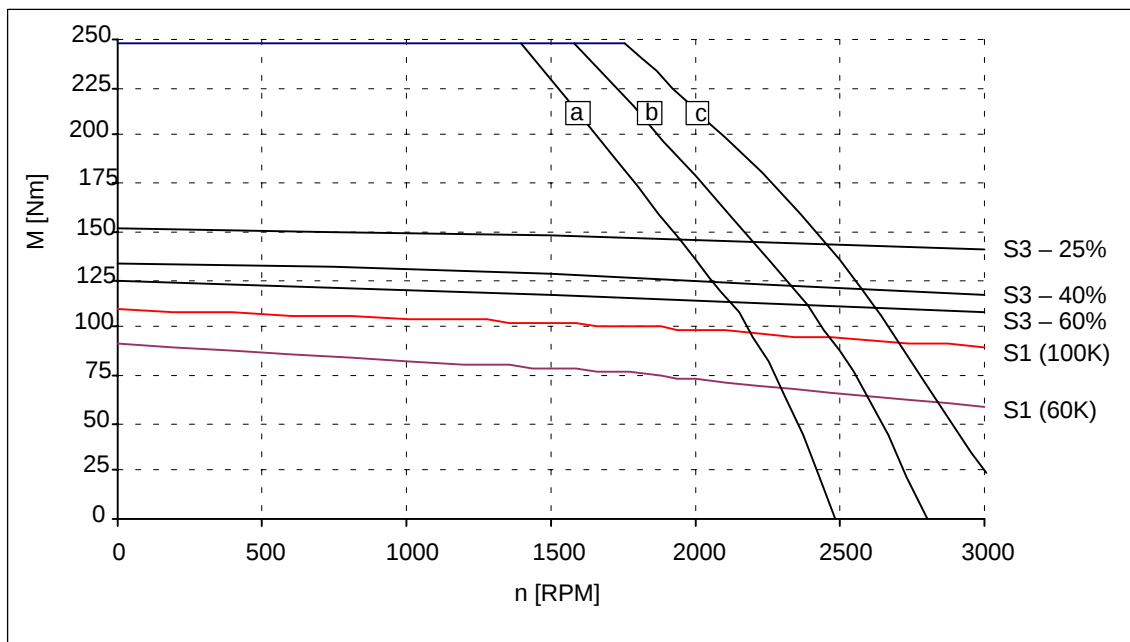


Fig. 2-67 Speed–torque diagram 1FT6132–6SC71

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

2.1 Speed–torque diagrams

Table 2-40 1FT6132 force ventilated

1FT6132				
Technical data	Code	Units	–6SF71	
Engineering data				
Rated speed	n_N	RPM	3000	
Number of poles	$2p$		6	
Rated torque (100K)	M_N (100K)	Nm	90	
Rated current (100K)	I_N (100K)	A	62	
Standstill torque (60K)	M_0 (60K)	Nm	91	
Standstill torque (100K)	M_0 (100K)	Nm	110	
Standstill current (60K)	I_0 (60K)	A	55	
Standstill current (100K)	I_0 (100K)	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. perm. 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	1.55	
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	

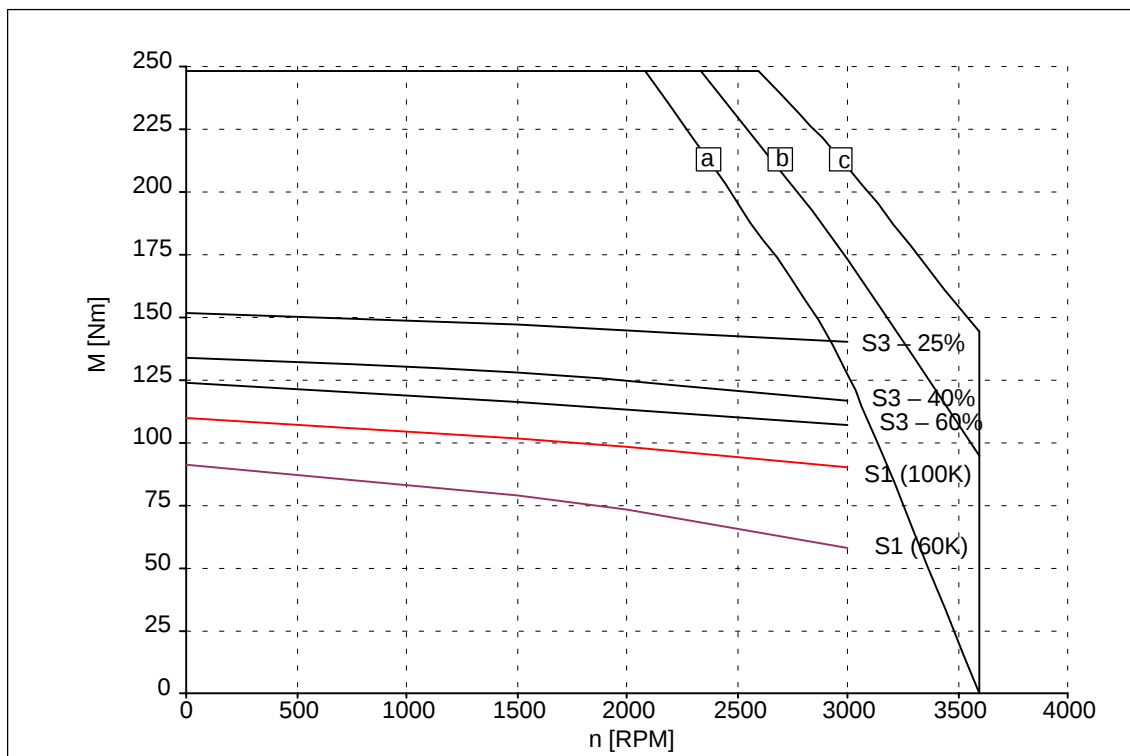


Fig. 2-68 Speed–torque diagram 1FT632–6SF71

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

2.1 Speed–torque diagrams

Table 2-41 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 (100K)	M_N (100K)	Nm	130	125	
Rated current (100K)	I_N (100K)	A	45	57	
Standstill torque (60K)	M_0 (60K)	Nm	116	116	
Standstill torque (100K)	M_0 (100K)	Nm	140	140	
Standstill current (60K)	I_0 (60K)	A	36	47	
Standstill current (100K)	I_0 (100K)	A	44	58	
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	20.4	26.2	
Limiting data					
Max. perm. 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	

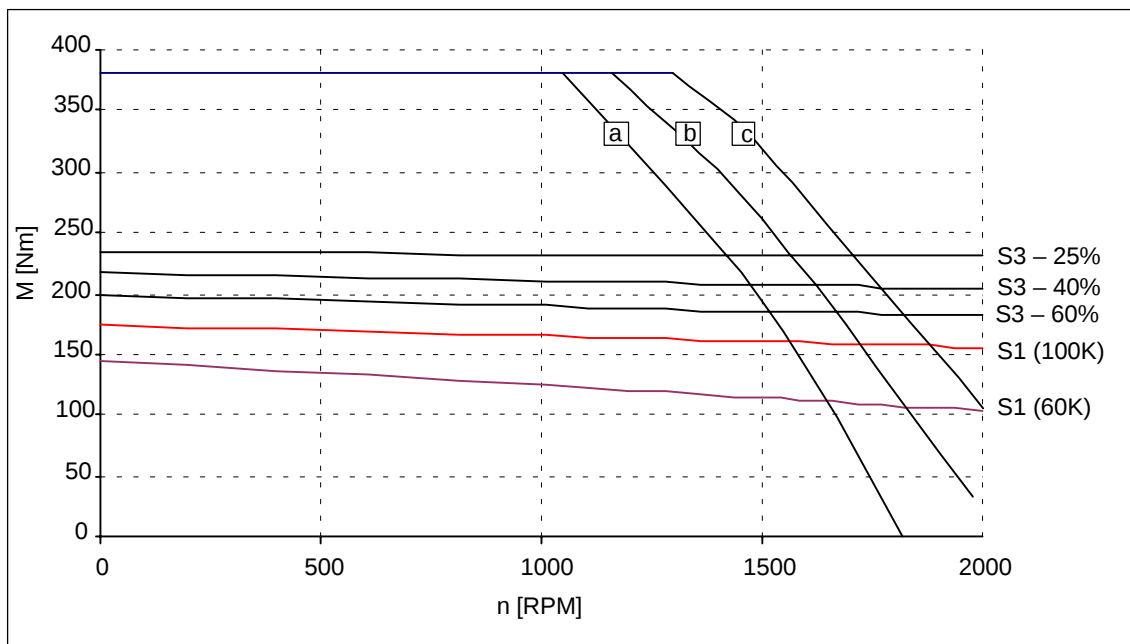


Fig. 2-69 Speed–torque diagram 1FT6134–6SB71

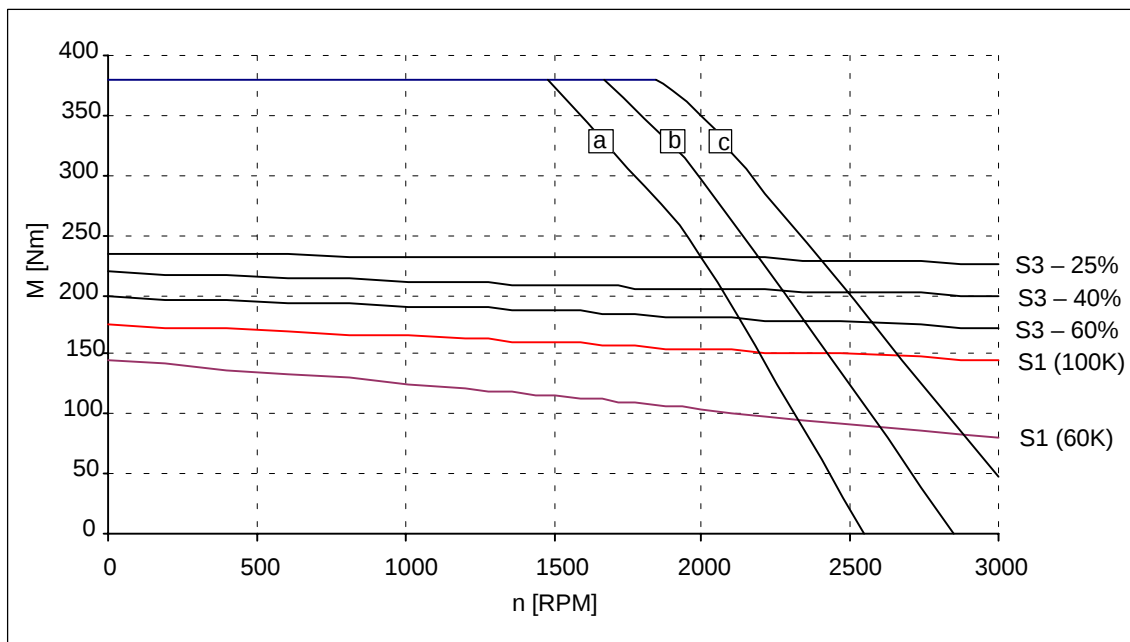


Fig. 2-70 Speed–torque diagram 1FT6134–6SC71

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

2.1 Speed–torque diagrams

Table 2-42 1FT6134 force ventilated

1FT6134					
Technical data	Code	Units	–6SF71		
Engineering data					
Rated speed	n_N	RPM	3000		
Number of poles	2p		6		
Rated torque (100K)	M_N (100K)	Nm	110		
Rated current (100K)	I_N (100K)	A	72		
Standstill torque (60K)	M_0 (60K)	Nm	116		
Standstill torque (100K)	M_0 (100K)	Nm	140		
Standstill current (60K)	I_0 (60K)	A	67		
Standstill current (100K)	I_0 (100K)	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. perm. 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		

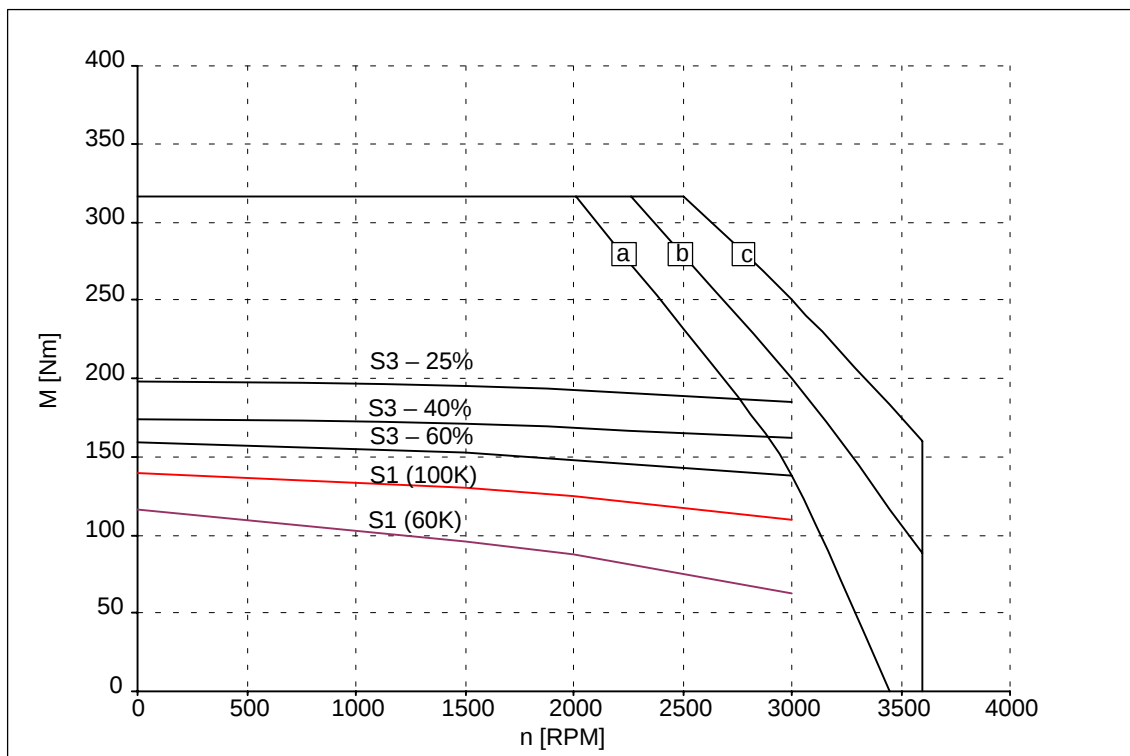


Fig. 2-71 Speed–torque diagram 1FT6134–6SF71

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

2.1 Speed–torque diagrams

Table 2-43 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 (100K)	M_N (100K)	Nm	160	155	
Rated current (100K)	I_N (100K)	A	55	72	
Standstill torque (60K)	M_0 (60K)	Nm	145	145	
Standstill torque (100K)	M_0 (100K)	Nm	175	175	
Standstill current (60K)	I_0 (60K)	A	45	62	
Standstill current (100K)	I_0 (100K)	A	55	77	
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	25	32	
Limiting data					
Max. perm. 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	3.8	2.0	
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	

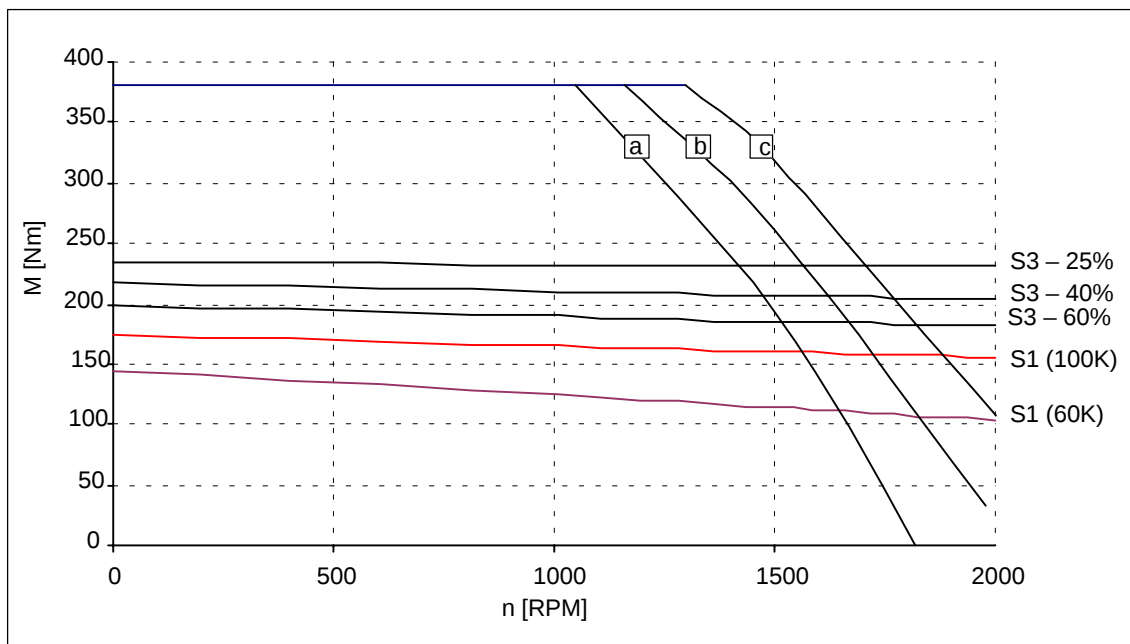


Fig. 2-72 Speed-torque diagram 1FT6136-6SB71

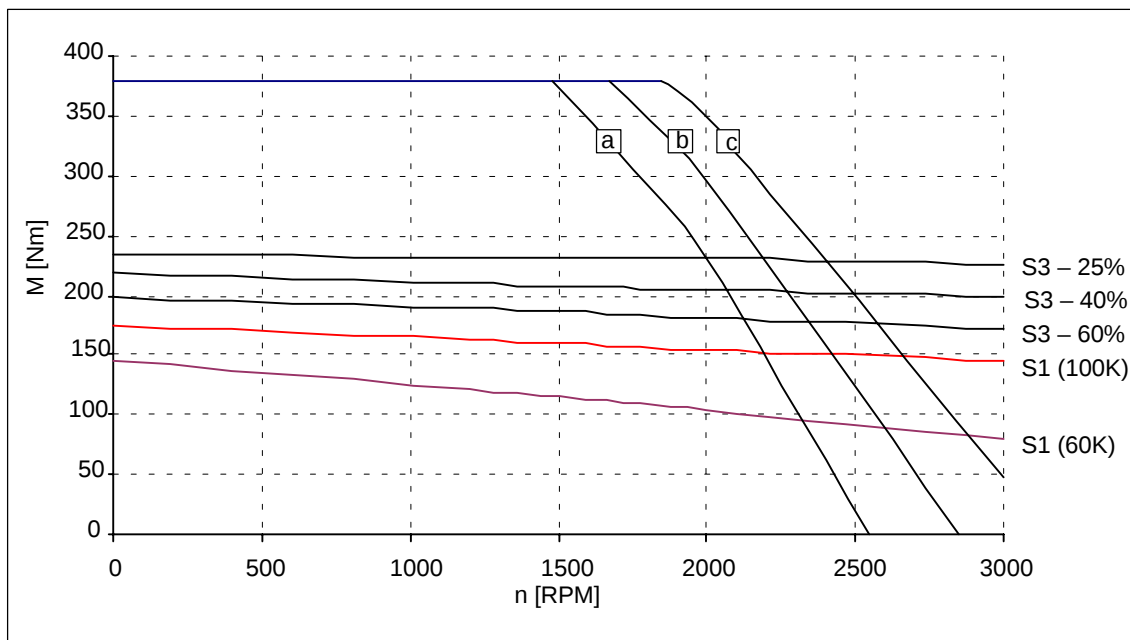


Fig. 2-73 Speed-torque diagram 1FT6136-6SC71

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

2.1 Speed–torque diagrams

Table 2-44 1FT6136 force ventilated

1FT6136				
Technical data	Code	Units	–6SF71	
Engineering data				
Rated speed	n_N	RPM	3000	
Number of poles	2p		6	
Rated torque (100K)	M_N (100K)	Nm	145	
Rated current (100K)	I_N (100K)	A	104	
Standstill torque (60K)	M_0 (60K)	Nm	145	
Standstill torque (100K)	M_0 (100K)	Nm	175	
Standstill current (60K)	I_0 (60K)	A	89	
Standstill current (100K)	I_0 (100K)	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. perm. 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	

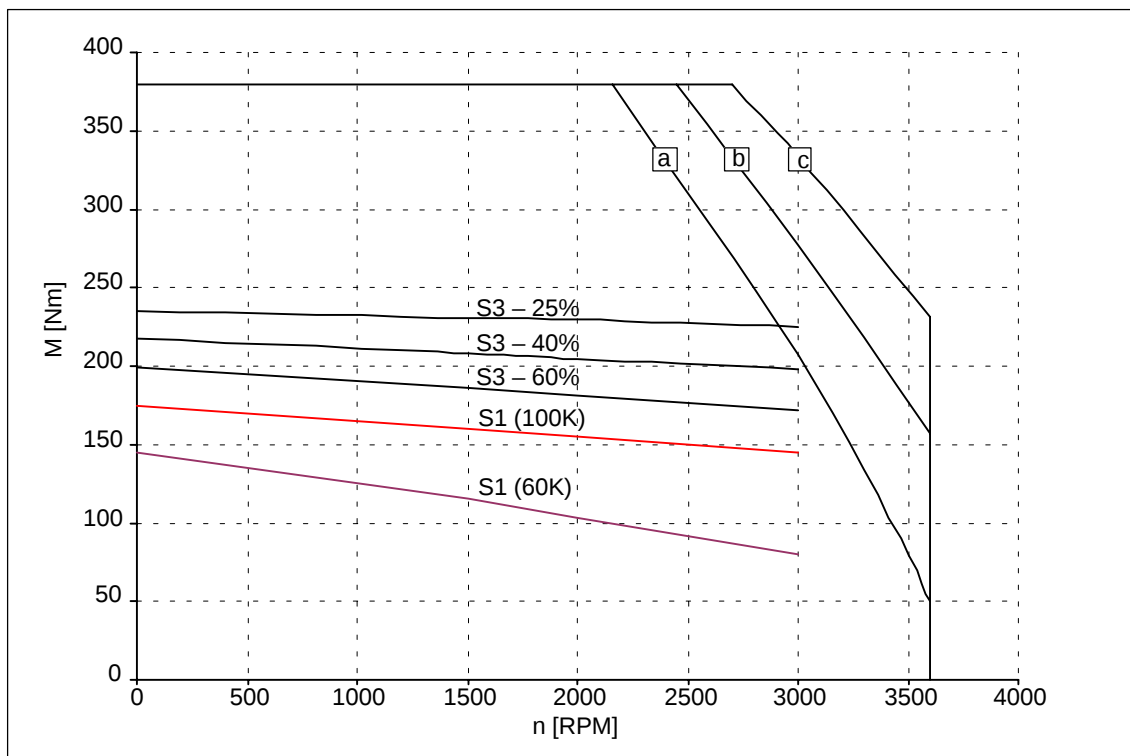


Fig. 2-74 Speed–torque diagram 1FT6136–6SF71

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

2.1 Speed–torque diagrams

Table 2-45 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 (100K)	M_N (100K)	Nm	385	340 ²⁾	
Rated current (100K)	I_N (100K)	A	136	185 ²⁾	
Standstill torque (60K)	M_0 (60K)	Nm	360	360	
Standstill torque (100K)	M_0 (100K)	Nm	425	425	
Standstill current (60K)	I_0 (60K)	A	124	186	
Standstill current (100K)	I_0 (100K)	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	
Optimum power	P_{opt}	kW	60.5	89.0	
Limiting data					
Max. perm. 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	472100	472100	
Mechanical time constant	T_{mech}	ms	2.3	2.3	
Thermal time constant	T_{th}	min	10	10	
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)

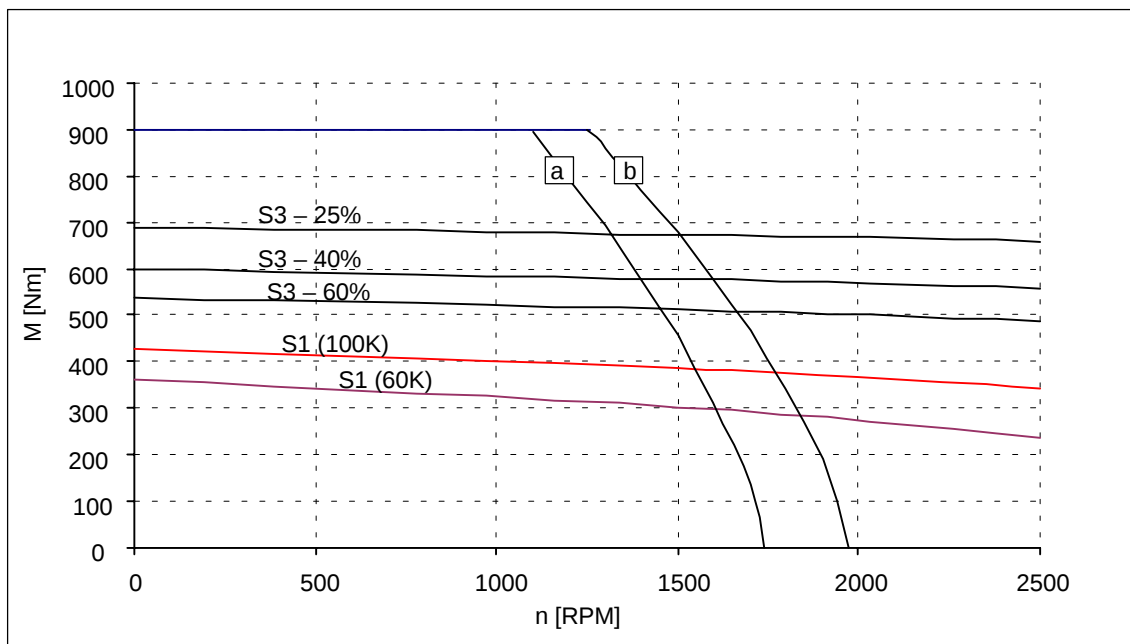


Fig. 2-75 Speed–torque diagram 1FT6163–8SB7

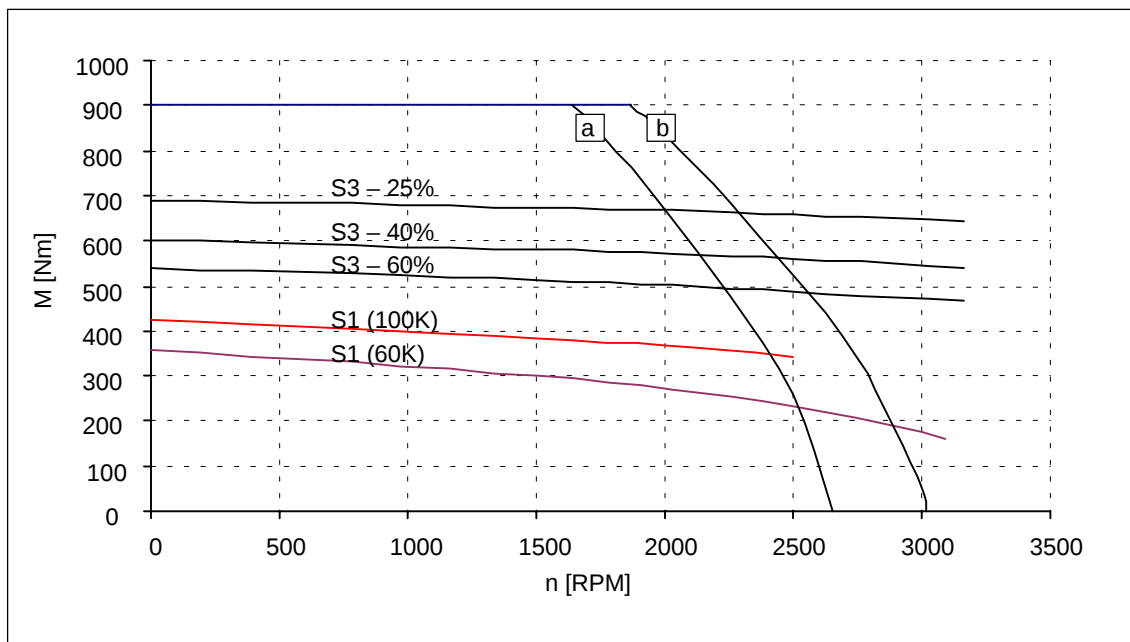


Fig. 2-76 Speed–torque diagram 1FT6163–8SD7

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

2.1 Speed–torque diagrams

Table 2-46 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 (100K)	M_N (100K)	Nm	540	
Rated current (100K)	I_N (100K)	A	174	
Standstill torque (60K)	M_0 (60K)	Nm	510	
Standstill torque (100K)	M_0 (100K)	Nm	600	
Standstill current (60K)	I_0 (60K)	A	165	
Standstill current (100K)	I_0 (100K)	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. perm. 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	431600	
Mechanical time constant	T_{mech}	ms	1.9	
Thermal time constant	T_{th}	min	10	
Weight with brake	m	kg	—	
Weight without brake	m	kg	210	

1) only valid for MASTERDRIVES MC (AFE)

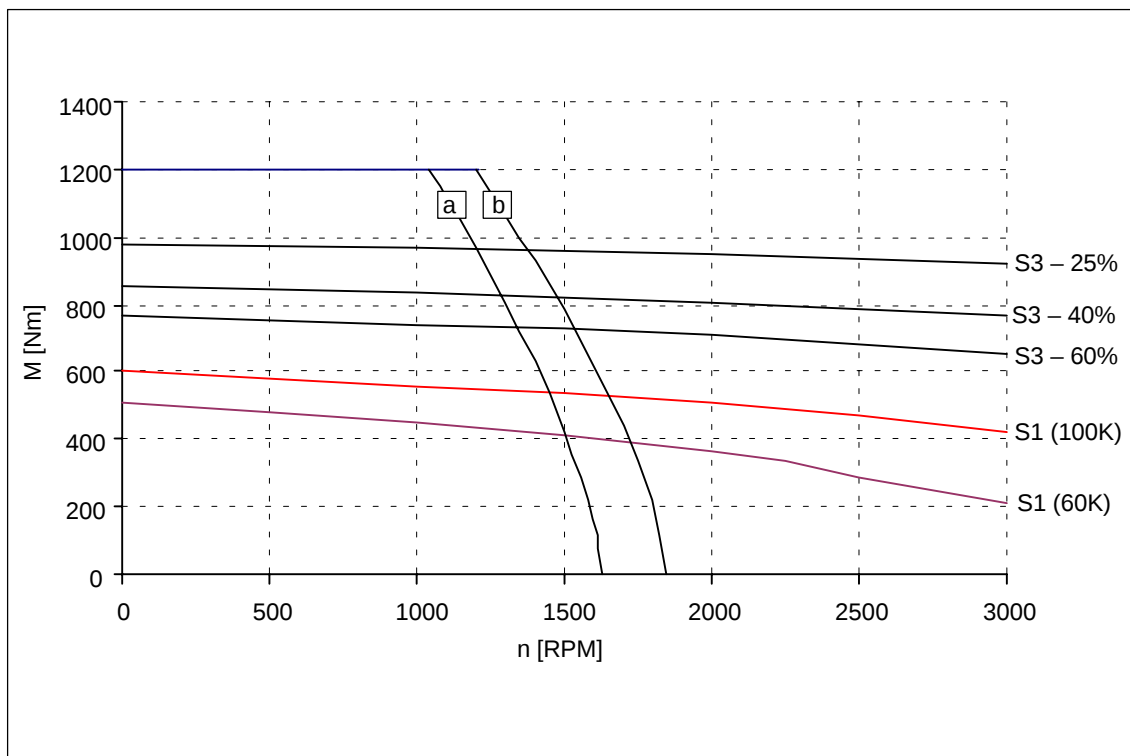


Fig. 2-77 Speed–torque diagram 1FT6168–8SB7

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

2.1.3 1FT6 series, water cooled

Table 2-47 1FT6062, water cooled

1FT6062						
Technical data	Code	Units	–6WF7□			
Engineering data						
Rated speed	n_N	RPM	3000 ¹⁾			
Number of poles	2p		6			
Rated torque (100K)	M_N (100K)	Nm	10.1 ¹⁾			
Rated current (100K)	I_N (100K)	A	6.9 ¹⁾			
Standstill torque (60K)	M_0 (60K)	Nm	8.5			
Standstill torque (100K)	M_0 (100K)	Nm	10.2			
Standstill current (60K)	I_0 (60K)	A	5.6			
Standstill current (100K)	I_0 (100K)	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			
optimaler Betriebspunkt						
Optimum speed	n_{opt}	RPM	3000			
Optimum power	P_{opt}	kW	3.19			
Limiting data						
Max. perm. 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	2			
Weight with brake	m	kg	11			
Weight without brake	m	kg	9.5			

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

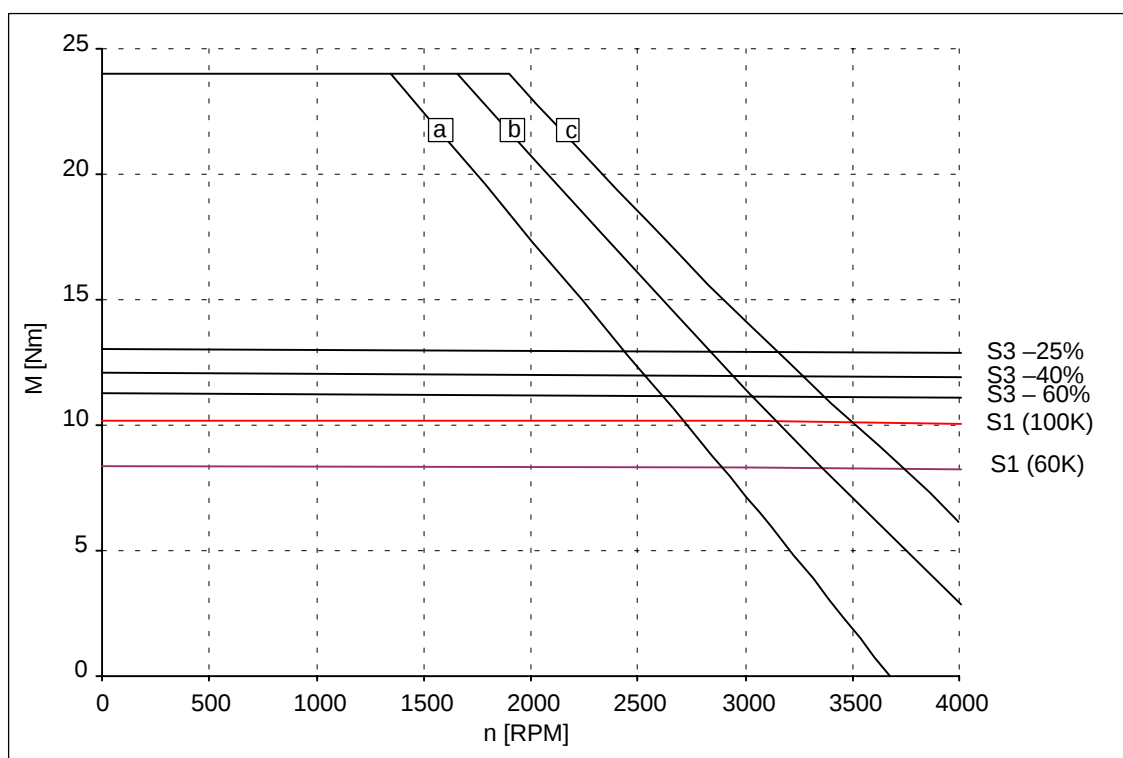


Fig. 2-78 Speed torque diagram 1FT6062-6WF7□

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

Table 2-48 1FT6062, water cooled

1FT6062					
Technical data	Code	Units	–6WH7□	–6WK7□	
Engineering data					
Rated speed	n_N	RPM	4500 ¹⁾	6000 ¹⁾	
Number of poles	2p		6	6	
Rated torque (100K)	M_N (100K)	Nm	10 ¹⁾	9.8 ¹⁾	
Rated current (100K)	I_N (100K)	A	9.6 ¹⁾	12.7 ¹⁾	
Standstill torque (60K)	M_0 (60K)	Nm	8.5	8.5	
Standstill torque (100K)	M_0 (100K)	Nm	10.2	10.2	
Standstill current (60K)	I_0 (60K)	A	7.9	10.6	
Standstill current (100K)	I_0 (100K)	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. perm. 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	2	2	
Weight with brake	m	kg	11	11	
Weight without brake	m	kg	9.5	9.5	

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

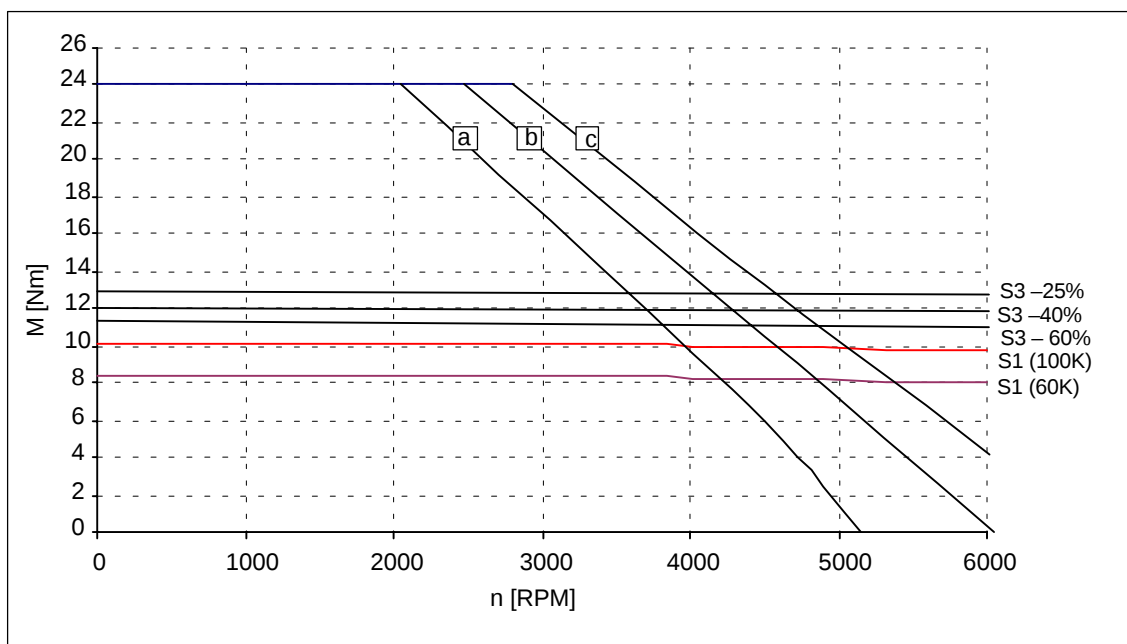


Fig. 2-79 Speed-torque diagram 1FT6062-6WH7□

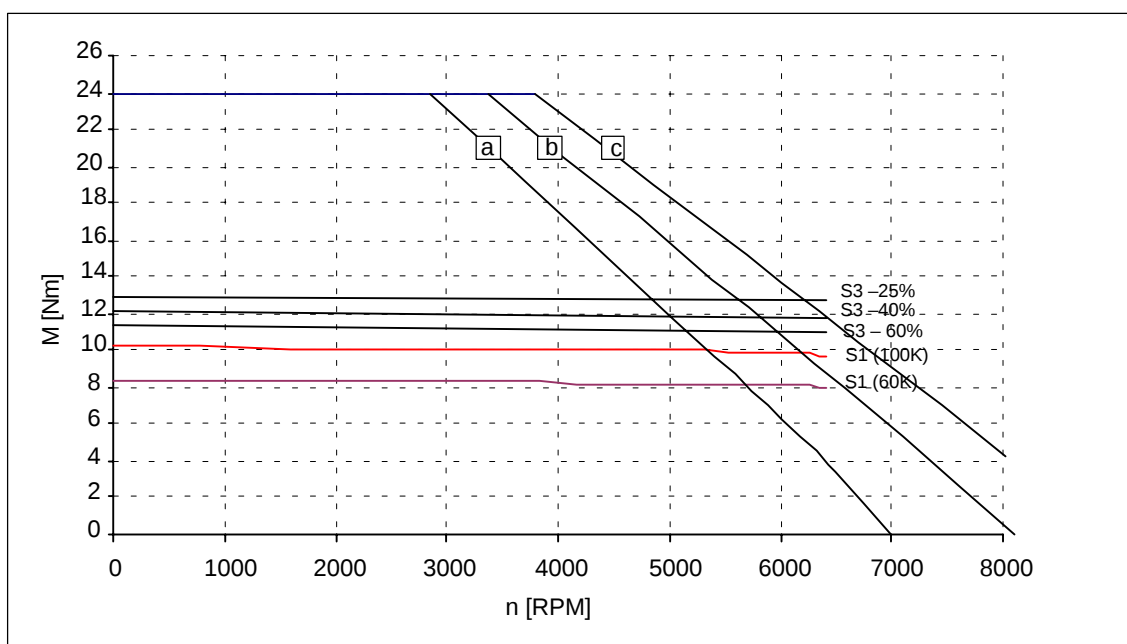


Fig. 2-80 Speed-torque diagram 1FT6062-6WK7□

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

Table 2-49 1FT6064, water cooled

1FT6064				
Technical data	Code	Units	–6WF7□	
Engineering data				
Rated speed	n_N	RPM	3000 ¹⁾	
Number of poles	2p		6	
Rated torque (100K)	M_N (100K)	Nm	16.1 ¹⁾	
Rated current (100K)	I_N (100K)	A	10.3 ¹⁾	
Standstill torque (60K)	M_0 (60K)	Nm	13.4	
Standstill torque (100K)	M_0 (100K)	Nm	16.2	
Standstill current (60K)	I_0 (60K)	A	8.4	
Standstill current (100K)	I_0 (100K)	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. perm. 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	2	
Weight with brake	m	kg	13	
Weight without brake	m	kg	12.5	

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

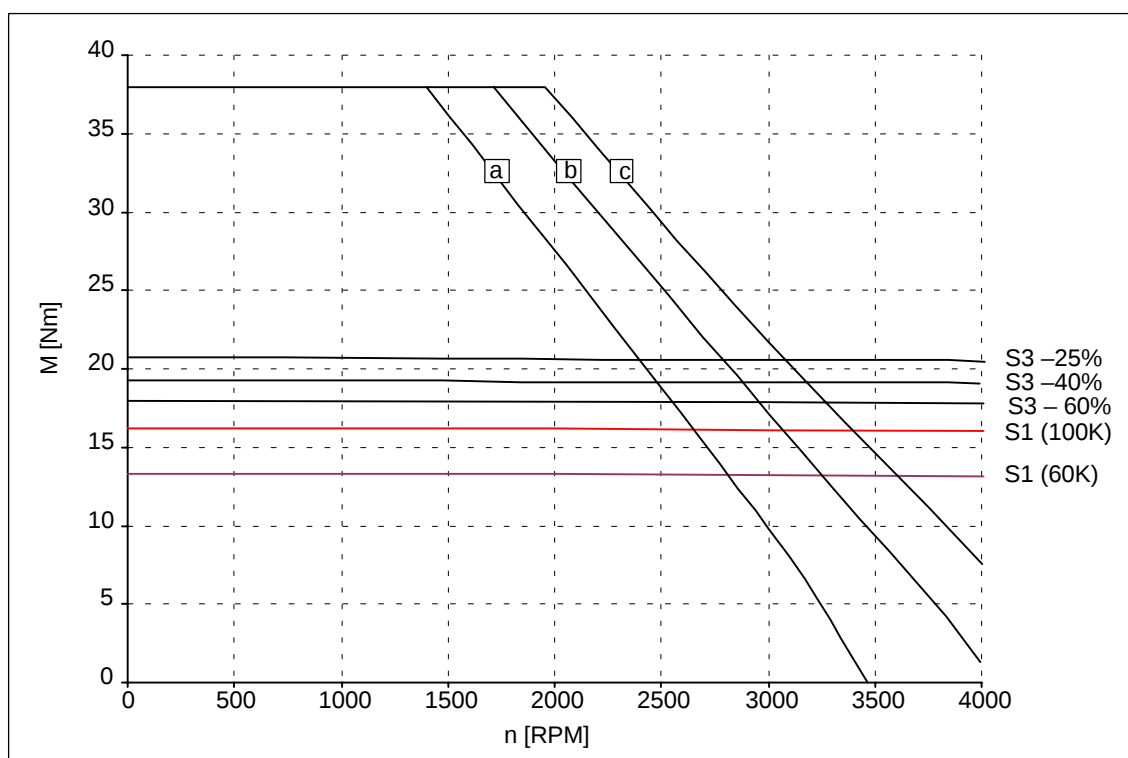


Fig. 2-81 Speed-torque diagram 1FT6064-6WF7□

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

Table 2-50 1FT6064, water cooled

1FT6064						
Technical data	Code	Units	–6WH7□	–6WK7□		
Engineering data						
Rated speed	n_N	RPM	4500 ¹⁾	6000 ¹⁾		
Number of poles	2p		6	6		
Rated torque (100K)	M_N (100K)	Nm	16 ¹⁾	15.8 ¹⁾		
Rated current (100K)	I_N (100K)	A	15.2 ¹⁾	20 ¹⁾		
Standstill torque (60K)	M_0 (60K)	Nm	13.4	13.4		
Standstill torque (100K)	M_0 (100K)	Nm	16.2	16.2		
Standstill current (60K)	I_0 (60K)	A	12.5	16.7		
Standstill current (100K)	I_0 (100K)	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. perm. 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	2	2		
Weight with brake	m	kg	13	13		
Weight without brake	m	kg	12.5	12.5		

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

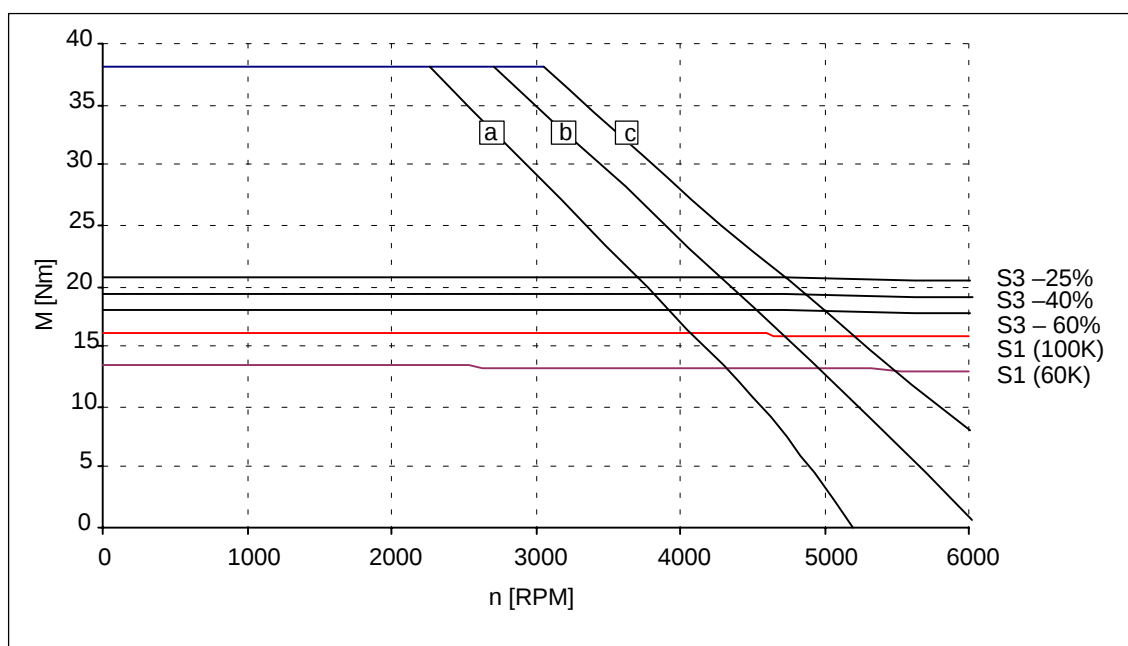


Fig. 2-82 Speed-torque diagram 1FT6064-6WH7□

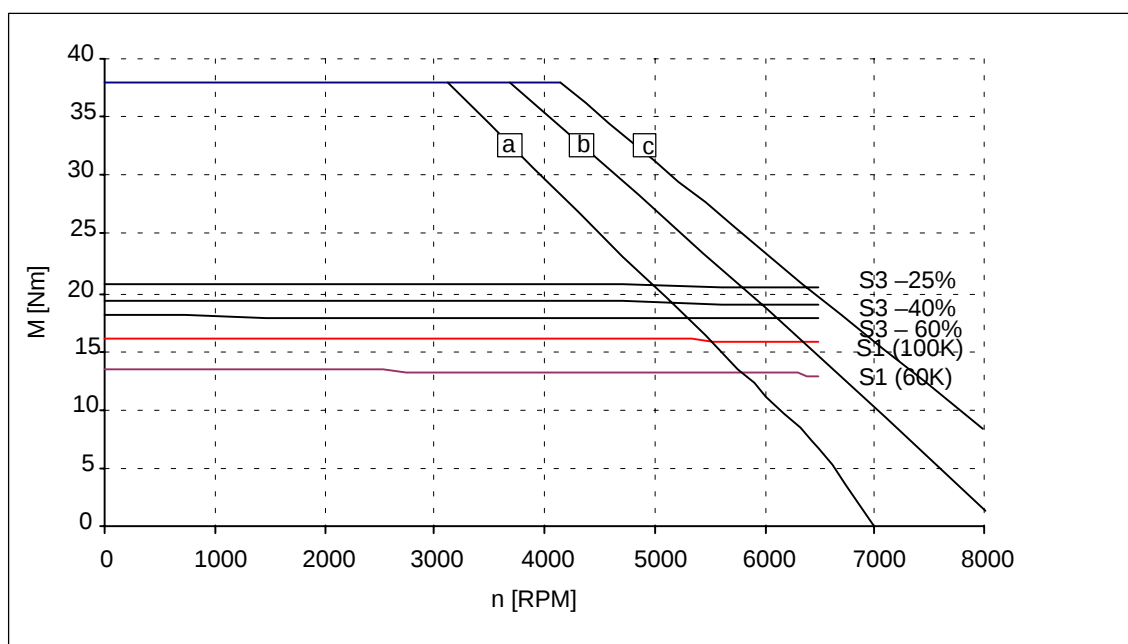


Fig. 2-83 Speed-torque diagram 1FT6064-6WK7□

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

Table 2-51 1FT6084, water cooled

1FT6084						
Technical data	Code	Units	–8WF7□			
Engineering data						
Rated speed	n_N	RPM	3000 ¹⁾			
Number of poles	2p		8			
Rated torque (100K)	M_N (100K)	Nm	35 ¹⁾			
Rated current (100K)	I_N (100K)	A	27 ¹⁾			
Standstill torque (60K)	M_0 (60K)	Nm	29			
Standstill torque (100K)	M_0 (100K)	Nm	35			
Standstill current (60K)	I_0 (60K)	A	19.9			
Standstill current (100K)	I_0 (100K)	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. perm. 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			

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

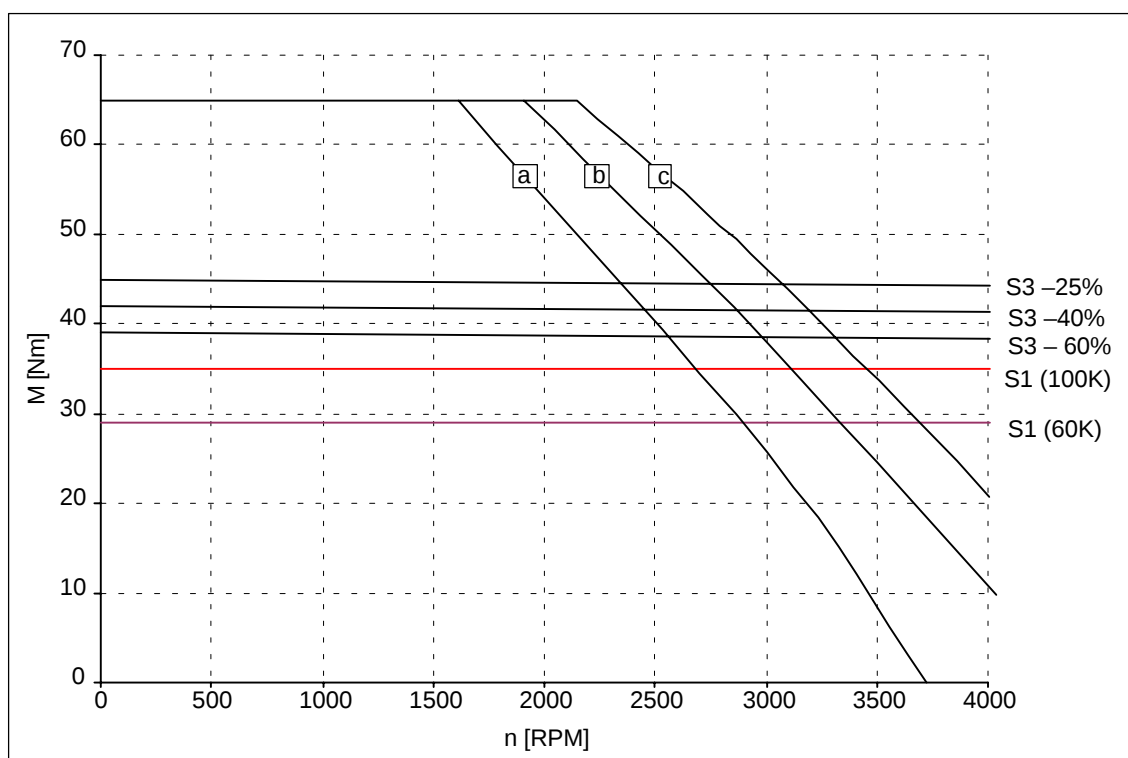


Fig. 2-84 Speed-torque diagram 1FT6084-8WF7□

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

Table 2-52 1FT6084, water cooled

1FT6084					
Technical data	Code	Units	–8WH7□	–8WK7□	
Engineering data					
Rated speed	n_N	RPM	4500 ¹⁾	6000 ¹⁾	
Number of poles	2p		8	8	
Rated torque (100K)	M_N (100K)	Nm	35 ¹⁾	34 ¹⁾	
Rated current (100K)	I_N (100K)	A	39 ¹⁾	51 ¹⁾	
Standstill torque (60K)	M_0 (60K)	Nm	29	29	
Standstill torque (100K)	M_0 (100K)	Nm	35	35	
Standstill current (60K)	I_0 (60K)	A	30	38	
Standstill current (100K)	I_0 (100K)	A	37	47	
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	4500	6000	
Optimum power	P_{opt}	kW	16.5	21.4	
Limiting data					
Max. perm. 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	26	
Weight without brake	m	kg	21	21	

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

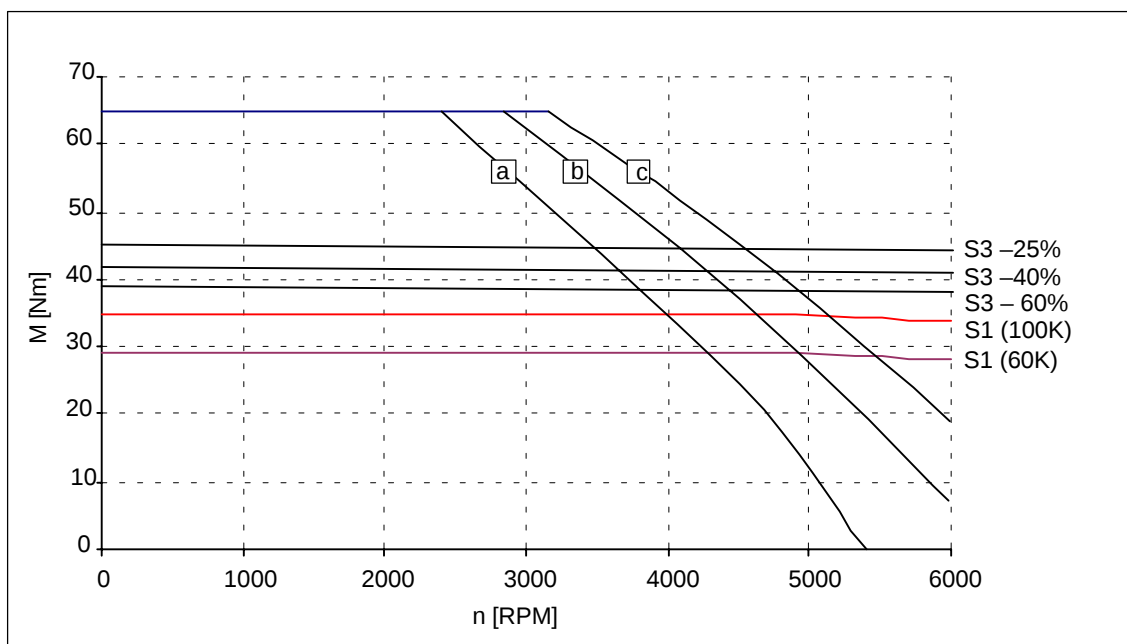


Fig. 2-85 Speed-torque diagram 1FT6084-8WH7□

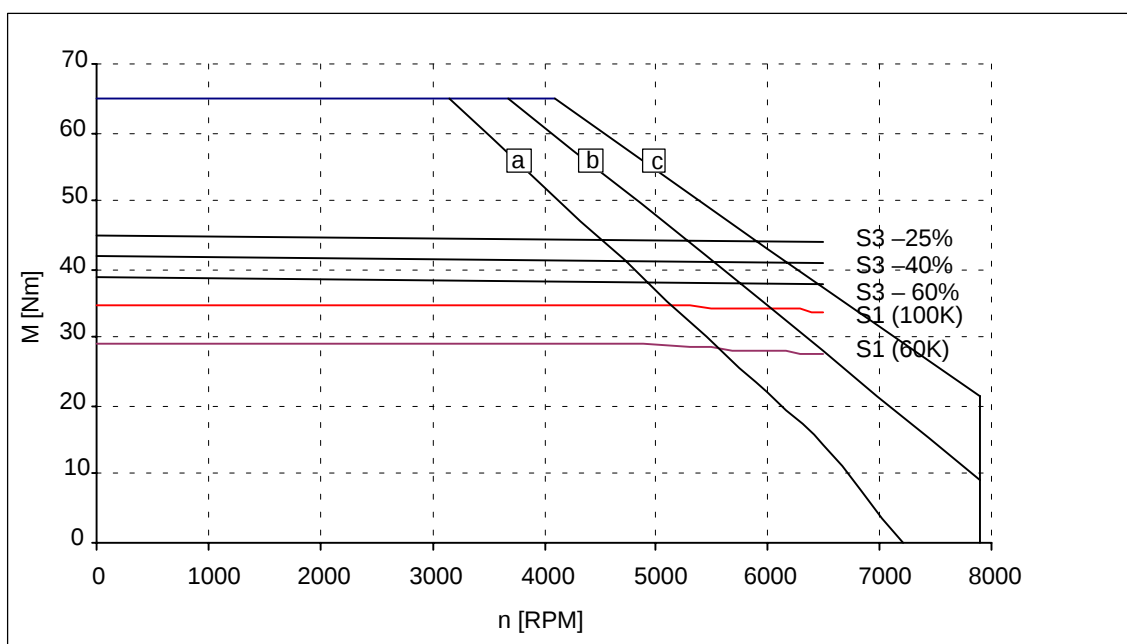


Fig. 2-86 Speed-torque diagram 1FT6084-8WK7□

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

Table 2-53 1FT6086, water cooled

1FT6086				
Technical data	Code	Units	–8WF7□	
Engineering data				
Rated speed	n_N	RPM	3000 ¹⁾	
Number of poles	2p		8	
Rated torque (100K)	M_N (100K)	Nm	46 ¹⁾	
Rated current (100K)	I_N (100K)	A	37 ¹⁾	
Standstill torque (60K)	M_0 (60K)	Nm	39	
Standstill torque (100K)	M_0 (100K)	Nm	47	
Standstill current (60K)	I_0 (60K)	A	27	
Standstill current (100K)	I_0 (100K)	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. perm. 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	

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

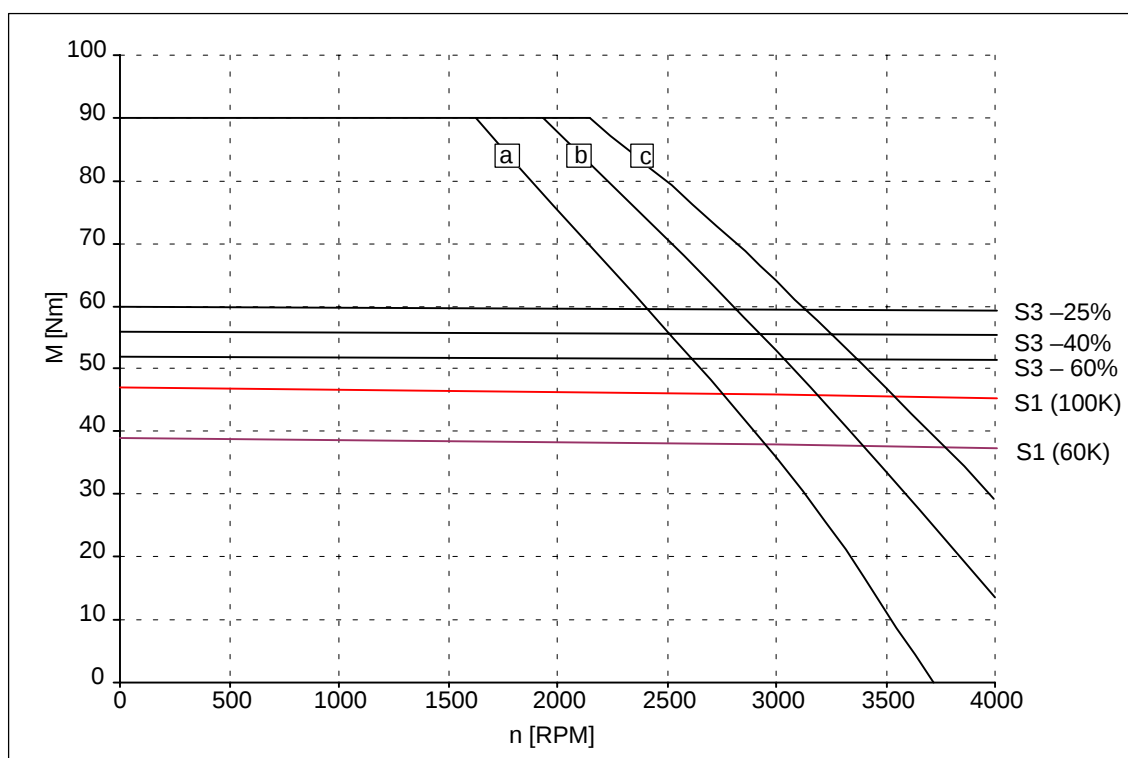


Fig. 2-87 Speed-torque diagram 1FT6086-8WF7□

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

Table 2-54 1FT6086, water cooled

1FT6086						
Technical data	Code	Units	–8WH7□	–8WK7□		
Engineering data						
Rated speed	n_N	RPM	4500 ¹⁾	6000 ¹⁾		
Number of poles	2p		8	8		
Rated torque (100K)	M_N (100K)	Nm	45 ¹⁾	44 ¹⁾		
Rated current (100K)	I_N (100K)	A	53 ¹⁾	58 ¹⁾		
Standstill torque (60K)	M_0 (60K)	Nm	39	39		
Standstill torque (100K)	M_0 (100K)	Nm	47	47		
Standstill current (60K)	I_0 (60K)	A	42	48		
Standstill current (100K)	I_0 (100K)	A	52.0	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. perm. 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		

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

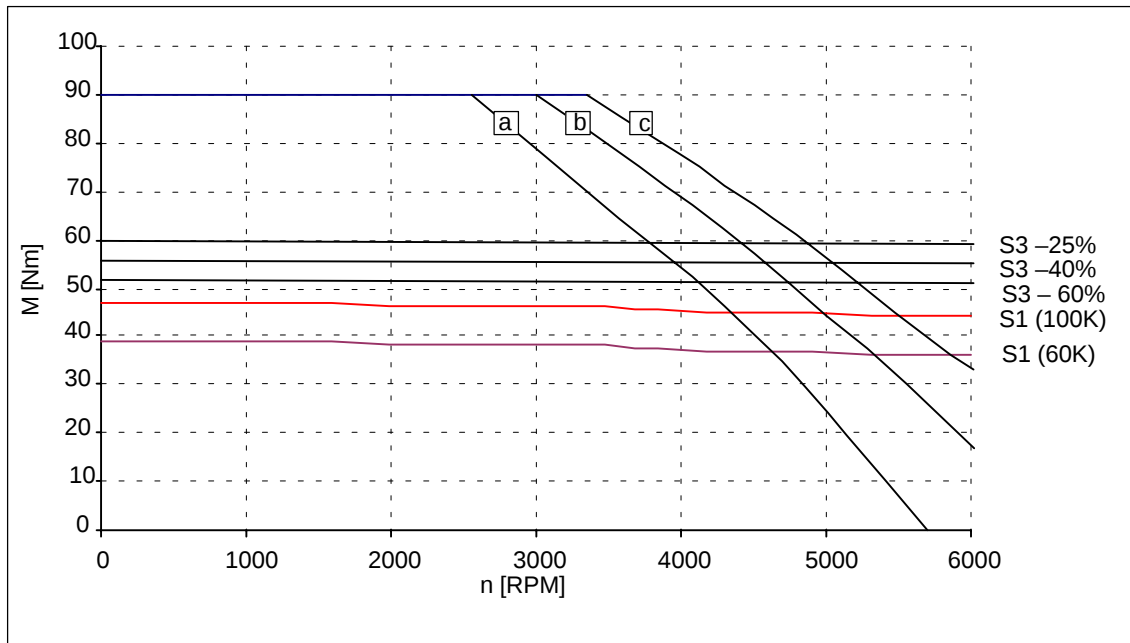


Fig. 2-88 Speed-torque diagram 1FT6086-8WH7□

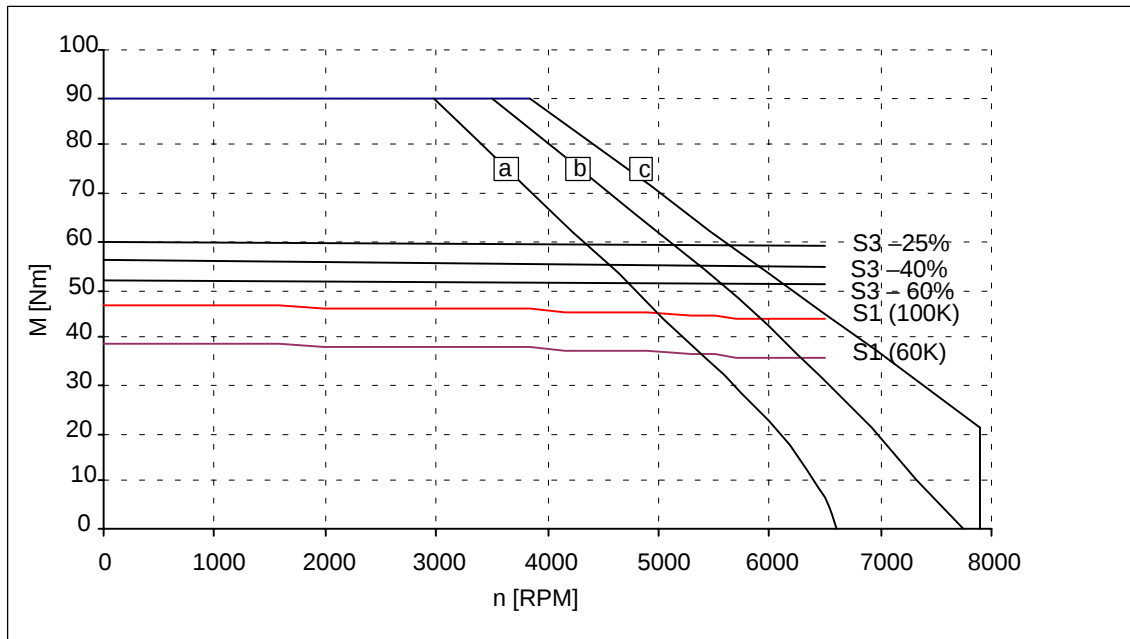


Fig. 2-89 Speed-torque diagram 1FT6086-8WK7□

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

Table 2-55 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 (100K)	M_N (100K)	Nm	82	78	
Rated current (100K)	I_N (100K)	A	60	82	
Standstill torque (60K)	M_0 (60K)	Nm	70	70	
Standstill torque (100K)	M_0 (100K)	Nm	85	85	
Standstill current (60K)	I_0 (60K)	A	47	67	
Standstill current (100K)	I_0 (100K)	A	58	83	
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	2000	3000	
Optimum power	P_{opt}	kW	17.2	24.5	
Limiting data					
Max. perm. 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	1	
Weight with brake	m	kg	50	50	
Weight without brake	m	kg	45.5	45.5	

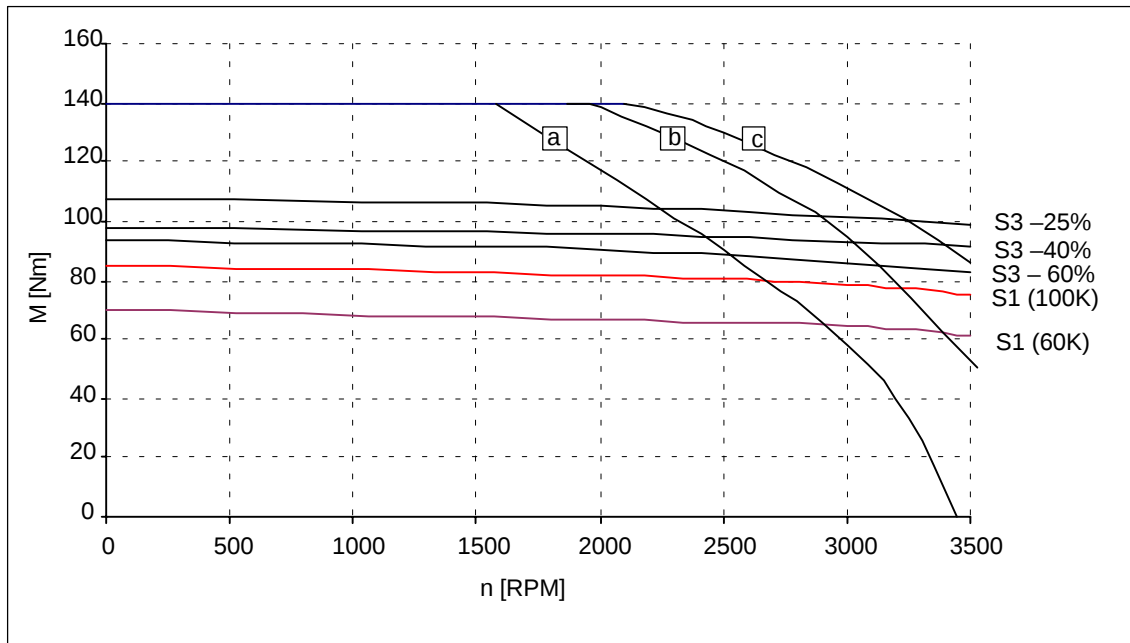


Fig. 2-90 Speed-torque diagram 1FT6105-8WC7□

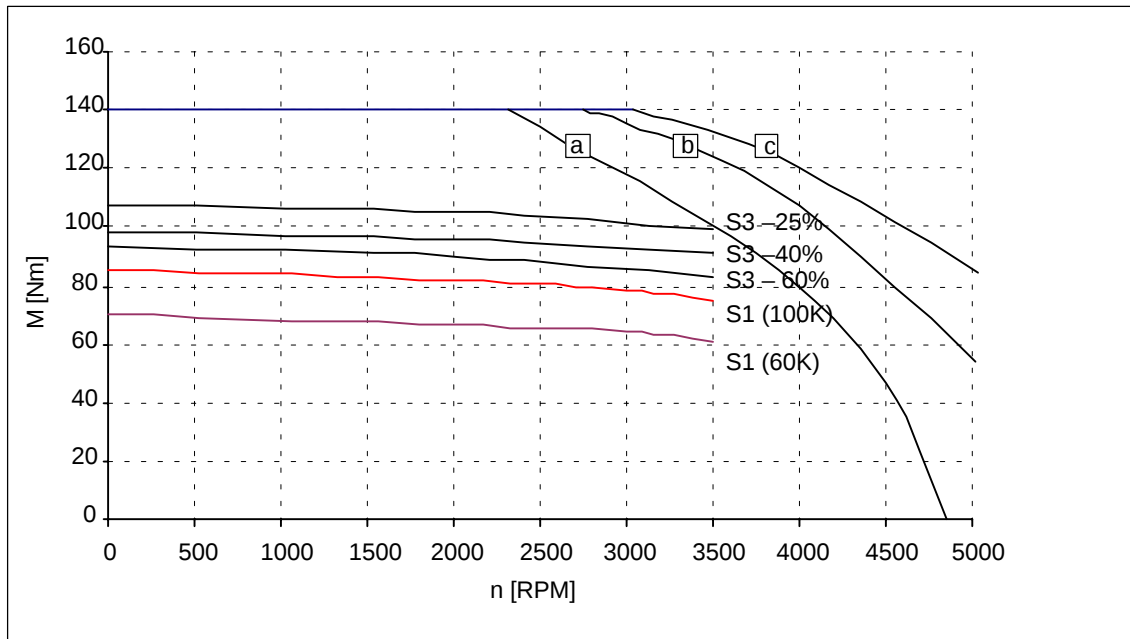


Fig. 2-91 Speed-torque diagram 1FT6105-8WF7□

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

Table 2-56 1FT6108, water cooled

1FT6108					
Technical data	Code	Units	–8WB7□	–8WC7□	
Engineering data					
Rated speed	n_N	RPM	1500 ¹⁾	2000 ¹⁾	
Number of poles	2p		8	8	
Rated torque (100K)	M_N (100K)	Nm	116 ¹⁾	115 ¹⁾	
Rated current (100K)	I_N (100K)	A	43 ¹⁾	57 ¹⁾	
Standstill torque (60K)	M_0 (60K)	Nm	98	98	
Standstill torque (100K)	M_0 (100K)	Nm	119	119	
Standstill current (60K)	I_0 (60K)	A	35	46	
Standstill current (100K)	I_0 (100K)	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. perm. 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	1	
Weight with brake	m	kg	66	66	
Weight without brake	m	kg	61.5	61.5	

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

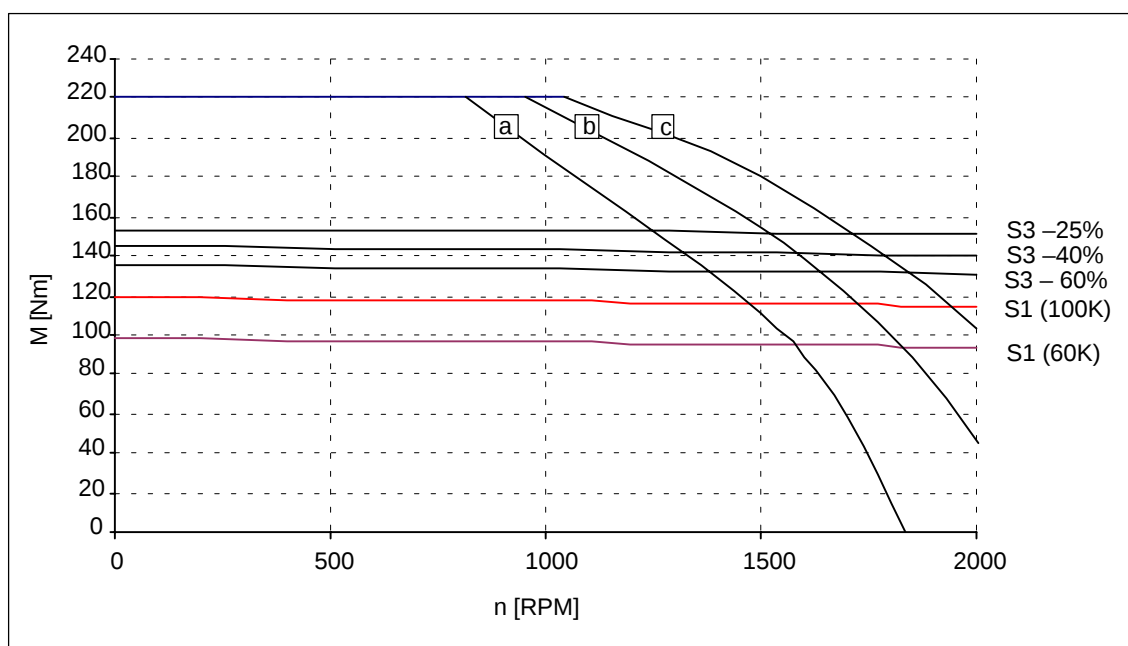


Fig. 2-92 Speed-torque diagram 1FT6108-8WB7□

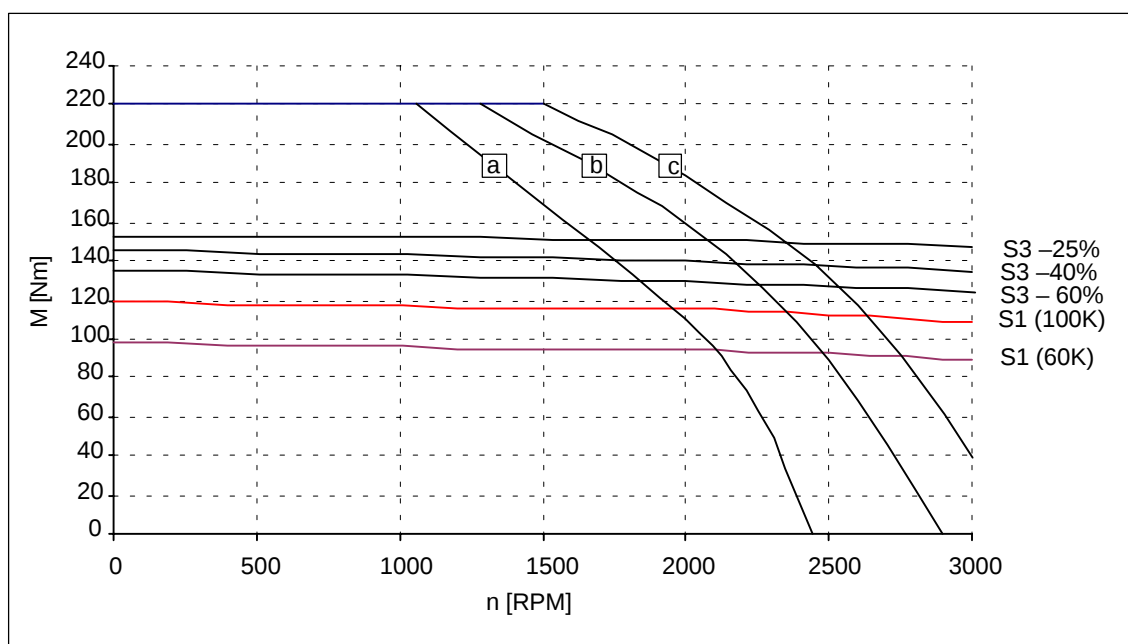


Fig. 2-93 Speed-torque diagram 1FT6108-8WC7□

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

Table 2-57 1FT6108, water cooled

1FT6108					
Technical data	Code	Units	–8WF7□		
Engineering data					
Rated speed	n_N	RPM	3000		
Number of poles	2p		8		
Rated torque (100K)	M_N (100K)	Nm	109		
Rated current (100K)	I_N (100K)	A	81		
Standstill torque (60K)	M_0 (60K)	Nm	98		
Standstill torque (100K)	M_0 (100K)	Nm	119		
Standstill current (60K)	I_0 (60K)	A	70		
Standstill current (100K)	I_0 (100K)	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. perm. 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		
Weight with brake	m	kg	66		
Weight without brake	m	kg	61.5		

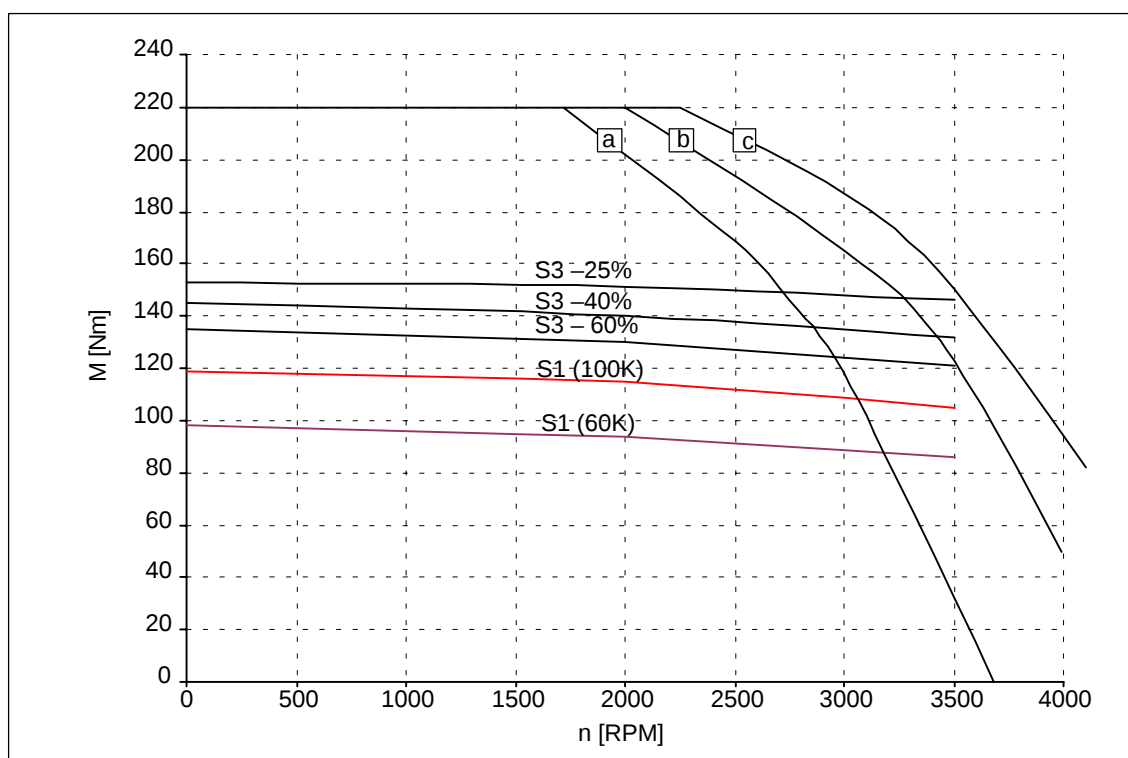


Fig. 2-94 Speed-torque diagram 1FT6108-8WF7□

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

Table 2-58 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 (100K)	M_N (100K)	Nm	150 ¹⁾	135 ¹⁾	
Rated current (100K)	I_N (100K)	A	58 ¹⁾	82 ¹⁾	
Standstill torque (60K)	M_0 (60K)	Nm	120	120	
Standstill torque (100K)	M_0 (100K)	Nm	155	155	
Standstill current (60K)	I_0 (60K)	A	45	71	
Standstill current (100K)	I_0 (100K)	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. perm. speed (mech.)	n_{max}	RPM	3600	3600	
Maximum torque	M_{max}	Nm	250	250	
Maximum current	I_{max}	A	124.5	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) only valid for MASTERDRIVES MC (AFE) or SIMODRIVE 611

2) Observe the maximum drive converter current

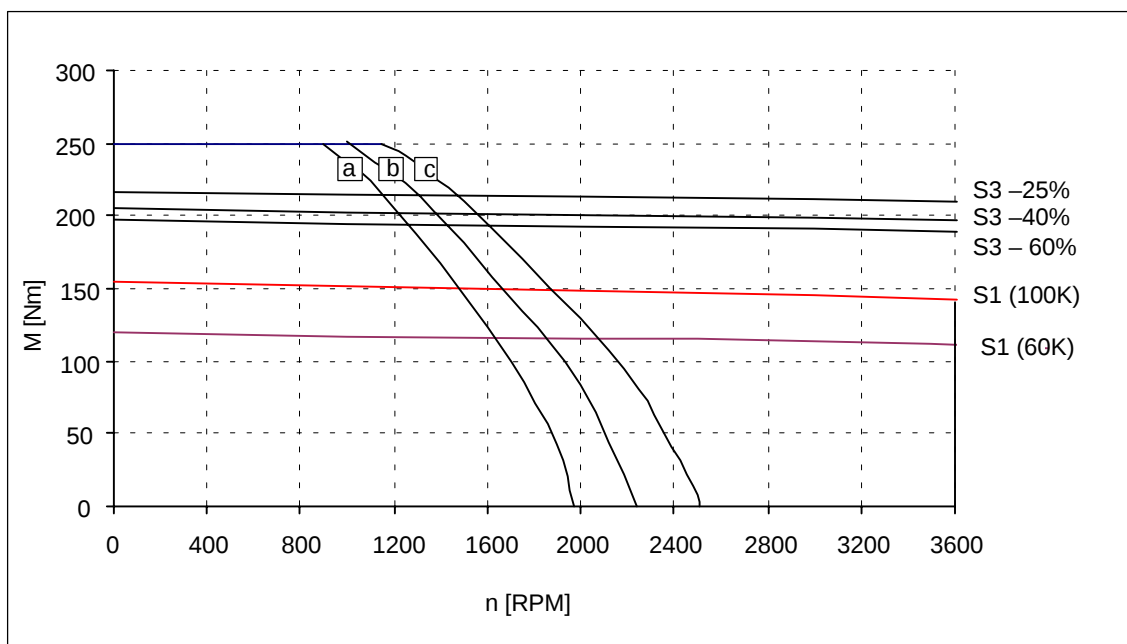


Fig. 2-95 Speed-torque diagram 1FT6132-6WB7□

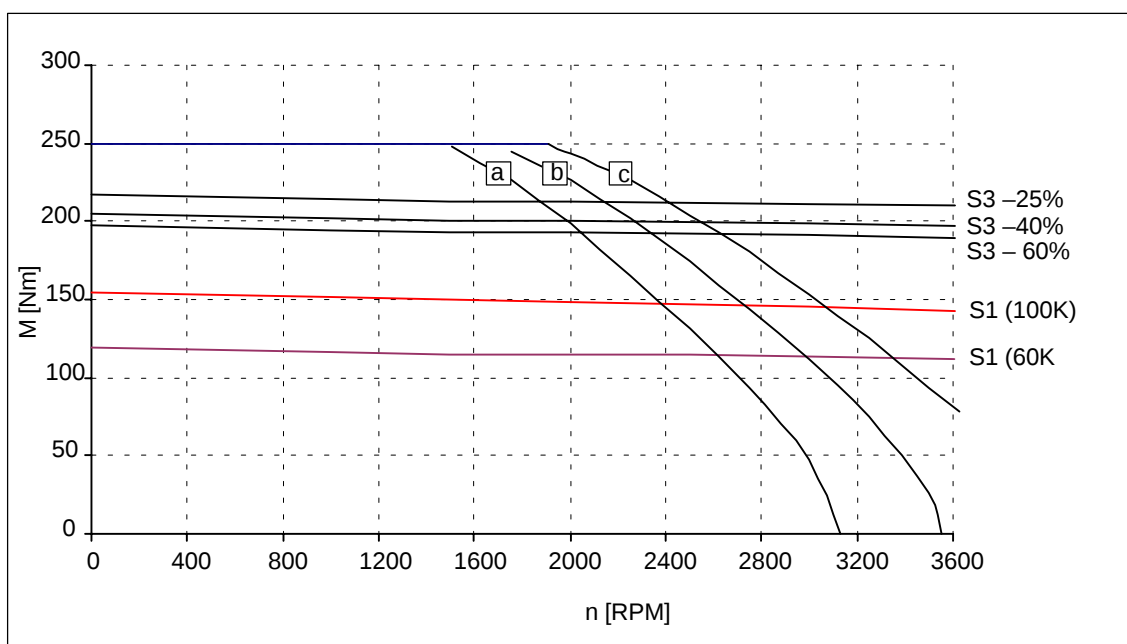


Fig. 2-96 Speed-torque diagram 1FT6132-6WD7□

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

Table 2-59 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 (100K)	M_N (100K)	Nm	185 ¹⁾	185 ¹⁾	
Rated current (100K)	I_N (100K)	A	67 ¹⁾	115 ¹⁾	
Standstill torque (60K)	M_0 (60K)	Nm	155	155	
Standstill torque (100K)	M_0 (100K)	Nm	200	200	
Standstill current (60K)	I_0 (60K)	A	57	95	
Standstill current (100K)	I_0 (100K)	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. perm. 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) only valid for MASTERDRIVES MC (AFE) or SIMODRIVE 611

2) Observe the maximum drive converter current

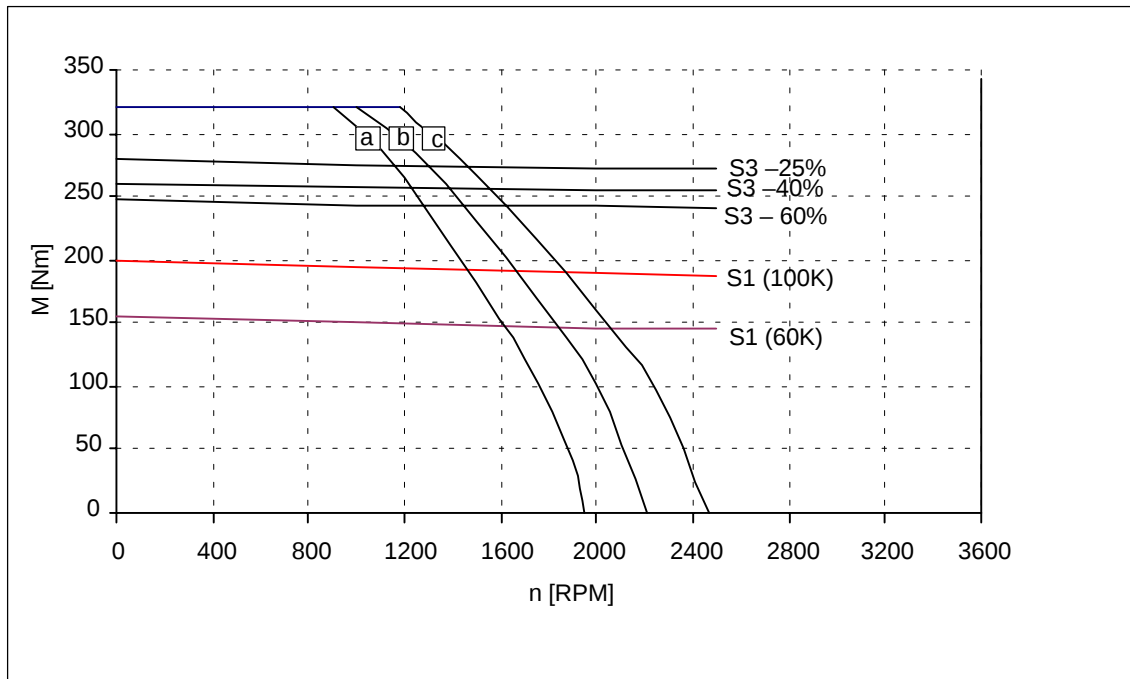


Fig. 2-97 Speed-torque diagram 1FT6134-6WB7□

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

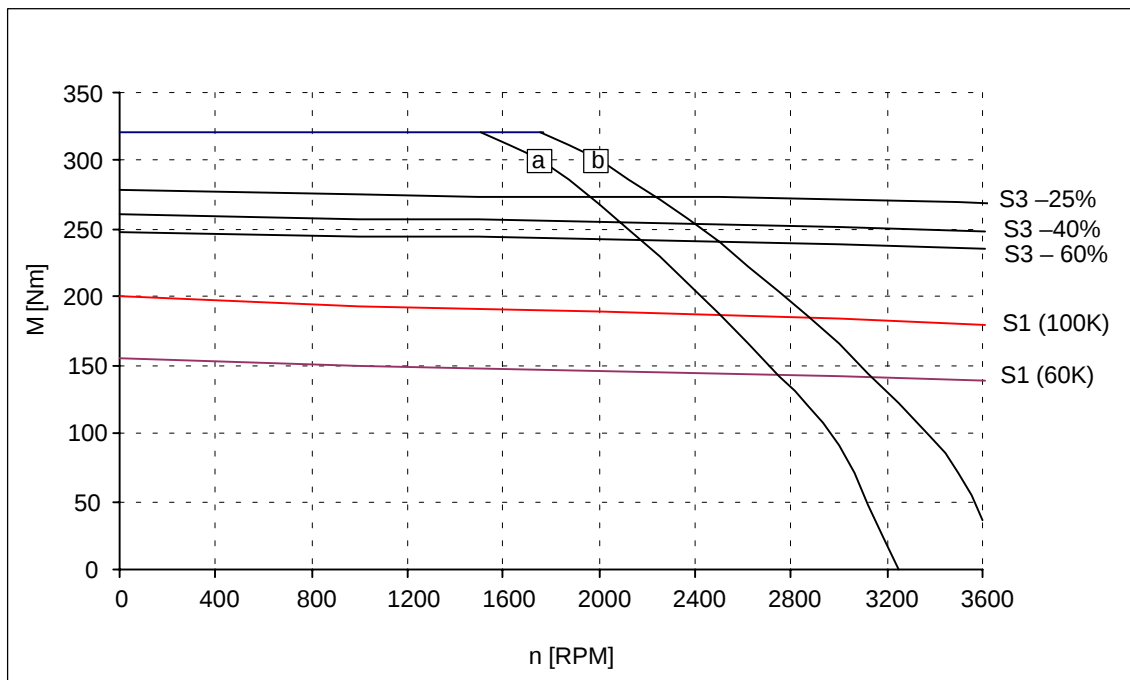


Fig. 2-98 Speed-torque diagram 1FT6134-6WD7□

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

Table 2-60 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 (100K)	M_N (100K)	Nm	230	220	
Rated current (100K)	I_N (100K)	A	90	149 ¹⁾	
Standstill torque (60K)	M_0 (60K)	Nm	200	200	
Standstill torque (100K)	M_0 (100K)	Nm	240	240	
Standstill current (60K)	I_0 (60K)	A	75	129	
Standstill current (100K)	I_0 (100K)	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. perm. speed (mech.)	n_{max}	RPM	3600	3600	
Maximum torque	M_{max}	Nm	390	390	
Maximum current	I_{max}	A	198	339 ¹⁾	
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) Observe the maximum and rated current of the drive converter

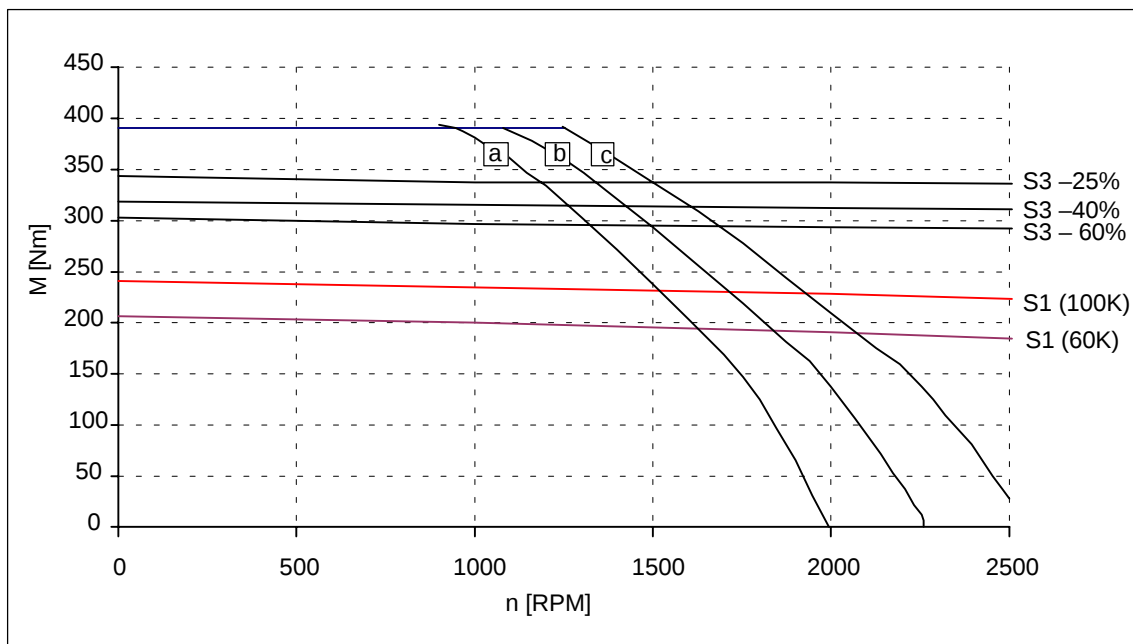


Fig. 2-99 Speed-torque diagram 1FT6136-6WB7□

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

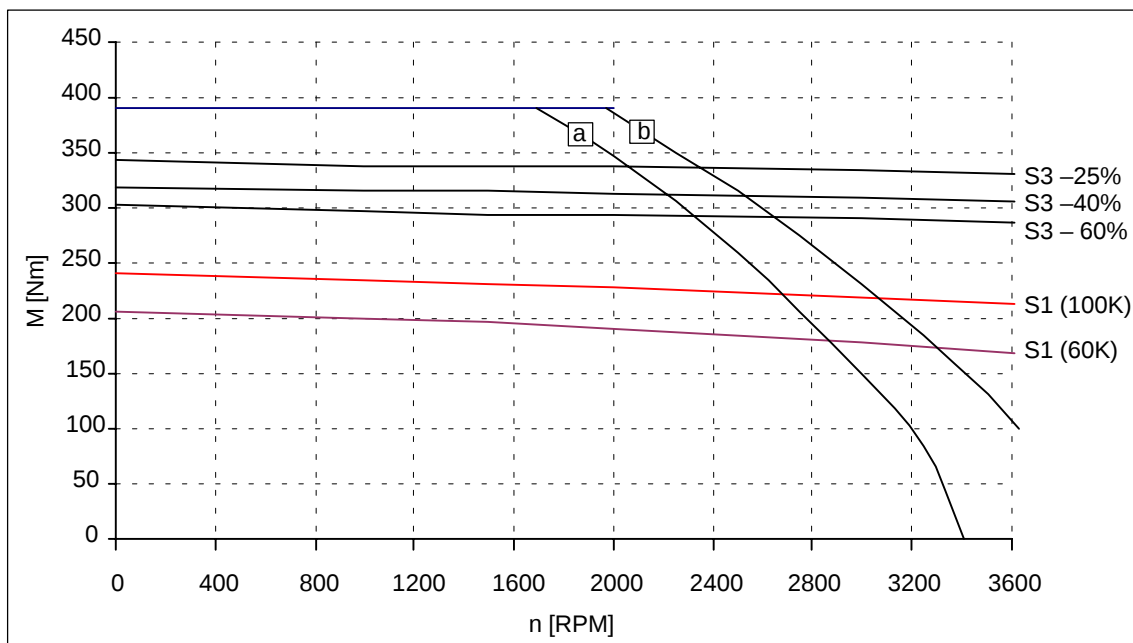


Fig. 2-100 Speed-torque diagram 1FT6136-6WD7□

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

Table 2-61 1FT6138, water cooled

1FT6138					
Technical data	Code	Units	–6WB7□	–6WD7□	
Engineering data					
Rated speed	n_N	RPM	1500	2500	
Number of poles	2p		6	6	
Rated torque (100K)	M_N (100K)	Nm	290	275	
Rated current (100K)	I_N (100K)	A	112	162 ¹⁾	
Standstill torque (60K)	M_0 (60K)	Nm	232	232	
Standstill torque (100K)	M_0 (100K)	Nm	300	300	
Standstill current (60K)	I_0 (60K)	A	87	129	
Standstill current (100K)	I_0 (100K)	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	
Optimum power	P_{opt}	kW	45.5	72	
Limiting data					
Max. perm. speed (mech.)	n_{max}	RPM	3600	3600	
Maximum torque	M_{max}	Nm	500	500	
Maximum current	I_{max}	A	263 ¹⁾	395 ¹⁾	
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) Observe the maximum and rated current of the drive converter

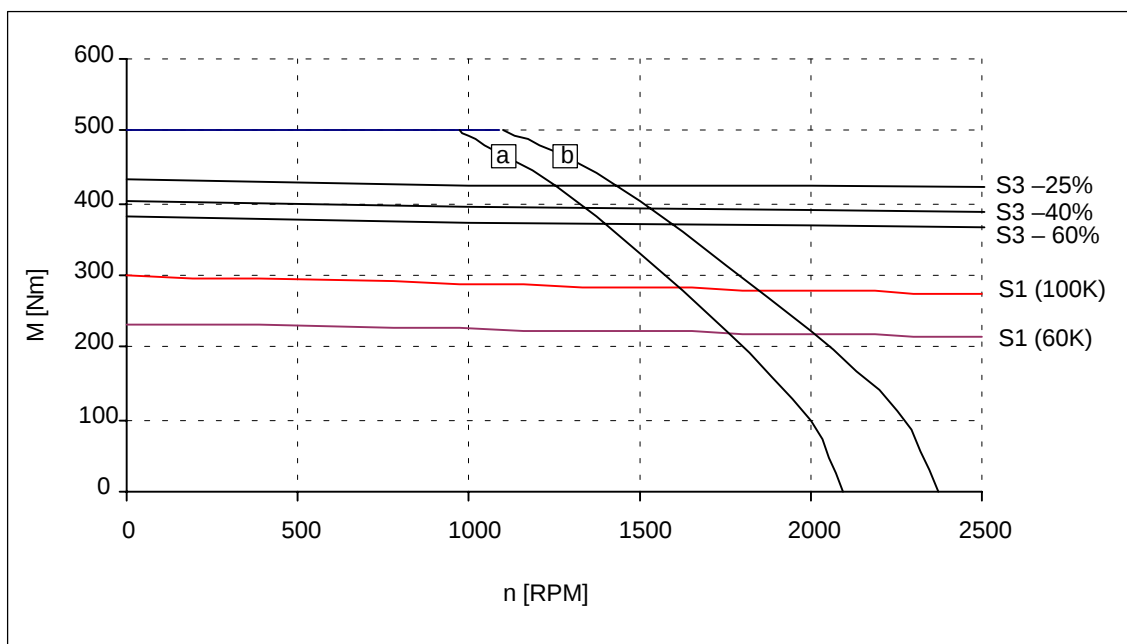


Fig. 2-101 Speed-torque diagram 1FT6138-6WB7□

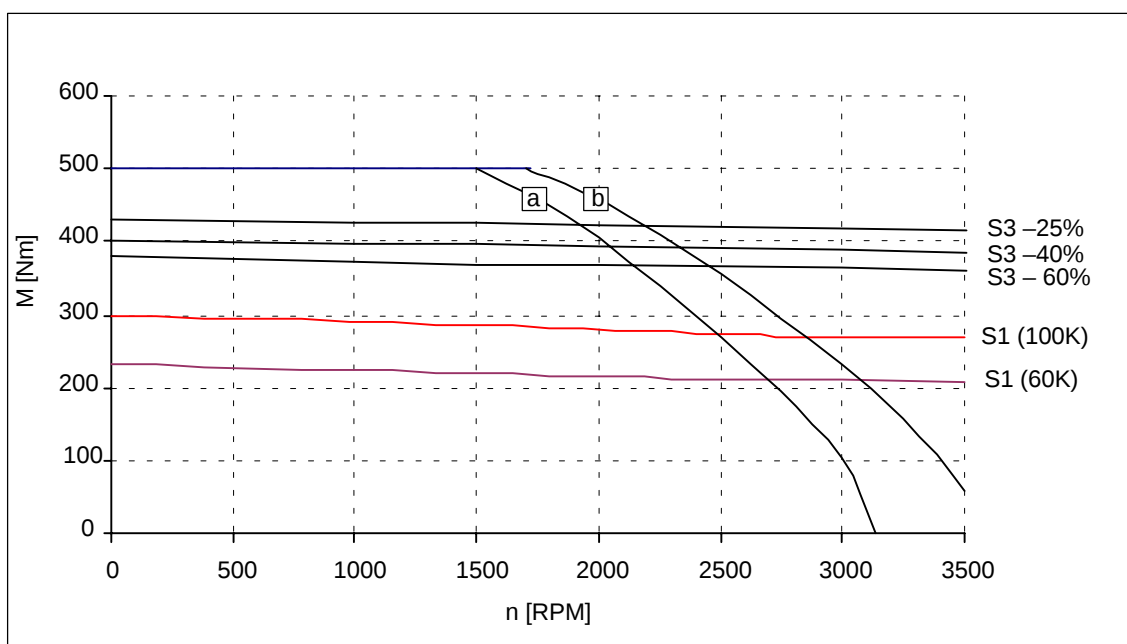


Fig. 2-102 Speed-torque diagram 1FT6138-6WD7□

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

Table 2-62 1FT6163, water cooled

1FT6163 ¹⁾					
Technical data	Code	Units	–8WB7□	–8WD7□	
Engineering data					
Rated speed	n_N	RPM	1500	2500 ²⁾	
Number of poles	2p		8	8	
Rated torque (100K)	M_N (100K)	Nm	450	450 ²⁾	
Rated current (100K)	I_N (100K)	A	160	240 ²⁾	
Standstill torque (60K)	M_0 (60K)	Nm	430	430	
Standstill torque (100K)	M_0 (100K)	Nm	450	450	
Standstill current (60K)	I_0 (60K)	A	150	224	
Standstill current (100K)	I_0 (100K)	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	
Optimum power	P_{opt}	kW	71	118	
Limiting data					
Max. perm. 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	472100	472100	
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) only valid for MASTERDRIVES MC

2) only valid for MASTERDRIVES MC (AFE)

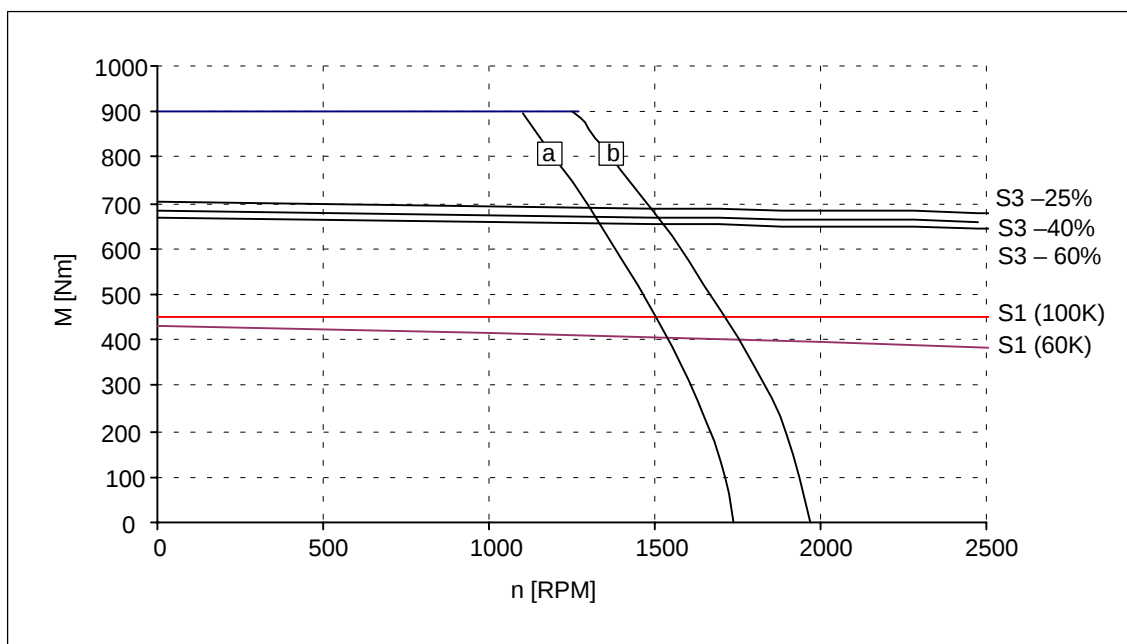


Fig. 2-103 Speed-torque diagram 1FT6163-8WB7□

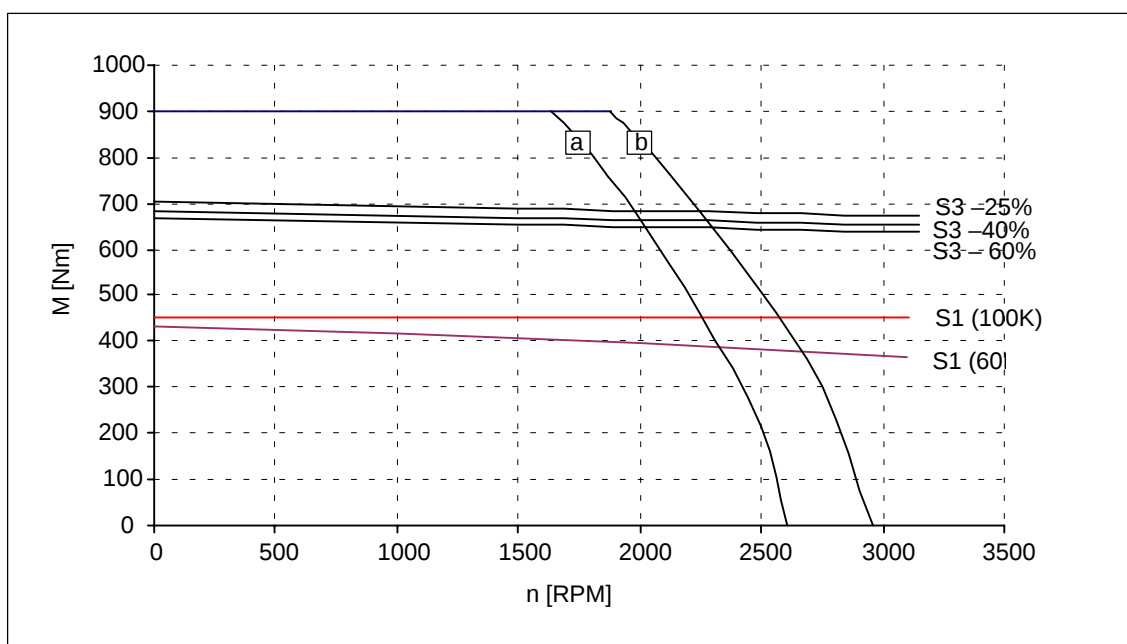


Fig. 2-104 Speed-torque diagram 1FT6163-8WD7□

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

Table 2-63 1FT6168, water cooled

1FT6168 ¹⁾				
Technical data	Code	Units	–8WB7□	
Engineering data				
Rated speed	n_N	RPM	1500	
Number of poles	2p		8	
Rated torque (100K)	M_N (100K)	Nm	690	
Rated current (100K)	I_N (100K)	A	221	
Standstill torque (60K)	M_0 (60K)	Nm	600	
Standstill torque (100K)	M_0 (100K)	Nm	700	
Standstill current (60K)	I_0 (60K)	A	193	
Standstill current (100K)	I_0 (100K)	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	
Optimum power	P_{opt}	kW	108	
Limiting data				
Max. perm. 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	431600	
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) only valid for MASTERDRIVES MC (AFE)

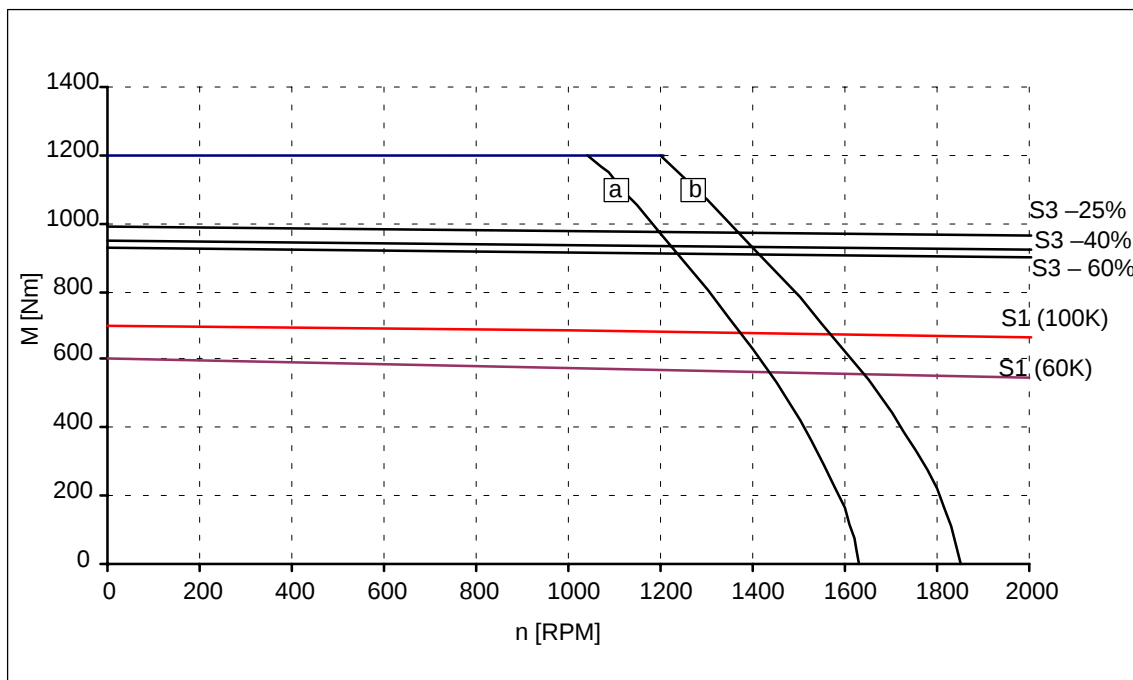


Fig. 2-105 Speed-torque diagram 1FT6168-8WB7

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

2.2 Cantilever force diagrams

Cantilever force stressing

Point of action of cantilever forces F_Q at the shaft end

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

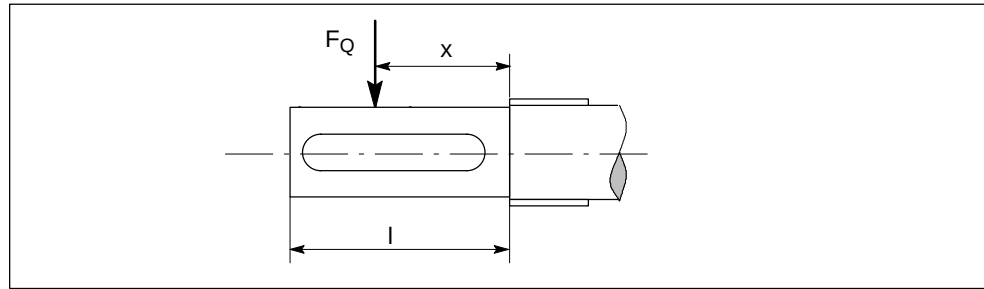


Fig. 2-106 Force applied at the drive shaft end

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

Dimension l : Length of the shaft end in mm.

Calculating the belt pre-tension F_R

$$F_R \text{ [N]} = 2 \cdot M_0 \cdot c / d_R \quad F_R \leq F_{Q\text{perm}}$$

Table 2-64 Explanation of the formula abbreviations

Formula abbreviations	Units	Description
F_R	N	Belt pre-tension
M_0	Nm	Motor standstill torque
c	—	Pre-tension factor, the pre-tension factor is a value that the belt manufacturers have gained with experience. 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

For other designs, the actual forces should be taken into account from the torques to be transmitted.

Cantilever force 1FT6024, 1FT6028

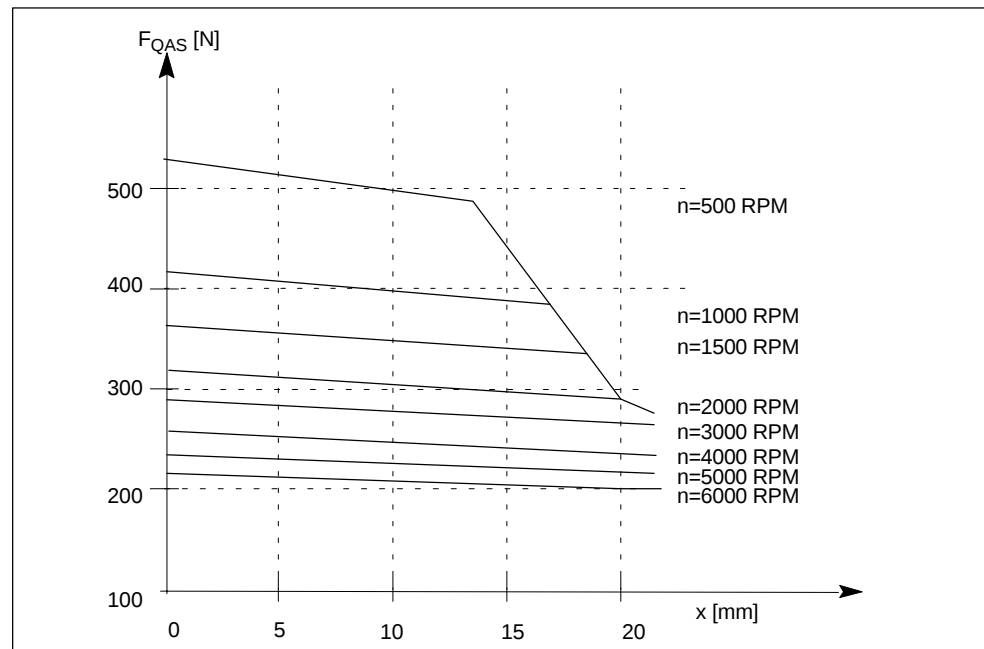


Fig. 2-107 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h.

Cantilever force 1FT6031, 1FT6034

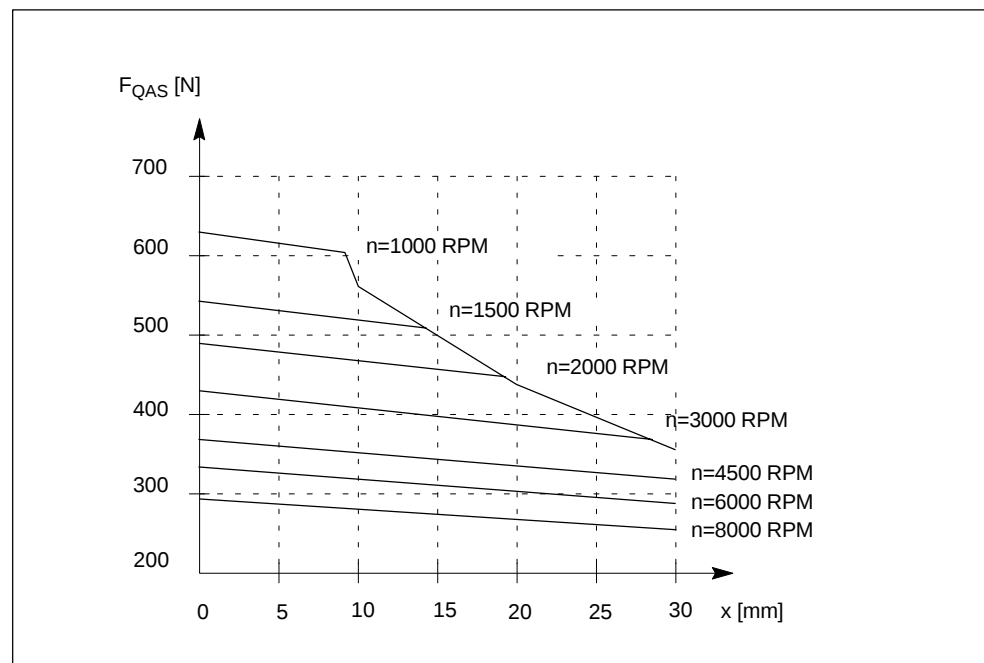


Fig. 2-108 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h.

2.2 Cantilever force diagrams

Cantilever force 1FT6041, 1FT6044

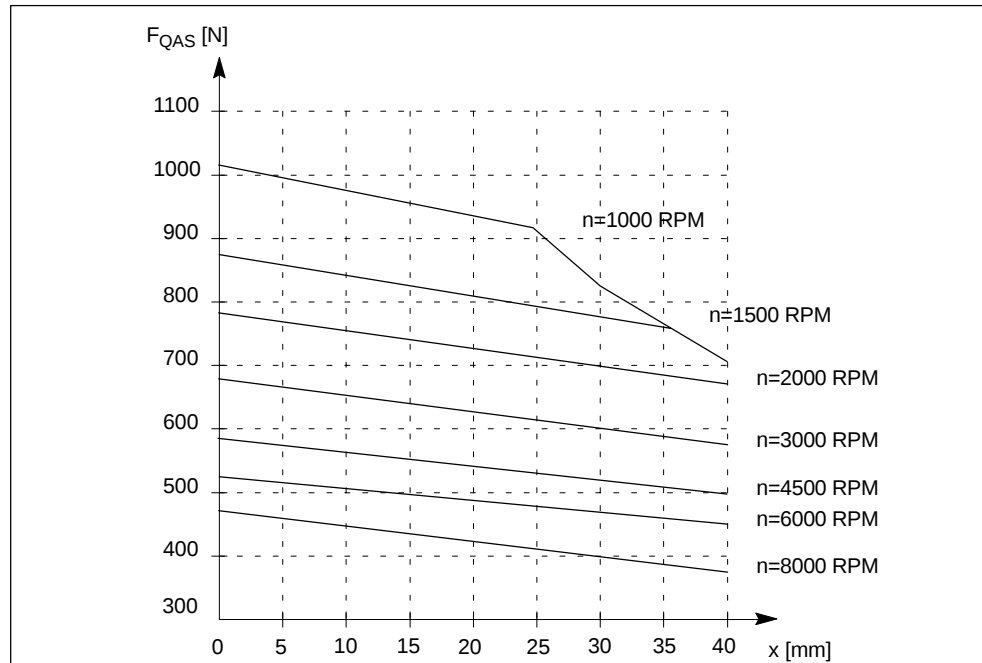


Fig. 2-109 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h.

Cantilever force 1FT6061, 1FT6062, 1FT6064

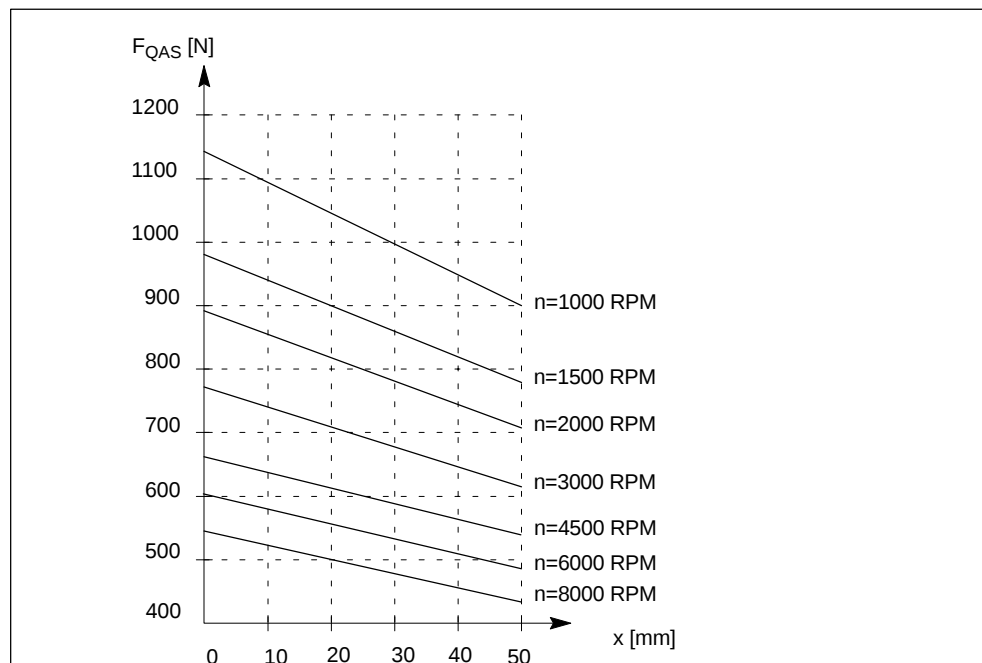


Fig. 2-110 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h.

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

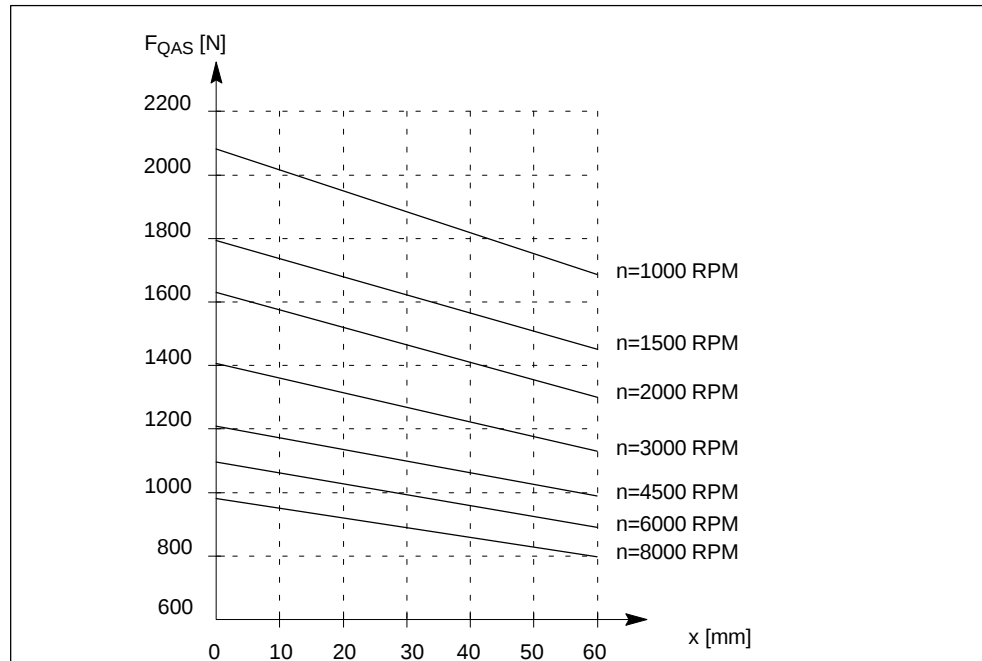


Fig. 2-111 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h.

Cantilever force 1FT6102, 1FT6105, 1FT6108

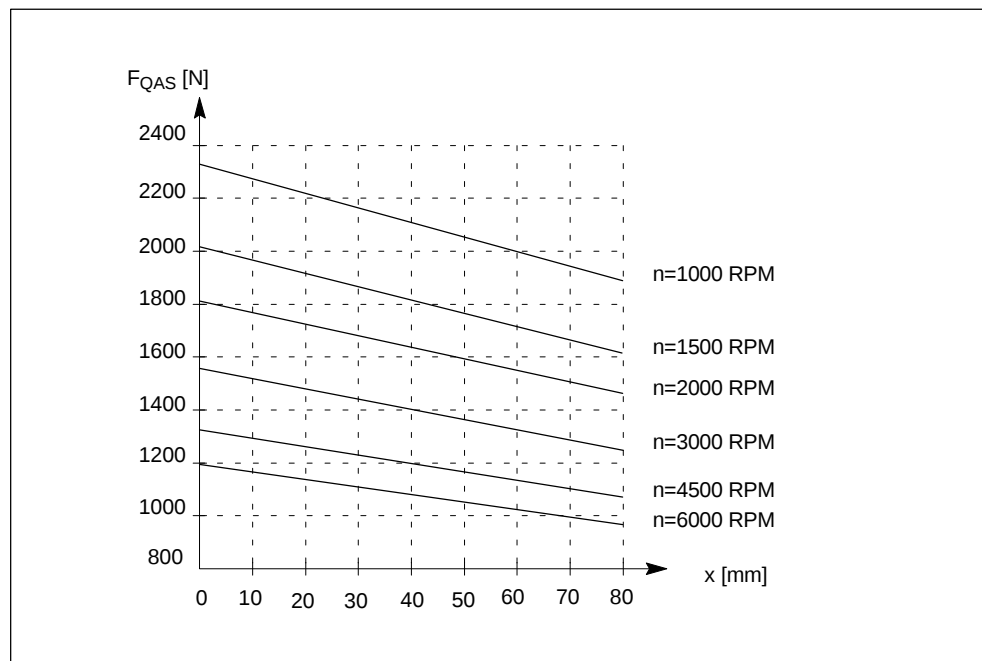


Fig. 2-112 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h.

2.2 Cantilever force diagrams

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

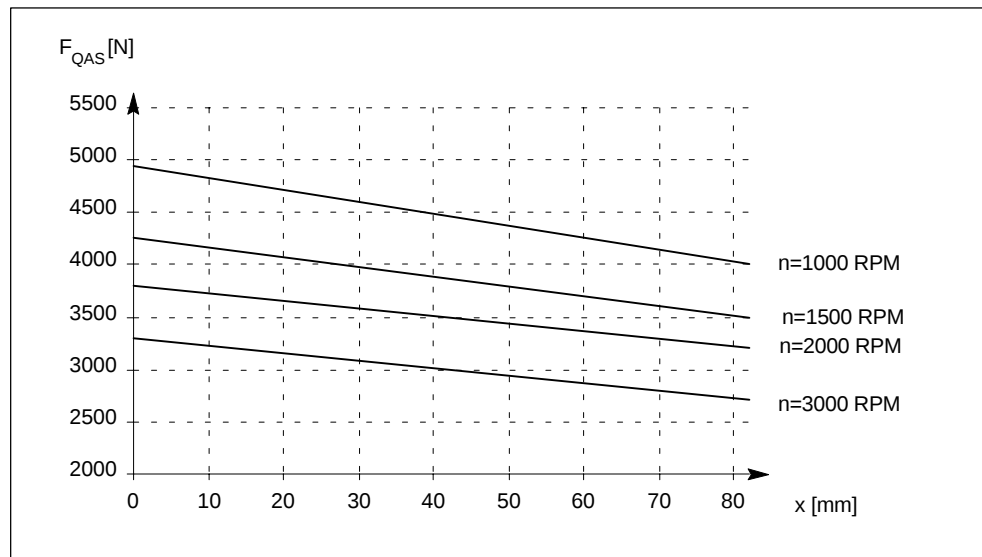


Fig. 2-113 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h.

Cantilever force 1FT6163, 1FT6168

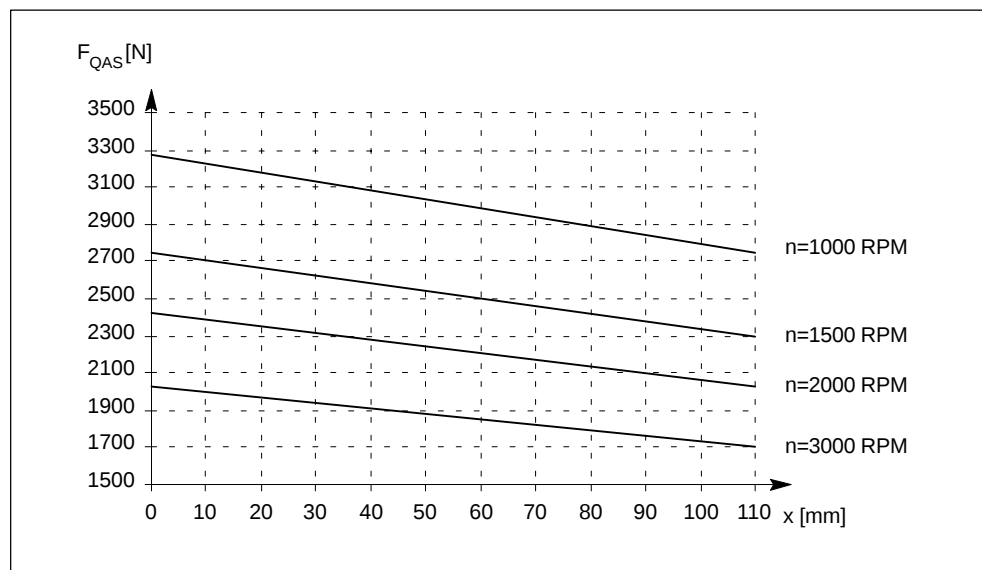


Fig. 2-114 Cantilever force F_Q at a distance x from the shaft shoulder for a nominal bearing lifetime of 20,000 h.

2.3 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 bearing system can be overcome so that the rotor moves corresponding to the available axial bearing play (up to 0.2 mm).

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

$$F_A = 0.35 \cdot F_Q$$



[illegible]

Motor Components (Options)

3.1 Thermal motor protection

A temperature-dependent resistor is integrated in the stator winding as temperature sensor. This temperature sensor monitors the motor temperature.

Table 3-1 Features and technical data

Type	KTY 84
Resistance when cold (20 °C)	approx. 580 Ohm
Resistance when hot (100 °C):	approx. 1000 Ohm
Connection	via signal cable
Response temperature	Alarm at 120 °C Shutdown at 155 °C $\pm$ 5 °C

The resistance of the KTY 84 thermistor changes proportionally to the winding temperature change (refer to Fig. 3-1).

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. Bei steigender Motortemperatur wird eine Meldung "Vorwarnung Motorüber Temperatur" ausgelöst, die extern ausgewertet werden kann. 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 has been designed so that the DIN/EN requirements for protective electrical separation are fulfilled.

3.1 Thermal motor protection



Caution

The integrated temperature sensor protects the synchronous servomotors against overload conditions:

Shaft height 28 to 48	to $2 \cdot I_{0\ 60\ K}$ and speed $\neq 0$
from shaft height 63	to $4 \cdot I_{0\ 60\ K}$ and speed $\neq 0$

There is no adequate protection at thermally critical load situations, e.g. a high overload at motor standstill. This is the reason that, for example, a thermal overcurrent relay must be provided as additional protection.

If an overload condition of $4 \cdot M_0$ lasts for longer than 4s, then additional motor protection should be provided.

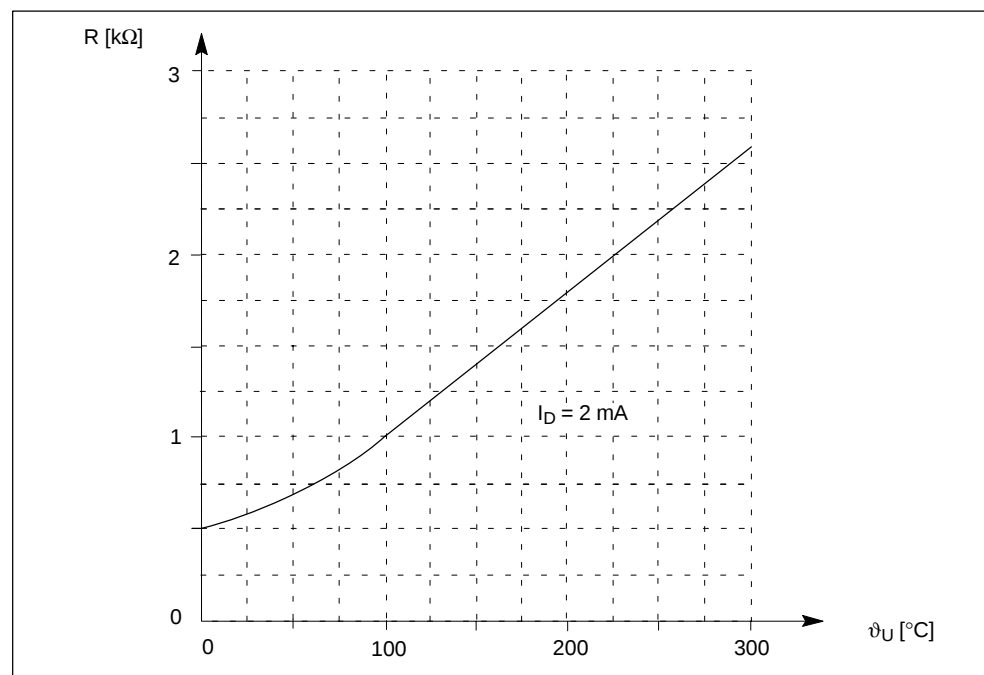


Fig. 3-1 Resistance characteristic of the KTY 84 as a function of the temperature

3.2 Encoder

Table 3-2 Overview of the encoders used

Motor types	Incremental encoders sin/cos 1 Vpp (l-2048) (for low shaft heights)	Incremental encoders sin/cos 1 Vpp (l-2048)	Absolute value encoder EnDat (A-2048)	Absolute value encoder EnDat (A-512) (for low shaft heights)	Resolver 2-pole or multi-pole
Order No. 14th position	A	A	E	H	T, S
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.

3.2 Encoder

3.2.1 Incremental encoders

- Function:
- Angular measuring system for commutation
 - Speed actual value sensing
 - Indirect incremental meas. system for the pos. contr. loop
 - One zero pulse (reference mark) per revolution

Table 3-3 Technical data, incremental encoders sin/cos 1V_{pp}

Features	Incremental encoders sin/cos 1V _{pp}	Incremental encoders sin/cos 1V _{pp} (low shaft height)
Operating voltage	5V ± 5%	5V ± 5%
Power consumption	max. 150 mA	max. 200 mA
Incremental resolution (periods per revolution)	2048	2048
Incremental signals	1 V _{pp}	1 V _{pp}
Accuracy	± 40"	± 80"
C–D track (rotor position)	present	present

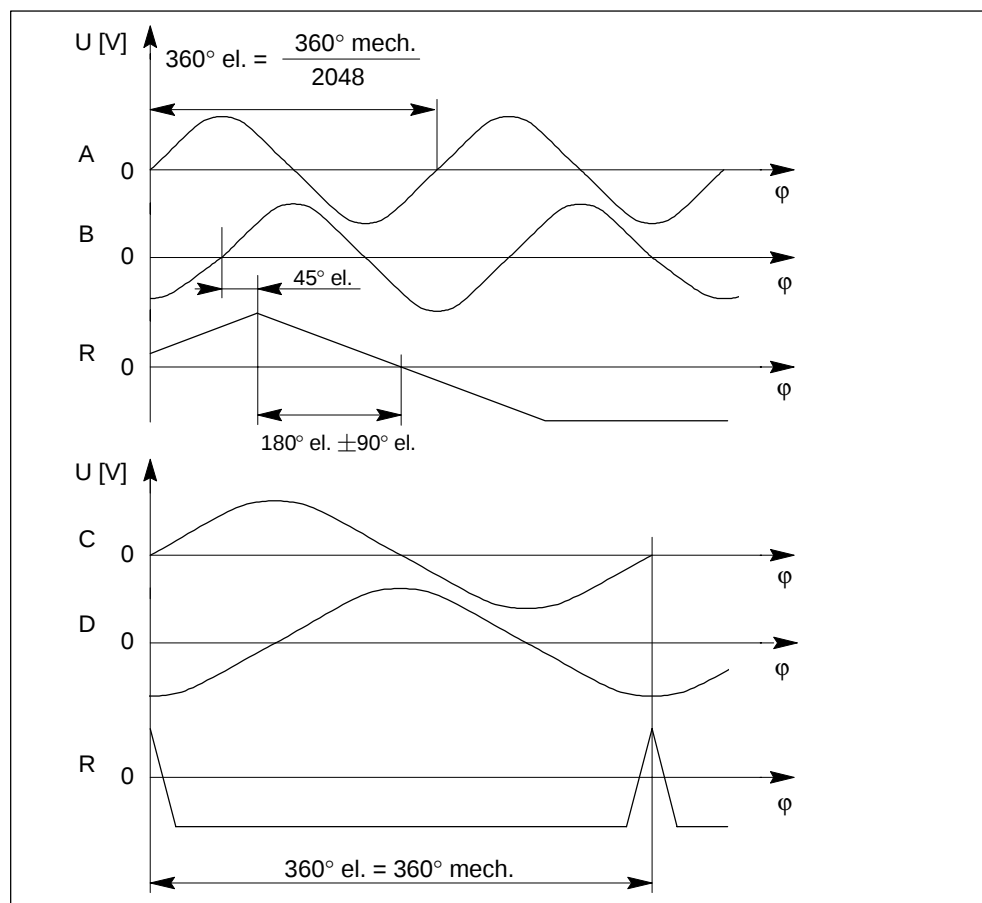
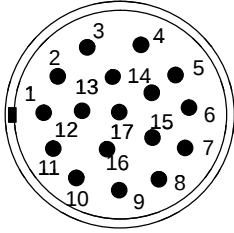


Fig. 3-2 Signal sequence and assignment for a positive direction of rotation (clockwise direction of rotation when viewing the DE side)

Connector assignment for a 17-pin flange-mounted socket with plug contacts

Table 3-4 17-pin flange-mounted socket

Signal name	PIN	
A	1	
*A	2	
B	11	
*B	12	
R	3	
*R	13	
Inner shield	17	
C	5	
*C	6	
D	14	
*D	4	
+Temp	8	
–Temp	9	
P encoder	10	
5 V sense	16	
M encoder	7	
0 V sense	15	
Outer shield at the connector housing	yes	

Connector and cables

Mating connector:

6FX2003-0CE17 (socket)

Pre-assembled cable:

6FX□002-2CA31-□□□0

Length 1)

5 = MOTION-CONNECT® 500 1)

8 = MOTION-CONNECT® 800 1)

Cable length:

max. 50 m for SIMODRIVE 611

max. 100 m for MASTERDRIVES MC

1) Technical data and length code, refer to Catalog, Chapter "MOTION-CONNECT connection system"

3.2 Encoder

3.2.2 Absolute value encoder

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

Table 3-5 Absolute encoder EnDat

Features	Absolute value encoder EnDat (A-2048)	Absolute value encoder EnDat (A-512)
Operating voltage	$5V \pm 5\%$	$5V \pm 5\%$
Power consumption	max. 300 mA	max. 300 mA
Incremental resolution (periods per revolution)	2048	512
Absolute resolution (coded revolutions)	4096	4096
Incremental signals	1 Vpp	1 Vpp
Serial absolute position interface	EnDat	EnDat
Accuracy	$\pm 40''$	$\pm 80''$

Note

The thermally permissible motor rated torque is reduced as a result of the reduced maximum operating temperature of the absolute value encoder with respect to incremental encoders (refer to technical data of the motors).

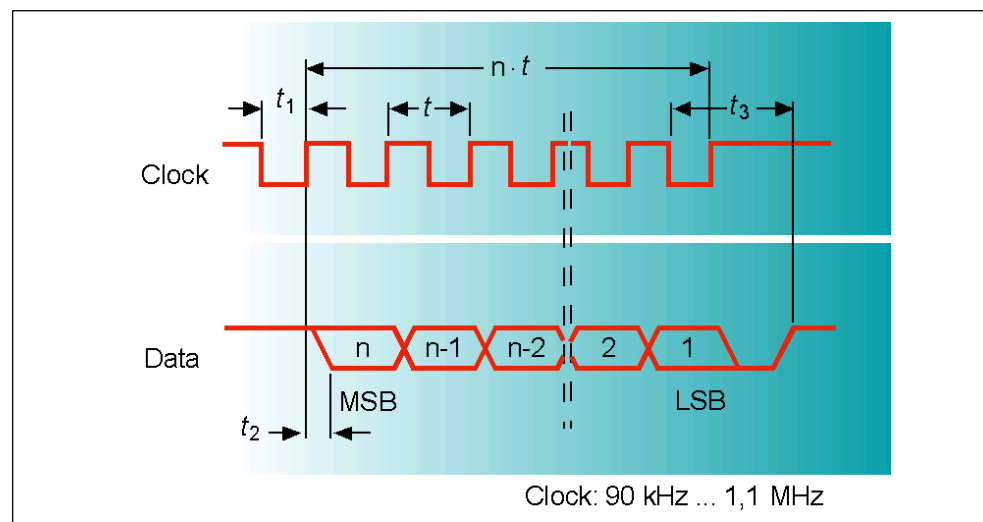
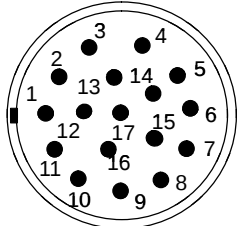


Fig. 3-3 Output signals

Connector assignment for a 17-pin flange-mounted socket with plug contacts

Table 3-6 17-pin flange-mounted socket

Signal name	PIN	
A	1	
*A	2	
B	11	
*B	12	
Data	3	
*Data	13	
Inner shield	17	
Clock cycle	5	
not connected	6	
*Clock cycle	14	
not connected	4	
+Temp	8	
–Temp	9	
P encoder	10	
5 V sense	16	
M encoder	7	
0 V sense	15	
Outer shield at the connector housing	yes	

Connector and cables

Mating connector:

6FX2003-0CE17 (socket)

Pre-assembled cable:

6FX□002-2EQ10-□□□0

Length 1)

5 = MOTION-CONNECT® 500 1)

8 = MOTION-CONNECT® 800 1)

Cable length:

max. 50 m for SIMODRIVE 611

max. 100 m for MASTERDRIVES MC

1) Technical data and length code, refer to Catalog, Chapter "MOTION-CONNECT connection system"

3.2.3 Resolver

- Function:
- Speed actual value sensing
 - Rotor position encoder for inverter control
 - Indirect incremental meas. system for the pos. contr. loop

Note

The limiting frequency of the drive converter must be carefully observed.

- SIMODRIVE 611U: Limiting frequency 432 Hz (before software release 4.1: 375 Hz)
- SIMODRIVE 611A: Only 2-pole resolvers are possible

Table 3-7 Technical data, resolvers

Erregerspannung	5 V (rms) to 13 V (rms)
Excitation frequency	4 kHz to 10 kHz
Power consumption	< 80 mA (rms)
Angular accuracy (bandwidth)	
2-pole	< 14'
multi-pole	< 4'
Number of poles	2, 4, 6 or 8 ¹⁾
Ratio	0.5

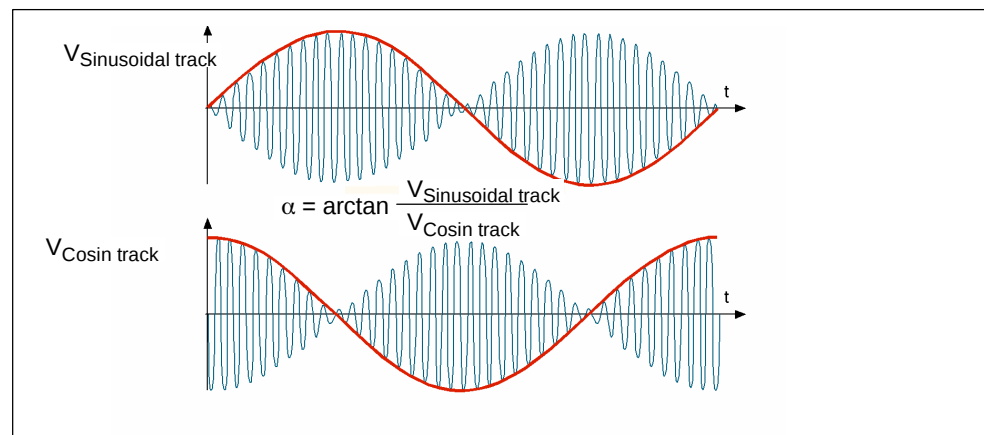
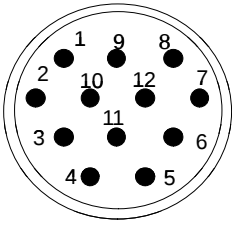


Fig. 3-4 Output signals

1) The pole number is identical to the motor pole number

Connector assignment for a 12-pin flange-mounted socket with plug contacts

Table 3-8 12-pin flange-mounted socket

Signal name	PIN	
SIN	1	
*SIN	2	
Inner shield	3	
Inner shield	4	
Inner shield	5	
not connected	6	
+Temp	8	
–Temp	9	
+Vpp	10	
–Vpp	7	
COS	11	
*COS	12	

Connector and cables

Mating connector:

6FX2003-0CE12 (socket)

Pre-assembled cable:

6FX□002-2CF02-□□□0




 Length 1)

 5 = MOTION-CONNECT® 500 1)

 8 = MOTION-CONNECT® 800 1)

Cable length:

max. 50 m for SIMODRIVE 611
 max. 100 m for MASTERDRIVES MC

1) Technical data and length code, refer to Catalog, Chapter "MOTION-CONNECT connection system"

3.3 Holding brake

3.3 Holding brake

For a description of the function, refer to the Planning Guide "General Section for Synchronous Servomotors".

The holding brake cannot be retrofitted! Motors with holding brake are longer by the mounted space required (refer to the dimension drawing).

Table 3-9 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 work
		[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	30	15	125
1FT606□	EBD 1.5 B	15	0.8	130	30	320
1FT6081	EBD 1.2 B	15	0.8	70	35	750
1FT6082	EBD 1.2 B	15	0.8	70	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	180	40	2100
1FT613□ ²⁾	EBD 8 B	140	1.7	260	70	9800

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).

1) Standardized acc. to VDE 0580 with varistor circuit

2) not for water cooling

3.4 Gearbox

When engineering/dimensioning gearboxes, refer to the documentation "General Part"

3.4.1 Planetary gearbox, 1-stage

Table 3-10 Selection table for 1-stage planetary gearboxes (alpha company, SP series)

Ordering data: **1FT6**□□□□-□**A**□7□-□□□□-**Z** ⁵⁾
 Order No. of the motor (standard type) with codes **-Z** and **V**□□
 Code for mounting the planetary gearbox assigned to the motor

Motor type Non-ventilated	Planetary gear 1-stage Torsional play ≤ 4 arcmin ²⁾		Available gearbox ratios <i>i</i> = 4...10				Max. perm. input speed	Max. permissible output torque	Max. permissible drive out shaft load ¹⁾		Moment of inertia Gearbox						
	Type	Weight approx. [kg]	4	5	7	10	n _{G1} [RPM]	M _{G2} [Nm]	F _r [N]	F _a [N]	J _G at <i>i</i> =4 10 ⁻⁴ kgm ²	J _G at <i>i</i> =10 10 ⁻⁴ kgm ²					
1FT6024 ⁴⁾	SP 060–MF1	1.5	X	X	X	X	6000	40 (32) ³⁾	2600	2300	0.17	0.15					
1FT6031			X	X	X	X											
1FT6034			X	X	X	X											
1FT6034	SP 075–MF1	2.8	X	X	X	X	6000	100 (80) ³⁾	3800	3200	0.57	0.4					
1FT6041											X	X	X	0.63	0.46		
1FT6044											X						
1FT6044	SP 100–MF1	6.2	X	X	X	X	4500	250 (200) ³⁾	6000	5400	2.0	1.3					
1FT6061											X	X	X	2.7	2.0		
1FT6062											X	X	X				
1FT6064																	
1FT6081	SP 140–MF1	11.5	X	X	X	X	4000	500 (400) ³⁾	9000	9400	8.4	6.2					
1FT6082			X	X	X	X											
1FT6084			X	X	X	X											
1FT6086	SP 180–MF1	27	X	X	X	X	3500	1100 (880) ³⁾	14000	13500	30.6	17.4					
1FT6102											X	X	X	31.7	18.5		
1FT6105											X	X	X				
1FT6108																	
1FT6105	SP 210–MF1	53	X	X	X	X	2500	1900 (1520) ³⁾	18000	22500	75.8	47.1					
1FT6132													X	X	X		
1FT6134													X	X	X		
1FT6136																	
1FT6132	SP 240–MF1	80	X	X	X	X	2200	3400 (2720) ³⁾	27000	27800	146.3	83.1					
1FT6134													X	X	X		
1FT6136													X	X	X		
Code																	
Gearbox shaft with key			V02	V03	V05	V09											
Gear shaft without key			V22	V23	V25	V29											

1) Nominal values for the max. permissible drive-out shaft load at the center of the shaft for a drive-out speed of 300 RPM

2) For SP 060 and SP 075: ≤ 6 arcmin

3) Values in brackets (...) for $i=10$

4) Due to the high gearbox frictional torque, it is not practical to make an assignment for 1FT6021

5) Only for vibration severity level N

3.4 Gearbox

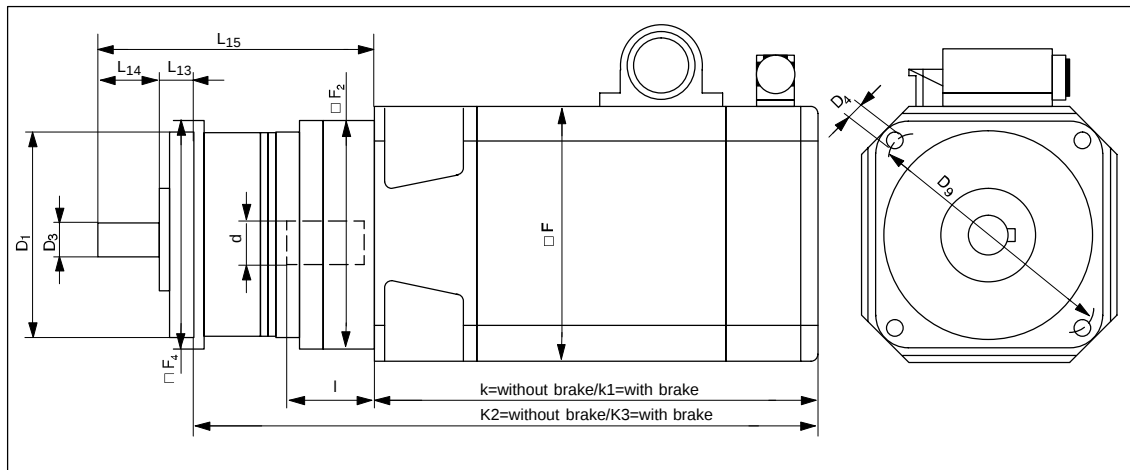


Fig. 3-5 1FT6 series with 1-stage planetary gearbox (alpha company), dimensions refer to Table 3-11

Table 3-11 1FT6 series with 1-stage planetary gearbox (alpha company)

Standard motors						Planetary gearbox, 1-stage											Dimension	
Type	Dimension					Type	Dimension										Dimension	
	k	k1	l	d	□ F		L13	L14	L15	D1	D3	D4	D9	□ F4	□ F2		K2	K3
1FT6024	233	258	20	9	55	SP 060-MF1	20	28	129	60	16	5.5	68	62	70		314	339
1FT6031	220	240	30	14	72												301	321
1FT6034	260	280															341	361
1FT6034	260	280	30	14	72	SP 075-MF1	20	36	156	70	22	6.6	85	76	80		360	380
1FT6041	228	263	40	19	96												328	363
1FT6044	278	313															378	413
1FT6044	278	313	40	19	96	SP 100-MF1	30	58	202	90	32	9	120	101	100		392	427
1FT6061	228	258															342	372
1FT6062	253	283	50	24	116												367	397
1FT6064	303	333				SP 140-MF1	30	82	256	130	40	11	165	141	150		417	447
1FT6081	221	248	58	32	155												366	393
1FT6082	246	273															391	418
1FT6084	296	342				SP 180-MF1	30	82	297	160	55	13	215	188	190		441	487
1FT6086	346	392															491	537
1FT6086	346	392	58	32	155												531	577
1FT6102	295	341				SP 210-MF1	38	105	335	180	75	17	250	219	260		480	526
1FT6105	370	416	80	38	192												555	601
1FT6108	470	516															655	701
1FT6105	370	416	80	38	192	SP 210-MF1	38	105	339	180	75	17	250	219	260		562	608
1FT6108	470	516															662	708
1FT6132	435	485															631	681
1FT6134	485	535	82	48	260	SP 210-MF1	38	105	339	180	75	17	250	219	260		681	731
1FT6136	535	585															731	781

3.4.2 Planetary gearbox, 2-stage

Table 3-12 Selection table for 2-stage planetary gearboxes (alpha company, SP series)

Ordering data: **1FT6**□□□-□**A**□**7**□-□□□□-**Z** ⁴⁾Order No. of the motor (standard type) with codes **-Z** and **V**□□

Code for mounting the planetary gearbox assigned to the motor

Motor type non- ventilated	Planetary gear 2-stage		Available gearbox ratios <i>i</i> = 16 ... 50					Max. perm. input speed <i>n</i> _{G1} [RPM]	Max. permis- sible output torque <i>M</i> _{G2} [Nm]	Max. permissible drive out shaft load ¹⁾		Moment of inertia Gearbox <i>J</i> _G at <i>i</i> =20 10 ⁻⁴ kgm ²
	Type	Weight approx. [kg]	16	20	28	40	50			<i>F</i> _r [N]	<i>F</i> _a [N]	
1FT6024 ³⁾	SP 075–MF2	3.1	X	X	X	X	X	6000	100	3800	3200	0.47
1FT6031			X	X	X	X	X					0.52
1FT6034			X	X								
1FT6034	SP 100–MF2	7.1			X	X	X	4500	250	6000	5400	1.7
1FT6041			X	X	X	X						1.8
1FT6044			X	X								
1FT6061			X	X	X							2.5
1FT6062			X	X								
1FT6041	SP 140–MF2	14.5				X	X	4000	500	9000	9400	4.4
1FT6044					X	X	X					
1FT6061					X	X						5.1
1FT6062					X	X						
1FT6064			X	X								
1FT6062	SP 180–MF2	29			X	X	X	4000	1100	14000	13500	5.5
1FT6064					X	X	X					
1FT6081			X	X	X	X						8.2
1FT6082			X	X	X							
1FT6084			X	X								
1FT6086			X	X								
1FT6082	SP 210–MF2	51			X	X	X	3500	1900	18000	22500	34.5
1FT6084					X							
1FT6086					X							
1FT6102			X	X	X		35.6					
1FT6105			X									
1FT6084	SP 240–MF2	78				X	X	3500	3400	27000	27800	43.1
1FT6086						X	X					
1FT6102				X	X							44.2
1FT6105				X								
1FT6108			X	X								
Code												
Gearbox shaft with key			V12	V13	V15	V16	V17					
Gear shaft without key			V32	V33	V35	V36	V37					

1) Nominal values for the max. permissible drive-out shaft load at the center of the shaft for a drive-out speed of 300 RPM

2) For SP 060 and SP 075: ≤ 8 arcmin

3) Due to the high gearbox frictional torque, it is not practical to make an assignment for 1FT6021

4) Only for vibration severity level N

3.4 Gearbox

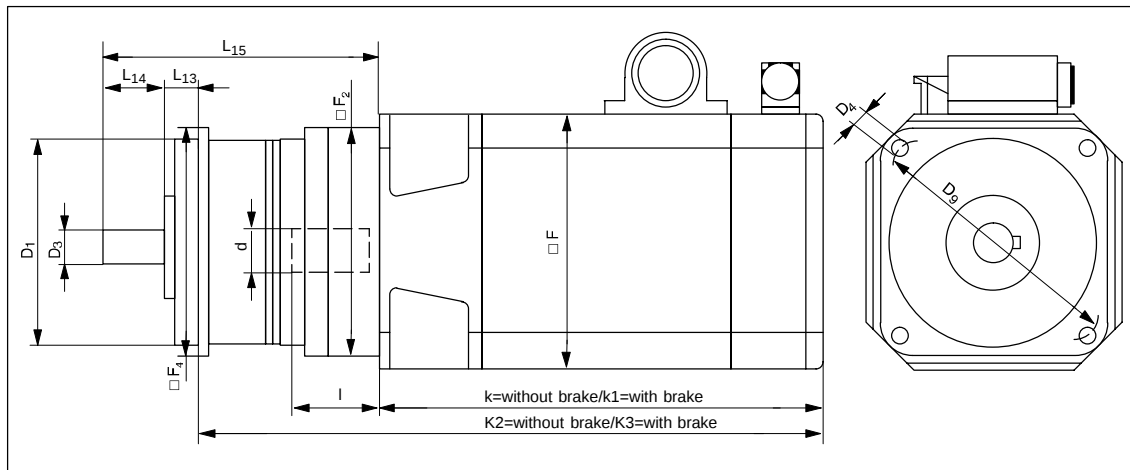


Fig. 3-6 1FT6 series with 2-stage planetary gearbox (alpha company), dimensions refer to Table 3-13

Table 3-13 1FT6 series with 2-stage planetary gearbox (alpha company)

Standard motors						Planetary gearbox, 2-stage												Dimension	
Type	Dimension					Type	Dimension												
	k	k1	l	d	□ F		L ₁₃	L ₁₄	L ₁₅	D ₁	D ₃	D ₄	D ₉	□ F4	□ F2	K ₂	K ₃		
1FT6024	233	258	20	9	55	SP 075–MF2	20	36	183	70	22	6.6	85	76	80	360	385		
1FT6031	220	240	30	14	72											347	367		
1FT6034	260	280														387	404		
1FT6034	260	280	30	14	72	SP 100–MF2	30	58	235	90	32	9	120	101	80	407	427		
1FT6041	228	263	40	19	96										100	375	410		
1FT6044	278	313													425	460			
1FT6061	228	258	50	24	116										120	375	405		
1FT6062	253	283													400	430			
1FT6041	228	263	40	19	96										100	413	448		
1FT6044	278	313					463	498											
1FT6061	228	258				SP 140–MF2	30	82	297	130	40	11	165	141		413	443		
1FT6062	253	283	50	24	116										120	438	468		
1FT6064	303	333													488	518			
1FT6062	253	283	50	24	116	SP 180–MF2	30	82	316	160	55	13	215	188	120	457	487		
1FT6064	303	333													507	537			
1FT6081	221	248													150	425	452		
1FT6082	246	273	58	32	155											450	477		
1FT6084	296	342														500	546		
1FT6086	346	392														550	596		
1FT6082	246	273				SP 210–MF2	38	105	359	180	75	17	250	219		462	489		
1FT6084	296	342	58	32	155										512	558			
1FT6086	346	392													562	608			
1FT6102	295	341	80	38	192										180	511	557		

Table 3-13 1FT6 series with 2-stage planetary gearbox (alpha company), continued

	k	k1	l	d	□ F		L ₁₃	L ₁₄	L ₁₅	D ₁	D ₃	D ₄	D ₉	□ F4	□ F2	K ₂	K ₃
1FT6105	370	416														586	632
1FT6084	296	342	58	32	155	SP 240–MF2	40	130	413	200	85	17	290	249.5	150	539	585
1FT6086	346	392														589	635
1FT6102	295	341														538	584
1FT6105	370	416	80	38	192										190	613	659
1FT6108	470	516														713	759



[illegible]

Dimension Drawings

4

Note

Siemens AG reserves the right to change the dimensions of the motors as part of mechanical design improvements without prior notice. Dimension drawings can go out-of-date.

Current dimension drawings can be requested at no charge from your local SIEMENS office.

4.1 Non-ventilated 1FT6 motors

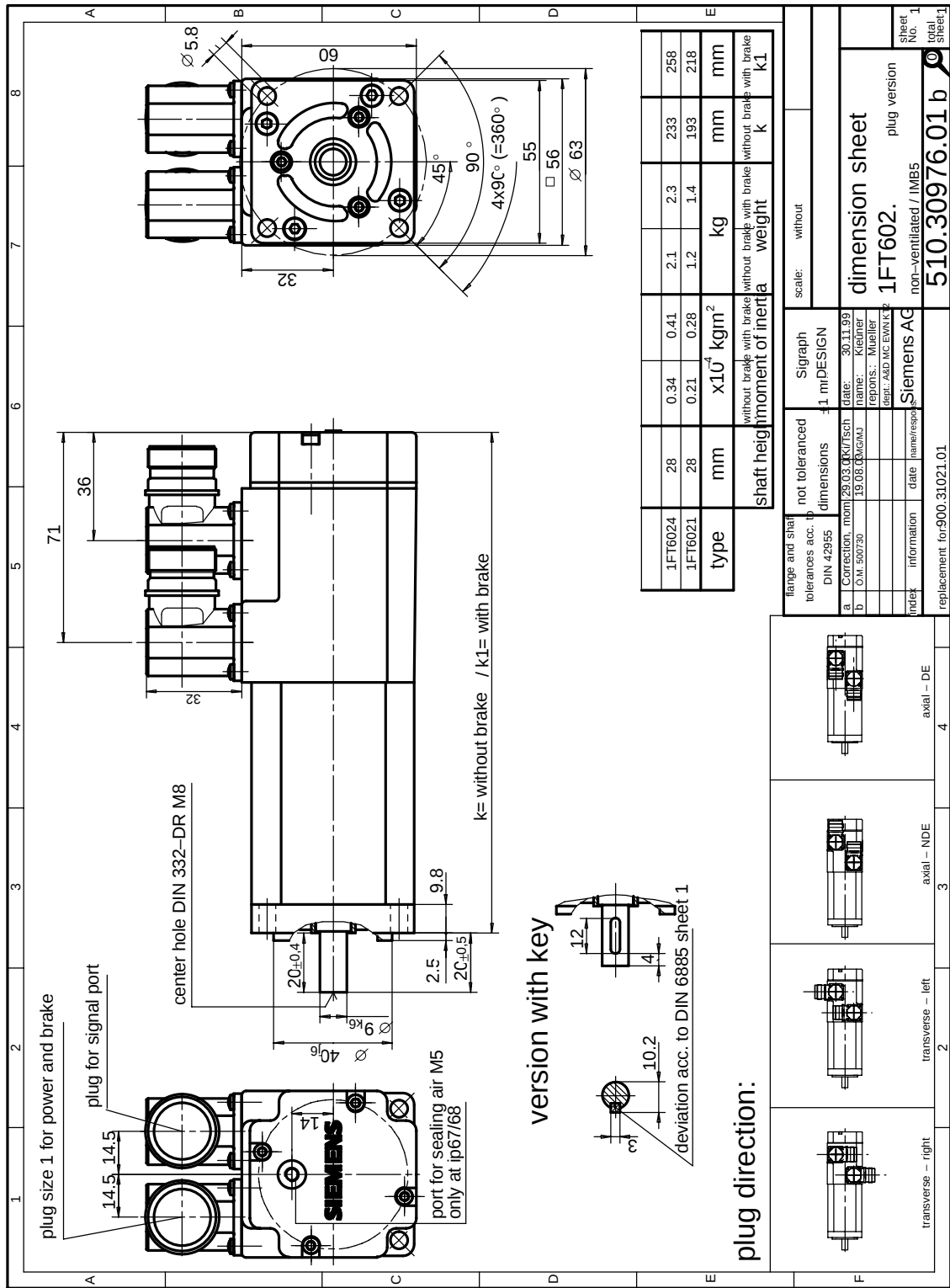


Fig. 4-1 1FT602□ non-ventilated with connector, Size 1

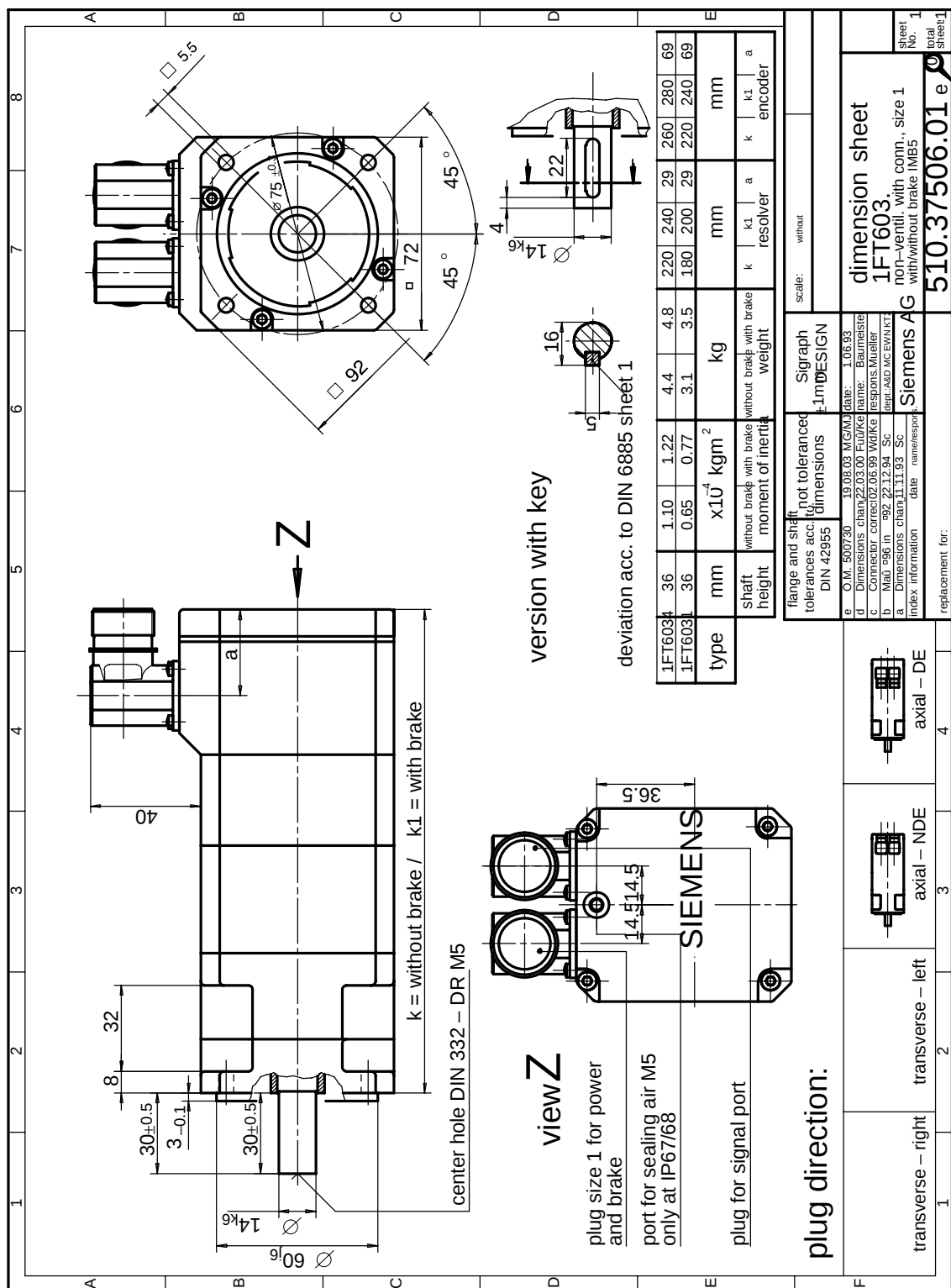


Fig. 4-2 1FT603□ non-ventilated with connector, Size 1



4.1 Non-ventilated 1FT6 motors

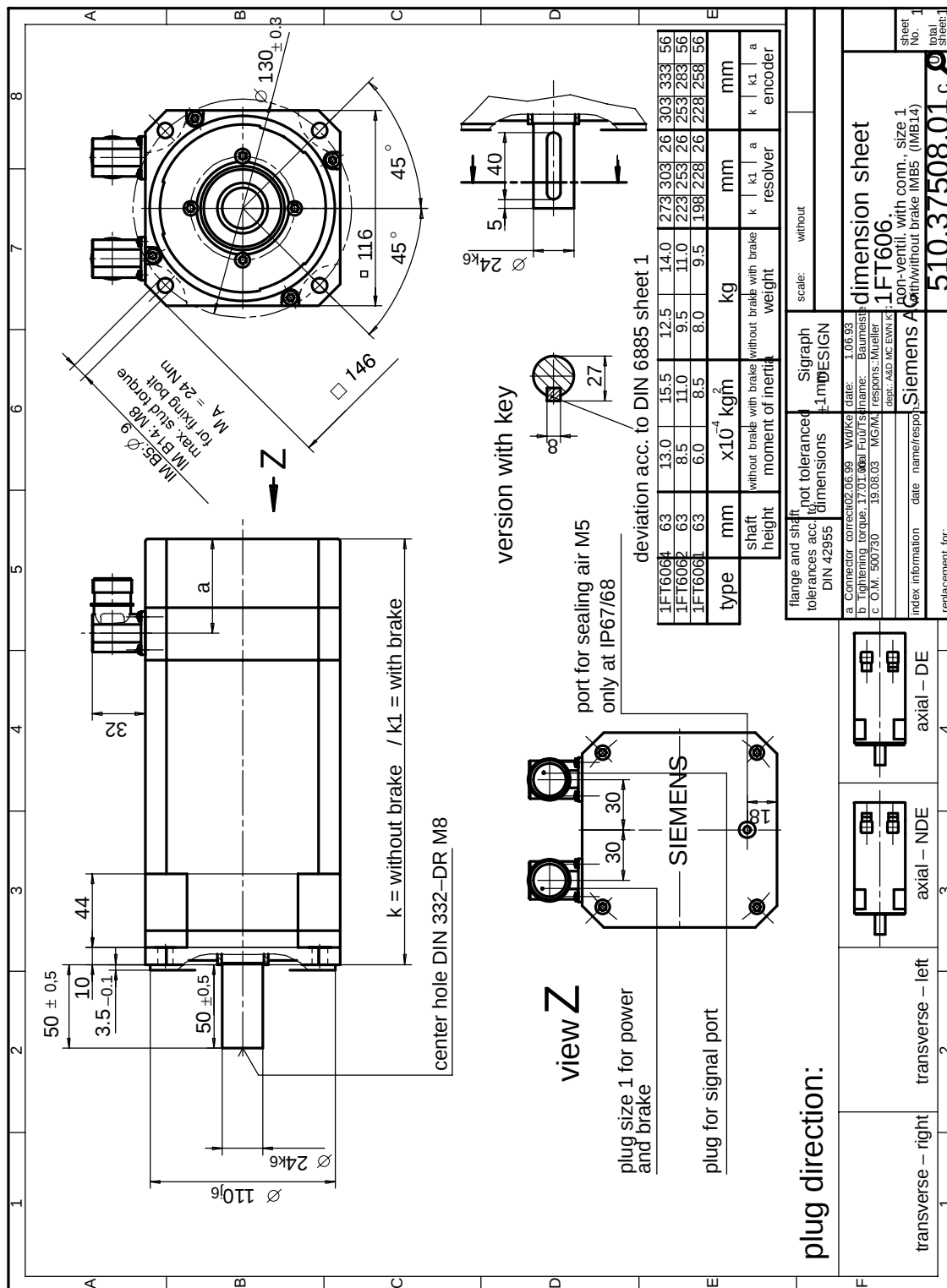


Fig. 4-4 1FT606□ non-ventilated with connector, Size 1

4.1 Non-ventilated 1FT6 motors

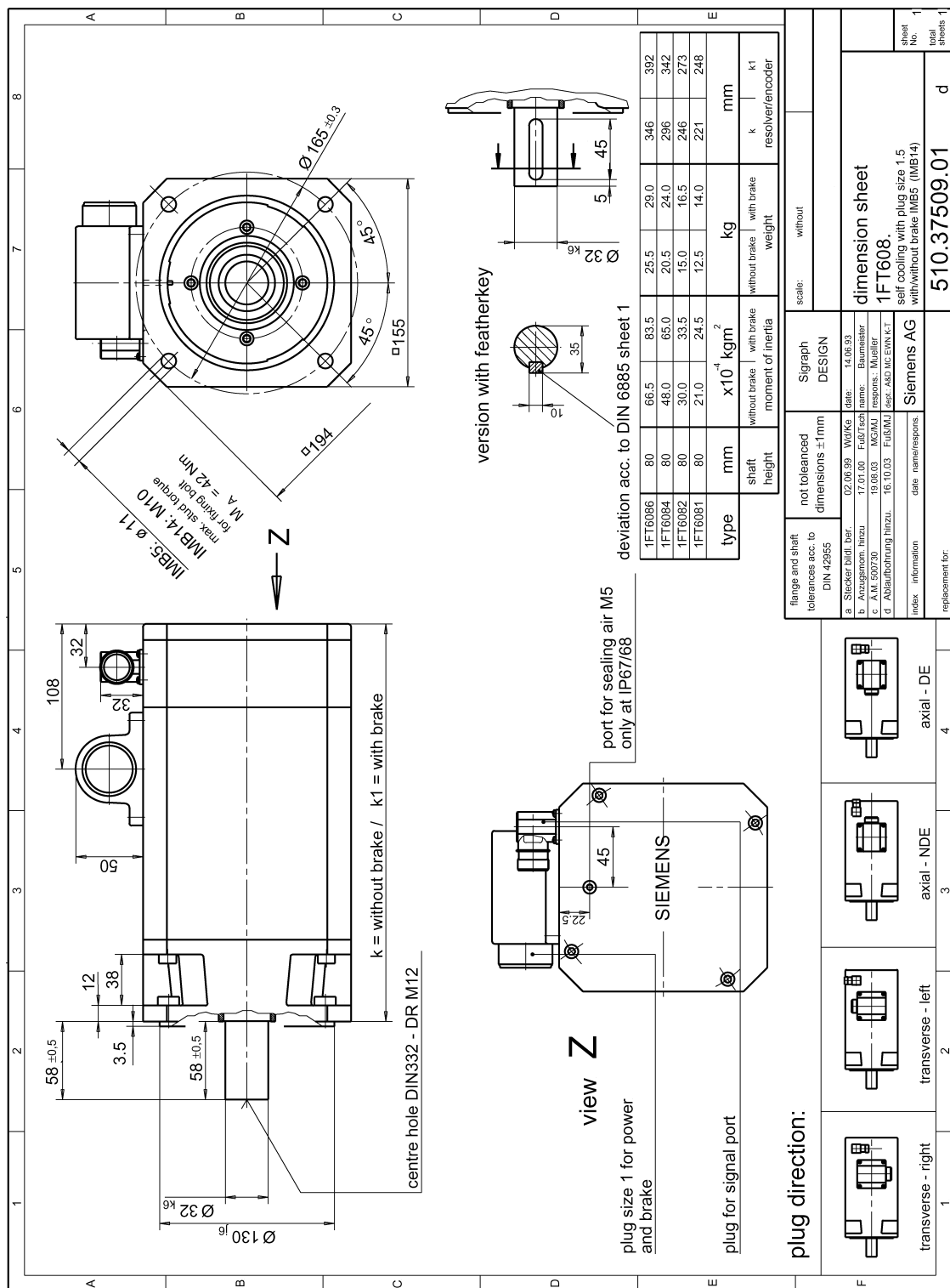


Fig. 4-5 1FT608□ non-ventilated with connector, Size 1.5

4.1 Non-ventilated 1FT6 motors

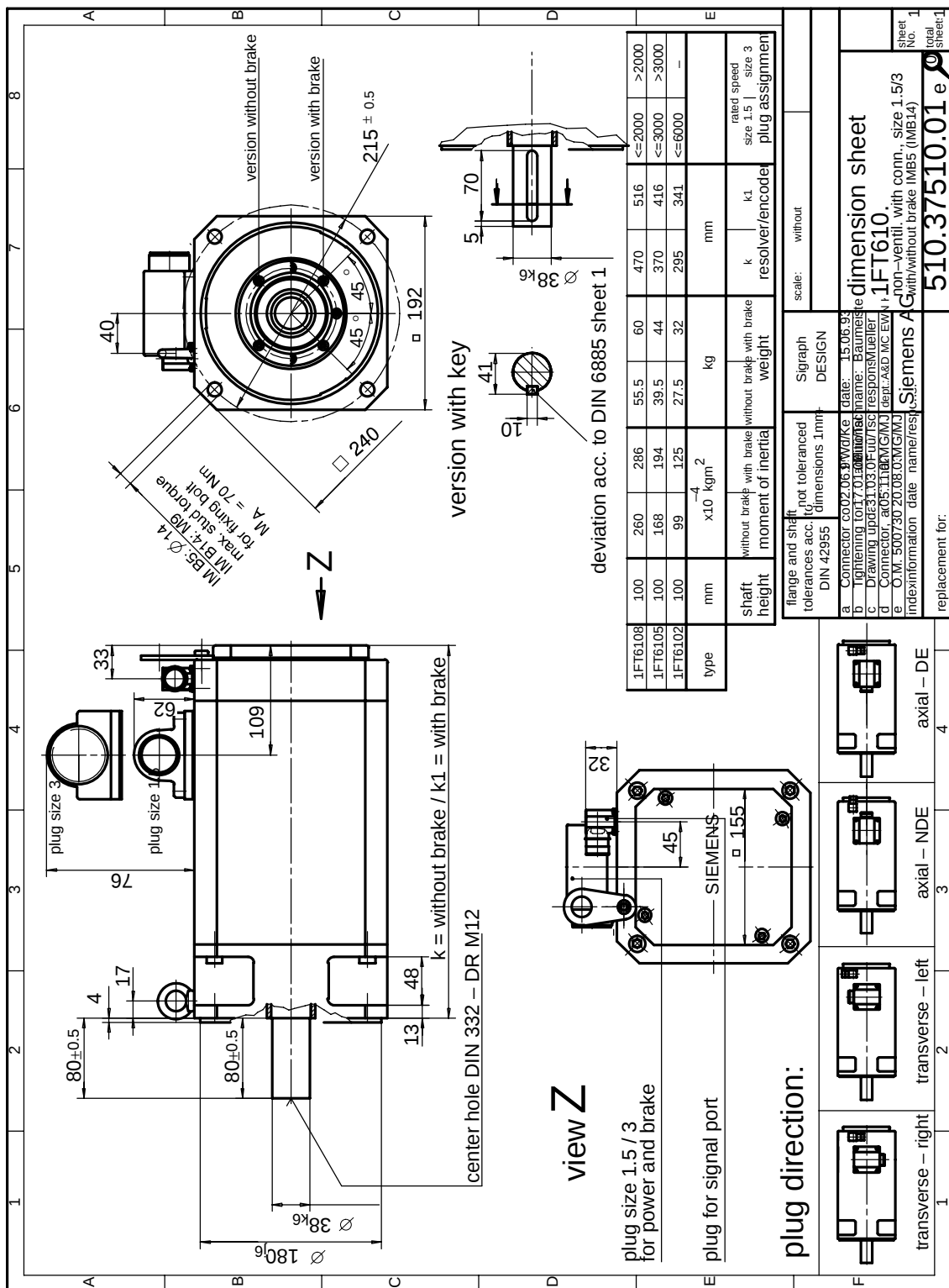


Fig. 4-6 1FT610□ non-ventilated with connector, Size 1.5

4.1 Non-ventilated 1FT6 motors

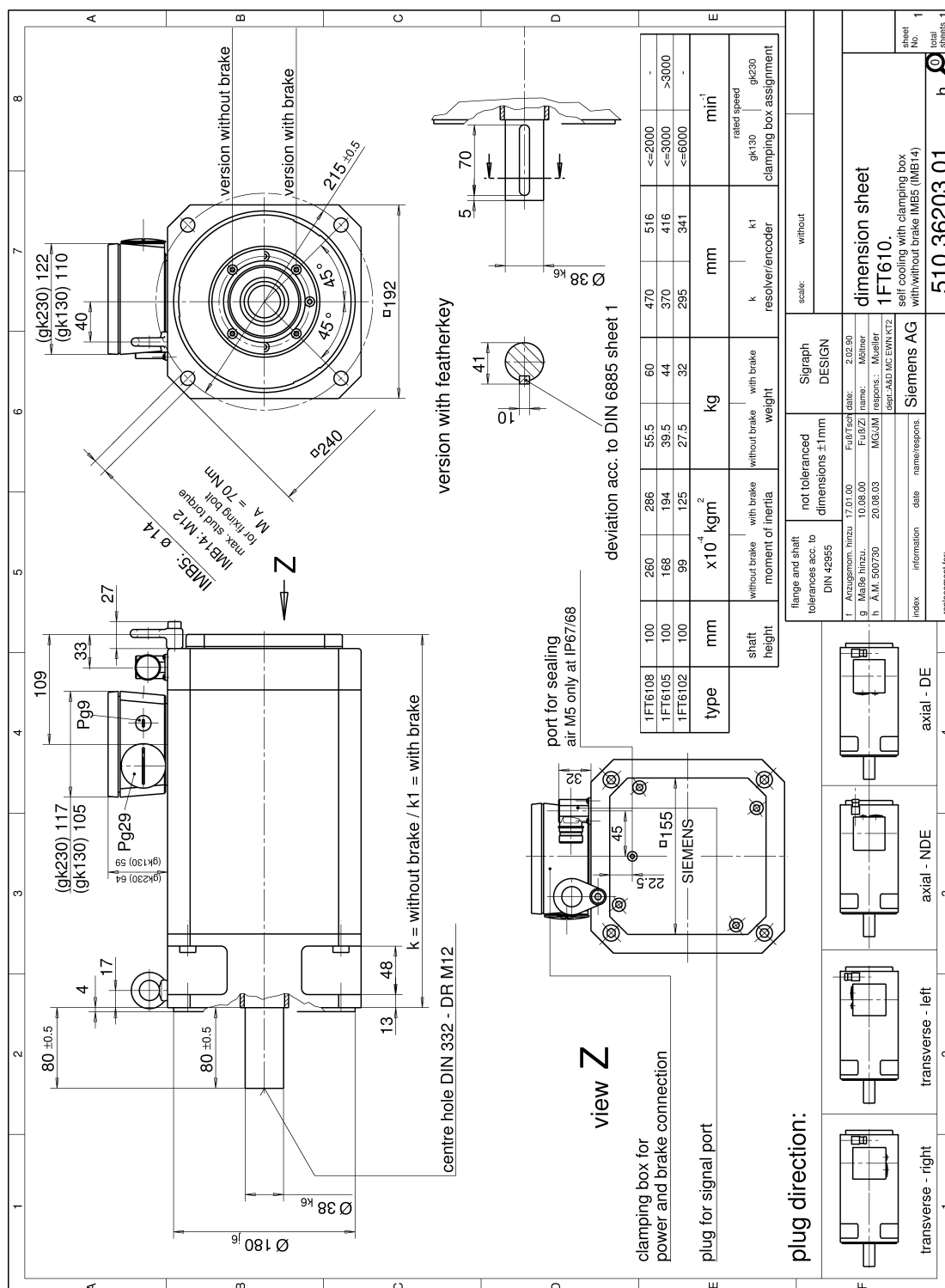


Fig. 4-7 1FT610 non-ventilated with terminal box

4.1 Non-ventilated 1FT6 motors

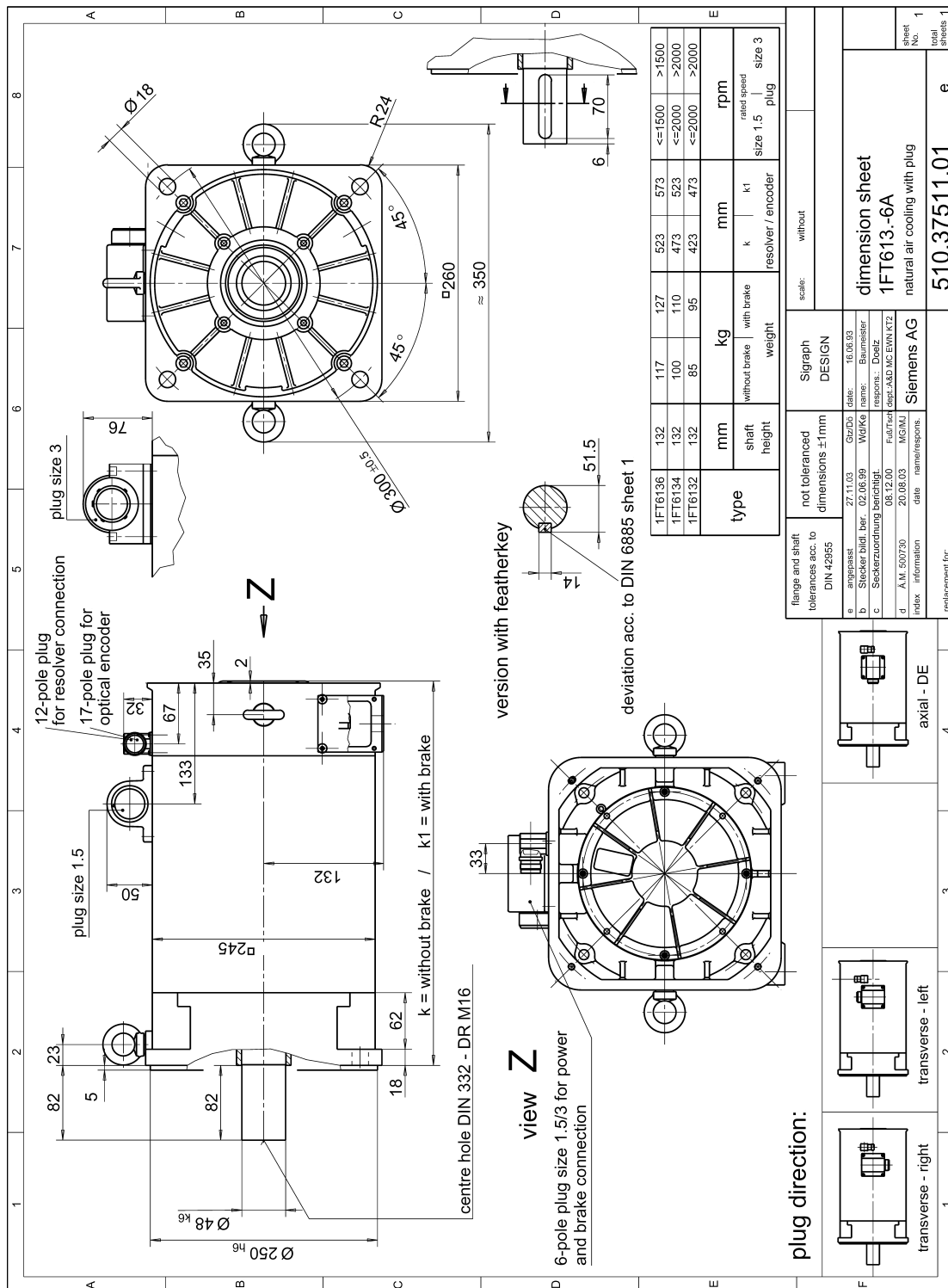


Fig. 4-8 1FT613□ non-ventilated with connector, Size 1.5/3

4.1 Non-ventilated 1FT6 motors

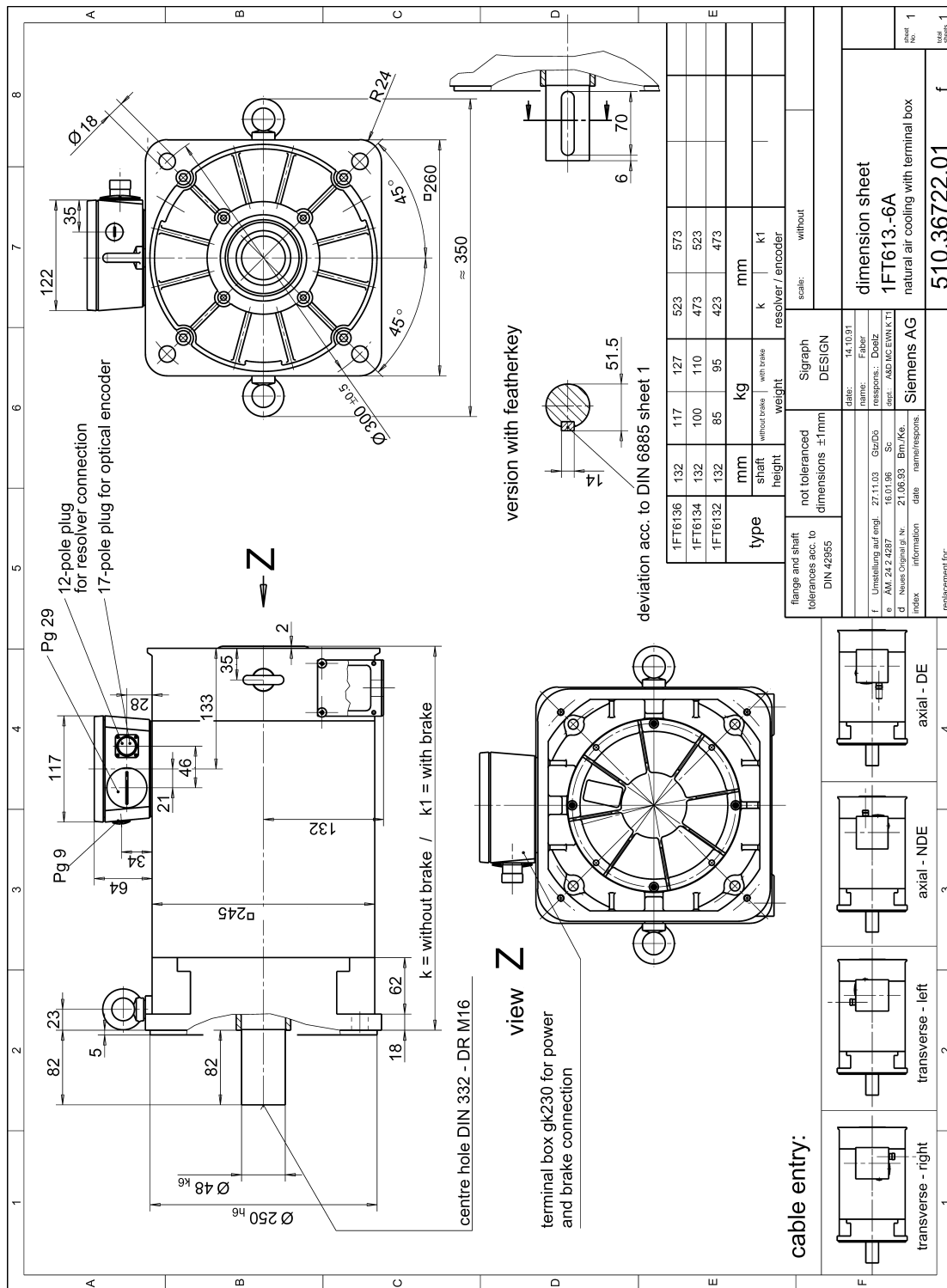


Fig. 4-9 1FT613□ non-ventilated with terminal box

4.2 Force-ventilated 1FT6 motors

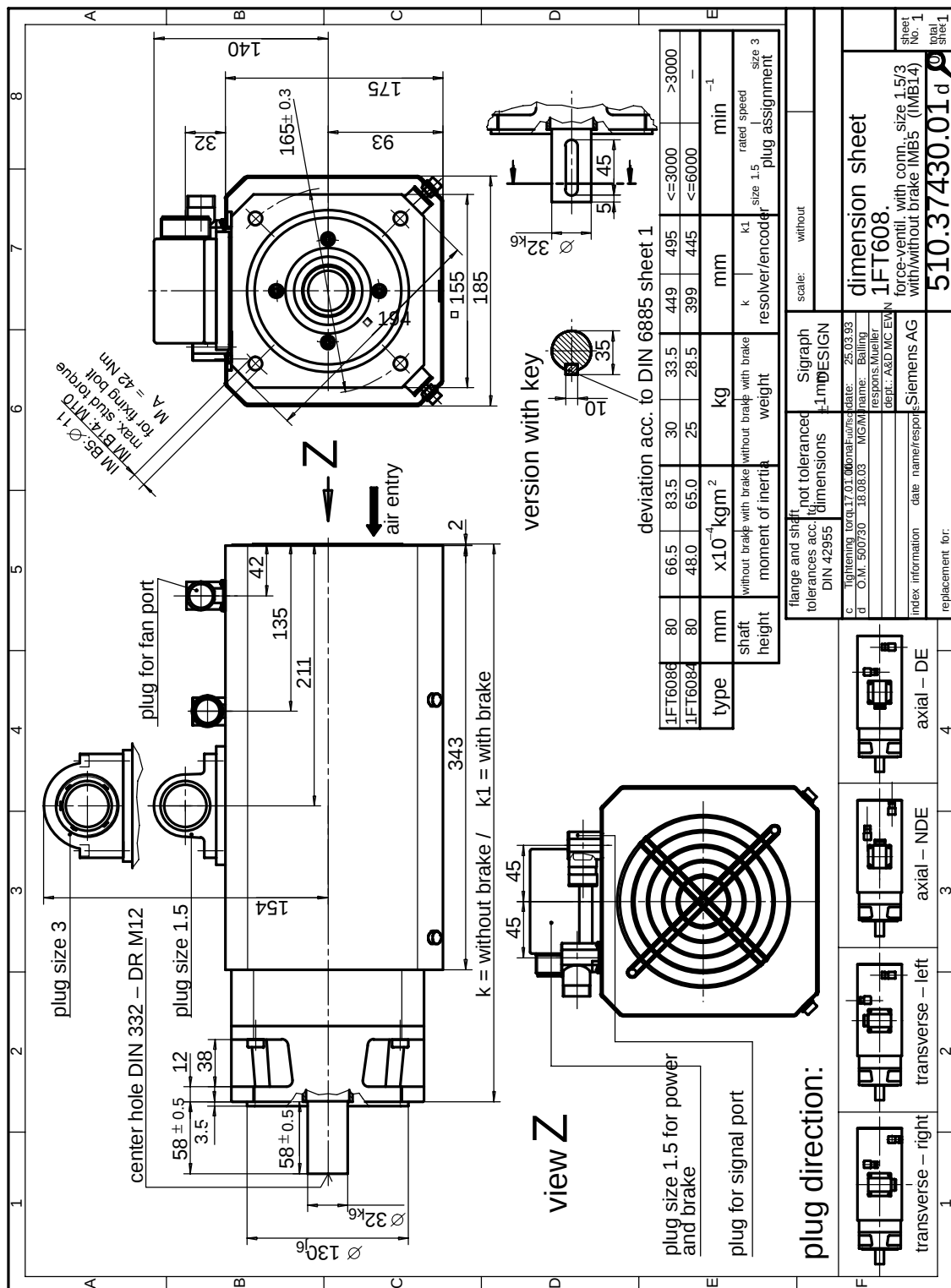


Fig. 4-10 1FT608□ force-ventilated with connector, Size 1.5/3

4.2 Force-ventilated 1FT6 motors

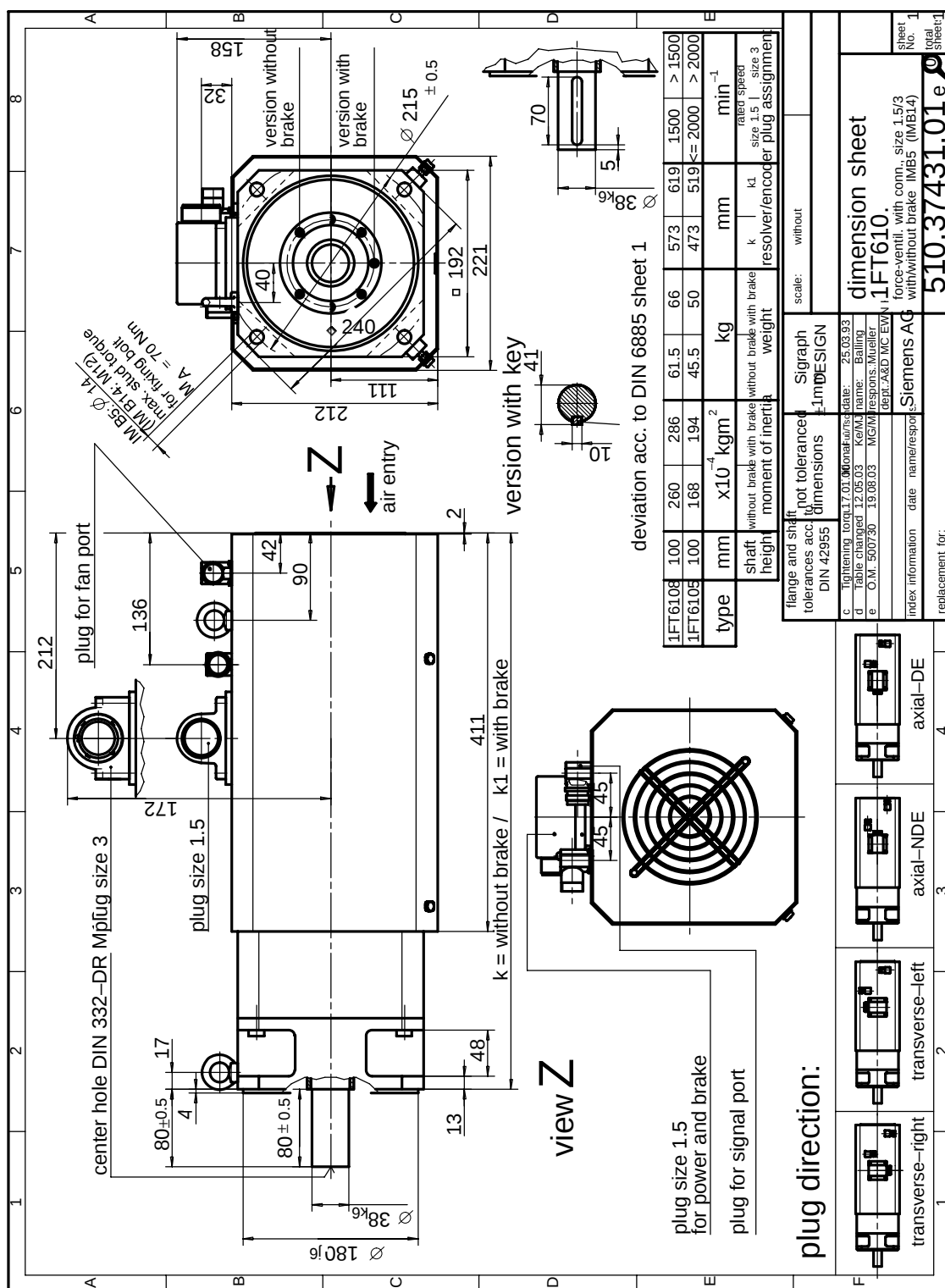


Fig. 4-11 1FT610 force-ventilated with connector, size 1.5/3

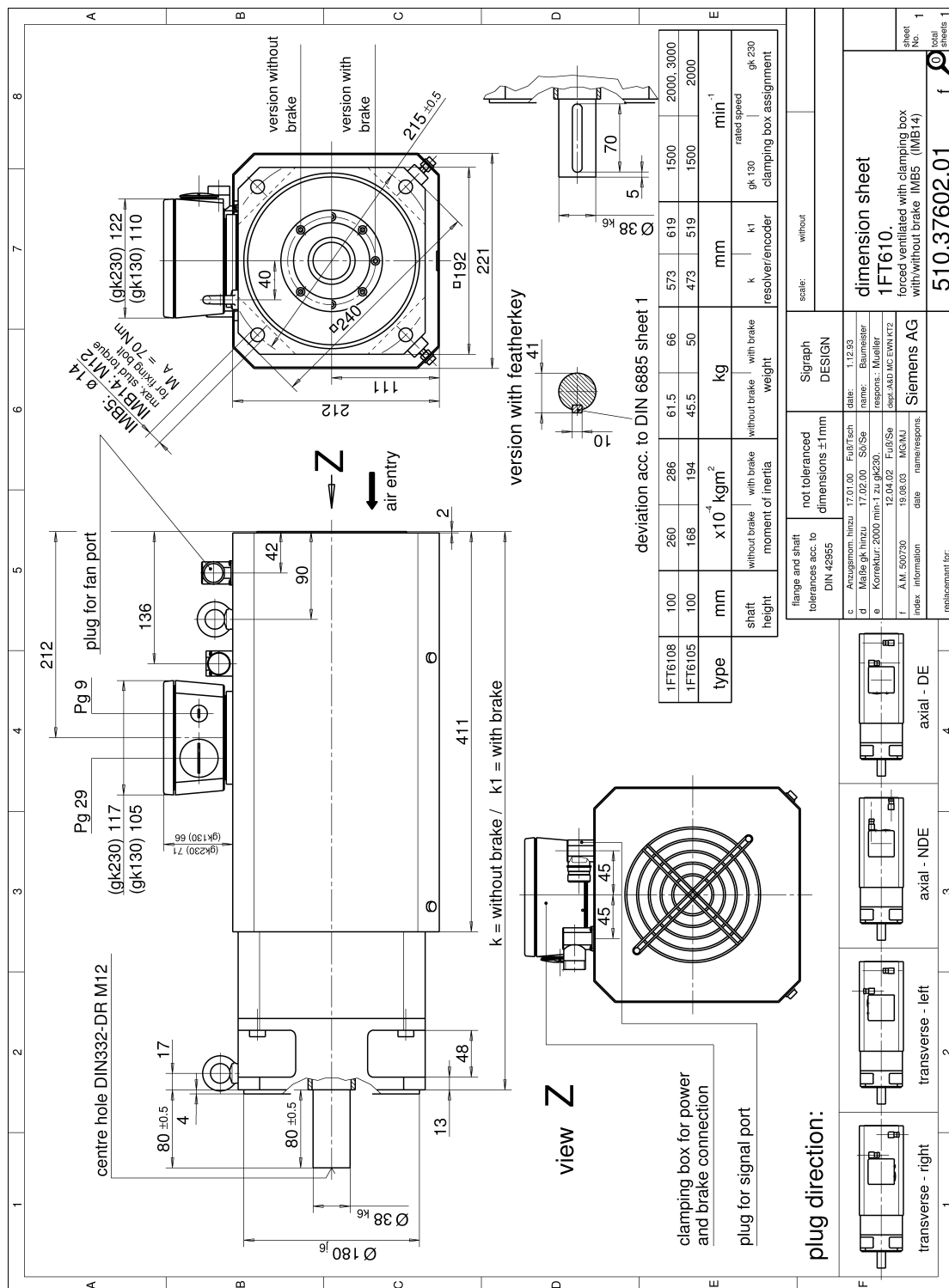


Fig. 4-12 1FT610□ force-ventilated with terminal box

4.2 Force-ventilated 1FT6 motors

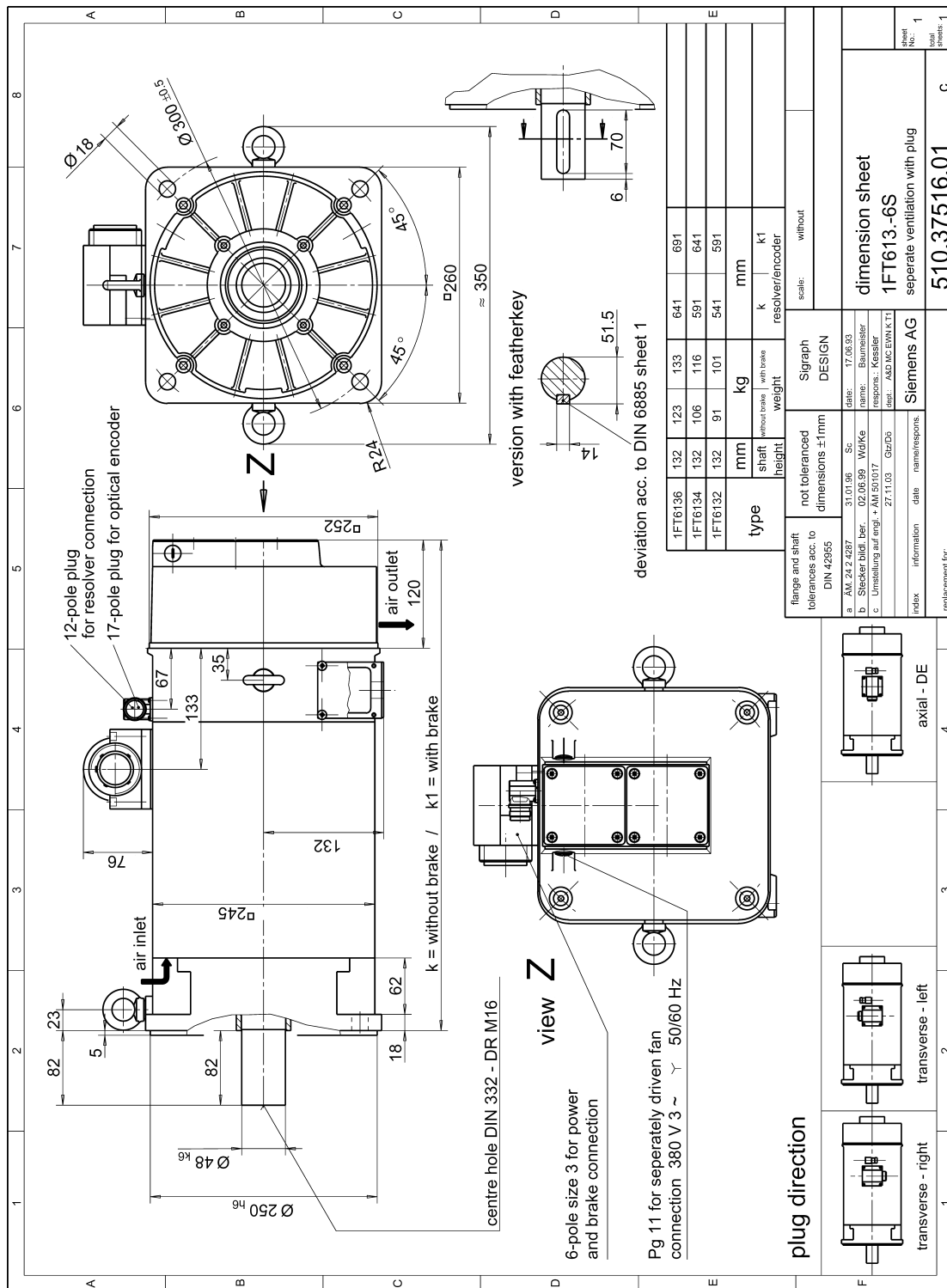


Fig. 4-13 1FT613□ force-ventilated with connector

4.2 Force-ventilated 1FT6 motors

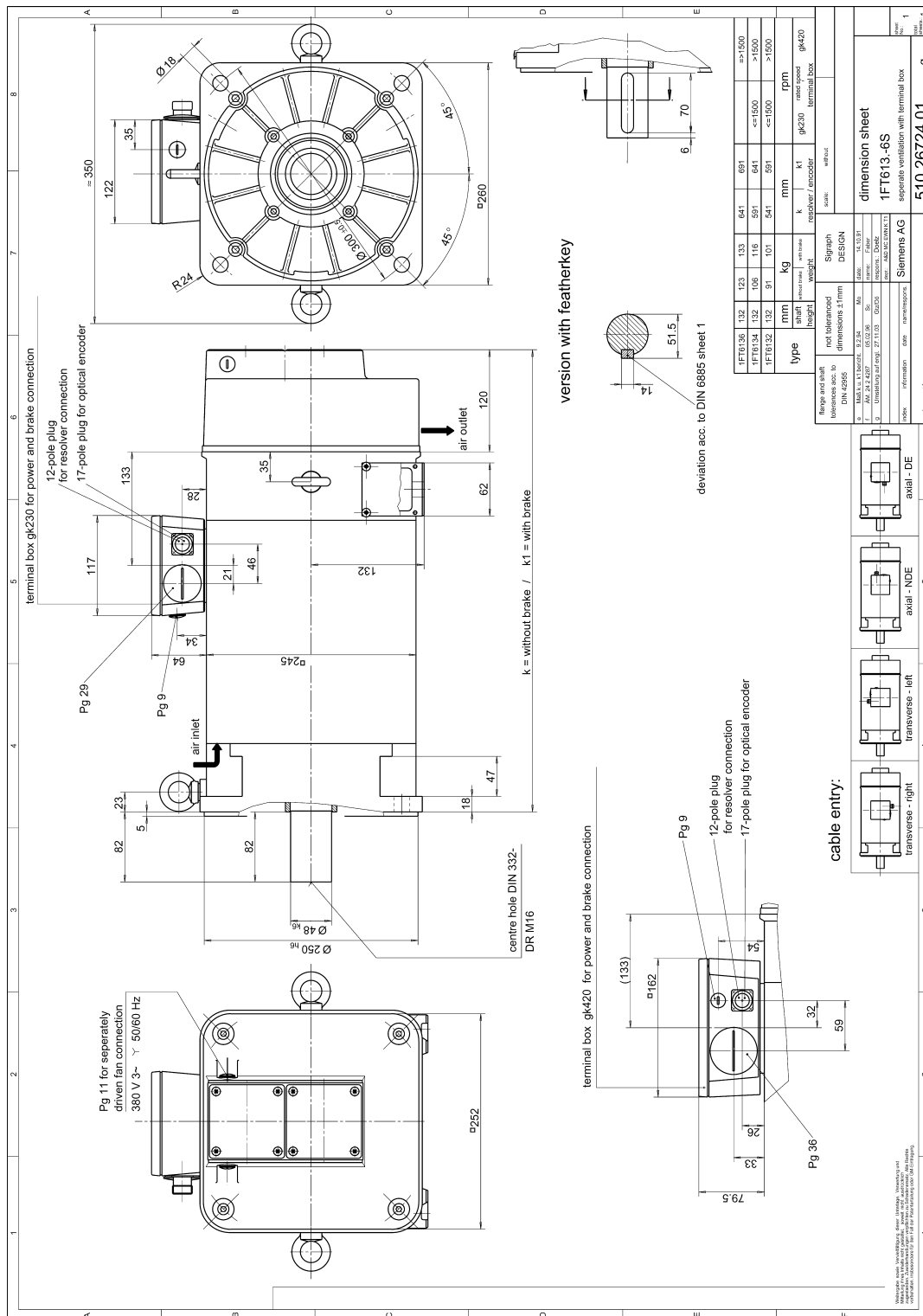
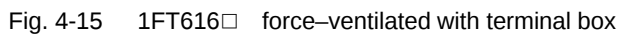


Fig. 4-14 1FT613 force-ventilated with terminal box



4.3 Water-cooled 1FT6 motors

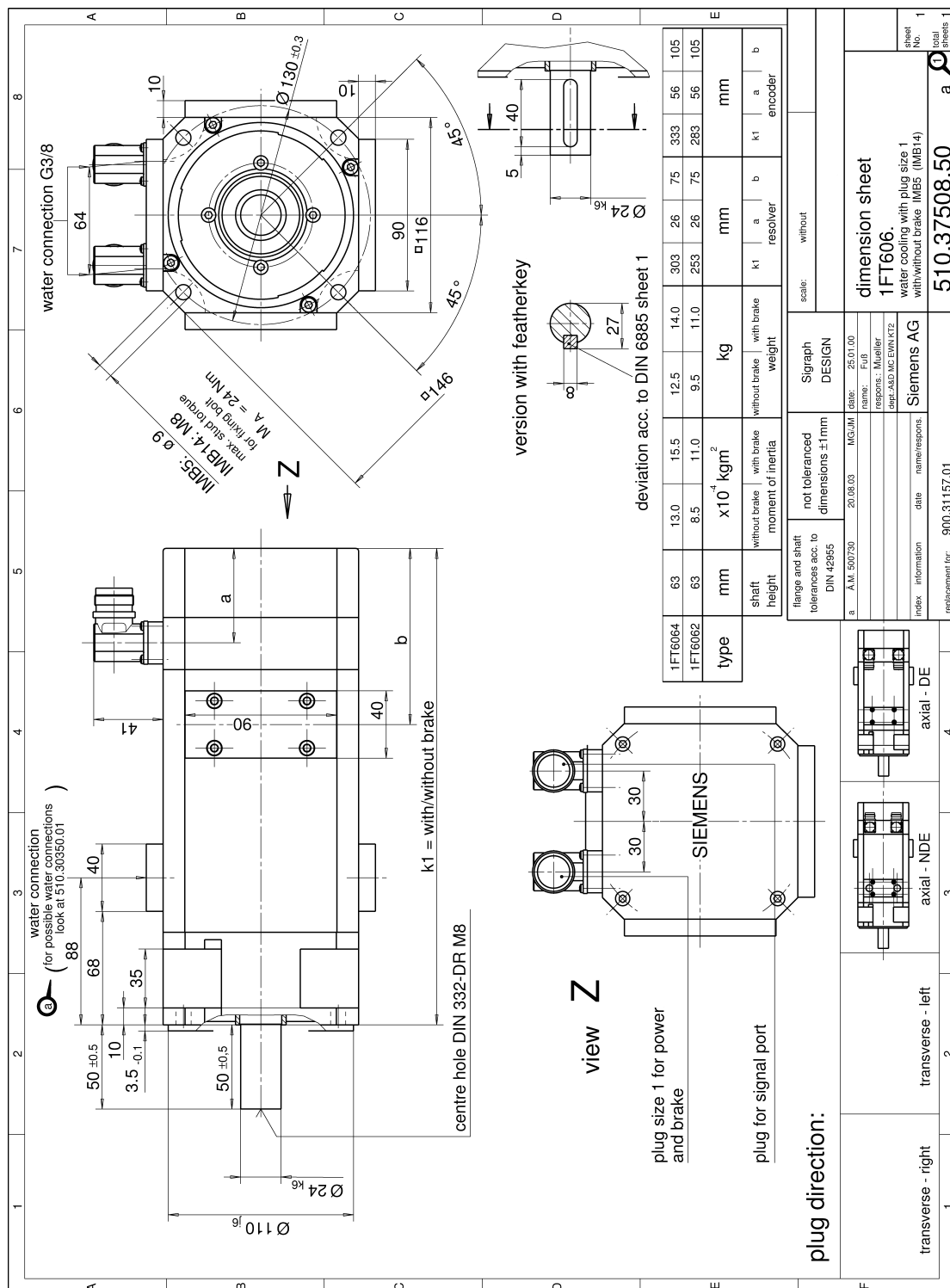


Fig. 4-16 1FT606□ water-cooled with connector, Size 1

4.3 Water-cooled 1FT6 motors

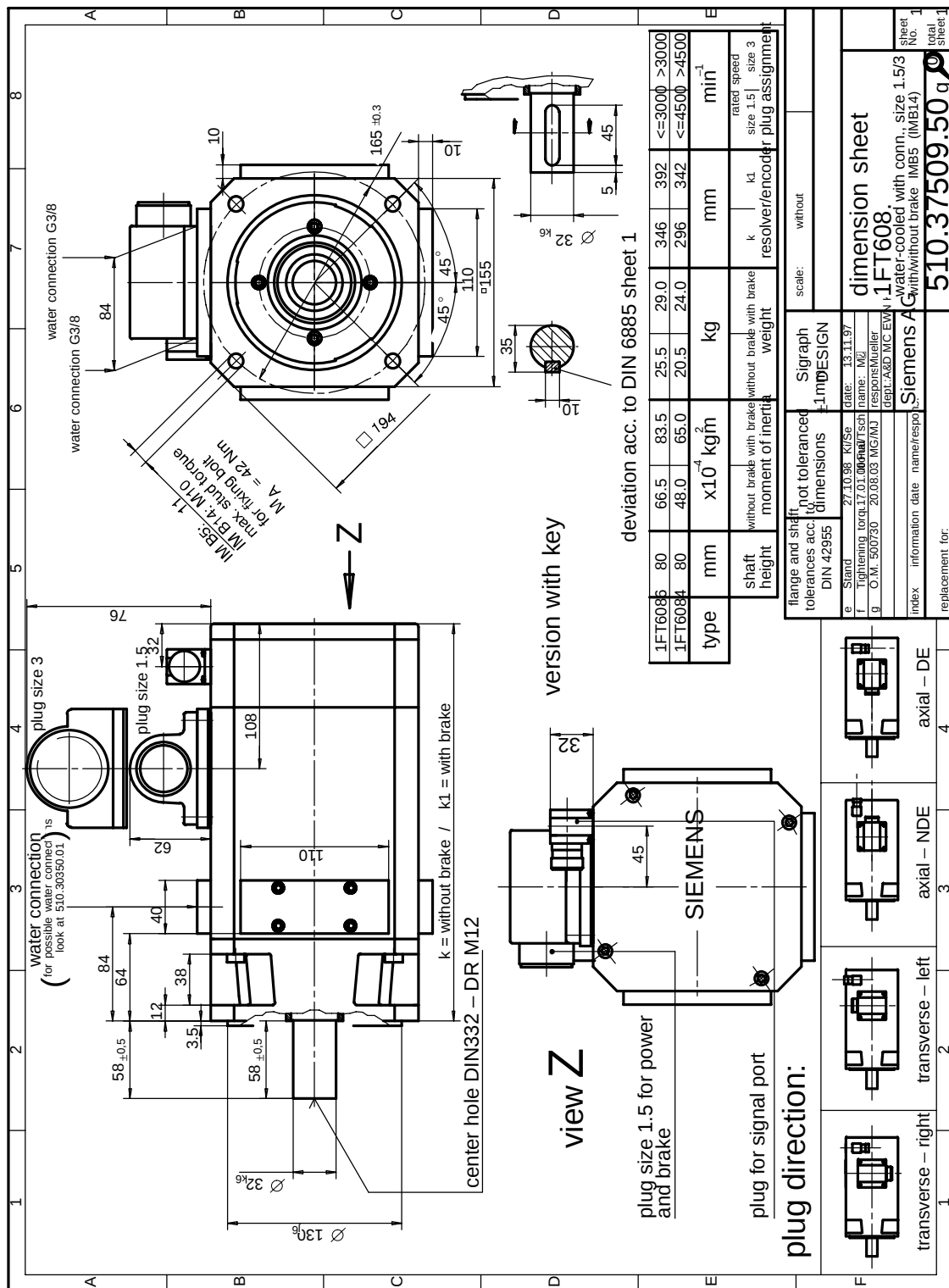
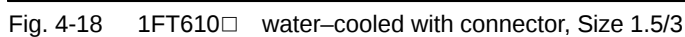


Fig. 4-17 1FT608□ water-cooled with connector, Size 1.5/3



4.3 Water-cooled 1FT6 motors

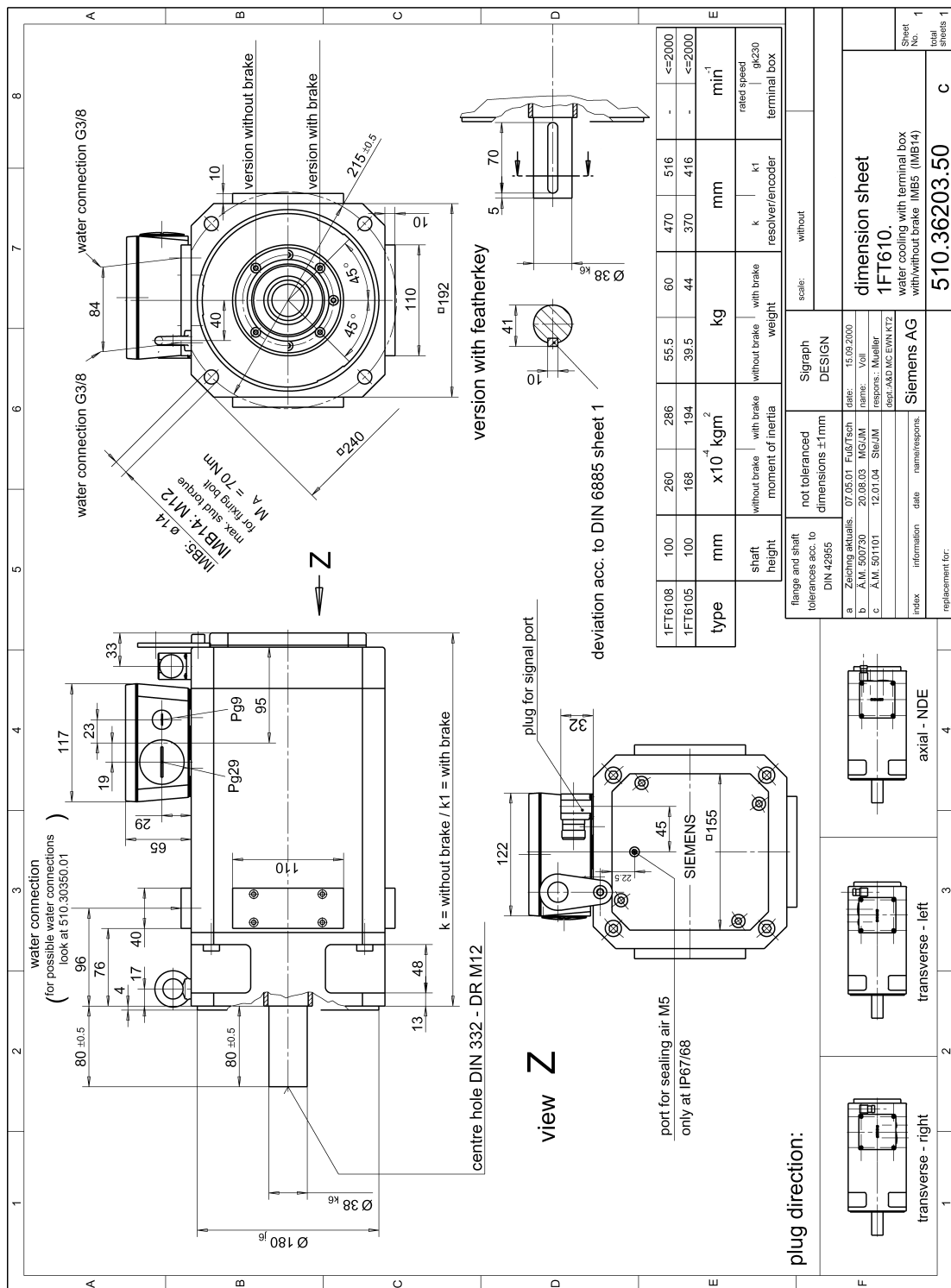


Fig. 4-19 1FT610□ water cooling with terminal box, rated speed ≤ 2000 RPM



4.3 Water-cooled 1FT6 motors

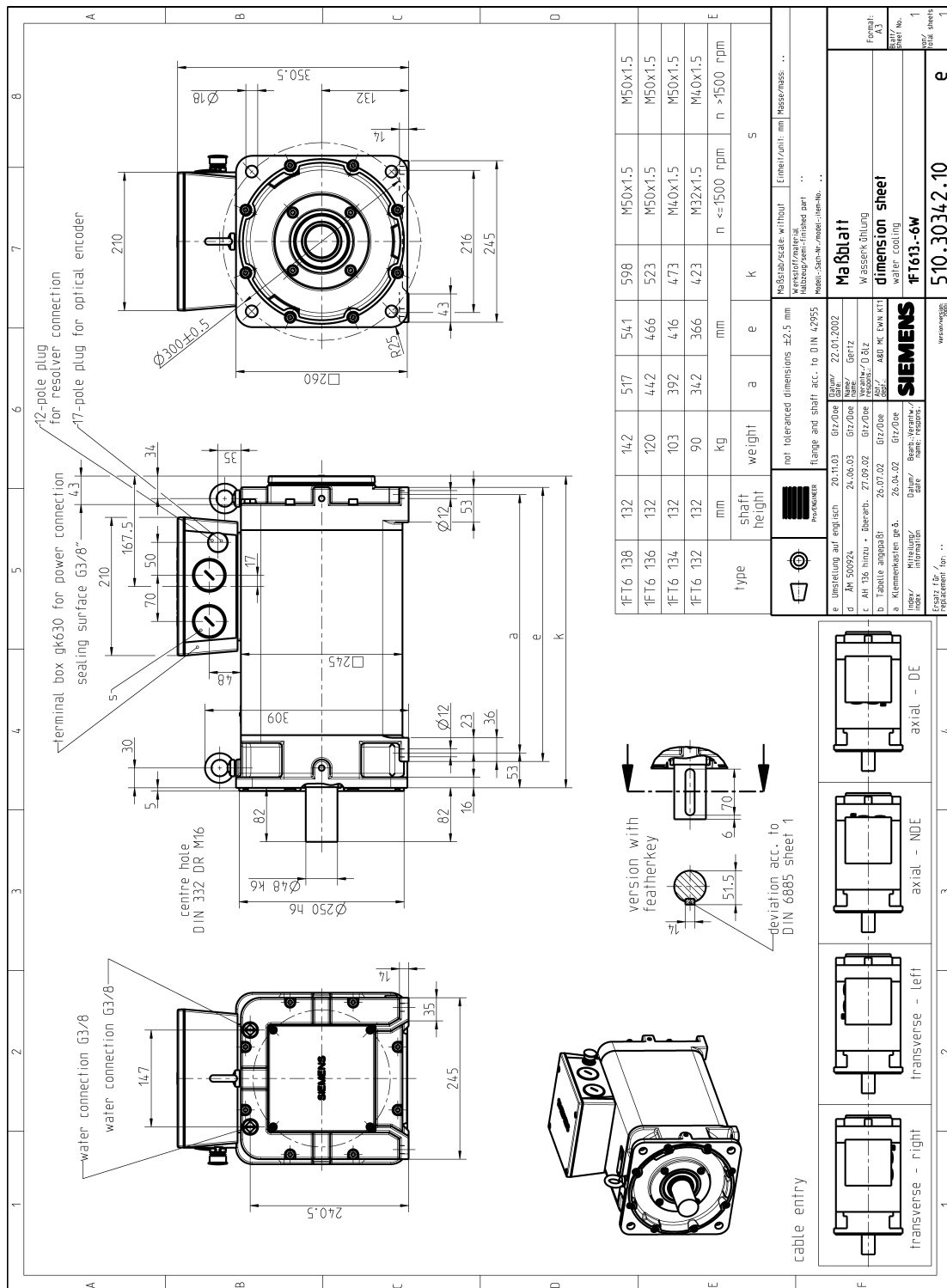


Fig. 4-21 1FT613□ water cooling with terminal box

4.3 Water-cooled 1FT6 motors

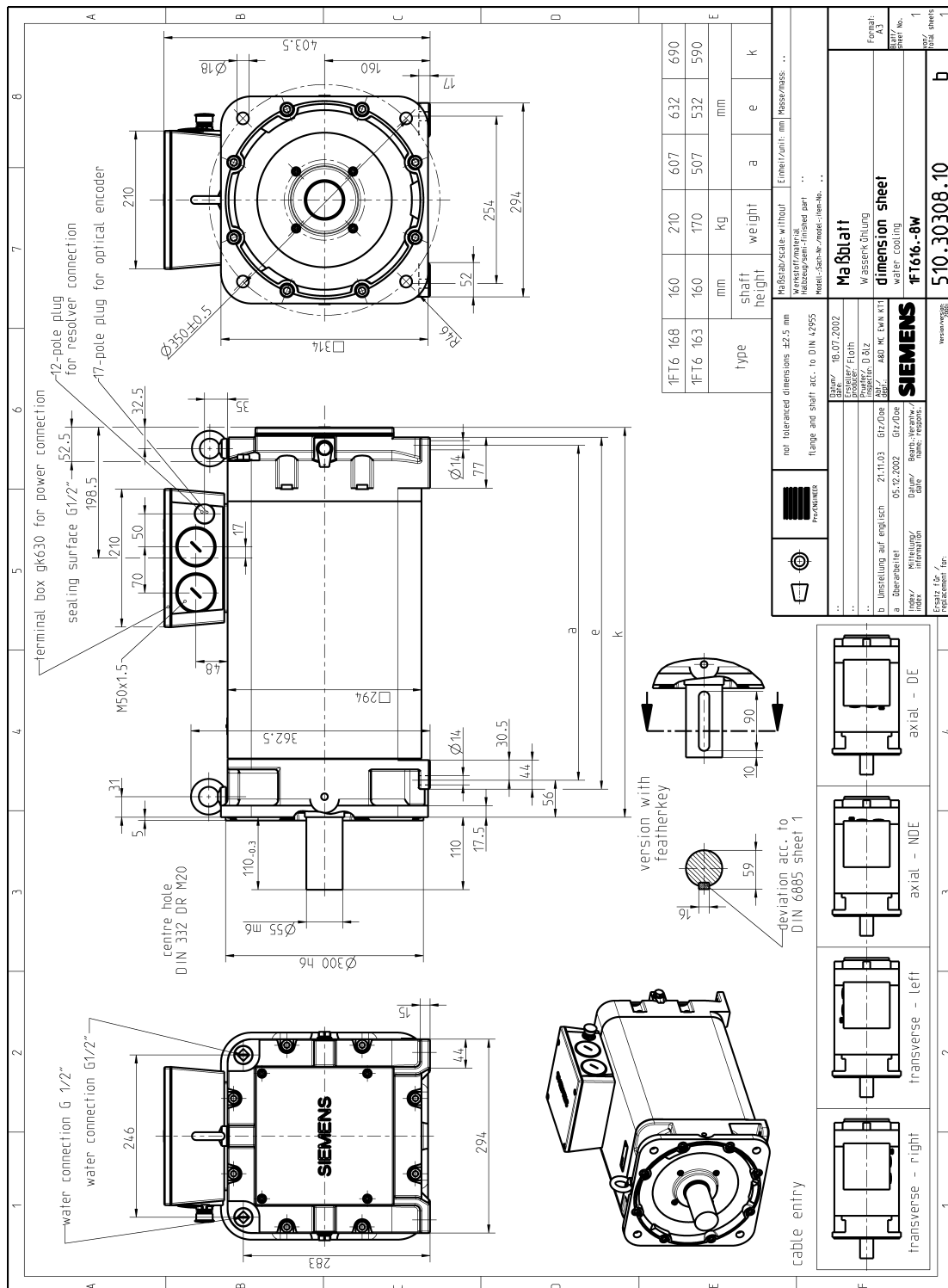


Fig. 4-22 1FT616□ water cooling with terminal box

Option (water connection)

1FT606.

Q20 (right side)

Q21 (left side)

Q22 (opposite side)

1FT608./610.

Q20 (right side)

Q21 (left side)

Q22 (opposite side)

Motor-connector direction AS and water connection from above impossible at 1FT6062.
 --> Water connection in this case automatically like Q22

↑ = Water connection

Sigraph DESIGN		Scale without	
-	new "Q" options at 1FT6	date:	25.01.2002
a	Optionen erweitert	author:	MC/MAJ
		revision:	10.10.02
		response:	Mailier
		approved:	AS&S MC EVNN K-T
Index:	Mitteilung	Datum	Bearb./Gegb.
			Siemens AG

Fig. 4-23 Cooling water connections for shaft height 60 to 100

Cooling water connections for shaft heights 132 and 160, refer to motor dimension drawing.

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/BU/ Catalog NC 60

Automation Systems for Machine Tools

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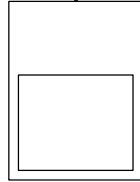
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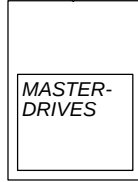
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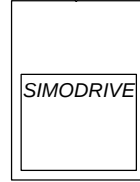


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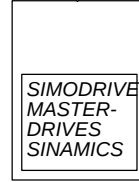
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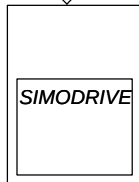


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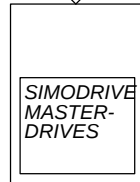
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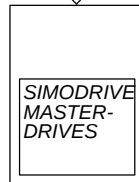
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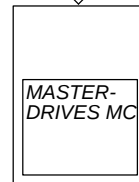
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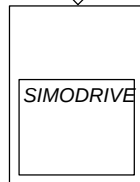


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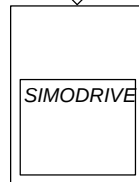
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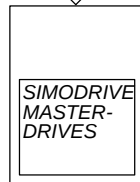
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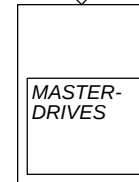
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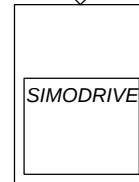
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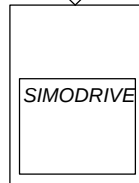


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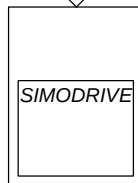


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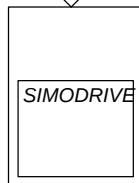
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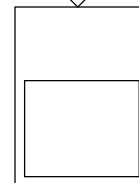
Planning Guide
Linear Motors
1FN1, 1FN3



Planning Guide
ECO Motor Spindle
2SP1



Planning Guide
Synchronous
Built-in Motors 1FE1



Planning/
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SIMAG H2

Siemens AG

Automatisierungs- und Antriebstechnik

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